

**Karnataka Ecotourism Development Board
&
Karnataka Forest Research Division**



THE ENVIRONMENTAL IMPACTS OF TOURISM IN PROTECTED AREAS IN KARNATAKA

Case studies from

Bandipur, Bhadra & Dandeli-Anshi Tiger Reserves

Final project report

submitted to

Karnataka Ecotourism Board



Karnataka Forest Department

by

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".....environmentally responsible tourism that involves travel and visitation to relatively undisturbed natural areas with the object of enjoying, admiring, and studying the nature (the scenery, wild plants and animals), as well as any cultural aspect (both past and present) found in these areas, through a process which promotes conservation, has a low impact on the environment and on culture and favors the active and socioeconomically beneficial involvement of local communities".

Héctor Ceballos-Lascuráin (Mexican Architect) (1983)

The Eco tourism scenario in India has been going through ups and downs. Even the Supreme Court of India had pitched in to bring in change. In such a scenario the NTCA (National Tiger Conservation Authority)¹ throws positive light to Eco Tourism and its functioning in India. The guidelines provided for in the NTCA will help the Tourism Industry and the stakeholders within the Government establishment to promote quality Eco tourism and thereby push for sustainability on the long run. The NTCA guidelines are broad in nature; it is the responsibility of the states and the local stakeholders to implement through a policy framework equitable Eco Tourism solutions for all the stakeholders. Hence, for this reason an understanding of the existing policies in the respective states is essential, so this study has been undertaken which will throw open the positive and the negative impacts of existing tourism practices in ecological sensitive areas i.e., the protected areas and in particular 3 Tiger Reserves- Bandipur (BTR), Dandeli (DATR) and Bhadra (BhTR). The study brings in the facet of site specific guidelines to ensure maximum benefits. In fact, the NTCA has asked the State governments to develop State-level legislation to favour a community driven, low-impact ecotourism in place of wildlife tourism to maintain the integrity and connectivity of Tiger reserves. In its 'Guidelines for tourism in and around tiger reserves,' the NTCA has categorically told the States that no new tourist infrastructure should be set up within the core/critical tiger habitat of the reserves in compliance with the Wildlife (Protection) Act, 1972 and Supreme Court directives. It insists on the formation of a Local Advisory Committee (LAC) for each tiger reserve to review the tourism strategy, ensure site-specific norms on constructions, advise local and State governments and regularly monitor all tourist facilities as well as operators to ensure wildlife was not disturbed while taking visitors into the reserves.

The NTCA¹, in order to mitigate the man-tiger conflicts has provided a plausible solution of tourism as a welfare measure/activity to avoid the man-tiger conflicts in the reserve areas. However, the guidelines specifically states that, since tourism has been happening in the areas of National Parks and wildlife sanctuaries, which are now designated as core or critical tiger habitat, as in the case of the present study sites. (Regulated Low Impact tourism [visitation] would be allowed in such areas, subject to site specific carrying capacity). However, no new tourism infrastructure should be permitted in such core and critical tiger habitats. The opportunities for stakeholders, would include management of low cost accommodation for tourists, providing guide services, providing sale outlets, managing excursions, organizing ethnic dances and the like.

The NTCA¹ guideline mentions of the fact that states should be provided assistance for fostering ecotourism to benefit local people; who otherwise would be juxtaposing their lives with the local ecosystem.

Tourism infrastructure shall conform to environment friendly, low impact aesthetic architecture, including solar energy, waste recycling rainwater harvesting, natural cross ventilation, proper

¹ National Tiger Conservation Authority (NTCA) notification, dated: 15th October 2012, Comprehensive guidelines for tiger conservation and tourism as provided under section 38o (1) (c) of the Wild Life (Protection) Act, 1972.

sewage disposal and merging with the surrounding habitat. Violations of these norms will be appropriately dealt with the Local Advisory Committee (LAC). Any violation of the guidelines will be referred to the appropriate authorities under intimation to the NTCA, for taking action in accordance to the relevant provisions of the law. Environmental clearances, have to be adhered to along with the noise pollution norms, solid waste disposal management, air pollution and water usage.

The NTCA¹ has also recommended the phasing out of permanent tourist facilities located inside core/critical tiger habitats which were being used for wildlife tourism within a time frame to be decided by the LAC. Strict plans ensuring low impact adherence by these facilities have to be developed and approved by the LAC to be strictly implemented. It goes on to mention that there should be no privately run facilities such as catering inside the core/critical tiger habitat where night stay is permitted and any existing facility has to be run by the Tiger Conservation Foundations, the NTCA has said. Besides, all States have been asked to notify the State-level ecotourism strategy within a year from the date of notification of the guidelines by the NTCA/Union Ministry of Environment and Forests (MoEF). NTCA has gone to the extent to say that there should be adequate provisions must be made to ensure that ecotourism was not being relegated to purely high-end tourism that excluded local communities. Thereby the emphasis is on Community based eco tourism, which will surely augur well with the tourism system. NTCA has also recommended that the State governments should develop a system to ensure that the gate collections from the tiger reserves were utilised by the management for specific conservation purposes and not to go as revenue to the State exchequer. Such a step would ensure that resources generated from tourism were earmarked for conservation, local livelihood development, tackling man-animal conflict and welfare measures for field staff of the reserve. Besides, the State governments should charge a conservation fee from the tourism industry for eco-development and local community uplift. The Chief Wildlife Warden has to ensure that each tiger reserve prepares a tourism plan as part of the tiger conservation plan vis-à-vis the NTCA's technical guidelines. The plan should include identification of corridor connectivity and important wildlife habitats and mechanisms to secure them. The guideline has also recommended the identification and monitoring of ecologically sensitive areas surrounding the tiger reserves to ensure the ecological integrity or corridor/buffer areas which will prevent encroachment.

It is undeniable that ecotourism has enormous potentials for the environment conservation of environment. However, it must also be borne in mind that the balance between tourism and the environment is a very fragile one. Many developing countries, anxious to reap the full benefits of tourism have, without undertaking a proper analysis of the potential impacts transformed their virgin areas into tourists' centres to cater for the tastes and desires of mass tourism. Such rapid development may lead to a complete transformation of an area, producing irreversible impacts to the natural environment (TIES).

Among the three impacts of Ecotourism namely, the economic, socio-cultural and environmental, the economic impact has undoubtedly played a dominant role in tourism literature and policy making till 1960s. With the focus on the economic benefits obtained by the areas due to the development of tourism, the adverse non-economic, socio-cultural and environmental-impacts are totally ignored. Environmental costs continued to be neglected because of the prevalent belief of the nature being inexhaustible and renewable. This led to an indiscriminate and unplanned growth of tourism infrastructure in many countries and soon the negative effects in the form of social and environmental degradation started emerging. Specialists tours such as photographic safaris and wildlife watching, which can affect animals through noise, visual and scent disturbances, and by

affecting predation and breeding behaviour. Similarly, wildflower tours can affect plant biodiversity if participants collect plants or fruit, introduce weeds or pathogens, or start fires².

In some destinations, ecotourism can produce a local economic boom leading to uncontrolled high-impact private development, high resource consumption, waste generation beyond the capacity of local waste treatment disposal systems, if any, and land clearance and harvesting with major impacts on biodiversity. In addition, infrastructure built for tourism may be used for illegal collection of endangered plant and animal species. Small-scale operations may eventually turn into much larger and more destructive operations³.

The study of the Environment Impacts of ecotourism is currently in a growing stage and more research is expected to appear. The first effort towards Environmental Impacts Assessment was directed basically to Impacts of Leisure activities and especially outdoor recreation. The first studies concerning the environmental impacts of tourism appeared after the mid seventies^{4,5}. followed by more research activity in the 1980s.

The biological and ecological impacts of tourism have been studied in the case of specific environments - Islands, Coastal Zones, Alpine areas, National Parks etc⁶. Another that was developed was the impact structure matrix combining environmental elements and the range of possible impacts of these elements from the development of tourism to a certain level (carrying capacity levels)⁷. To fill out the structure matrix a set of different tools are used (Social surveys, behavioral inquiries, multiple measurement techniques, ecological indicators etc.).

The study of the environmental impacts of tourism thus started basically after 1970s. The analysis of the environmental impacts of tourism has been predominantly qualitative and mostly descriptive. The type and intensity of the environmental impacts of tourism depends on the interaction between the type of tourism development, the socio-economic and other characteristics of tourists and the natural, socio-economic and institutional characteristics of the host area. The environment is being increasingly recognized as a key factor in tourism. In the last decade of the twentieth century, it was noted that tourism depends ultimately upon the environment, as it is a major tourism attraction itself, or is the content in which tourism activity takes place⁸.

The relationship between tourism and the environment is taking place on various levels. In addition to direct tourism impacts on the environment through e.g., pollution, noise and disturbance, indirect, irreversible and long term consequences between tourism and environmental quality is characterized by dynamic feedback mechanisms⁹.

It has been suggested that controlling the volume of tourism might alleviate the situation¹⁰. Especially since the tourism is typically found in locations with fragile environments, such as

² Buckley, Ralph (2002), *Environmental Impacts of Ecotourism*, CAB International Publishing.

³ Hunter, C and Green, H (1995), *Tourism and the Environment, A sustainable Relationship*, Routledge, London

⁴ Tangi, M (1977), *Tourism and the Environment*, Ambio, Volume 6

⁵ Baud Bovy, M and Lawrence, F (1977), *Tourism and Recreational Development*, The Architectural Press, London

⁶ Lindsay, J, (1986), *Carrying capacity for tourism development in the National Parks of United States*, UNEP Industry and Environment, Jan/Feb/Mar 8(1)

⁷ Nijkamp, P (1980) *Environmental Policy Analysis*, John Wiley and Sons, New York

⁸ Holden, A (2000), *Future of Tourism's relationship with Environment*, *Environment and Tourism*, Routledge, London

⁹ OECD (1980), *The Impacts of Environment on Tourism*, Paris

¹⁰ Wheeler, B (1994), *Ecotourism: A reuse by any other name*. In Cooper, C, and Lockwood, A (edited), *Progress in Tourism Recreation and Hospitality Management*, Volume 6, Wiley, Chichester.

mountains and coasts which are peripheral to the world economy. Ecotourism not only depends on mass tourism enterprises and infrastructure (air, travel, other forms of transports, tour operators, hotels, etc.), but also involves the danger to eventually promote mass tourism itself. Unfortunately, the experience of alternative tourism in general shows that adventurous travellers have just served to open up destinations “of the beaten track ” to large-scale tourism projects, accelerating the pace of social and environmental degradation of these areas. As a result of increasing globalization and liberalization, the competition within the international tourism industry and among tourist-receiving countries has become so fierce that there is hardly any margin left for social and ecological concerns. Many studies throughout the world have now documented the ecological impact of indigenous population on the environment¹¹.

In order to analyze the impacts of Tourism on the Environment as a necessary prerequisite for tourism planning and policy decisions, following major issues need to be addressed:

1. Identification and analyses of various impacts of Tourism on environment in the target area.
2. Assessment of the contribution of tourism in the observed or expected environmental modification in the destination area.
3. Estimation of the demand for resources and the amounts of residuals disposed to the regional environment.
4. Analyses of the environmental impacts of tourism on the local communities.

¹¹ Bhattacharya, AK, Banerjee, S and Saksena, V, (2003), *Local initiatives to localize Ecotourism*, An Exploratory study in Kerwa Van Vihar National Park Catchments, Journal Tourism Recreation Research. Volume 28 (1)

Ecotourism Impact Study



Environmental Impacts of Ecotourism in Bandipur Tiger Reserve (BTR)

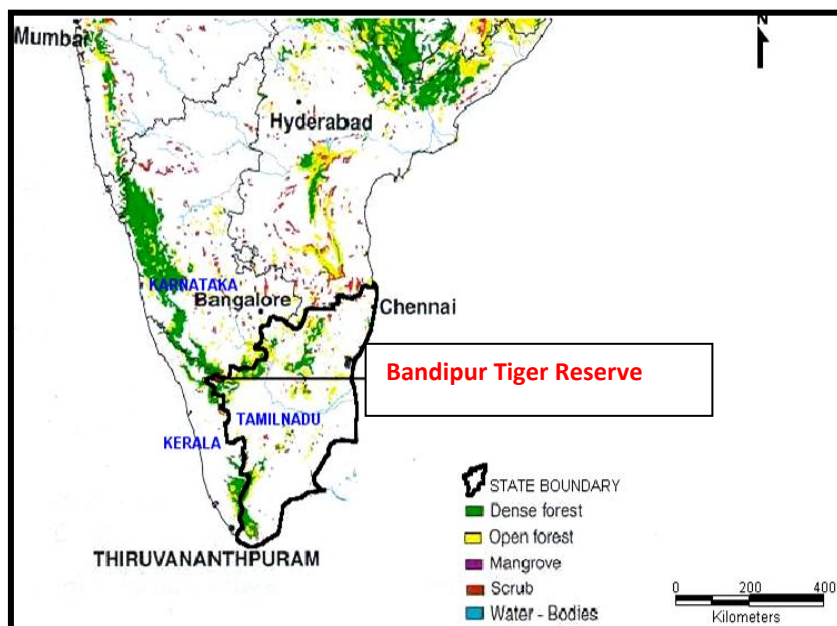
Freedra Maria Swarna¹ and Manojkumar²



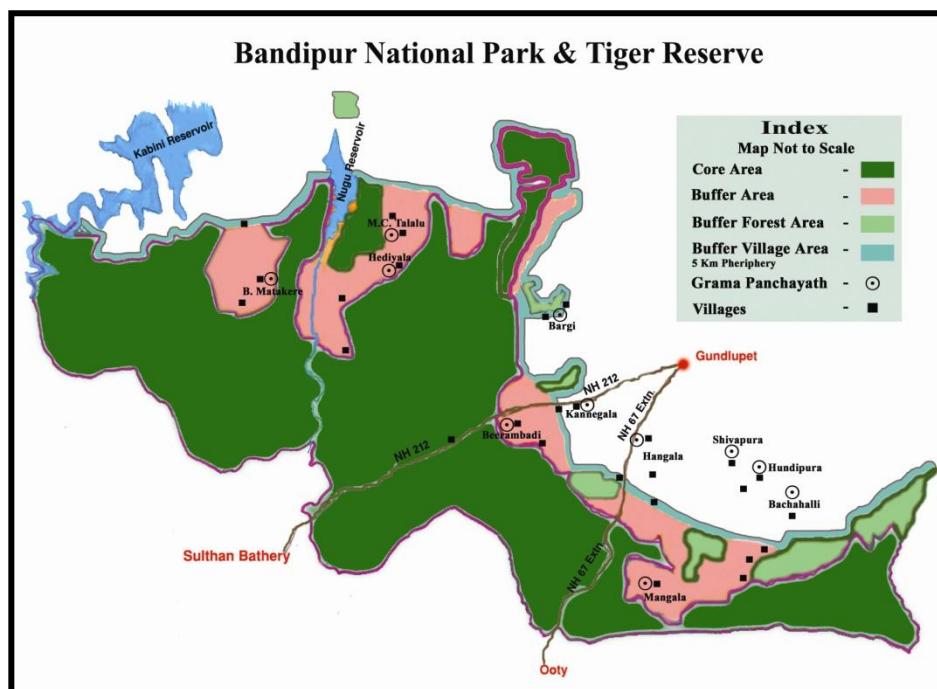
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Introduction

The Bandipur National Park and Tiger Reserve is situated in the contiguous landscape spread in two revenue districts of southern Karnataka namely Mysore and Chamarajanagar. Geographically, it is an “ecological confluence” as the western and Eastern Ghats meet and constitute



this area as distinctive and extraordinary from the point of its fauna and flora. The notified forests included in the park and the adjoining notified and non-notified forests including the community land areas of all the border villages have become an integral part of the tiger reserve. The areas of the reserve are from the part of Nanjungud and H.D. Kote taluks of Mysore and Gundlupet taluk of Chamarajanagar revenue districts.

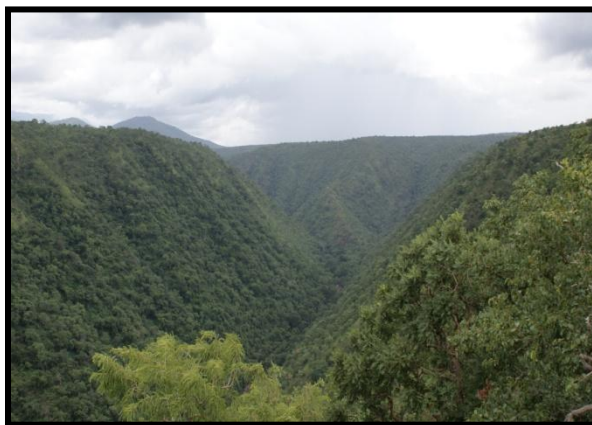


Area details	
1. Core Area (11 Reserved forests)	872.24 Sq. Km
2. Buffer Forest Area (15 Reserved forests)	118.27 Sq. Km
3. Buffer non-forest Area (32 villages of 13 GPs)	291.88 Sq. Km
TOTAL	1282.39 Sq. Km

Bandipur is 80.00 Km from Mysore and about the same distance from Ooty and located on the Mysore-Ooty main road. The nearest Airport is Bangalore, 230.00 Km from Bandipur. There are more than 15 private tourist lodges located around the park within the radius of 5-10 Km distance including the Government owned Jungle lodges and resorts Ltd., and Karnataka Forest Department campus to accommodate visitors with a common kitchen for catering arrangement at the entrance of the park. The nearest townships are Gundlupet in Karnataka, Masingudi and Gudalur in Tamil Nadu and Sulthan Bathery in Kerala where there is availability of Fuel, Hotel, Medical, Bank and other Civic facilities including taxi services.

One of the most of the landscape is meters with near occasionally

The Moyar river lofty bluish Nilgiri into the gorge Mudumalai in a



remarkable features the Moyar gorge, 260 vertical sides which overhang the gorge. and gorge faces the Mountains plunges below Theppakadu of roaring water-fall

popularly known as Moyar Falls. Bandipur remains one of the most popular and largely visited reserves in the country, where more than 2.00 lakh visitors including floating day tourists, visits annually.

Rolling Rocks is another picturesque spot on the banks of the Kekkanahalla Stream (which joins the Moyar River), where the rocks roll down the turbulent stream during rainy season.

Bolgudda, a hillock near Bandipur is a fine elevated place for viewing wildlife and the valleys round about. Chamanalla hillock located in Mulehole range and Kullana betta located opposite to Bolagudda offers similar panoramic view to the visitors.¹²

¹² The entire Introduction chapter was compiled with information from the Management Plan of Bandipur and also from the information collected from The Karnataka Forest dept office in Bandipur.

STATEMENT OF SIGNIFICANCE¹³

GLOBAL

1. This area being the National Park and Tiger Reserve falls in PA network of IUCN category II designated for the conservation
2. As per UNESCOs mandates it is most important and great significant component area of Nilgiri Biosphere Reserve (NBR) under Man and Biosphere (MAB) programme designated for sustainable development of the entire landscape in totality
3. Being one of the high density Tiger landscape recognized by the Global tiger protocol for conservation of tiger in their landscape
4. It is an important area of cultural diversity linked to conserve the Biodiversity as per UNESCO guide lines of 2001 to link cultural diversity to conserve the Biodiversity

NATIONAL

5. This being most important landscape of high density elephant area became the part Mysore Elephant Reserve (MER), which is the largest conservation area for Asiatic elephants in the Asian continent
6. It is the confluence of Western and Eastern ghats having rich Biodiversity in its fauna and flora and thus became one of the mega Biodiversity area of the nation
7. It is one of the richest wildlife area in the nation and noted for the intact assemblage of seven large ungulate species Chital, Sambar, Chousingha, Gaur, Muntjac, Wildpig and Elephant
8. This area is part of one of the Biological hotspot (Western ghats) of the nation known for its geo-physical and geo-morphological reasons

REGIONAL

9. It is an important segment of regional tourism hub famous for ecotourism particularly known for wilderness tourism in south India
10. It is a tri-junction point blended with rich ecological, cultural and historical values as the three states , Karnataka, Kerala and Tamilnadu meets here

LOCAL

11. This area has rich cultural value as large number of different sects of local tribes live around this reserve have their cultural diversity linked to the local biodiversity and for its conservation
12. It is an important In-situ conservation of all taxa of flora and fauna in their eco-system to maintain genetic purity in population

¹³Source: Management Plan of Bandipur

WATER SOURCES¹⁴

Bandipur is located in Wayanad plateau, which is characterized by the presence of several swamps and vayals varying in size. These vayals and swamps become wallowing grounds for herbivores like Sambar, Wild boar and Tiger too. The central part of the Tiger Reserve is slightly elevated with intermittent hills with moderate height and has got several seasonal streams and there are also few perennial water sources in the reserve.

The Moyar River, originating from Nilgiri Mountain near Pykara and meanders through the reserve for a distance of more than 20 Km. Moyar River is the major water source for wildlife and people living in and around the reserve. On the western part of the reserve bordering Wayanad of Kerala, a river by name Noolpuza enters into Karnataka changing its name to Nugu hole and passing through the reserve to a length of more than 30 Km joining Nugu dam which is also the life line of the reserve. There are several seasonal streams and rivulets running through the reserve Mavinhalla, Shikkatihalla, Bidharhalla, Hebhall, Kekkanhalla, Vaddattihole, Varanchihole and Mukkattihole. Water in these seasonal streams flow only during rainy season but water is available for wildlife in puddles throughout the year.

CLIMATE

The climate of the Bandipur is moderate. There is a rainfall gradient from east to west with spatio-temporal in pattern. The eastern part of the reserve falls on the leeward side of the Western Ghats, hence this part receives low rainfall. The western part of the reserve falls on the windward side of the Western Ghats and hence it receives high rainfall. Bandipur experiences cold weather during the month of December - January and the hot weather is experienced during the months of March - April.

RAINFALL PATTERN AND DISTRIBUTION

The eastern side of the reserve lies on the leeward side of the Nilgiri hills and hence it receives a poor rainfall (790mm) and there is a gradual increase in rainfall towards the western part of the reserve. The Northwestern most part reserve receives nearly more than 1800 mm of rainfall. The rainfall gradient also has got an influence on the vegetation type present in the reserve. The eastern part of the reserve receives rainfall during southwest and northeast monsoons. Two peaks of rainfall can be seen in the eastern part of the

¹⁴ Source: Management Plan of Bandipur

reserve one during the month of June (100-150 mm) and the second peak during the September-October (200 mm).

Average Rainfall in Bandipur Tiger Reserve from 2006 to 2012 ¹													
Year s	Month-wise rainfall ¹⁵												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2006	-	-	42.41	60.1	141.08	103.36	54.03	48.21	130.98	92.23	72.87	-	745.27
2007	-	-	-	47.06	87.46	95.47	93.83	172.63	115.12	214.33	57.13	69.25	952.28
2008	-	25.07	100.33	63.20	96.83	66.35	84.47	136.18	38.70	266.05	23.58	0.95	901.70
2009	-	-	21.10	43.71	127.78	29.98	82.73	86.51	106.46	47.38	114.83	30.61	691.09
2010	3.86	5.92	11.43	120.88	137.61	70.21	88.82	99.10	90.48	95.85	196.72	12.50	933.38
2011	0.37	22.03	30.23	137.53	76.66	109.82	68.05	81.47	38.91	161.46	101.22	2.18	829.93
2012	2.15	-	0.52	131.53	52.70	13.61	27.40	66.93	-	-	-	-	294.84

Tourism zone covers **82 Sq. km.**, the main portion of it being the old *sanctum* of Bandipur, which has been well organised not only to provide board and lodge for the visitors, but also to enable them to see wildlife of the reserve by all possible means. Bandipur is one of the best developed National Parks in India, and unlike most Parks has a very long 'Season' practically right round the year; it caters to every class of visitors, from jaded city-dwellers seeking forest recreation and a change to an authentically wild environment, the serious students of the plant and animal life of Karnataka, and wildlife photographers of all descriptions. Here, over the years, a regular grid of motorable roads have been laid carefully so as not to take away from the giddily of the open forests, these roads pass close to a number of pools to which Elephants and other animals come and there is ample natural

¹⁵ Source: Management Plan of Bandipur

forest in between the roads so that motoring along them one has excellent opportunities for seeing the animals and the trees and ground flora. Riding Elephants are also available and there are some watch towers overlooking pools. Because of its open forests, rich ground vegetation, easily traversed terrain and many pools and tanks there are interesting animals and plants to be seen at Bandipur all the year round. Except during the heaviest rains, when an outing may not be possible, a visit to Bandipur should prove rewarding to those who go over, not with the fixed, pre-conceived idea of getting a close view of wild Elephants(though this, too is usually possible) but with a broader and more enterprising interest in the varied attractions of the sanctuary.

The villages with agricultural fields in the peripheral area have been targeted for the purposes of the Eco-development activities. There are 210 Villages which are located 0-05 kms distance from the park boundary have been identified for the purpose.

TEMPLE FESTIVAL IN TOURISM AREA¹⁶

The devotees gathering for festivals dead wood for cooking and also for annual fire (Konda) in which the devotees walk on the fire (not with flame) in Byaladakuppe and Marigudi and waste a lot of green firewood. Most of the villages have temples and for annual festivals, the



villagers bring bamboo for chariot and green firewood for fire (Konda). These religious practices also act as dependency pressures and contribute of the degradation of the PA, disturbance to the wild animals and some time cause forest fires and smuggling of timber.

¹⁶ Source: Management Plan of Bandipur

Data Analysis, Findings, Results and Recommendations

1.Membership and related aspects

	MEMBER NATIONAL BODY	MEMBER INTERNATIONAL BODY	GUIDELINES NATIONAL	GUIDELINES INTERNATIONAL	ENVIRONMENTAL POLICY FOR THE FACILITY
YES	5	5	4	3	4
NO	4	4	5	6	5



Running resorts catering to the needs and requirements of International and Domestic tourists and that too under the nuance of Eco Tourism and off Sustainable Development clearly brings in the aspect of the resort management seeking membership of National (vis-à-vis, India) and International bodies. This would and will clearly help in getting to the best of adherence of norms as per the prescribed mechanisms and frameworks.

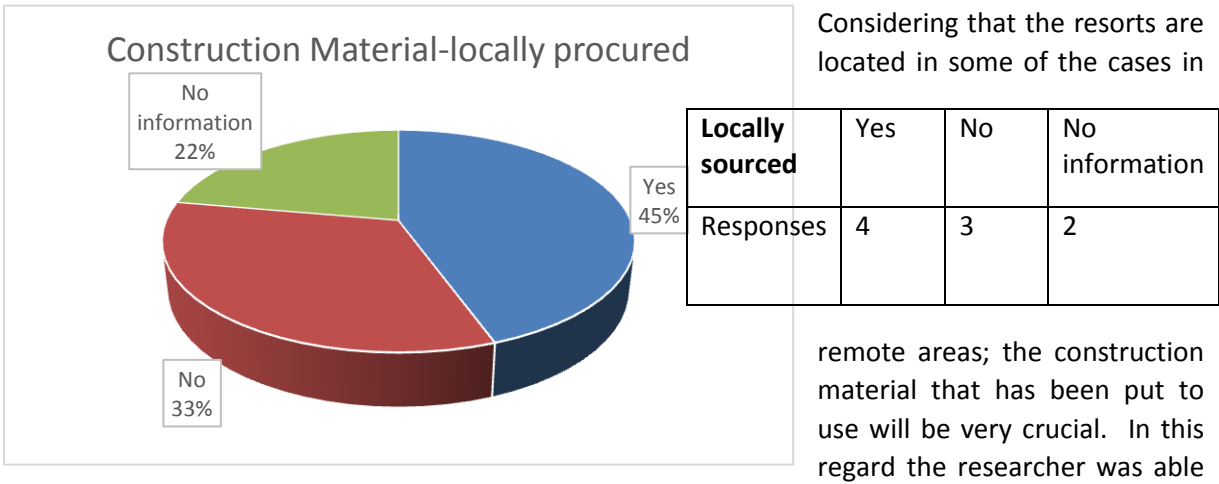
From the data collated, it is clear that, one should make efforts to be members of National and International bodies as it would help bring in relevant frameworks. One aspect that needs to be assuaged is that being a member is a voluntary facet; thence, in the schemata of things, it should be made mandatory for a resort to be members of National or International bodies that will help usher in quality and sustenance to the products and service offering, besides, ensuring reach to the prospective tourists at the global level. Adherence to the guidelines and norms, becomes critical and thence, it should be made mandatory for the resorts to follow on the guidelines fixed by the Organizations such that a quality conscious level and a similarity in experience can be maintained.

There also needs to be an Environmental policy for the facilities, in a manner wherein a broad framework is provide which will help build the necessary checks and off course balances, which will ensure sustainability and long term survival of the project.

The advantage of becoming a member or subscribing for a membership of an association would be the fact that parameters pertaining to the effective management of the area will come in handy; as can be seen in the practices mentioned in the National Tiger Conservation Authority (NTCA) guidelines, which states, “...to adopt low-impact wildlife tourism which protects ecological integrity of forest and wildlife areas, secure wildlife values of the destination and its surrounding areas.” This clearly means, formalizing of the administrative measure and adopting to ensure protection of the area. Thence, from the data collated and assessed, it is pertinent that the Government machinery, implement uniform guidelines which will help in promoting quality and sustainable tourism.

2. Construction Material

To blatantly put it in a marketing jargon, the unique selling proposition (USP) of a resort is the way it has been built, or the materials that have been used for construction of the infrastructure that is to be made available or has been made available to the tourists and off course the managers and other members of the team that will manage the resort.



to collate from the nine resorts the following information.

For obvious reasons, the basis material viz., brick, sand, wood that are essential in any construction activity have been sourced locally; though two of the respondents have categorically mentioned that they have no information of the same. This brings in the aspect of archiving of information about the resort for posterity, which will help in bringing about the growth and development and also provide a historical value to the resort/property. A systematic collation of information which will help the resort to appreciate its history and the value chain.

This apart, if there is a built in framework which will help in retaining the information, it will go down well and help the resort to grow qualitatively. This is sure to become a best practice that can be emulated in similar or identical scenario.



Considering that there are many Eco friendly products that are available in the market; then is advisable to study the same and bring about a transition to the resorts in the far flung areas; which are promoting sustainable tourism development. A case in point is of *Vivekananda Girijana Kalyana Kendra*¹⁷ (VGKK)¹⁸ who have brought about sustainability in the finer aspects of Ethnology and tribal development in various areas they operate in. Considering that there

has been a huge amount of resource depletion¹⁹, pollution, interference with the Environment, disturbance with the eco-system, breaking of the food chain, alterations in the behavior of the fauna and flora. Eco-friendly construction can not only help to create a better outdoor environment, it can also help to build a healthier indoor environment. Conventional building materials and methods have been linked to a wide range of health problems. Chemical pollutants from paints, solvents, plastics and composite timbers, along with biological pollutants such as dust mites and molds are known to cause symptoms such as asthma, headaches, depression, eczema, palpitations and chronic fatigue syndrome. Green buildings eliminate these problems through good ventilation design, breathable walls, and the use of natural, non-toxic products, viz., Lime Mortar²⁰, Lime wash²¹, Sheep's wool²², flax and hemp²³ cellulose²⁴ wood fibre²⁵



¹⁷ <http://www.vgkk.org/mysore.php> accessed on 1st April 2013

¹⁸ VGKK Mysore works closely in collaboration with Council for Advancement of Peoples Action and Rural Technology (CAPART) (Under the aegis of Ministry of Rural Development, Govt. of India) to share the expertise in various rural technologies imbibed over the decades. Supplementary Technologies are supported in the areas of Rain Water Harvesting and Low Cost Housing. VGKK works in collaboration with various other organizations.

¹⁹ <http://www.sustainablebuild.co.uk/ecofriendlyconstructionmethodsmaterials.html> accessed on 1st April from the article, *Eco Friendly Construction Methods and Materials*, Jennifer Gray, 3rd January 2013

²⁰ This is lime putty mixed with sand. This can be used to bed in masonry, and is also used in pointing or rendering brickwork, and for general plastering use.

²¹ This is lime putty diluted in water. This is used to paint internal and external walls. A pigment can be added to create a colour wash.

²² This material usually needs to be treated with chemicals to prevent mite infestation and reduce fire risk, although some natural builders use it untreated with success. It has very low embodied energy (unless it is imported) and performs exceptionally well as an insulation material. Thermafleece is the most common commercial brand available.

²³ Natural plant fibres that are available in batts and rolls, and typically contain borates that act as a fungicide, insecticide and fire retardant. Potato starch is added to flax as a binder. Both materials have low embodied energy and are often combined in the same product. Examples include Isonat and Flax 100.

²⁴ A recycled product made from newsprint and other cellulose fibre. It is one of the most favoured materials of natural builders because it can be blown into cavity walls, floors and roofs; used as a loose fill; and is also available in quilts, boards and batts. Like hemp and flax it contains borate as an additive. Products include: Warmcell and Ecocel.

and other materials as required for the project. One should note that, if the norms are fixed by the Administrative machinery the stakeholders are bound to follow and bring in necessary changes that will help in sustaining and adding value to the eco tourist destination.

There is an urgent need to address the great challenges of our times: climate change, resource depletion, pollution, and peak oil. These issues are all accelerating rapidly, and all have strong links with the building industry. Simply put, a sample²⁶ from a resort that has established itself as a center of hospitality is worth savoring.

The NTCA guideline has categorically mentioned to, “promote sustainable use of indigenous materials for tourism activities.” This aspect needs to be highlighted in any intervention that the Government would bring in for resorts run by the Government through Public Sector undertakings and the private sector players. It is clear, that campaigns have to be organized and inputs provided to ensure a proliferation of the NTCA thoughts and guidelines that will augur well for the business of eco-tourism.

Simply put – the resort is a botanical wonderland. Elegantly designed, tastefully decorated with a variety of artifacts, constructed with rosewood and traditional materials, and laminated carefully with trees and flowers, Hoysala Village Resort keeps you astounded. The resort is a matchless escapade if you love history, nature, serenity, modern comfort and scrumptious food.

Hoysala Village is not just a resort, it’s a poetry created with passion. It’s a philosophy to give and gain from nature. It doesn’t offer just a stay but a wholesome experience. A holiday, to rejuvenate, realize, regain and to craft memories which will last a lifetime!

3. Source of Electricity

Electricity, power has been a perennial issue for the resorts. Electricity is required for a multitude of purposes. And if the same is lacking, then one needs to ensure the availability of the same. The data collated has the following for the planner to cherish and understand the requirements further.

Source of power generation	Responses
Diesel Generator	4
Solar	3
Windmill	1
Government Electricity Grid	9

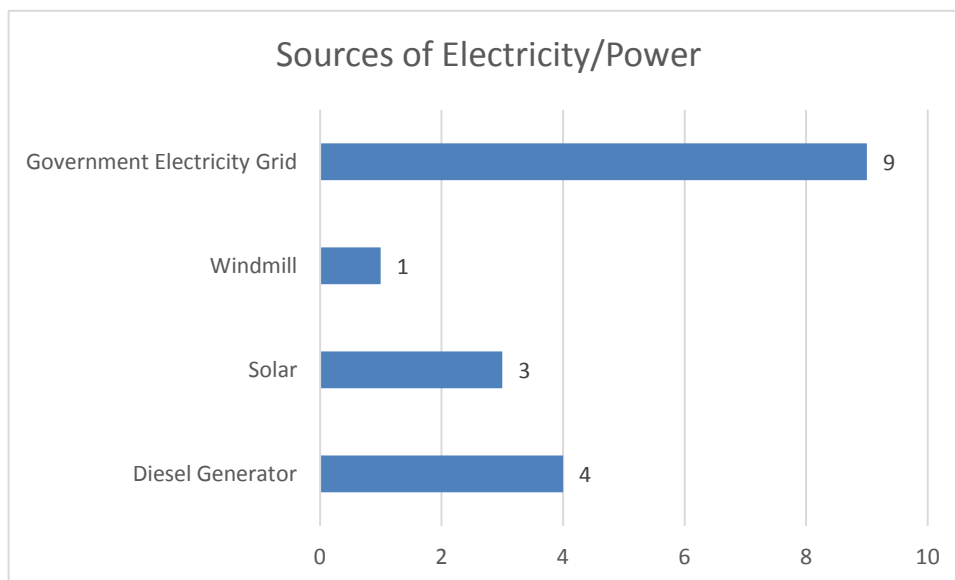
The dependency on the Government Electricity Grid and in-house generators, since there is a perennial shortage of power supply. There is, on an average (recorded) for a period of one

week, a power shut-down for 8 hours. During these times, the resorts depend on in-house generators which run on diesel. There is one resort, which has an in-house windmill to supply power 24 hours, and is not dependent on the electricity board. These heavy duty generators can be disturbing to the local eco-system and also brings in pollution of various kinds. A case in point is of a Kirloskar 100 KV²⁷ generator that is used in one of the resorts, which, has been considered as an eco-friendly product. Considering, the deficiency of power supply from the Electricity Grid, the resort

²⁵ Made from wood chips that have been compressed into boards or batts using water or natural resins as a binder. It has very low embodied energy and uses by-products from the forestry industry. Examples include: Pavatex, Thermowall and Homatherm.

²⁶ <http://hoysalavillageresorts.com/> accessed on 3rd April 2013

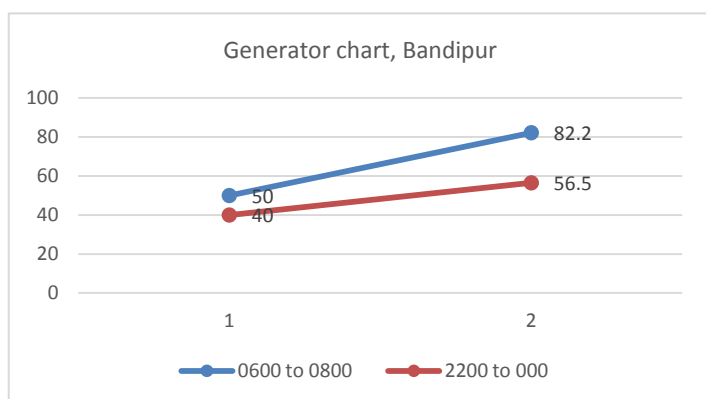
²⁷ http://kirloskarapps.kirloskar.com/category.aspx?category_id=aZ72PXPwpal=&path=Genset_%3E_100_-160_kVA_%3E_Water_cooled accessed on 29th March 2013



uses 70 liters of diesel per day; which adds to the pollution, viz., air and noise. The researcher put into use a noise machine, wherein noise measurements were made with

a type 1 Integrating Sound level meter with free-field microphone supplied by Karnataka State Pollution Control Board (KSPCB)²⁸ which meets the accuracy of noise measurement as per IEC 804 (BS 6698) Grade I or ANSI Type I or equivalent IEC 61672 -1 (2002-05), Class-1.

The objective was to see the impact of using generators on the environment and whether ambient noise level is within the prescribed noise level standard limit. (Day time: 50 dB²⁹, Night time: 40 dB) (*Aspects of Noise pollution dealt in detail in the chapter*). The Quest Technologies, model, 1100 integrating logging sound level meter was placed away from facades, obstacles at 1.5 meter above the ground level; the instrument was isolated from strong vibration and shock. The readings are as follows:



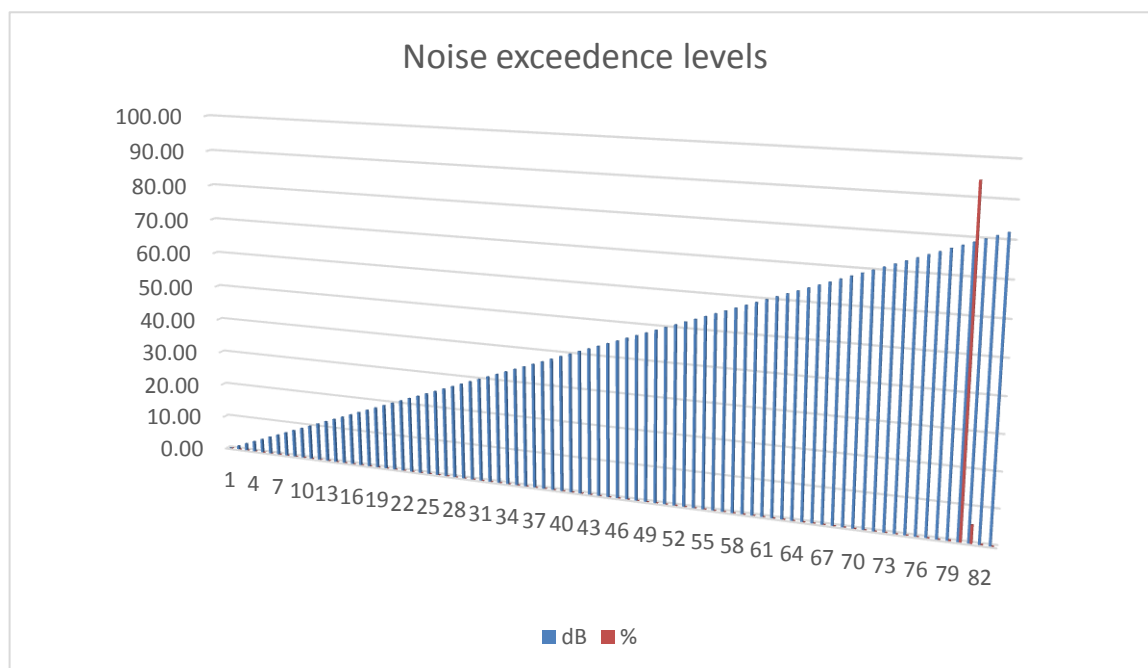
The response was recorded in a slow mode and the recordings showed LMAX³⁰ was 82.2 dB, and LMIN³¹ was 56.5 dB and the total weighted average was 74.1 dB which was recorded between 0600 and 0800 and 2200 to 0000.

²⁸ Karnataka State Pollution Control Board: www.kspcb.kar.nic.in

²⁹ dB (A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

³⁰ LMAX: Maximum

³¹ LMIN: Minimum



According to Noise Pollution Control Rules 2000³² the following is the classification as per the areas/zones:

Area Code	Category of Area/Zone	Limits in dB (A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

The above rules and limits are to be implemented by the State Government. Besides, making the state Government responsible, the Government needs to take measures for abatement of noise and to ensure that the existing noise levels do not exceed the standards specified above. It also imposes responsibility on all development authorities, local bodies and other concerned authorities to take into consideration all aspects of noise pollution as a parameter of quality of life while planning developmental activity or carrying out functions relating to town and country planning. Despite the above parameters are being implemented in an urban set up, one needs to ponder and bring in parameters to help in binding the stakeholders in the forest areas. By adhering to norms and parameters, one can be confident that, the same will be implemented. The norms related to the forest and eco-tourism areas, should be brought about by the Forest authorities on the parameters established. Benchmarks and best practices will help in assuaging the necessary quality of life to the flora, fauna and other stakeholders in a specific jurisdiction.



³² Shanthakumar, S., *Introduction to Environmental Law* (2010), Lexis Nexis Butterworths Wadhwa

The dependency factor on Electricity Grid will lead to resorts making alternative efforts to ensure constant power supply. Hence, the Eco Tourism system and frameworks built in should encourage the harness and usage of Non-conventional Energy (NCE) viz., solar power generation (as feasible), Wind energy, Bio Gas (if relevant at the local level) would be a differentiator. One has to ensure the same and utilize various incentives that should be planned such that, investments are made on areas of NCE. The incentives can be in the form of waiver of taxes (for a reasonable period of time), concessions in Electricity Grid, for augmenting alternative sources of power. This would surely help to establish a carbon foot print that is the need of the hour.

Another case in point is one of the resorts did not want to make use of solar energy on account of the fact that, the units in the resort are wide spread. They found that having separate solar energy equipment for each resort unit would be un-economical and unviable. In such cases, other alternative sources of NCE should be probed in a diligent fashion.

On the contrary, another resort which is widespread; has gone in for solar energy and provided solar bulbs in every unit, which the guests can use in case of a power shutdown. Another effort towards a pollution free environment is not to use the captive power from the generators for accommodation facilities; which adds value to sustainable and eco-tourism. This illustration should be studied deeper, and the same should be used as a best practice by other resorts and commit them to the cause of sustainable tourism.

A smaller resort with less than 20 bed capacity, used wind energy for electricity requirements. This is a sure value add, that one needs to emulate, as a best practice. The illustrations and the best practices that have been showcased above, clearly bring in the dimension of the size of the resort; is big beautiful or a smaller resort, sustainable and efficient in the management of the limited resources available. As proponents of eco friendly and sustainable tourism, we need to take a stand and bring to book the aspect of healthy tourism that needs to be promoted, and provide a fix, a framework, that will help in bringing about quality to the tourism product.

A case in view would be of the encouragement that the Government of India, Ministry of New and Renewable Energy³³ has put forward. The objective for off-grid renewable (OGR) energy/power³⁴ would



³³ The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. The broad aim of the Ministry is to develop and deploy new and renewable energy for supplementing the energy requirements of the country. The role of new and renewable energy has been assuming increasing significance in recent times with the growing concern for the country's energy security. Energy self-sufficiency was identified as the major driver for new and renewable energy in the country in the wake of the two oil shocks of the 1970s. The sudden increase in the price of oil, uncertainties associated with its supply and the adverse impact on the balance of payments position led to the establishment of the Commission for Additional Sources of Energy in the Department of Science & Technology in March 1981. The Commission was charged with the responsibility of formulating policies and their implementation, programmes for development of new and renewable energy apart from coordinating and intensifying R&D in the sector. In 1982, a new department, i.e., Department of Non-conventional Energy Sources (DNES), that incorporated CASE, was created in the then Ministry of Energy. In 1992, DNES became the Ministry of Non-conventional Energy Sources. In October 2006, the Ministry was re-christened as the Ministry of New and Renewable Energy.

³⁴ <http://www.mnre.gov.in/schemes/offgrid/> accessed on 1st April 2013

definitely suit the requirements of the resort and help in supporting the movement to generating clean energy that will be required for managing the facility.

Distributed/decentralized renewable power projects using wind energy, biomass energy, hydro power and hybrid systems are being established in the country to meet the energy requirements of isolated communities and areas which are not likely to be electrified in near future.

Off-grid Renewable Energy / Power:

- Biomass based heat and power projects and industrial waste to-energy projects for meeting captive needs
- Biomass gasifiers for rural and industrial energy applications
- Watermills/micro hydro projects – for meeting electricity requirement of remote villages
- Small Wind Energy & Hybrid Systems - for mechanical and electrical applications, mainly where grid electricity is not available.
- Solar PV Roof-top Systems for abatement of diesel for power generation in urban areas

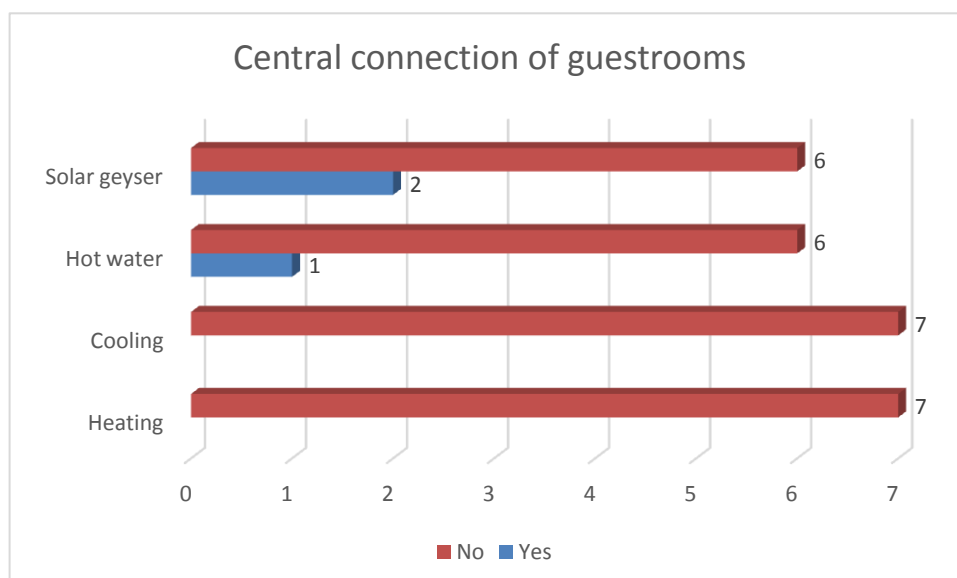
The main objectives of the programme are: supporting RD&D to make such systems more reliable and cost-effective, demonstration, field testing, strengthening manufacturing base.

One needs to note that there are organizations like Dholes Den, which has an elaborate practice of Bio Gas. This has added to the power generation and supported the resort to garner energy on its own, rather than being dependent on the external elements.

6. Central connectivity of Guestrooms:

	Yes	No
Heating		7
Cooling		7
Hot water	1	6
Solar geyser	2	6

The debate that one needs to address is of Centralization or Decentralization of the structures that manage or are a part of the Air conditioning, hot water supply, framework in a resort. Should one follow the stand alone approach, i.e., provide the requirements for each unit in the resort or have a centralized mechanism, which will help in an approach of construct and also bring in a closer aspect of control, management and maintenance. The researcher found that larger resorts (two) were keen to have a centralized mechanism for heating/cooling/hot water generation; as it was economical, easy to maintain and manage.



This in comparison to the smaller resorts, where economies of scale took precedence over centralized units. This brings in to effect, the

potential of a positive carbon foot print; within a centralized environment which will lead to, qualitative maintenance, one time investment for infrastructure (in a logical reason of having many silo units, which otherwise would bring in more management), lesser manpower (in comparison to having a higher manpower if the products of the resort are spread out and in a silo environment), easy management of the facility with the engagement of specialists. In Bandipur it has been a thumb down for centralization of any of the services that have been discussed above.

Option of having a cooling plant helps in a multiple of ways, as the resort management can provide adequate supply of cool air to the rooms and bungalows as and when required; in fact, at a given point in time, the same can be closed as well. Central hot water facility is always advantages as it will help to supply water at a right time to the guests in the resort; besides, one can avoid the expensive attributes of geysers, wherein the resort managers will not have control in any manner.

It is a stand that one needs to take; through policy intervention or an administrative framework to ensure centralization or a mechanism that would suit the requirements of the resort.

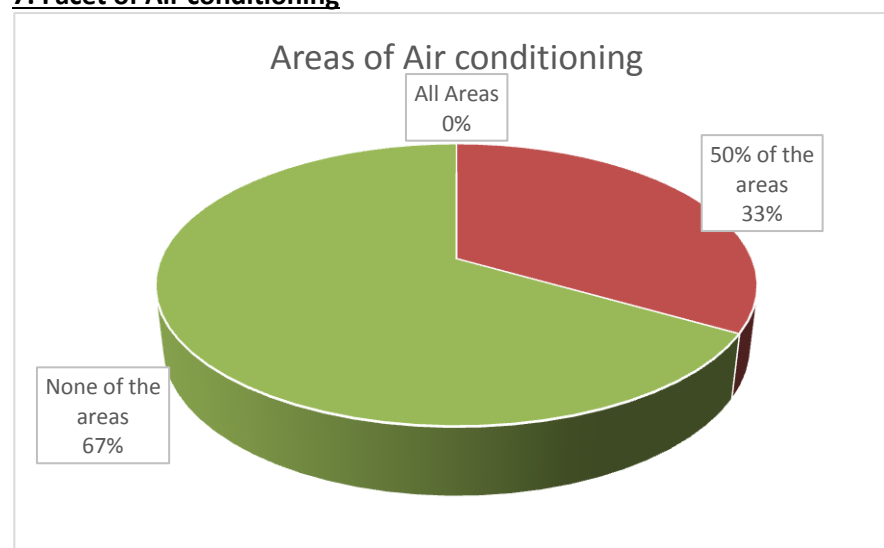
The use of a single heating or cooling plant to serve a group of buildings, facilities, or even a complete community through a system of distribution pipework that feeds each structure or facility. Central heating plants are basically of two types: steam or hot-water, The latter type uses high-temperature hot water under pressure and has become the more usual because of its considerable advantages. Steam systems are only used today where there is a specific requirement for high-pressure steam. Central cooling plants utilize a central refrigeration plant with a chilled water distribution system serving the air-conditioning systems in each building or facility.

Advantages of a central heating or cooling plant over individual ones for each building or facility in a group include reduced labor cost, lower energy cost, less space requirement, and simpler maintenance. Central cooling plants, using conventional, electrically driven refrigeration compressors, have the advantage of utilizing bulk electric supply, at voltages as high as 13.5 kV, at wholesale rates. Additionally, their flexible load factor, resulting from load divergency in the various buildings served, results in major operating economies.

The disadvantages of a central heating plant concern mainly the maintenance of the distribution system where steam is used. Corrosion of the condensate water return lines shortens their life, and the steam drainage traps need particular attention. These disadvantages do not occur with high-temperature hot-water installations.

Source: <http://encyclopedia2.thefreedictionary.com/Central+heating+and+cooling>

7. Facet of Air conditioning



All Areas	0
50% of the areas	3
None of the areas	6

Out of the 9 resorts interviewed, except for

one, which caters to high end tourists (?) all the others have opted for natural ventilation by having big windows, balconies open to air and ceiling fans instead of air conditioning units.

Calculating Carbon footprint of using Air conditioners (AC) should be mandated; and efforts to avoid AC, by educating the travelers, and providing alternative mechanisms should be thought over.

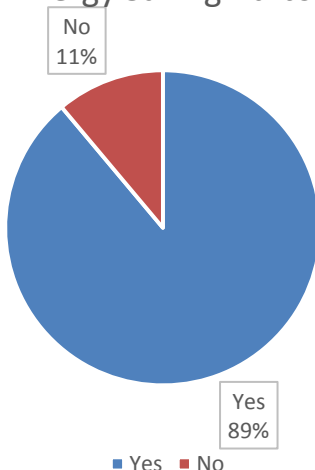
8. Energy Saving Bulbs:

	Yes	No
Energy Saving Bulbs	8	1

Most of the resorts are using energy saving bulbs; which ensures power saving in the resorts. For better understanding of the nuance of LED bulbs, here is a brief:

Clearly, through administrative interventions, if there is policy of ensuring LED/CFL usage then the benefits will be accrued on the long run. As per the NTCA guidelines too, outdoor high intensity illuminations shall not be utilized as it disturbs nocturnal wild animal activities. All tourist facilities, old and new, shall aim to generate at least 50% of their total energy and fuel requirements from alternative energy sources, which may include Solar and Bio-gas. The researcher suggests the use of LED bulbs that are energy efficient and durable.

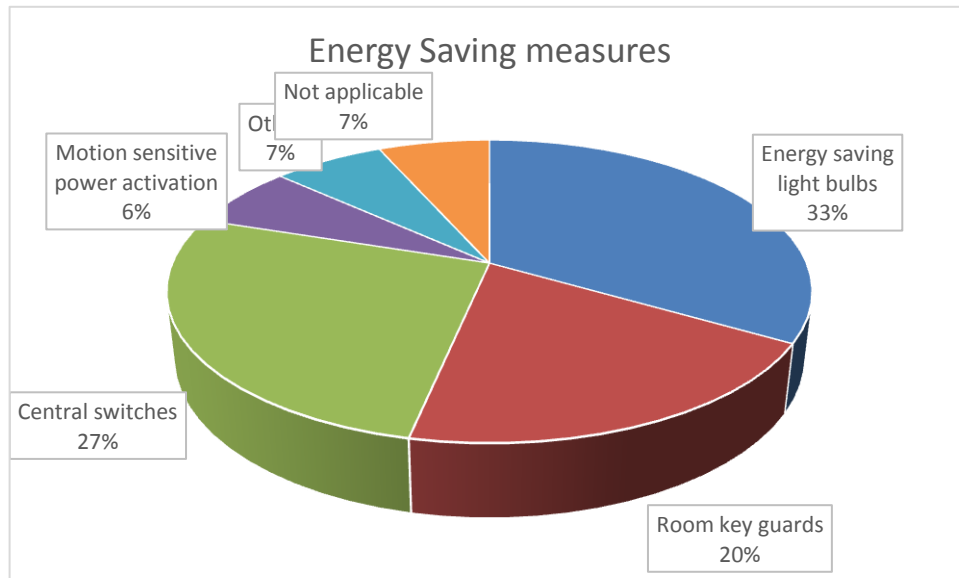
Energy Saving Bulbs



Energy efficient light bulbs for indoor residential use fall into two basic types: compact fluorescent lamps, or CFL, and light emitting diode, or LED, bulbs. CFL bulbs have been available for residential lighting for a long time now. LED bulbs are more expensive than CFL or incandescent bulbs, but they make up for that expense with a drastically longer life span and lower energy consumption. A standard incandescent bulb lasts between 1,200 to 2,500 hours. A CFL lasts for 10,000 hours, and an LED bulb lasts for up to 50,000 hours. CFL and LED bulbs use less electricity to generate the same amount of light produced by an incandescent bulb. To make purchasing energy efficient bulbs easier on consumers, who are used to buying high-wattage incandescents, many list the equivalent wattage on their packaging. For example, an LED that uses six to eight watts or a CFL that uses 13 to 18 watts will be listed as equivalent to a 60-watt incandescent bulb.

9. Employment of Energy Saving measures

Energy saving light bulbs	5
Room key guards	3
Central switches	4
Motion sensitive power activation	1
Others	1
Not applicable	1

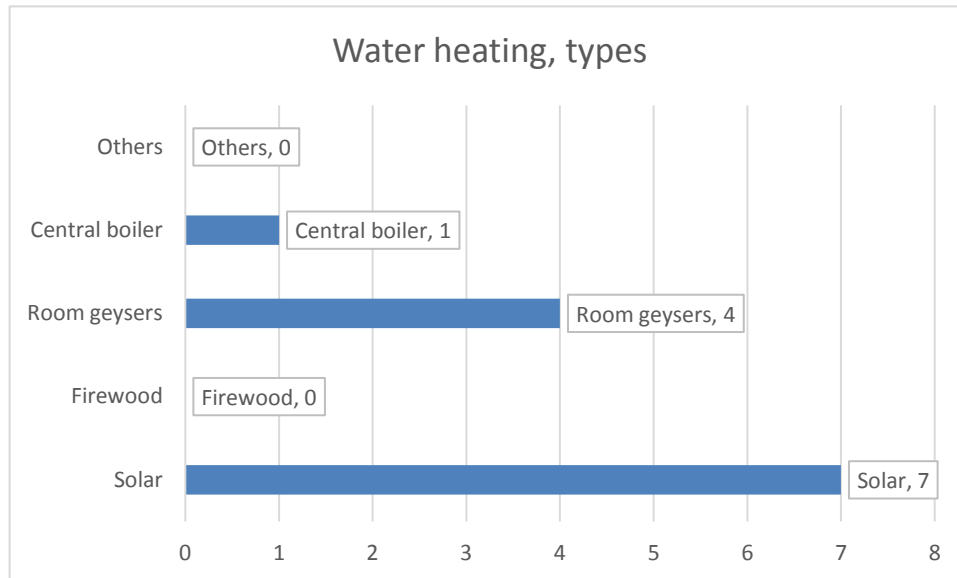


Energy saving measures in the form of Energy saving light bulbs (5 resorts), Central Switches (4 resorts), Room key guards (3 resorts) is an indication that resorts are conscious of the same. This should be made mandatory such

that the resorts adhere to the norms and bring in necessary frameworks for saving energy. In the study conducted at Bandipur, it is also to be seen that 1 of the 9 resorts has put in place the motion sensitive power activation mechanism which augurs well for the system.

10. Water Heating

Solar	7
Firewood	0
Room geysers	4
Central boiler	1
Others	0



A good sign can be found in the water heating mechanism that has been adopted at Bandipur, wherein 7 of the 9 resorts have set up Captive Solar water heating devices and 1 resort has the Central Boiler facility. However, 4 resorts have

established the facilities of room geysers; which does not augur well for the resorts.

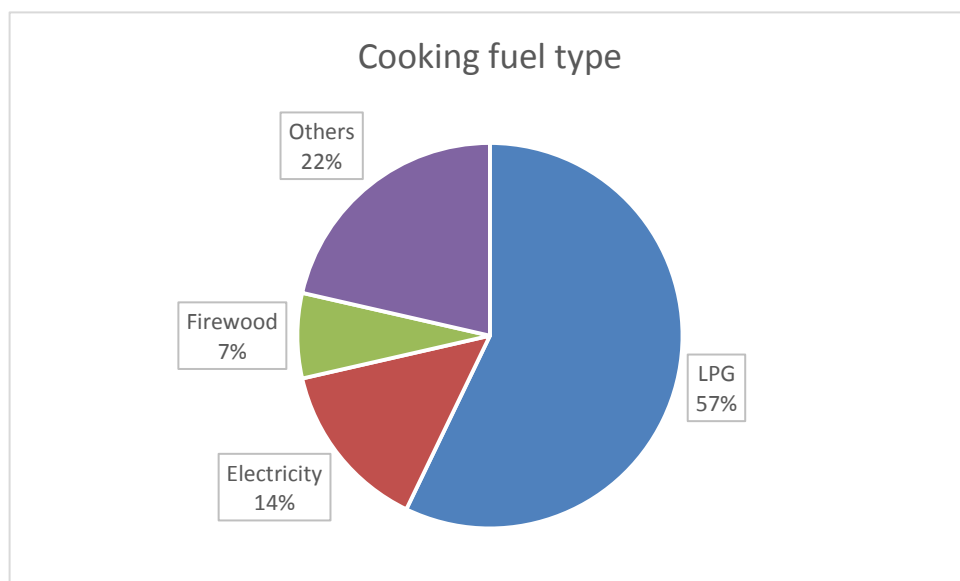
The researcher would like to mention that solar energy, bio gas and other non-conventional energy mechanisms should be put to use to ensure that not much of energy is consumed through the water heating mechanism.

11. Cooking fuel, type

LPG	8
Electricity	2
Firewood	1
Others	3

Others	Bonfire, Induction, Charcoal for tandoor
--------	--

LPG is the norm for cooking practices in the landscape of Bandipur, with 8 of the 9 resorts who were part of the survey agreeing to the same. Though the Bandipur Eco Tourism system is at an advance state, meaning that resorts have been in existence for a long time now; there is one resort that uses firewood for cooking purposes.



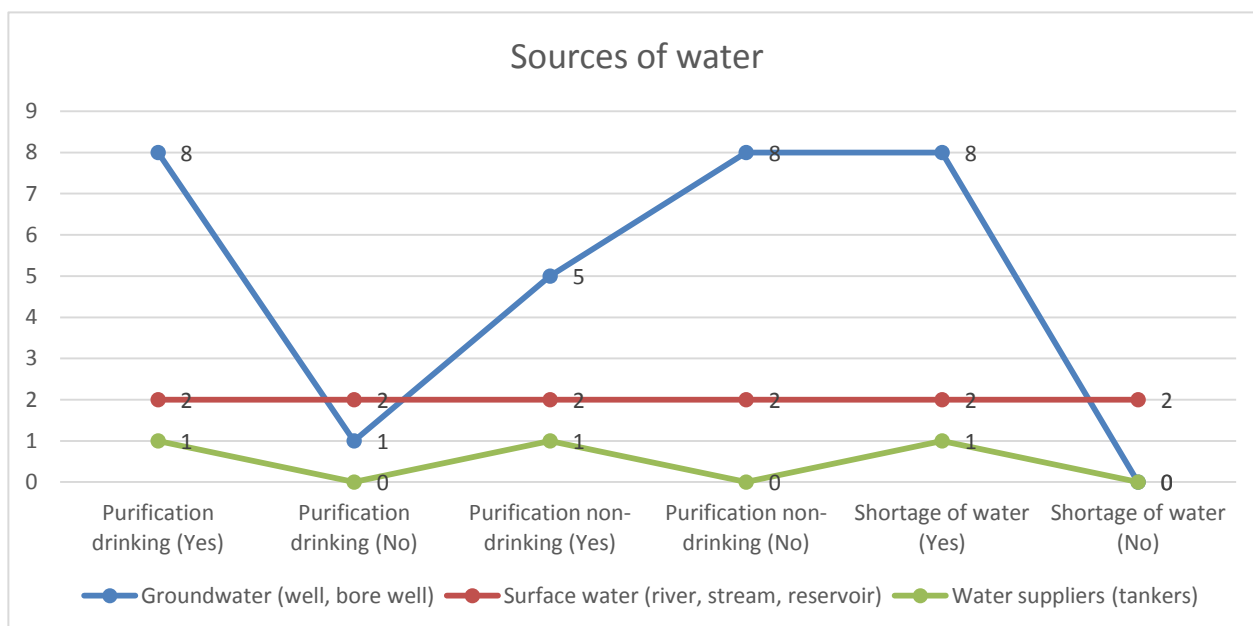
Bandipur has serious issues of fire wood collection by the locals in the forest areas, some of the locals are employed in the resorts. While interviewing the resort owners the fact of firewood collection was negated by the

resorts, who mentioned that the firewood was being purchased from the KFD depot in Gundlupet. One question that arises is are the resorts really purchasing from the KFD depot in Gundlupet, or are they getting the firewood from the locals who collect the same for household use? Whilst administering the questionnaire, the researcher found that the statements made by the resort owner were questionable.

The researcher would like to place a perspective as per the NTCA, which has also been dealt with separately in another aspect of the study. For easier understanding the same is presented for the reader/administrator to access and analyze. The use of wood as fuel as per the NTCA guidelines is prohibited except for campfire for which wood must be procured from the State Forest Department or the forest development corporation depots.

13. Source of water

SOURCE OF WATER	PURIFICATION ON DRINKING (YES)	PURIFICATION ON DRINKING (NO)	PURIFICATION ON NON-DRINKING (YES)	PURIFICATION ON NON-DRINKING (NO)	SHORTAGE OF WATER (YES)	SHORTAGE OF WATER (NO)
GROUNDWATER (WELL, BORE WELL)	8	1	5	8	8	0
SURFACE WATER (RIVER, STREAM, RESERVOIR)	2	2	2	2	2	2
WATER SUPPLIERS (TANKERS)	1	0	1	0	1	0



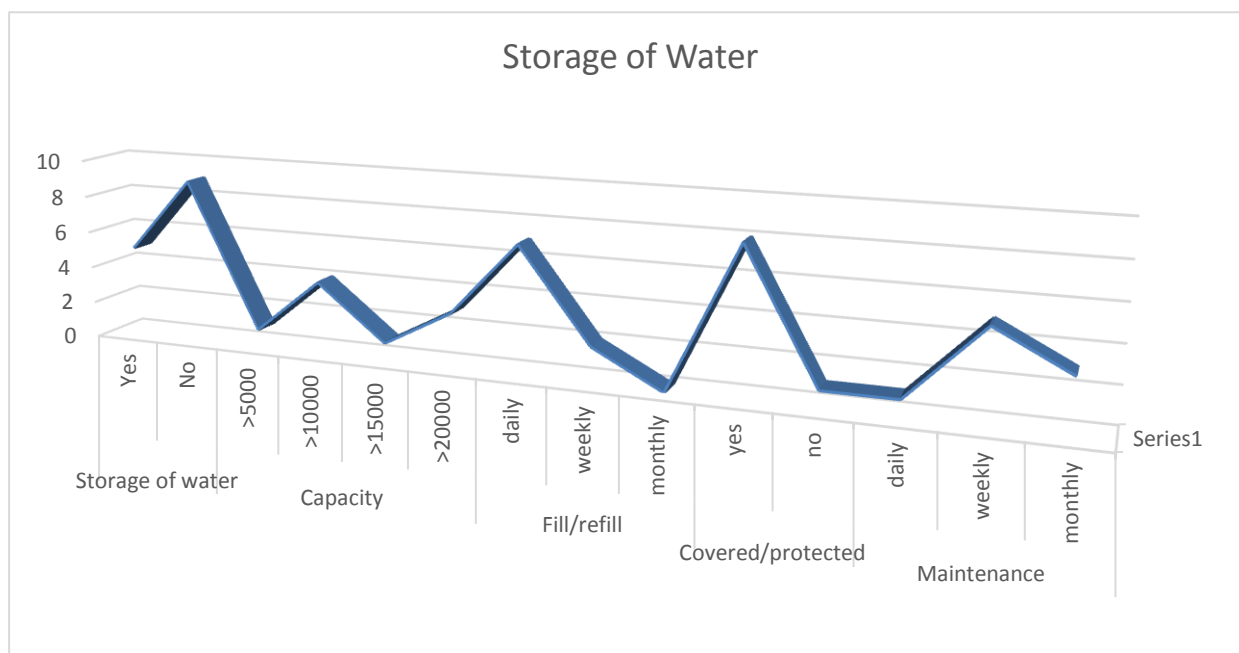
Storage of Water

STORAGE OF WATER		CAPACITY				FILL/REFILL			COVERED/PROTECTED		MAINTENANCE		
YES	NO	>5000	>10000	>15000	>20000	DAILY	WEEKLY	MONTHLY	YES	NO	DAILY	WEEKLY	MONTHLY
5	9	1	4	1	3	7	2	0	8	1	1	5	3

The issue with the Bandipur area is that the Water Table is dry. And most of the accommodation facilities in the Tourism area of Bandipur depend on the groundwater table. Bore wells are to be found in all the resorts. Despite the fact that the area is flanked by the Kabini river in the north and the Moyar river in the south, and the Nugu runs through the park, there is a perennial water shortage in the dry season. Not only the tourism area but the villages and the population also have an issue with water. The indications are very clear 8 of the 9 resorts have clearly specified to the researcher that there is a great amount of shortage of water.

The Park experiences two peaks of rainfall, which can be seen in the eastern part of the reserve, i) month of June-100 to 150 mm and ii) during the months of September – October – 200 mm. It can be seen that for a long time now, there have been reports of less or no rain in the area³⁵. The researcher was not able to get inputs on what has been done over a period of time to ensure adequate water supply to the stakeholders. In fact, all across the Bandipur landscape one can see water tankers in large numbers, including the forest area as they provide water to the waterholes across the forest.

³⁵ http://articles.timesofindia.indiatimes.com/2003-09-08/bangalore/27207700_1_water-scarcity-bandipur-national-park-water-holes accessed and retrieved on 1st June 2013



Bandipur³⁶ is located in the Wayanad plateau which is characterized by the presence of several swamps and vayals, varying in size. The central part of the Tiger reserve is slightly elevated with intermittent hills with moderate height and has got several seasonal streams. There are also perennial water sources in the area. There are seasonal streams and rivulets that run through the reserve and water in these seasonal streams flow only during the rainy season.

Hence the following has to be considered:

Rainwater harvesting, not only amongst the resorts, but also within the forest are.

Building check dams across the rivulets and preserve water for as long as possible by capturing the water during the rainy season.

Cloud seeding, which would be required, if there is a situation of drought. However, an adequate mechanism has to be ensured to get water under this heading. Besides, the cost would be on the higher side. Cloud seeding, a form of intentional weather modification, is the attempt to change the amount or type of precipitation that falls from clouds, by dispersing substances into the air that serve as cloud condensation or ice nuclei, which alter the microphysical processes within the cloud. The usual intent is to increase precipitation (rain or snow)³⁷.

Another extreme measure that can and should be adopted is that no new resorts should be allowed to come up in the Bandipur landscape.

Considering the water shortage in the area, it has been seen that the resorts have water storage tanks in the capacities (5000, 10000, 15000 and 20000 liters) of and which are being filled on a daily basis, clearing showcasing the fact that there is a shortage of water.

The research team noted that there is a sharing of the bore well in the Kaniyanpura colony, wherein the bore well water meant for the locals is being used by a resort in the area. Clearly, this does not augur well for the water system in the area. On an average, a resort in Bandipur with 15 pax occupancy uses 1000 liters of water per day in dry months. Which is the double of the capacity used

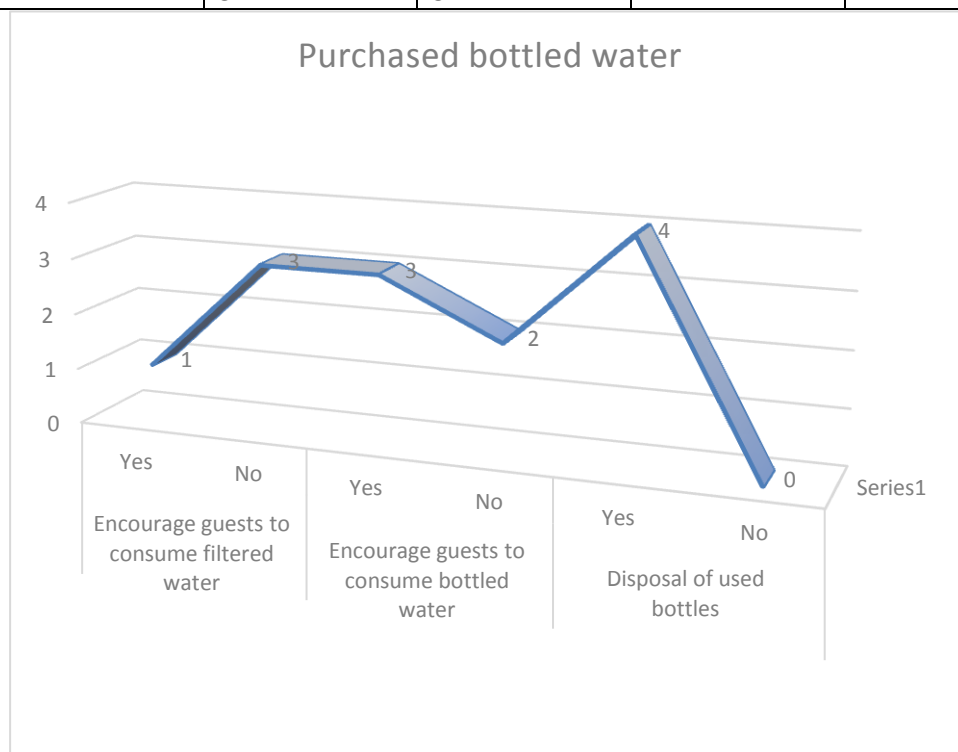
³⁶ Management Plan of Bandipur (unpublished)

³⁷ http://en.wikipedia.org/wiki/Cloud_seeding accessed and retrieved on 1st June 2013

by the local on a daily basis, clearly putting a strain on the water resources and putting a force on local populations to compete for the use of critical resources.

15. Water Consumption

ENCOURAGE GUESTS TO CONSUME FILTERED WATER		ENCOURAGE GUESTS TO CONSUME BOTTLED WATER		DISPOSAL OF USED BOTTLES	
Yes	No	Yes	No	Yes	No
1	3	3	2	4	0



Though filtered water and bottled water is available in the resorts, there is encouragement provided to the guests to consume bottled water, which generates waste in the form of used bottles. The resorts did make a mention that these bottles are disposed to the kabadis. In fact, a

total of 7 resorts (see write up on Waste Management) ensure that the used bottles reach the kabadis.

16. Cleaning

	ACID					ECO FRIENDLY PRODUCT		
FLOORS	PHENYL	SOAP				NEEM	CITRO VELLA OILS	JOHNSON DIVESY PRODUCTS ³⁸
BATHROOMS	PHENYL	DETERGENTS	VIM BAR	HARPIC	BLEACH			
LAUNDRY	DETERGENT	WASHING POWDER						

³⁸ Diversey, Inc (2002)., formerly *JohnsonDiversey, Inc.*, is a Racine, Wisconsin, based manufacturer of cleaning and hygiene products, and global provider of commercial cleaning and hygiene solutions. It was created by Johnson Wax Professional's acquisition of the DiverseyLever company in May, 2002

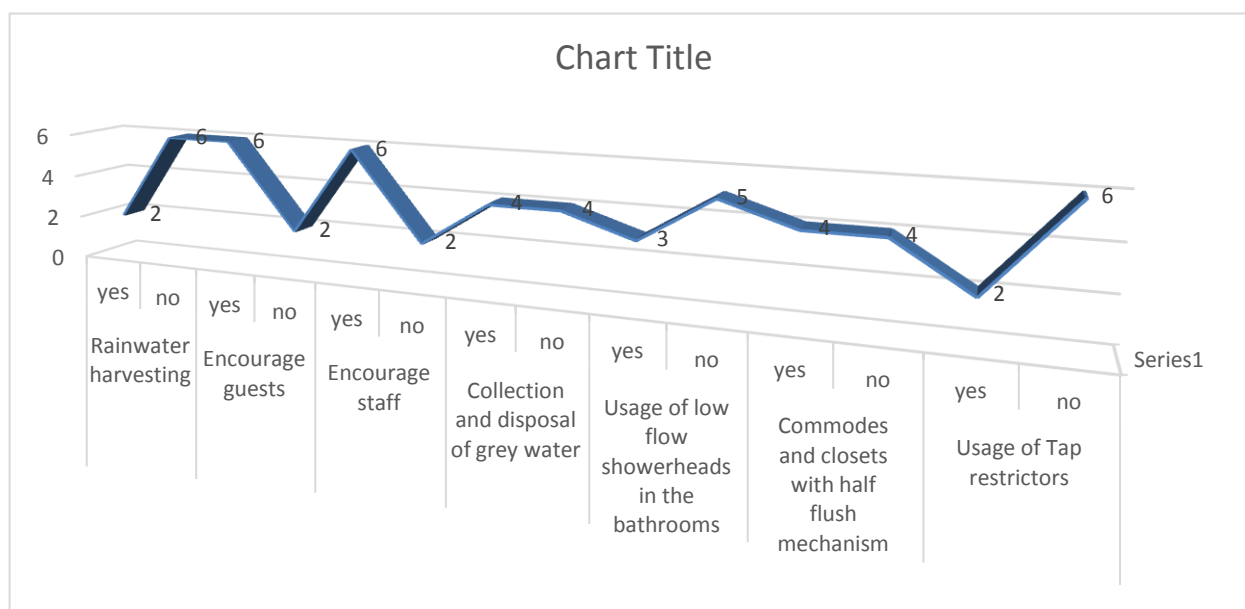
DISHES	VIM BAR							
--------	---------	--	--	--	--	--	--	--

Eco tourism operator should imbibe in a tourist, a sense of education towards using environment/eco friendly products. The very aspect of education is flouted in Bandipur landscape, because all of them do not use eco friendly products to clean and wash. It was deduced that 8 out of 9 respondents, use acids of various kind for their cleaning/washing purposes. One resort, The Serai, uses Johnson Diversey's eco friendly products for cleaning and washing purposes; throughout all their resorts spread in different places. It should be mandated that eco friendly products be used for the above purposes, thereby spreading a eco friendly message.

17. Water conservation practices

RAINWATER HARVESTING		ENCOURAGE GUESTS		ENCOURAGE STAFF		COLLECTION AND DISPOSAL OF GREY WATER		USAGE OF LOW FLOW SHOWERHEADS IN THE BATHROOMS		COMMODOES AND CLOSETS WITH HALF FLUSH MECHANISM		USAGE OF TAP RESTRICTORS	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
2	6	6	2	6	2	4	4	3	5	4	4	2	6

Water conservation should be encouraged in the best of circumstances in the Bandipur area, considering there has been a shortage of water over a period of time. Rainwater harvesting should be made mandatory in any framework that the forest department is contemplating. Collection, disposal and usage of grey water after treatment also should be made mandatory. The treated water can be put to use for gardens, growing vegetables and similar activity.

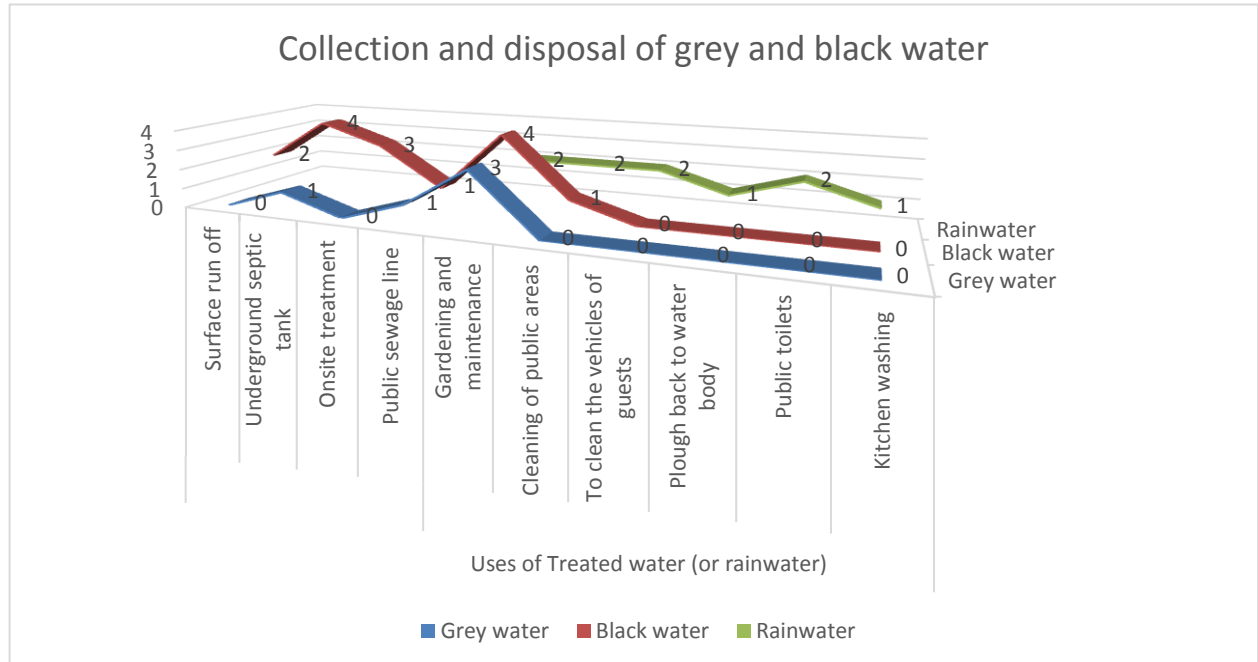


18. Collection and disposal of Grey and Black water:

<i>COLLECTION AND DISPOSAL</i>	<i>USES OF TREATED WATER (OR RAINWATER)</i>
--------------------------------	---

	SURFACE RUN OFF	UNDERGROUND SEPTIC TANK	ONSITE TREATMENT	PUBLIC SEWAGE LINE	GARDENING AND MAINTENANCE	CLEANING OF PUBLIC AREAS	TO CLEAN THE VEHICLES OF GUESTS	PLOUGH BACK TO WATER BODY	PUBLIC TOILETS	KITCHEN WASHING
GREY WATER	0	1	0	1	3	0	0	0	0	0
BLACK WATER	2	4	3	1	4	1	0	0	0	0
RAIN WATER					2	2	2	1	2	1

Of the nine resorts only two have adopted rain harvesting measures. Considering the fact that the resorts are present in eco sensitive areas; rain harvesting should be made compulsory across resorts as a policy framework. This should be mandated by the Government or the administrative body who oversee the implementation of policy mandates. Rain water harvesting will lead to the soil and environs rejuvenating. A scientific study on rain water harvesting and rejuvenation of the land area, will help in further understanding the same.



Considering that grey and black water will be produced in large quantities, adequate mechanisms for collection, treatment and disposal/use should be adhered to which will ensure qualitative use. The researcher found that the resorts had put to use practices of septic tanks. In fact, one resort has ensured that black water is treated through three tanks with fishes and the water is literally clean and is being used for the nearby land for purposes of agriculture.

If a framework is mandated for managing grey and black water, then one should ensure strict guidelines are specified such that the environment does not get to suffer on account of effluents that are left into the open.

19. Swimming pool

Swimming pools bring in a dichotomous situation to a commercial enterprise like a eco tourist resort vis-à-vis the nuance of sustainability, ecological preservation, the aspect of carbon footprint, do tourists really need a pool, or is it a value add for a high end tourist in an eco-friendly

CAPACITY (MENTION AREA)	SOURCE OF WATER	CLEANING AGENT- OZONE	CLEANING AGENT- CHLORINE	CLEANING AGENT- SELF MECHANISM	FREQUENCY OF CLEANING
25000 LTRS	BOREWELLS	0	1	2	MONTHLY

destination, or is it only an aspect of services being offered to the best of one's ability or is it a for a tired tourist, who would like to relax after tough outing (tour) in the forest, and, off course having sighted the wild in its primordial beauty or as mentioned earlier, is it just a value add to get tourists into the area. These are the leading



questions that come in the mind of an eco-sensitive person, who would be totally devoid of the thought of the very existence of this contraption, i.e., the pool. Based on the size of the pool, the water used, the cleaning agents used, the water disposal, if any, will surely add to an environmentalists list of objecting to a pool being present in the eco fragile zone. However, in the times of today, the commercial aspects will surely over rule the doctrine of Sustainable tourism. Thence, it can be seen that, of the

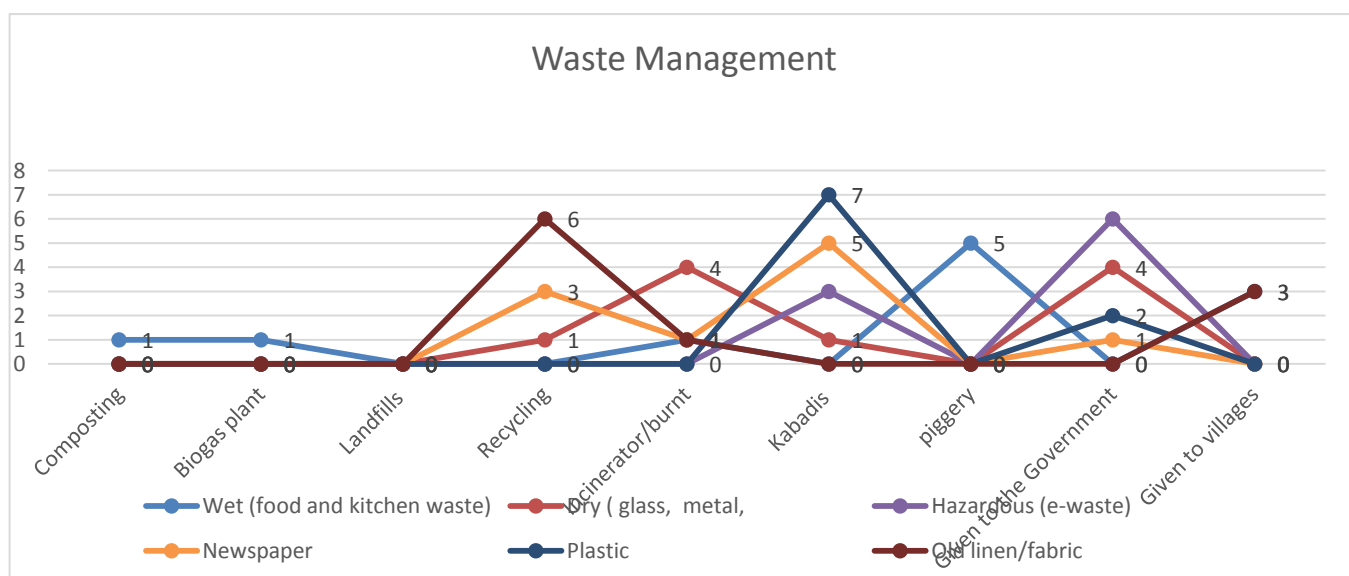
nine resorts researched in Bandipur area, three resorts have a swimming pool.

20. Waste management:

	COMPOSTIN G	BIO GAS PLA NT	LANDFILL S	RECYCL ING	INCINERA TOR/BUR NT	<i>KABA DIS</i>	PIGGERY	GIVEN TO THE GOVERNMEN T	GIVEN TO VILLAGES
WET (FOOD AND KITCHEN WASTE)	1	1	0	0	1	0	5	0	3
DRY (GLASS, METAL, GARDEN, WOOD)	0	0	0	1	4	1	0	4	0

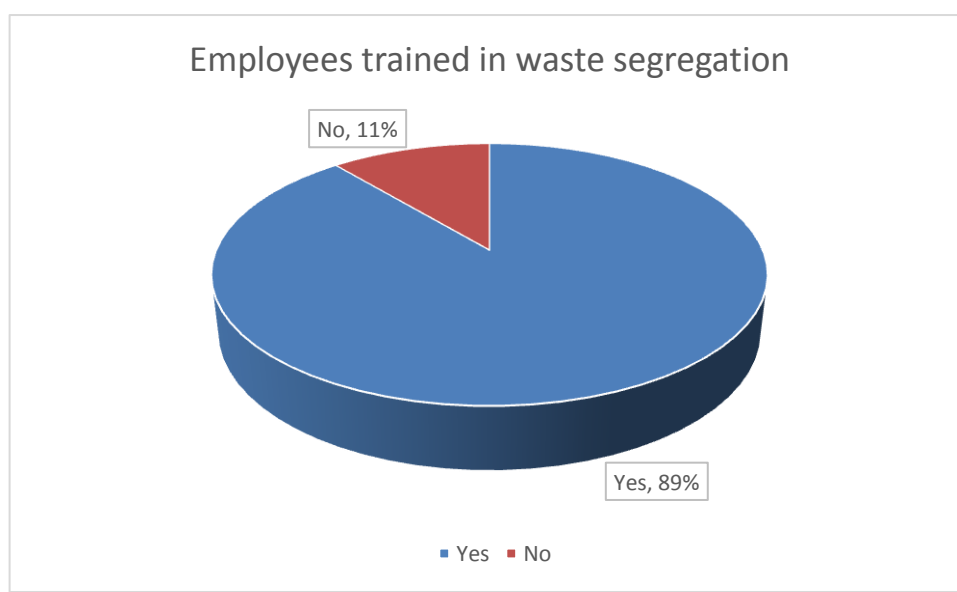
HAZARDOUS (E-WASTE)	0	0	0	0	0	3	0	6	0
NEWSPAPER	0	0	0	3	1	5	0	1	0
PLASTIC	0	0	0	0	0	7	0	2	0
OLD LINEN/FABRIC	0	0	0	6	1	0	0	0	3

The NTCA has clearly articulated the fact that, there shall be a complete ban on burying, burning or otherwise disposing non-biodegradable or toxic waste in and around the tiger reserve. This is a clear indication that the tourist accommodation operating facilities should adopt scientific management of waste and not allow human made waste to decompose within the fragile forest area.



21. Employees trained in waste segregation:

Yes	No
8	1

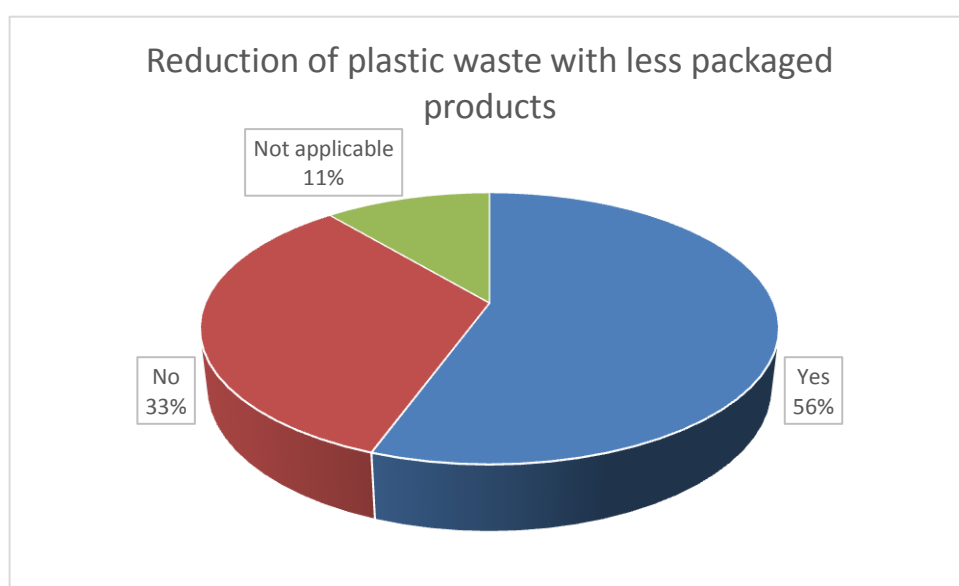


8 of the 9 resorts have ensured adequate training for the employees in the area of waste segregation. Though there has been a form of

formal training given to the employees of the resorts interviewed, the researcher particularly noticed that there is lack of seriousness on the part of employees for waste segregation at source. Country Club resorts, would generate humongous amount of waste for which a scientific understanding of waste management is pivotal. Color coded waste bins must be placed at different areas, for collecting and segregating different kinds of waste. This should be the responsibility of the employees, for which formal training is necessary.

22. Reduction of plastic waste with less packaged products:

Yes	No	Not applicable
5	3	1



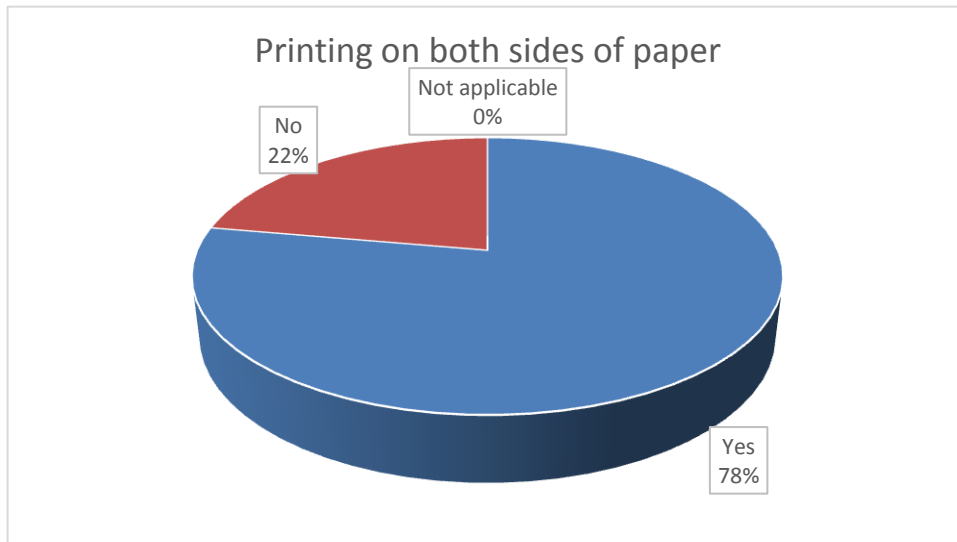
The above is a clear indication of the fact that 56% of the resorts in the area of Bandipur are making efforts to ensure reduction in the plastic waste. Considering that these are eco fragile areas, this should be mandated, and

strict audits done which will help bring down usage of plastic and related items that can damage the environment in an irreversible fashion. Considering that plastic is non-biodegradable, one should have it in the policy framework to bring about either reduction to begin with or complete avoidance. The researcher would like to make mention here, that even packaging materials like tetra packs, carry bags, should either be avoided or recycled wherever possible or even banned from the resort areas.

It is best suggested that such of the resorts in Bandipur who are not making efforts to reduce plastic and related items should be encouraged to reduce and help build a healthy practice that will bring in the aspect of protecting the eco sensitive products.

23. Printing of paper on both sides:

Yes	No	Not applicable
7	2	0



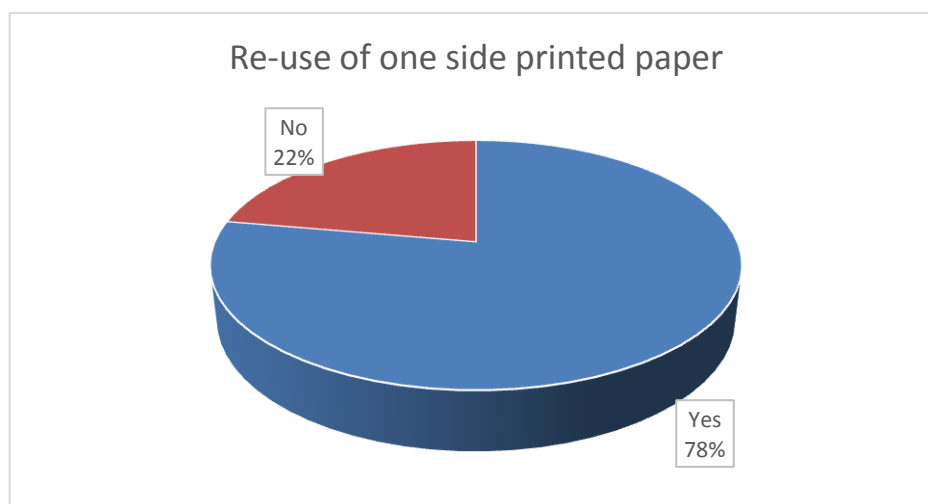
Moving towards a paperless resort, would it be a figment of imagination on the mind of the Forest Administrator, or the Ecologist; well a qualitative documentation will help analyze and assess the same. In the case

of the resorts studied in Bandipur, it is clear that 78% of the resorts make efforts to print on both sides of the paper as and when required.

Reducing printing would be an indirect impact on the resort; and it is not visible to the public or the administrators, however, it will bring in necessary involvement to know impacts of such activity, though it may not be mandated by Law or a specific framework.

24. Re-use of one side printed paper:

Yes	No
7	2

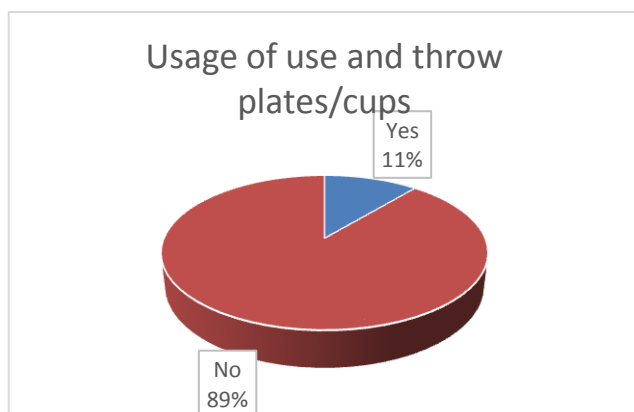


Juxtaposing the thoughts on illustration 24, read along with the analysis and findings of illustration 23, it is clear that prints taken during the course of office work, and considered as waste, are re-used for internal purposes

such that generic printing can be avoided and thereby one can self-impose a restriction that would usher in good practices.

25. Usage of use and throw plates/cups:

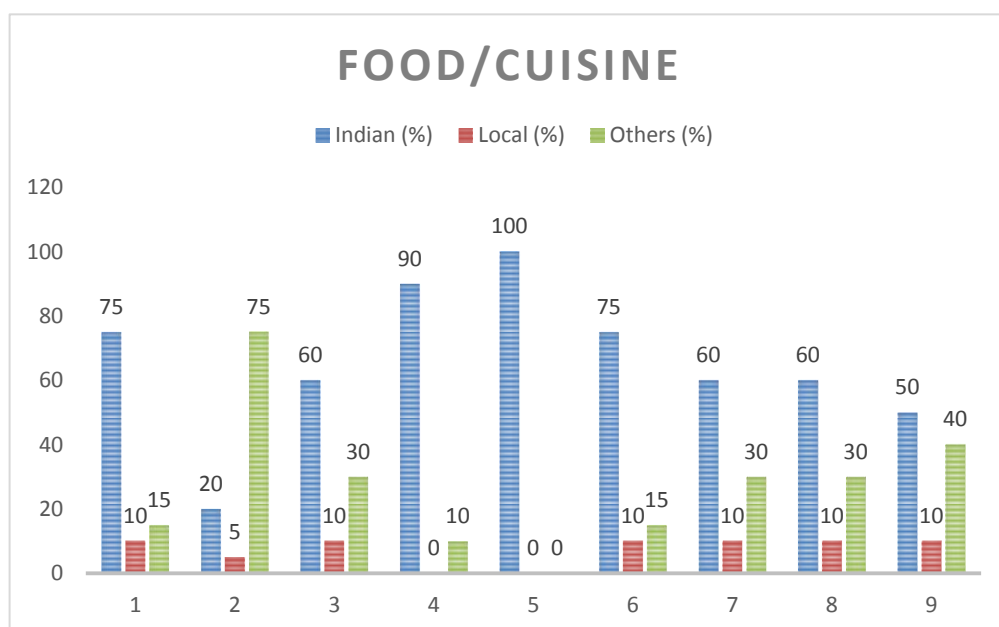
Yes	No
1	8



It has been found that anything that is of the nature of use and throw comes in handy. Cups, paper plates, plastic spoons, which need not be re-used, have been taken as a boon by many. However, in the case of the resorts in Bandipur, that were contacted, only one of the resort management made use of use and throw plates and cups, whilst 89% were not in the habit of using them for the purposes of the guests who visited the resort.

26. Food/cuisine

	INDIAN (%)	LOCAL (%)	OTHERS (%)	PAX/COVER COUNT PRIOR TO ACTUAL COOKING (YES/NO)
1	75	10	15	YES
2	20	5	75	YES
3	60	10	30	YES
4	90	0	10	YES
5	100	0	0	YES
6	75	10	15	YES
7	60	10	30	YES
8	60	10	30	YES
9	50	10	40	YES



In the Bandipur landscape, considering the economies of scale and the size of the resorts, all practice the finer aspect of ensuring a head count of

the number of guests who stay in the resort whilst preparing food. When the researcher was administering the questionnaire at Bandipur, it clearly came out that most of them preferred to consume the Indian cuisine. Local food was the least of the preference amongst the guests. In one resort however, a majority of the guests (75% of the food prepared) preferred other category of food, hence there was a preference for the Chinese variety.

Pollution

The facet of Noise³⁹ pollution is dealt with in detail. The time factor and constraint has been a barrier to do in-depth primary data collection on Air Pollution and Water Pollution. These can be looked at in detail as a separate spin-off study with the help of the Karnataka State Pollution Control Board (KSPCB) who execute such studies and also rent out their devices to check Air Pollution and Noise Pollution. For this study their sound level meter was used at key locations to determine if noise levels exceeded the prescribed norm. The study can be furthered to know the repercussions; noise can have on the environment, animal behavior and reproduction. As for Air Pollution, secondary

Area Code	Category of Area/zone	Limits in dB (A) Leq	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

data was collected through interview.

For this study, the researcher adopted and adhered to the rules laid down by the Noise Pollution (Regulation and Control) Rules 2000 of Government of India. For the

purpose of the study the following is taken as the benchmark, which is part and parcel of the Rules as enunciated by the Government⁴⁰. The forest area would fall under (D) Silence Zone as mandated by Law.

Protocol:

The researcher tested the noise levels in the tourism safari routes (a total of 30 kms) of BNP at different zones which are as follows:

Zone 1: *Karigowdanakatte*

Zone 2: *Yerekatte, border road, Siddarayanakatte, Kempanamatti, Shettikere, pick up road, Kennaikolsi.*

Zone 3: *Mulepura, Moyar Gorje, Bettadakatte, Uppinerhalla*



³⁹ Noise derived from Latin, “*nausea*”. Noise is defined as, “sound which is undesirable by the recipient”. This definition is as per the Report of the committee on the problem of noise, (Wilson Committee), United Kingdom, July, 1963. From an Encyclopedic perspective, “undesired sound” (Britannica); “un-wanted sound” (Americana).

⁴⁰ Schedule [Rules 3(1) and 4 (1)]

(ILLUSTRATION)

Details of Safari vehicles (JLR and KFD)

	Vehicle type	Number of vehicles	Seating capacity (per vehicle)	Make of vehicle and year of manufacture	Engine capacity (CC)	Fuel type (petrol – diesel – electric)	Fuel consumption per month	Owner – operator (JLR-KFD- Others)	Noise level (dB)
1	Buses Large								
2	Buses Mini	5	25+1			Diesel		KFD	75
		2	16+1	2010		Diesel		JLR	80
		2	19+1	2011		Diesel		JLR	80
		1	15+1	2009		Diesel		JLR	80
3	Multi Utility vehicle (safari jeeps)	2	6+1	Mahindra		Diesel		KFD	63
		1	9+1	Mahindra, 2007		Diesel		JLR	65
		3	8+1			Diesel		JLR	65
4	Tractors	1	-			Diesel		JLR	78
5	Trucks								
6	Two wheelers								
7	Others (please specify)	Gypsy 1	5+1	Suzuki		Petrol		KFD	60
		Bolero 1	6+1	Mahindra		Diesel		KFD	65
		Bolero	6+1	Mahindra		Diesel		JLR	67

(a) Physical Carrying Capacity (PCC)⁴¹: This is the “maximum number of visitors that can physically fit into a defined space, over a particular time”. It is expressed as:

$$PCC = A \times V/a \times RF$$

⁴¹ Bandipur Management Plan, KFD.

Where, A = available are for public use

V/a = one visitor/ M²

Rf = rotation factor (number of visits per day)

In order to measure the PCC to Bandipur, the following criteria must be taken into account:

- Only vehicular movements on forest roads are permitted.
- The “standing area” is not relevant, but “closeness” between vehicles is important.
- There is required distance of at least 500 m (½ Km) between 2 vehicles to avoid dust (2 vehicles /Km.)
- At least 1 ½ hours are needed for a single park excursion
- The PA is open to tourists for 11 months in a year and 6 hours per day.
- Linear road lengths within the tourist zone are more relevant than area, and the total length of the area is more appropriate.
- Due to constant vehicular use, the entire road length of 30 Km.
- Physical Carrying Capacity (PCC) for Bandipur = 30 km. X 2 vehicles/km. X 1.5 = 90 visits/day

Calculating the number of visits on a weekday at Bandipur, during peak season (beginning of holiday season); the main limitation to the calculation, that it does not account for the week day data throughout the year; however, one can see a picture of what would be the number of visits on a week day. Hence, this can be considered as relative metric that can be used for further planning and strategizing.

Weekday data: (start time/end time: 06.00 to 08.00)

Vehicle type - number	Time of data collection	dB	Additional details
JLR, jeep. KA 03 MK 9334	06.12	66	NA
KFD, Gypsy (petrol). KA 10 G 390	07.03	60	NA
KFD, bus. KA 10 G 294	07.20	75	Dusty
JLR, jeep. KA 03 MH 9624	08.24	65	NA
KFD, bus. KA 10 G 200	08.34	65	Dusty and noisy
JLR, bus. KA 10 6949	08.44	71	Dusty

Weekday data: (start time/end time: 16.00 to 18.00)

Vehicle type - number	Time of data collection	dB	Additional details
-----------------------	-------------------------	----	--------------------

KFD, bus. KA 10 G 200	16:16	67	Dusty
JLR, jeep. KA 03 MH 9624	16:18	65	NA
KFD, bus. KA 10 G 294	16:22	77	Dusty
JLR, jeep. KA 03 MK 9334	17:40	67	NA
KFD, Gypsy (petrol). KA 10 G 390	17:30	60	NA

As per the NTCA PCC calculation on a week day, it is found that, a total of 171 visits (tourists entering the safari zone), i.e., 98 in the morning (06.00 to 09.00) and 73 in the evening (16.00 to 18:00) have occurred in Bandipur, which is well above the NTCA metric limit, considering the fact the PCC calculation for Bandipur is 90 visits/tourists per day. This has been arrived at on the basis of the fact that there is 30 kilometers of road network within the 80 Sq. Km. of tourism zone/area. The Bandipur Management Plan has taken the road network to be 180 kilometers in all.



Weekend data: (start time/end time: 06.00 to 09.00)

Vehicle type - number	Time of data collection	dB	Additional details
KFD, bus. KA 10 G 294	06.29	74.9	No talking or shouting from guests
JLR, Jeep. KA 03 MK 9334	06.42	66	No talking or shouting from guests
KFD, bus. KA 10 G 201	07.10	72	No talking or shouting from guests, but creates a lot of dust
KFD, bus. KA 10 G 193	07.37	72	No talking or shouting from guests, but creates a lot of dust

Weekend data: (start time/end time: 16.00 to 18.00)

Vehicle type - number	Time of data collection	dB	Additional details
KFD, bus. KA 10 G 294	15.59	77	No talking or shouting from guests
KFD, Bus. KA 10 G 193	16.00	66.9	Noisy crowd, very dusty
KFD, jeep. KA 10 G 311	16.07	59.1	Noisy crowd
KFD, bus. KA 10 G 201	16.11	62.5	Noisy crowd who were singing
KFD, bus. KA 10 G 200	16.20	65	Tourist standing on foot board was peeping out of bus
JLR, bus. KA 10 6948	16:34	70.1	Children talking loudly
KFD, Sumo (non-safari). KA 09 G 351	16:32	66.1	NA
KFD, bus. KA 10 G 193	17.29	80	No noise from tourists
KFD, jeep. KA 10 G 311	17.30	65	Noisy tourists
KFD, bus. KA 10 G 294	17.42	67	No noise, but dusty
Tractor. KA 10 T 1021	17.48	78.3	Noisy and dusty
Tractor. KA 10 T 1647	17.49	76	Dusty and dusty
KFD, bus. KA 10 G 201	17:51	63	No noise from tourists



A total of 301 visits/tourists have entered the Bandipur safari area on a week end, i.e., 83 visits/tourists (06.00 to 09.00) 218 visits/tourists (16.00 to 18:00) through the KFD and JLR run vehicles. The number is well above the PCC limit of 90 visits/tourists venturing into the safari area on a day to day basis.

Considering that, there is overcrowding in the Bandipur and the researcher primarily noted that safari vehicles of Tusker Trails were plying, it is understood that tourists are more and vehicles other than that of KFD and JLR are being put to use. Considering this, the following calculation is pivotal.

The combination of JLR and KFD vehicles in Bandipur comes up to 18, which can take a total of 266 tourists into the safari area. If this is to be considered a benchmark, then the PCC limit of 90 should be adhered. However, the safari system of Bandipur is in a position to take 266 on a day to basis, is questionable. Reading from NTCA, one needs to put a limit to the number of tourists going into the safari on a day to day basis.

It is to be noted, that, the safari vehicles of JLR and KFD do not follow zones to take the tourists in, but would follow on an event based travel, i.e., if one party sights a tiger with an animal kill, the same is radioed to the other teams, who assemble to watch the spectacle. This in a way does not bring forth the aspect of natural eco-tourism, wherein the tourists get to see a spectacle of nature in an 'as-is' environment. Besides, 'overcrowding' is fallout of this behavior, which leads to an increase in the noise levels. Dust and smoke also get added to the pandemonium.

In the forest area of Bandipur, that is a catchment for the eco-tourist destination; and placed the noise calculating meters at vantage points during the tourist movements in the forest.

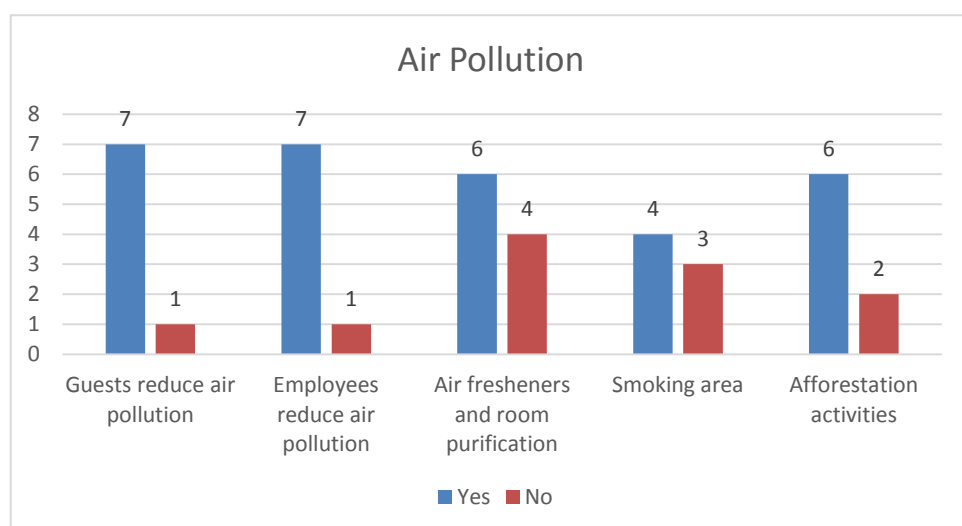


Air Pollution:

28. Sources of Air Pollution:

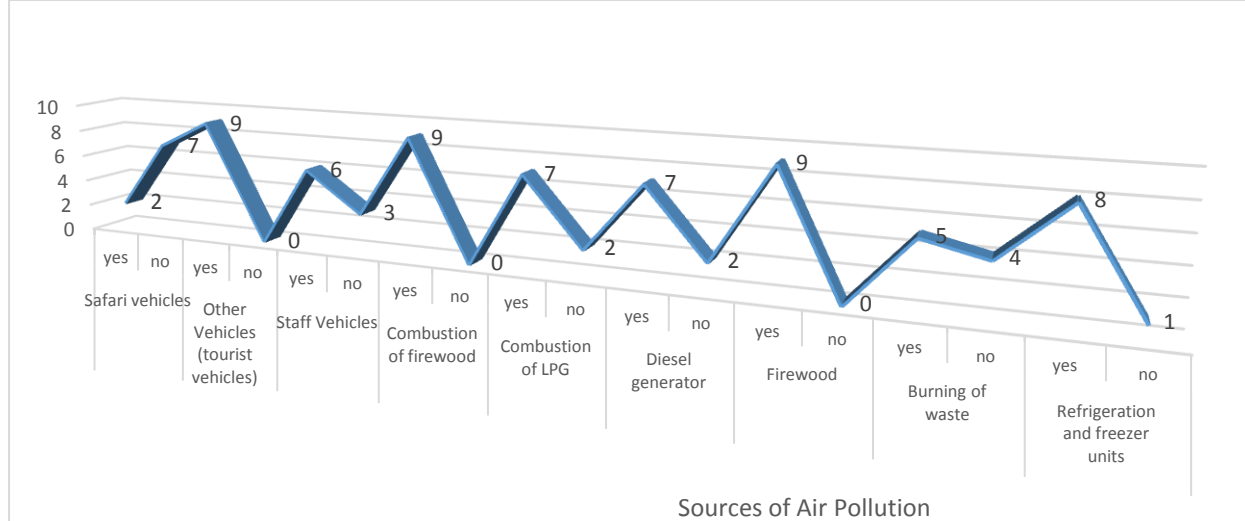
SAFARI VEHICLES		OTHER VEHICLES (TOURIST VEHICLES)		STAFF VEHICLES		COMBUSTION OF FIREWOOD		COMBUSTION OF LPG		DIESEL GENERATOR		FIREWOOD		BURNING OF WASTE		REFRIGERATION AND FREEZER UNITS	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
2	7	9	0	6	3	9	0	7	2	7	2	9	0	5	4	8	1

	GUESTS REDUCE AIR POLLUTION	EMPLOYEES REDUCE AIR POLLUTION	AIR FRESHENERS AND ROOM PURIFICATION	SMOKING AREA	AFFORESTATION ACTIVITIES
YES	7	7	6	4	6
NO	1	1	4	3	2



Considering that the resorts are located in fragile ecological zones, the mandate of Air Pollution has to be seen and understood. The research team while at Bandipur ensured that the question was addressed to all the resorts and the findings were significant. When the tourists proceed to safari as per the directions of the KFD no private safari vehicle is allowed to enter the forest. Hence JLR or/and KFD

vehicles only ply with the tourists for safari purposes. Only 2 respondents mentioned that safari vehicles pollute the environment and 7 clearly mentioned that they were not polluting. Surprisingly the tourist vehicles that come to the resorts, all 9 respondents have mentioned that the tourist vehicles pollute the environment. Staff vehicles a total of 6 respondents mentioned that there is pollution and 3 respondents confirmed that there was no pollution. Combustion from fire wood, all 9 respondents confirmed that there was pollution. Whilst 7 confirmed that combustion of LPG also lead to pollution in the resort area; 2 respondents did not believe there was pollution. Most of the resorts possess Diesel generators considering the power scenario from the Government grid. 7 of the respondents confirmed that there was pollution on account of the generator and 2 confirmed that there was no pollution. Another facet that is contributing to the pollution is the burning of waste; as some of the resorts burn the plastic waste. Here too, 5 of the respondents confirmed that burning of the waste was providing an impetus to pollution and 4 said that burning of waste did not lead to pollution. 8 respondents confirm that refrigeration units add to the pollution in the resorts as well.



There was an intent of the researcher to collect Air Pollution data with the help of the Karnataka State Pollution Control Board (KSPCB); however the same was not possible on account of the machine and the power it would consume. KSPCB Scientist confirmed that if the machine was placed in vantage then 24 hour power supply would be mandated. In the case of the forest areas, it was clear that 24 hour power supply could not be provided, hence the Air Pollution data was not collated. However, if need be the KFD should make a detailed study in regards to the Air Pollution and have a metric in place. This should be done in a planned way along with KSPCB.

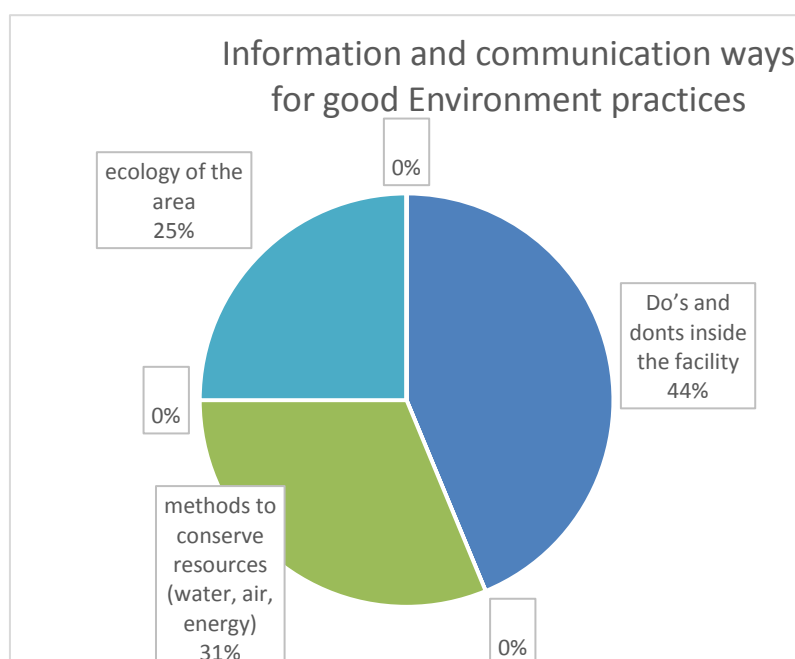
This apart 7 of the respondents have confirmed that help the guests and their employees to understand the issues of air pollution and in fact educate them to reduce pollution from the perspective of air. 4 respondents have confirmed that there are no smoking areas in the resorts. Afforestation activities become mandatory in eco sensitive areas, and 6 of the respondents have confirmed that they resort to afforestation activities like sapling plantation which helps them to preserve the ecology on the long term.

30. EDUCATION, CONSERVATION AND COMMUNITY DEVELOPMENT

DO'S AND DONT'S INSIDE THE FACILITY	7
METHODS TO CONSERVE RESOURCES (WATER, AIR, ENERGY)	5
ECOLOGY OF THE AREA	4

[Note: two of the resorts do not engage in any of the activities as prescribed for the study.]

Educating and communicating to the stakeholders, including the tourists/guests is an important phenomenon. Do's and Don'ts play a very vital role in any facility, considering the fact tourists/guests may not know or would not be genuinely aware of the things to be done, our simply be ignorant of the same. Here the team is able to establish that 7 of the respondents made efforts to provide for the Do's and Don'ts to the tourists/guests who visit the facilities thereby making efforts to

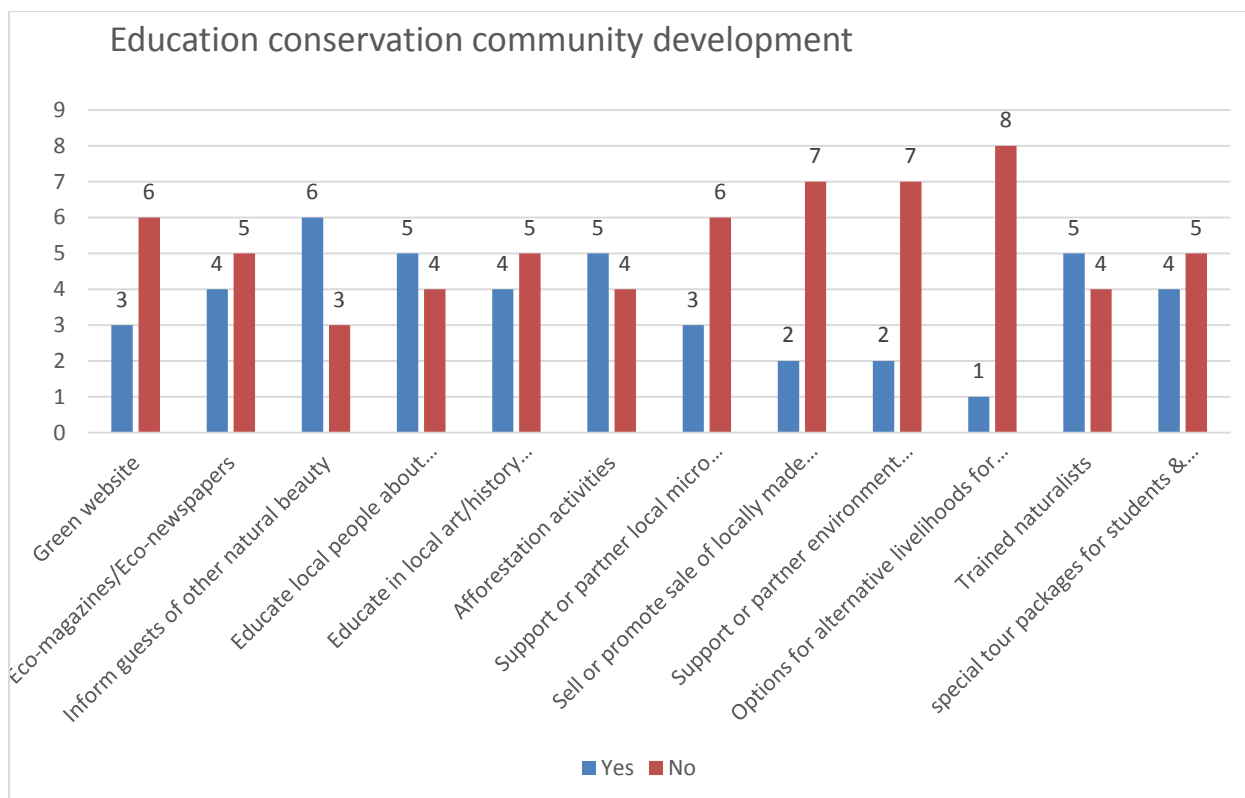


ensure a qualitative stay in the eco fragile areas. 5 of the respondents confirmed that they educate the visitors and other stakeholders to conserve resources, which will go a long way in ensuring protection of the place.

However, the research team did find that 2 resorts did not engage in any of the activities. Such a situation should be arrested. Education and communication should be key aspects to help preserve the environment and ensure sustainability.

31. Communication:

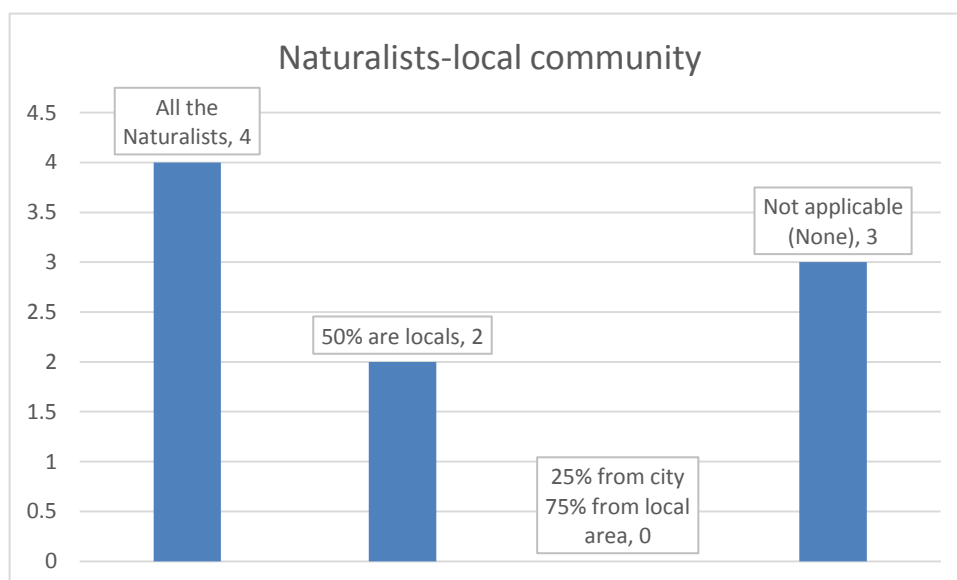
	YES	NO
GREEN WEBSITE	3	6
ECO-MAGAZINES/ECO-NEWSPAPERS	4	5
INFORM GUESTS OF OTHER NATURAL BEAUTY	6	3
EDUCATE LOCAL PEOPLE ABOUT BIODIVERSITY/CONSERVATION	5	4
EDUCATE IN LOCAL ART/HISTORY (PERFORMANCES,PUPPETRY,STORYTELLING,DOCUMENTARIES ETC)	4	5
AFFORESTATION ACTIVITIES	5	4
SUPPORT OR PARTNER LOCAL MICRO ENTERPRISES	3	6
SELL OR PROMOTE SALE OF LOCALLY MADE ITEMS	2	7
SUPPORT OR PARTNER ENVIRONMENT EDUCATION/COMMUNITY DEVELOPMENT INITIATIVES/ORGANISATIONS	2	7
OPTIONS FOR ALTERNATIVE LIVELIHOODS FOR PERSONS ERSTWHILE ENGAGED IN ENVIRONMENTALLY DETRIMENTAL ACTIVITIES	1	8
TRAINED NATURALISTS	5	4
SPECIAL TOUR PACKAGES FOR STUDENTS & TEACHERS	4	5
REPORT ANY ILLEGAL ACTIVITIES (VIZ.,QUARRYING, MINING, DEFORESTATION ETC IN YOUR SURROUNDINGS TO THE GOVERNMENT	4	5



NCTA has also focused on aspect of a social cause wherein the Government order has categorically mentioned that, the ecotourism system should provide for subsidized visits of students while fostering educational extension activities. This is a clear indication of support the future generations leading to the preservation of the natural resources, but also gets juxtaposed with the nuance of corporate social responsibility (CSR), which brings business closer to the people.

32. Naturalists-local community:

All the Naturalists	4
50% are locals	2
25% from city 75% from local area	0
Not applicable (None)	3



It can be rightly said, Naturalists, who front the end the resort and the various products/services are the heart of the eco-tourism scenario. Should they be local, or should they be come from cities

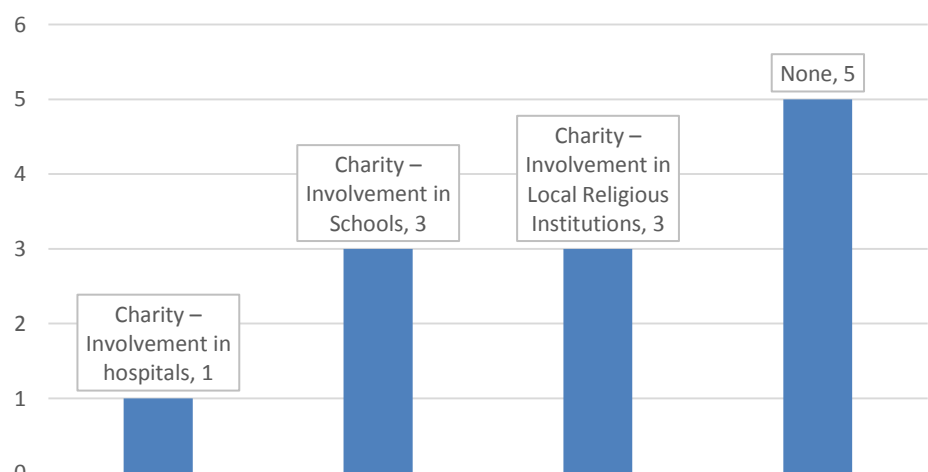
is an issue that the administrator's eco-tourism face. It is here that we need to have a committed understanding of the nuance and ensure that the locals, who will know the area of operation all too well be part of the same in a big way. In that case, the argument would be how does one train the locals to ensure interaction with the tourists? Who would bare the bottom-line? Should there be an administrative guideline to ensure implementation? Should there be an aspect of licensing of naturalists, as is the case of Tour Guide who are trained and licensed by the Indian Government and/or by the State Governments or the Tourism Directorates or Corporations, viz., Karnataka State Tourism Development Corporation (KSTDC).

33. Involvement in Local Community Development:

Charity – Involvement in hospitals	1
Charity – Involvement in Schools	3
Charity – Involvement in Local Religious Institutions	3
None	5

Call it corporate social responsibility (CSR) or involvement of the stakeholder at the grass root level, it becomes mandatory for the resorts to ensure, participation of the local population and institutions to bring in a symbiotic relationship that will go a long way to have a healthy relationship

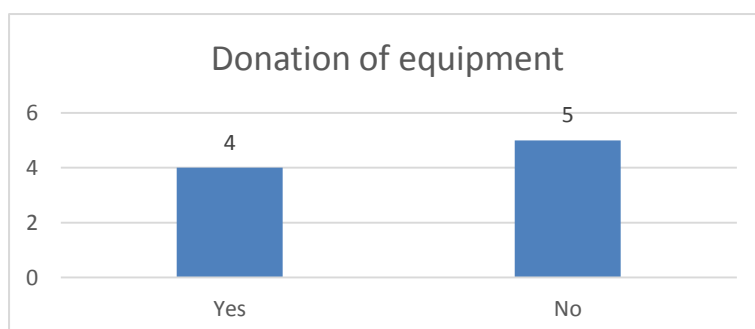
Involvement in Local Community Development



between all the participants. It has been seen that, all lines of business, in the corporate world, the interaction between the local population and the functionaries, besides, the users of the facilities is a must, and should be provided the highest attention possible. Resorts add a unique challenge to the *Suo Moto* participation of the locals. More than the participation, it is the way the managements make efforts to bring about locals on to their side and have a healthy format of business.

34. Donation of equipment

Yes	4
No	5

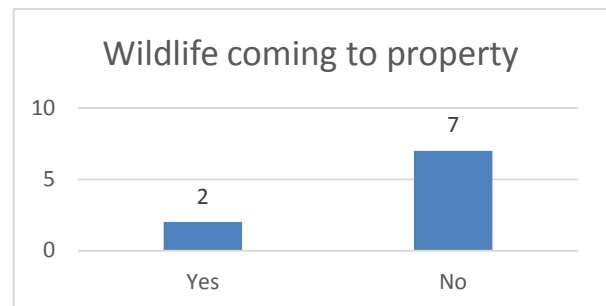


Part of CSR activity, a total of 4 resorts have confirmed that they donate equipment viz., computers and similar to the local stakeholders, which helps them to build a good relationship with the

locals. Whilst 5 of the respondents have said that they do not donate any equipment.

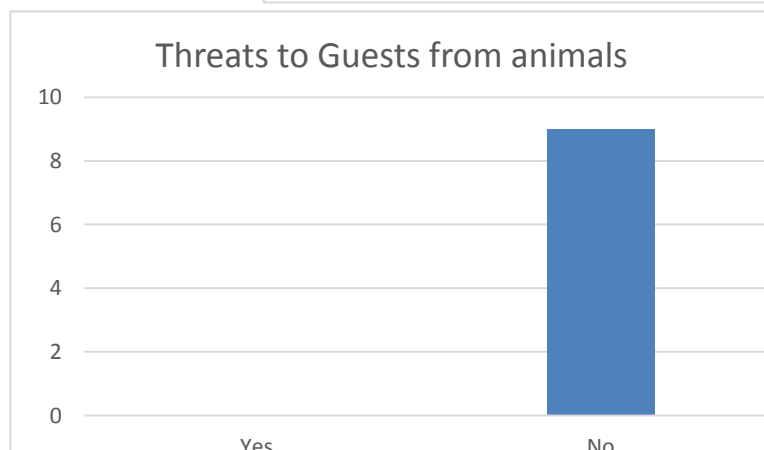
35. Wildlife coming into the property:

Yes	2
No	7

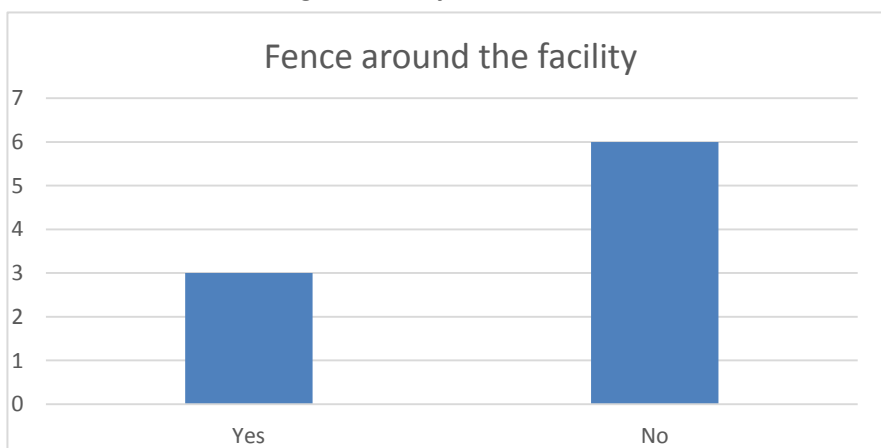


36. Threat to Guests:

Yes	0
No	9



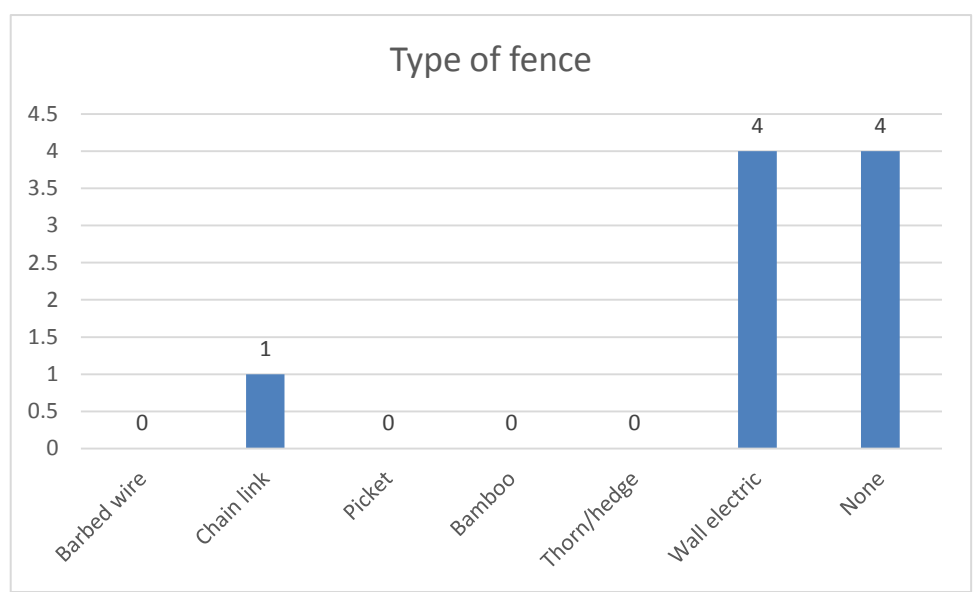
37. Fence surrounding the facility:



Yes	3
No	6

38. Type of fence:

Type of Fence	Response
Barbed wire	0
Chain link	1
Picket	0
Bamboo	0
Thorn/hedge	0
Wall electric	4

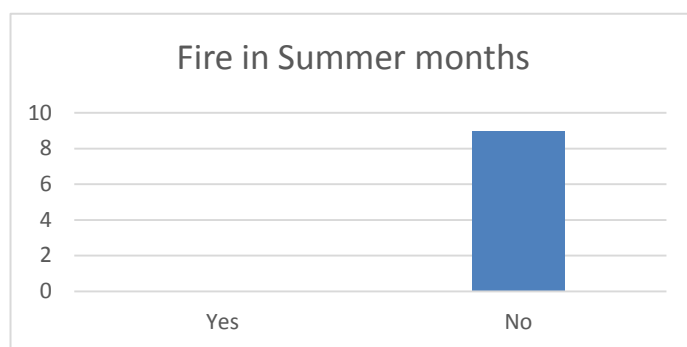


None	4
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Animals coming close to the resorts, the threats to the guests and the employees, the measures taken are all very realistic. When the research team placed questions about wildlife coming to the property, 2 respondents have said in the positive whilst 7 have said, no animals come to the resorts. When queried further about the threat to the guests, all 9 respondents have informed the team in the negative. From the point of view of fencing, 6 respondents have confirmed that they do have a fence, whilst 3 have said that they do not have a fence. Chain link and wall with an electric fence are popular with the resorts in the Bandipur landscape.

39. Fire in summer months:

Yes	0
No	9



Forests are known for forest fires, surprisingly all the 9 respondents have mentioned that even during the summer months there have no instances of fire in the Bandipur forest or the environs close to the resorts. It is suggested that adequate training and preparation should be provided to the resort managements to face any eventuality.

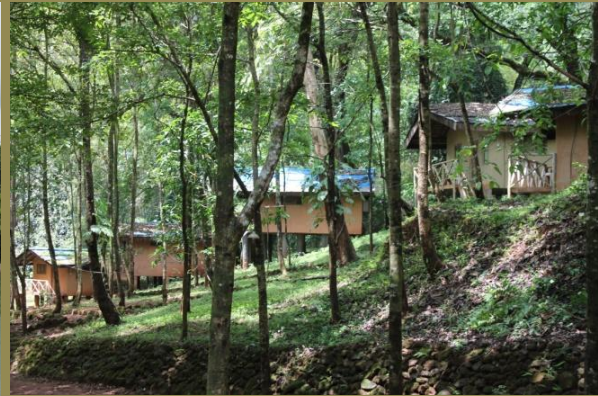


The rugged beauty of Bandipur has captivated the tourist for years, also has put tremendous pressures on its fauna and flora. The park has withstood all odds and has kept its visitors ever satisfied. With social problems and the battle to save itself, Bandipur is an enchantment amidst the fury of



mankind! The biggest problem is perennial shortage water, which in turn is compromised by the locals to the tourist accommodation facilities owners, thereby competing for critical resources. Bandipur- The stakeholder for extreme tourism!

Ecotourism Impact Study



Environmental Impacts of Ecotourism in Dandeli-Anshi Tiger Reserve (DATR)

Freeda Maria Swarna¹ and Manojkumar²

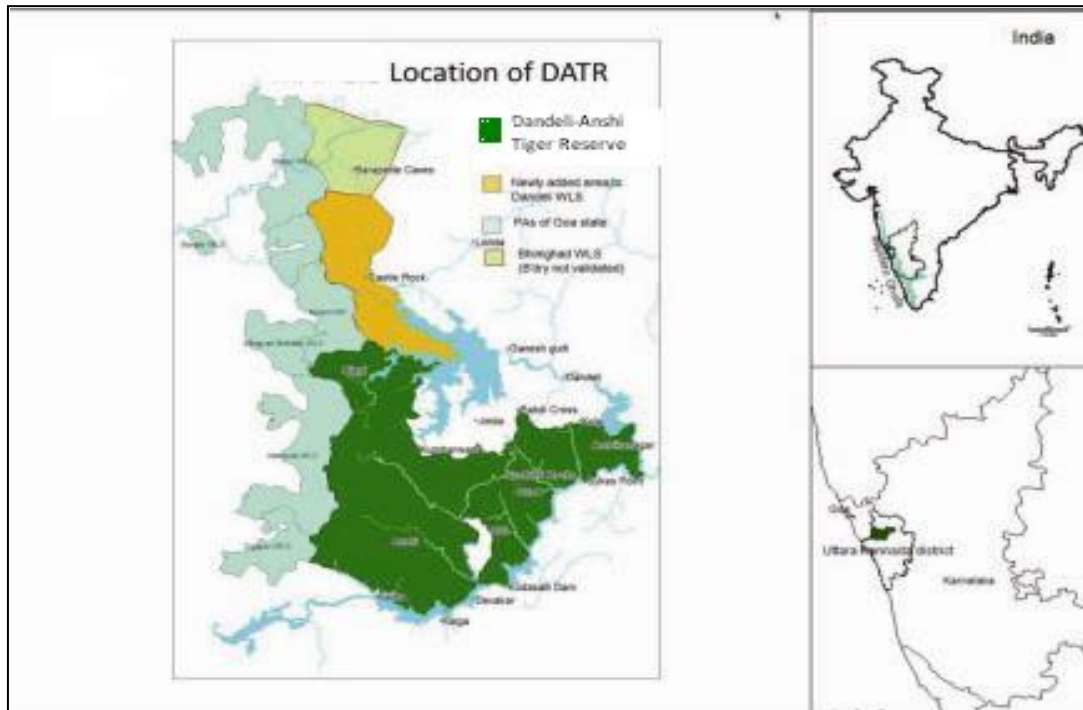
Karnataka Ecotourism Development Board



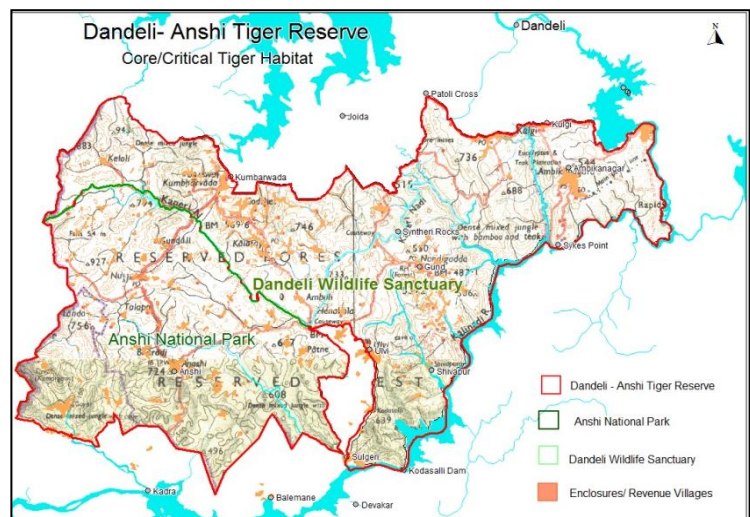
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Introduction

Covering the taluks of Haliyal, Karwar and Joida, the Dandeli –Anshi Tiger Reserve (DATR) is part of the Uttara Kannada district of Karnataka. It lies between latitudes 14° 57' 23.04" N; longitudes 74° 15' 7.56" East and latitude 15° 9' 56.16" North; longitude 74° 43' 10.56" East.



The Tiger Reserve comprises of two important protected areas of the region viz., Dandeli Wildlife Sanctuary and Anshi National Park. **Dandeli Wildlife Sanctuary** (475.018 sq km) and **Anshi National Park** (339.866 sq km) are contiguous to each other and form a single tract of protected area located in biologically sensitive Western Ghats. These two protected areas are administratively unified under DATR.

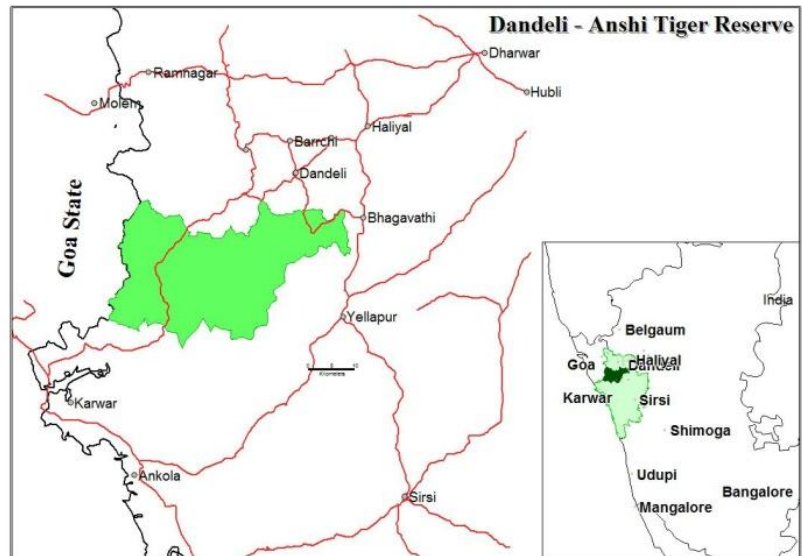


The total extent of the core/critical area of the reserve is 814.884 sq km. The details are as under:

Sl. No.	Govt. of Karnataka Notification No. & Date	Dandeli Wildlife Sanctuary	Anshi National Park	Total Area (in sq. kms.)	Remarks
1	FEE 58 FWL 96 dated: 9-3-1998	475.018	-	475.018	Dandeli Wildlife Sanctuary
2	FEE 221 FWL 99 Dated: 18-8-2003		339.866	339.866	Anshi National Park
3	G.O. No. FEE 254 FWL 2006, Bangalore dated: 04-01-2007				Dandeli-Anshi Tiger Reserve
4	Notification No. FEE-299-FWL-2007 dated: 20-12-2007	475.018	339.866	814.884	Critical Tiger Habitat of Dandeli-Anshi Tiger Reserve.
5	Additional area of Joida Range of Karwar Division				
	FEE-16-FWL-2008 dated: 11-9-2008	163.3303	-	163.3303	Buffer area Notification No. FEE 123 FWL 2009 dated: 1-9-2010
6	Additional area of Kadra Range of Karwar Division				
	FEE-16-FWL-2008 dated: 21-8-2009	-	77.4823	77.4823	Buffer area Notification No. FEE 123 FWL 2009 dated: 1-9-2010 Total Buffer area 77.48+163.33+29.62 (Ulvi) +12.20 (Bommanalli Tank) (Virnoli Range) Total: 282.63
	Total Area:	638.3483	417.3483	1055.6966	
7	Additional area of Tinaighat Range of Haliyal Division				
	Grand Total of Area:	886.4144	417.3483	1303.7627	

DATR can be approached either from Dharwad-Belgaum or from Karwar-Goa side. From Dharwad the approach is by rail from Bangalore to Dharwad (479 km), on to Alnavar (31 km), then to Dandeli by road (32 km) and on to the Sanctuary by road (11 km). Otherwise from Dharwad to Dandeli (57 km) and on to the Sanctuary (11 km). From Bangalore : by air or road to Belgaum (480 km), on to Ganeshgudi (76 km), then to Kulgi (via Potoli, 22 km). The approach from Karwar-Goa side is by road from Goa (Panaji) to Sadashivgad

i.e., Karwar (105 km), Sadashivgad to Kadra (35 km) and then from Kadra to Anshi (15 km).



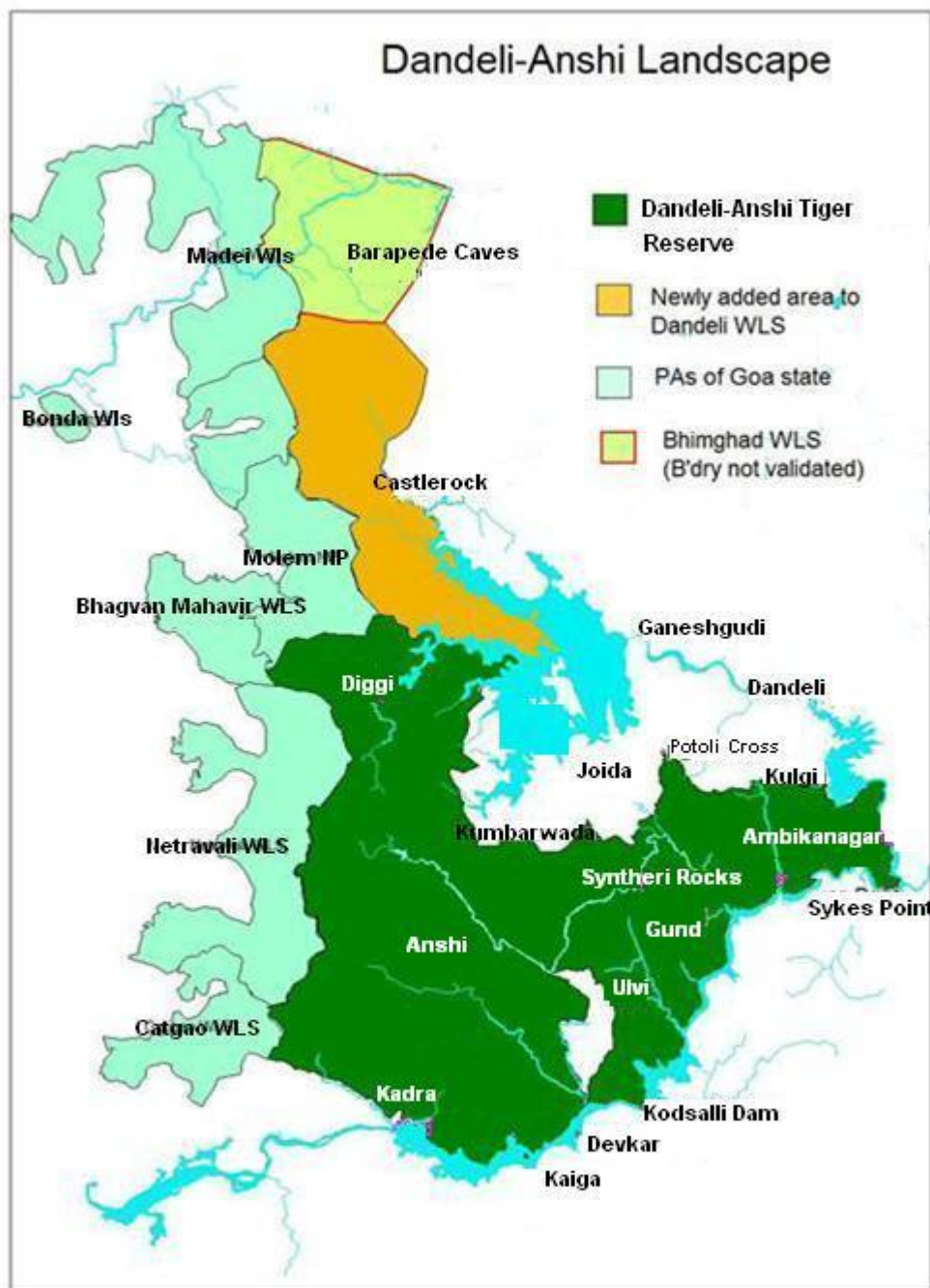
In the entire region of Northern Karnataka Dandeli WLS and Anshi NP are the only two protected areas located in lush green and diverse forest area. These protected areas are contiguous to each other and together constitute the Tiger Reserve, which is one of the five Tiger reserves in Karnataka.

These areas are home to rare endemic flora and fauna. The largest Indian butterfly – Southern Birdwing to the endemic Malabar Tree Nymph are found in good population in these woods. The major part of the fauna found is of typical South Indian type carnivores. The important fauna includes Tiger, Leopard, Dhole, Jackal, Elephant, Gaur, Sambar Deer, Spotted Deer, Barking deer, Mouse Deer, Sloth Bear, Hanumaan Langur, Bonnet Macaque, Indian Giant Squirrel, Flying Squirrel, Pangolin, etc.

The Reserve is a paradise for bird watchers. DATR acknowledges the presence of at least 272 bird species belonging to 45 families of which 19 species are endemic. Interesting birds include Common Grey Hornbill, Malabar Grey Hornbill, Malabar Pied Hornbill, Great Indian Pied Hornbill and Ceylon Frogmouth.

Anshi NP comprises of mostly tropical evergreen and semi-evergreen types of forests and hence is not so rich in large mammals. However, it is a treasure house for small mammals, reptiles, amphibians, butterflies, orchids, birds, ferns, medicinal herbs and insects. The King Cobra, Python, Cobra, Rat Snake, Vipers (Bamboo Pit Viper, Hump-nosed Pit Viper, Malabar Pit Viper, etc), Ornate flying snake, wolf snake and Kraits are among the snakes that inhabit the Park. Reptiles such as *Draco*, are also found in quite good number.

It is adjoining to the existing protected areas of Goa viz., Cotigao wildlife sanctuary, Netravali wildlife sanctuary, Molem National Park, Bhagavan Mahaveer wildlife sanctuary and Madai wildlife sanctuary.

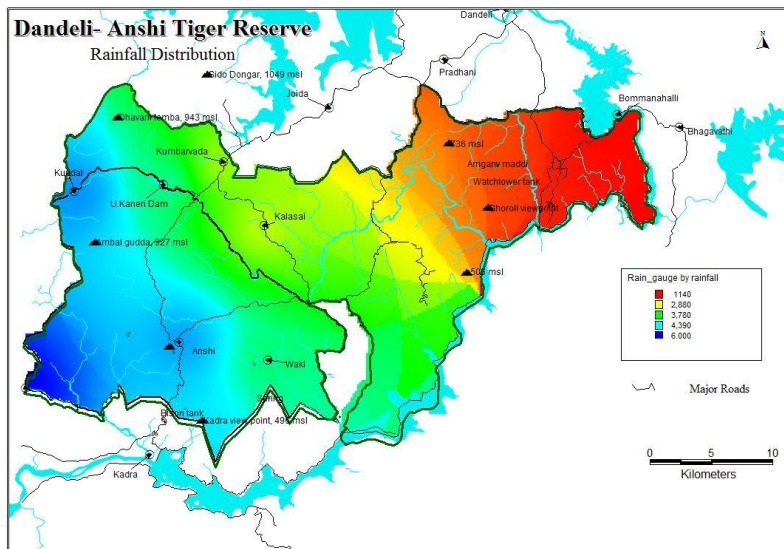


The climate is clearly demarcated by three distinct seasons. The monsoon signifies the wet season and starts in the last week of May and lasts up to the middle of October. Heavy showers are noticed in the months of June and July. The cold season generally starts in November and lasts up to mid February. The coldest months are December and January. The hot season commences in mid February and extends some times till mid June. The climate is clearly demarcated by three distinct seasons. The monsoon signifies the wet season and starts in the last week of May and lasts up to the middle of October. Heavy showers are noticed in the months of June and July. The cold season generally starts in November and lasts up to mid February. The coldest months are December and January. The hot season commences in mid February and extends some times till mid June.

The temperature of the reserve is generally moderate. It varies from 16⁰ C to 36⁰ C all through the year. The coldest temperature is recorded during the nights of January with 13⁰ C. The mercury begins to rise from February and reaches its peak in April – May.

Mist is quite common during the winter season. The Mist is seen all over the reserve in the cold season. However, it is not so significant in the region.

Rainfall

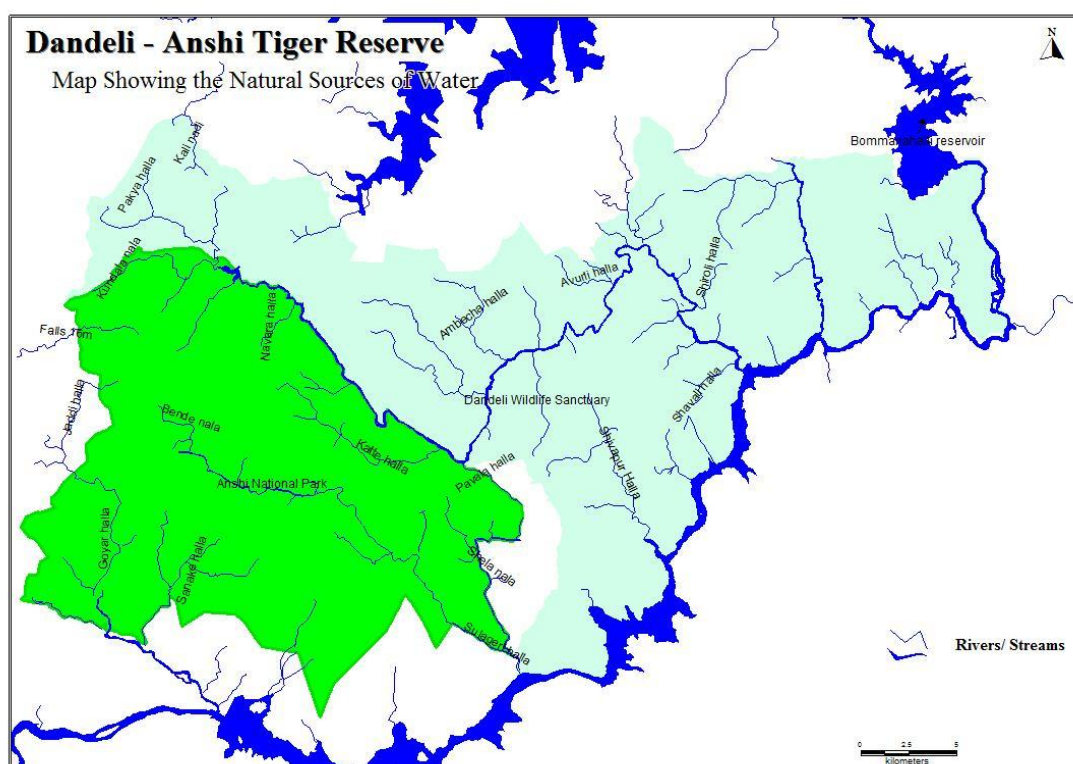


The south west monsoon usually breaks in the first or second week of June and withdraws by September. The area receives heavy rainfall during July. Rainfall is high in the west and decreases rapidly eastwards. The rainfall varies from 1250 mm to 4000 mm with an average of 2500 mm. The highest rainfall of about 5000 mm is recorded in Sulgeri village. Kumbharwada range receives about 3500 mm, Gund receives about 2250 mm, Aurli receives about

3000 mm and the least of all recorded in Ambikanagar is 1500 mm. Storms and cyclones are not recorded so far in this region.

Water Sources

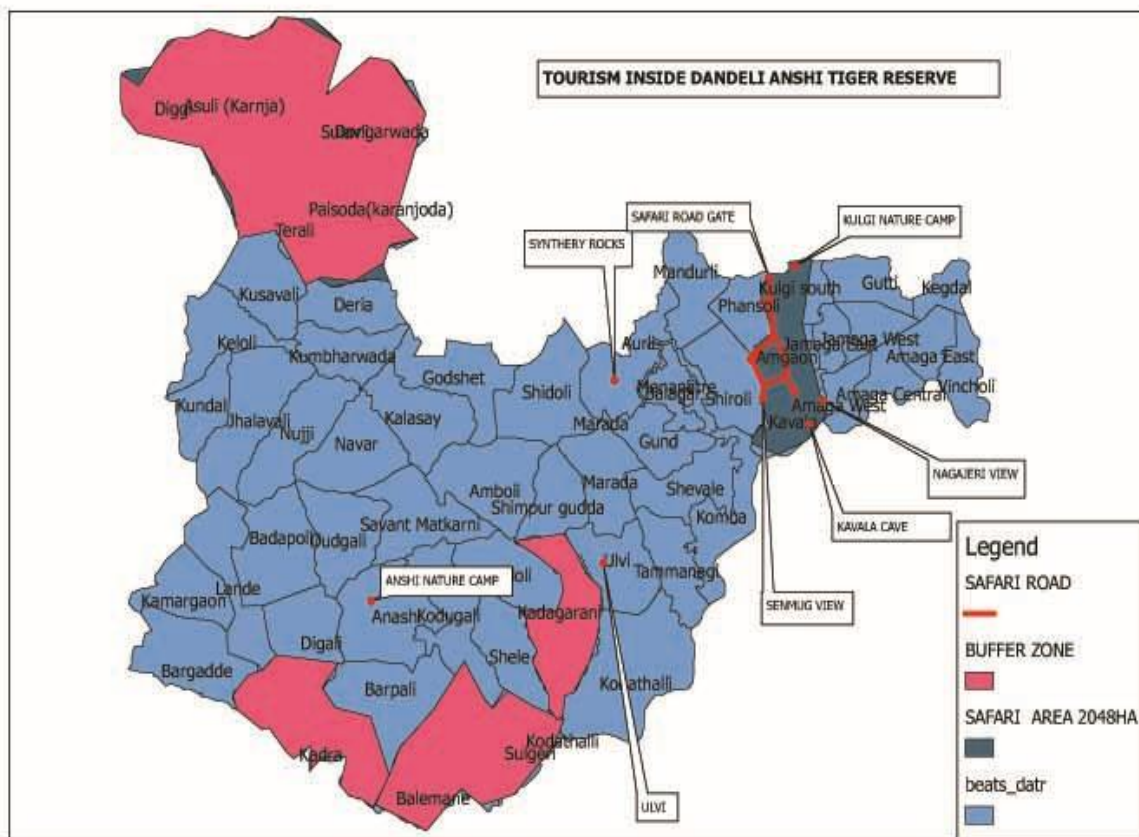
The terrain is quite undulating with numerous valleys and hill ranges. Due to the terrain and drain, in spite of the heavy rainfall, the water becomes scarce during the summer months. The reserve is a



Water from most of these perennial natural springs is utilised by the people for agriculture. In order to augment the natural water source there are artificial water sources created especially for the wild animals.

There are 6 dams in the Kali catchment viz., Supa, Bommanalli Pick-up Dam, Kodsalli and Kadra across river Kali and Upper Kaneri and Tattihalla . Due to the continuous release of water for electricity generation from Supa dam, the Kali river flows almost throughout the year. Due to the diversion of river water from Bommanalli to Nagazari power house, a stretch of around 18 kms remains dry except during monsoon.

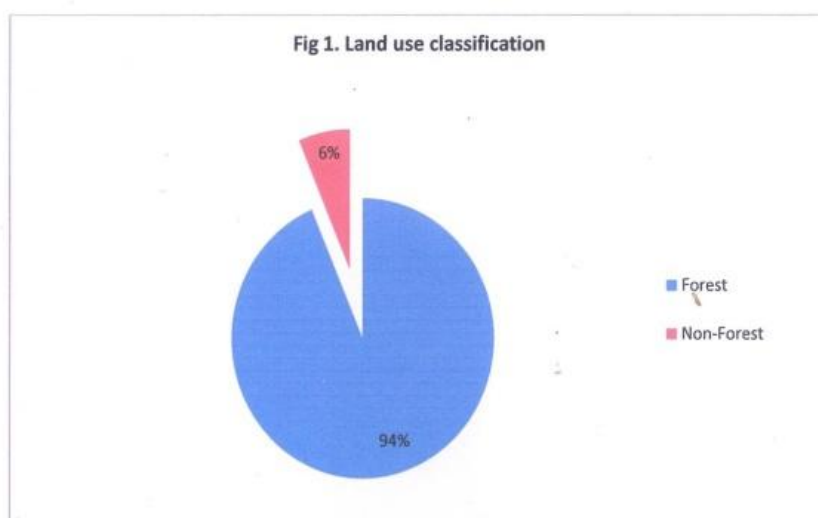
As per comprehensive guidelines for tiger conservation and tourism as provided under section 380 (i) (c) of the wild life (protection) act 1972 of National Tiger Conservation Authority, New Delhi, dated: 15-10-2012, 20% of the core or critical tiger habitat usage (not exceeding the present usage) for regulated, low-impact tourist visitation may be permitted.



Sl No	Year	Tourist Visitors Numbers			Amount
		Kulgi	Anshi	Total No	Grand Total
1	2	3	4	5	6
1	2001-02	6223	-	6223	593914.00
2	2002-03	10151	450	10601	549924.00
3	2003-04	7068	110	7178	585810.00
4	2004-05	9060	467	9527	710110.00
5	2005-06	13572	55	13627	839808.00
6	2006-07	17085	337	17422	1312455.00
7	2007-08	18073	717	18790	1943918.00
8	2008-09	19625	687	20312	2771062.00
9	2009-10	22423	798	23221	3121278.00
10	2010-11	25111	958	26069	4737768.00
11	2011-12	16067	1592	17659	6565674.00

Land use

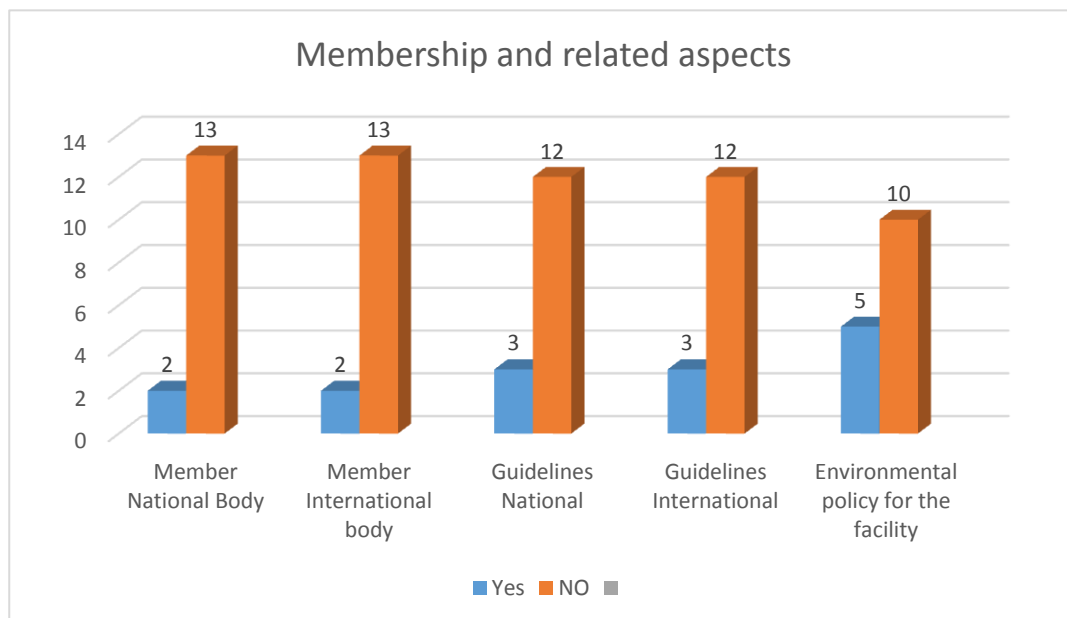
The land use pattern in the reserve is broadly categorized into Forest and Non-forest land. The non-forest land could be a Garden of Areca or a Paddy field. Apart from this another category could be submergence land due to dams across the river Kali.



Data Analysis, Findings, Results and Recommendations

Membership and related aspects

	MEMBER NATIONAL BODY	MEMBER INTERNATIONAL BODY	GUIDELINES NATIONAL	GUIDELINES INTERNATIONAL	ENVIRONMENTAL POLICY FOR THE FACILITY
YES	2	2	3	3	5
NO	13	13	12	12	10



The tourism system in the environs of the Kali, can be considered to be about two decades in the counting, and is looking bright. In the two decades of running a tourism system, the local populace though has joined in late; has come forward to usher in prosperity through tourism. Hence, we find that, but for a few, there are not many takers for becoming members of National or International bodies adhering to the norms specified. However, one can see a qualitative effort of the local tourism system to imbibe the best of practices and proceed to evolving a healthy tourism system.

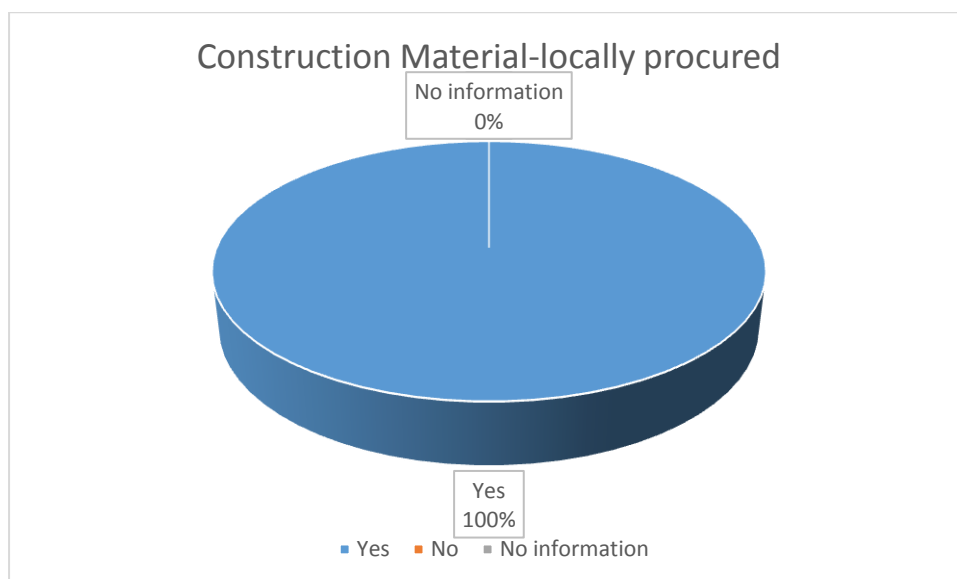
From the study and the data collated it is very clear that in the Kali Tourism system; the stakeholders, who are small enterprises, have not got into the aspect of subscribing to the members of National or International bodies which would help to benchmark the best practices. When the researcher was discussing the reason for not subscribing for the membership and adhering to best practices or guidelines, the stakeholders were candid to mention that either i) they were not aware of subscriptions or ii) could not afford subscribing for the same. However, the respondents clearly mentioned that they were for the betterment of the environment and its preservation. In fact, some of the respondents had adopted their own methodologies to have a designated environmental

policy for the facility that was being offered to the tourists. The advantage of becoming a member or subscribing for a membership of an association would be the fact that parameters pertaining to the effective management of the area will come in handy; as can be seen in the practices mentioned in the National Tiger Conservation Authority (NTCA) guidelines, which states, “...to adopt low-impact wildlife tourism which protects ecological integrity of forest and wildlife areas, secure wildlife values of the destination and its surrounding areas.” This clearly means, formalizing of the administrative measure and adopting to ensure protection of the area. Thence, from the data collated and assessed, it is pertinent that the Government machinery, implement uniform guidelines which will help in promoting quality and sustainable tourism.

Construction Material

The materials used on construction have always attracted the tourists. In many cases tourism products by way of infrastructure have taken the local aesthetics and pertinent frameworks and ensured beauty to the product. In the case of the Kali Tourism system, the homestays have been stand-alone properties/products that are part and parcel of the household; hence, most of the respondents, have made use of locally available construction material and not gone too far away destinations to procure the same.

Locally sourced	Yes	No	No information
Responses	15	0	0



The NTCA guidelines have categorically mentioned to, “promote sustainable use of indigenous materials for tourism activities.” This aspect needs to be highlighted in any intervention that the Government would bring in for resorts run by the Government through Public Sector undertakings and the private sector players. It is clear, that campaigns have to be organized and inputs provided to ensure a proliferation of the NTCA thoughts and guidelines that will augur well for the business of eco-tourism.

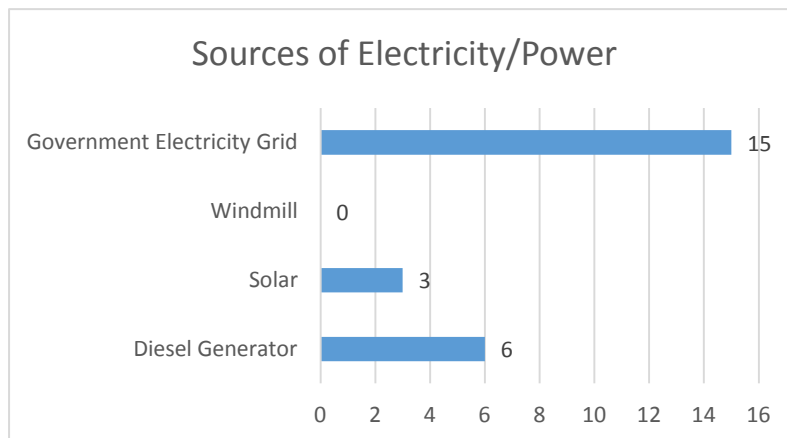


3. Source of Electricity

Electricity, power has been a perennial issue for the resorts as in other destinations. Electricity is required for a multitude of purposes, from lighting up the place to running fans, the kitchen to mention a few. And if the same is lacking, then one needs to ensure the availability of the same. The data collated has the following for the planner and administrator of the Eco Tourism to cherish and understand the requirements further.

Source of power generation	Responses
Diesel Generator	6
Solar	3
Windmill	0
Government Electricity Grid	15

All the 15 respondents depend on the Government Electricity Grid to ensure adequate power supply. Considering the area and issues that one can face; dependency on one source is not advisable. Considering that there are multitude of load shedding; the home stay operators and the Major resort players have resorted to power generation through Diesel Generators. Solar power has



been harnessed by 3 properties. The researcher would like to make a mention that Non-conventional energy sources must be put to good use to ensure minimum pressure on the Electricity Grid mechanism. For the purpose of adhering to the Non-Conventional energy mechanism, the Government should encourage the

stakeholders, to introduce solar, windmill, bio-gas other related mechanisms by means of subsidy, tax holiday, providing benefits of carbon credits; which will surely encourage the entrepreneurs to avail the benefits and provide for a minimum impact on the resources that are becoming scarce.

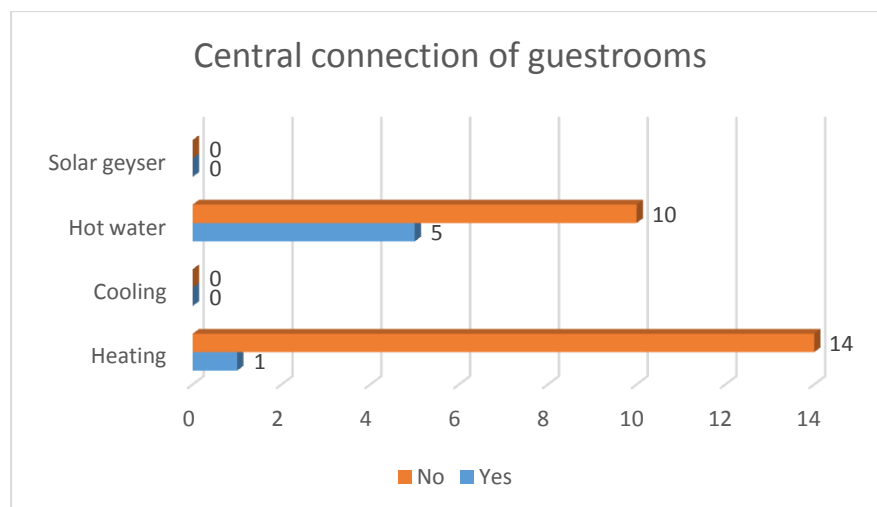
As is the case of Dandeli, the resorts, homestays, being located within forested areas and dense tree cover use of generators can cause harm to local flora and fauna. The generators produce an average of 80dB of sound and also are diesel operated, which adds to air pollution. The noise levels are clearly above the permissible limits of 50dB in a silent zone⁴².

⁴² The Karnataka Pollution Control Board mandates 50dB in a silent zone during the day and 40dB during night.

At the cost of being repetitive, considering that the Kali Tourism system has small resorts with less than 5 bed capacity, at times only one or two rooms to spare, use of wind energy for electricity requirements will surely help to accrue the benefits. Solar, Wind energy, bio-gas, will add value and ensure quality in Eco tourism.

Central connectivity of Guestrooms:

	Yes	No
Heating	1	14
Cooling	0	0
Hot water	5	10
Solar geyser	0	0



Most of the homestays had boilers, wherein hot water meant for the guests was boiled using firewood and supplied in buckets to the rooms where the guests were staying. The firewood was primarily collected from around the homestay which is surrounded by a forest area. The researcher observed in Dandeli in particular, a lot of wood was being used as fuel wood due to its availability in abundance. Use of forest depots. The researcher would like to place a perspective as per the NTCA, which has also been dealt with separately in another aspect of the study. For easier understanding the same is presented for the reader/administrator to access and analyze. The use of wood as fuel as per the NTCA guidelines is prohibited except for campfire for which wood must be procured from the State Forest Department or the forest development corporation depots. In the survey conducted at Dandeli area, 5 respondents confirmed that they use firewood collected locally for purposes of water heating. Here one needs to look into the aspect of firewood gathering and ensure compliance such that the mandates of the NTCA are adhered.



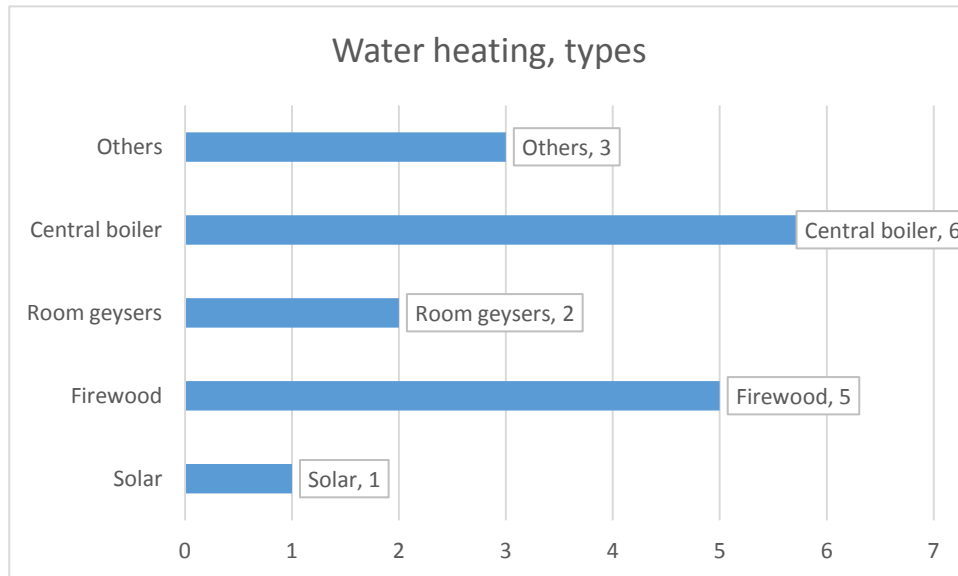
Another aspect worth noting is that most of the Home Stays in Dandeli are using Gujarat Boilers which can be operated with the dry waste, viz., leaves, twigs and off course wood. The researcher observed that wood



strewn around are being used for the boilers, instead of dry waste generated by them.

Water Heating

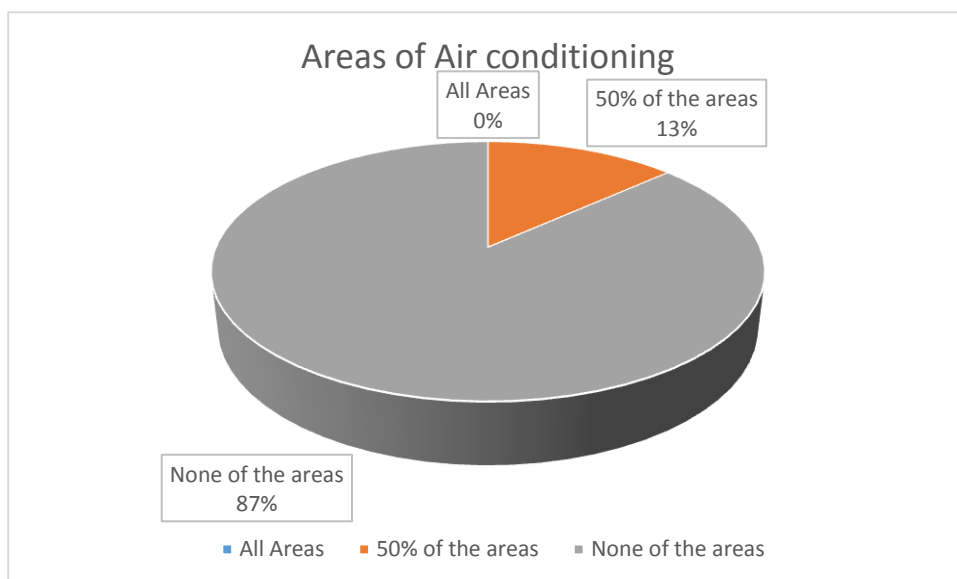
Solar	1
Firewood	5
Room geysers	2
Central boiler	6
Others	3



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Facet of Air conditioning

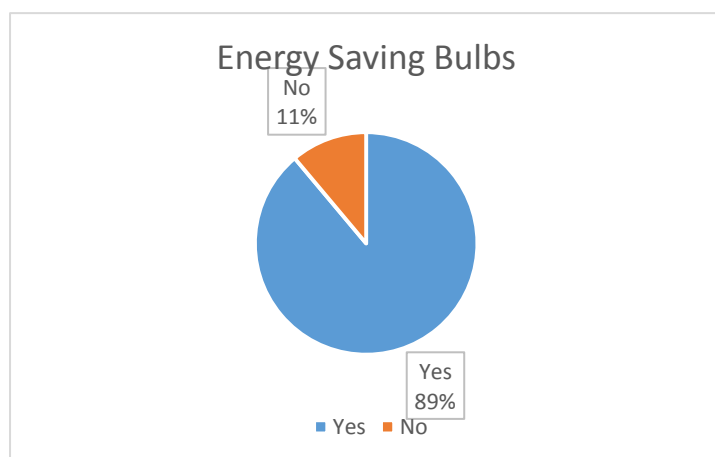
All Areas	0
50% of the areas	2
None of the areas	13



Except for JLR and Bison River Resorts, all the other resorts and homestays, do not have provision for Air Conditioning. The researcher strongly suggests that a law/order be passed for stopping the use of AC's in a place like Dandeli and the tourism system, which is during most part of the year, has a salubrious climate. Good ventilation and open spaces will take care of the comforts of the guests.

Energy Saving Bulbs:

	Yes	No
Energy Saving Bulbs	8	1



As per the NTCA guidelines, outdoor high intensity illuminations shall not be utilized as it disturbs nocturnal wild animal activities. All tourist facilities, old and new, shall aim to generate at least 50% of their total energy and fuel requirements from alternative energy sources, which may include Solar and Bio-gas. The researcher suggests the use of LED bulbs that are energy efficient and durable.

Employment of Energy Saving

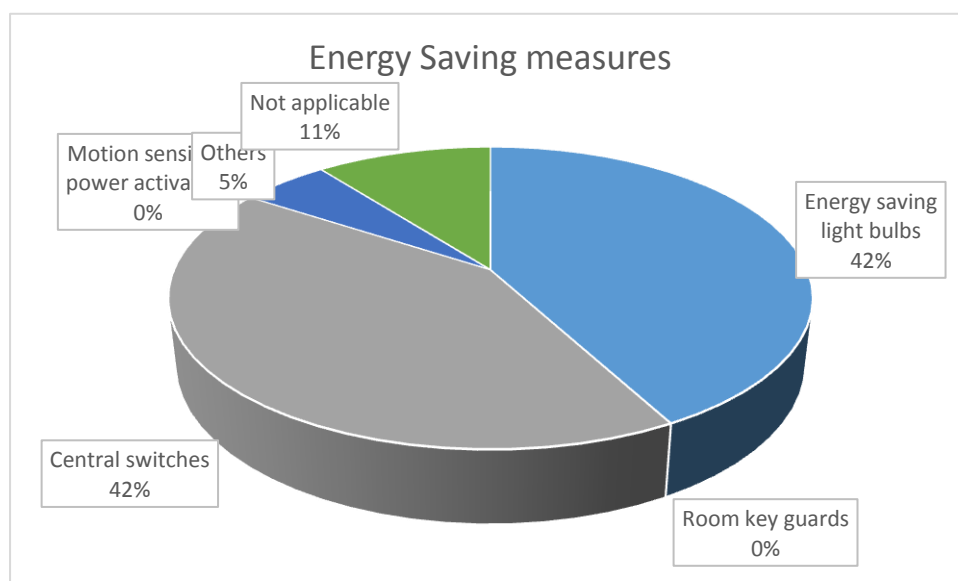
measures

Whilst pursuing on the research, the researcher identified a few parameters that the Ministry of Power⁴³, Government of India, has come out through the Energy Conservation Act, 2001. The following are some of the observations that can be adopted, under the Energy conservation building code (ECBC) (launched by the Government of India on 27th May 2007 read along with the National

⁴³ http://powermin.nic.in/acts_notification/energy_conservation_act/introduction.htm accessed and retrieved on 8th July 2013. The Act of 2001 has undergone an amendment in 2010, and many inputs to bring about critical change have been incorporated. The issues of ECBC juxtaposed with NBC can be incorporated as required while creating a policy document/framework.

Building Code (NBC), which has a focus on the facets of sustainability. The ECBC sets minimum standards for commercial building have a connected load of 100kW or contract demand of 120 kVA

Energy saving light bulbs	8
Room key guards	0
Central switches	8
Motion sensitive power activation	0
Others	1
Not applicable	2

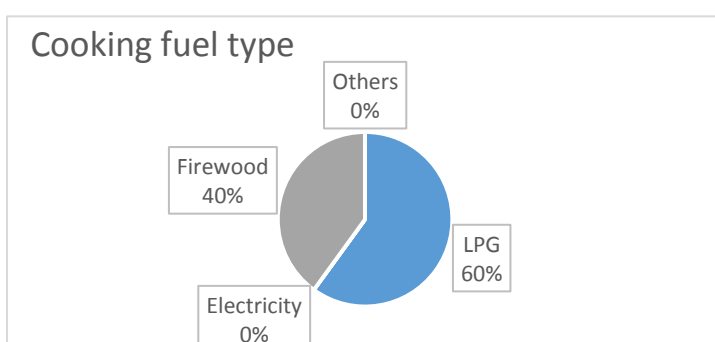


in terms of the Energy Conservation Act. The Ministry has developed an ECO Nirman conformance check tool with an objective of helping architects and design professionals to assess the conformance of their design with the ECBC

requirements. The Ministry under the ECBC issues the ESCO conformance label for those building that conform to the energy efficiency measures in building through performance contracting.

Cooking fuel, type

LPG	15
Electricity	0
Firewood	10
Others	0

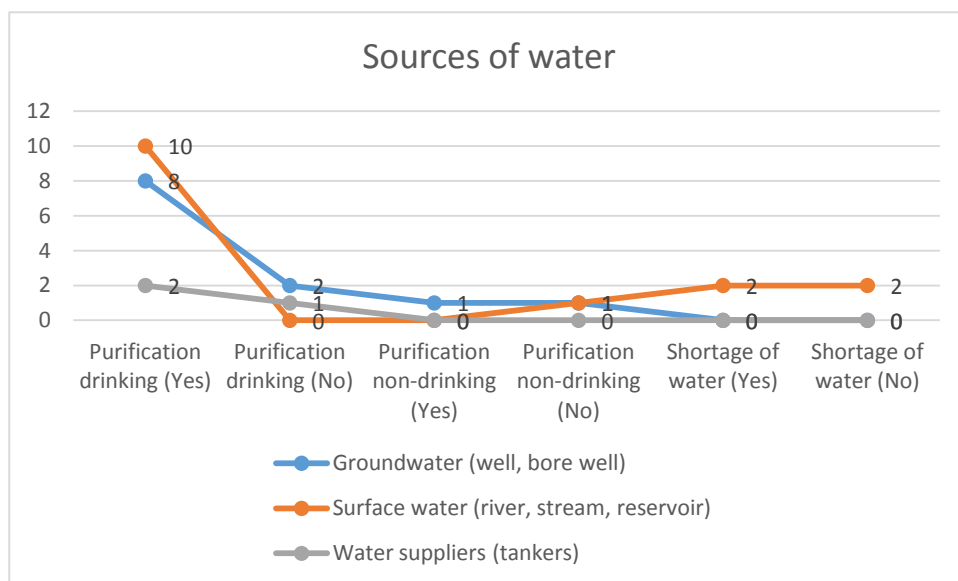


Considering the availability of wood from the forests, in its abundance, the stakeholders of the Dandeli Eco Tourism system, have adopted to the modern methods and induced Liquefied Petroleum Gas (LPG) for cooking purposes. Encouragement should be provided to all the homestay owners to ensure they move from fire wood and

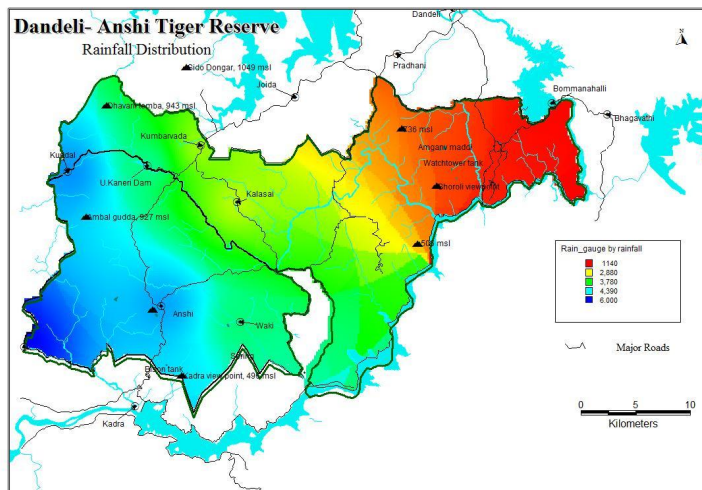
other medium to LPG which will help in the environment protection and preservation.

Source of water

SOURCE OF WATER	PURIFICATION DRINKING (YES)	PURIFICATION DRINKING (NO)	PURIFICATION NON-DRINKING (YES)	PURIFICATION NON-DRINKING (NO)	SHORTAGE OF WATER (YES)	SHORTAGE OF WATER (NO)
GROUNDWATER (WELL, BORE WELL)	8	2	1	1	0	0
SURFACE WATER (RIVER, STREAM, RESERVOIR)	10	0	0	1	2	2
WATER SUPPLIERS (TANKERS)	2	1	0	0	0	0



The terrain of Dandeli⁴⁴ is quite undulating with numerous valleys and hill ranges. Due to the terrain and drain, in spite of the heavy rainfall, the water becomes scarce during the summer months. The reserve is a catchment for river Kali and its tributaries like Kaneri. Kaneri and Kali are two major perennial natural sources of water in the Tiger Reserve. Other than these rivers there are several streams, springs, ponds like Shivali Nala, Shirolu Nala, Gangoda Nala, Kavala Nala, etc., nearly 37



springs flowing inside the reserve. All of them are perennial in nature. In Dandeli, the dependence on Ground water (inclusive of Wells and Borewells) from the 15 respondents stands at 8; whilst for surface water (river, stream and reservoir) the number of respondents who use the source stands at 10. Water from most of these perennial natural springs is utilized by the tourism accommodation facilities.

The south west monsoon usually breaks in the first or second week of

June and withdraws by September. The area receives heavy rainfall during July. Rainfall is high in the west and decreases rapidly eastwards. The rainfall varies from 1250 mm to 4000 mm with an average of 2500 mm. The highest rainfall of about 5000 mm is recorded in Sulgeri village. Kumbarwada range receives about 3500 mm, Gunda receives about 2250 mm, Aurli receives about 3000 mm and the least of all recorded in Ambikanagar is 1500 mm. Storms and cyclones are not recorded so far in this region.

Despite the area being water bearing, there have been occurrences of dry summers and dependence on water tankers. There have been instances of borewell failures, which clearly symbolizes reduction in the water table. The dependence on natural streams and rivers in the long run, will deplete the natural sources due to pressures on them for excess need of water; hence to avoid this the best plausible solution would be to make rain water harvesting a mandatory regulation in the eco-tourism guidelines. Dandeli, unlike Bandipur as a whole is heavily forested and the homestays are situated in remote areas that are otherwise inaccessible for patrolling to take place to understand their functioning and adherence to the environmental practices. Therefore, a periodic workshop or an association of tourism operators should be formed for interface and effectiveness. Joida, has an association called the Kali Group, a voluntary association of tourism operators in Joida area; who have empowered themselves for adopting standard operating procedures (SoP), which has helped in better environment practices.

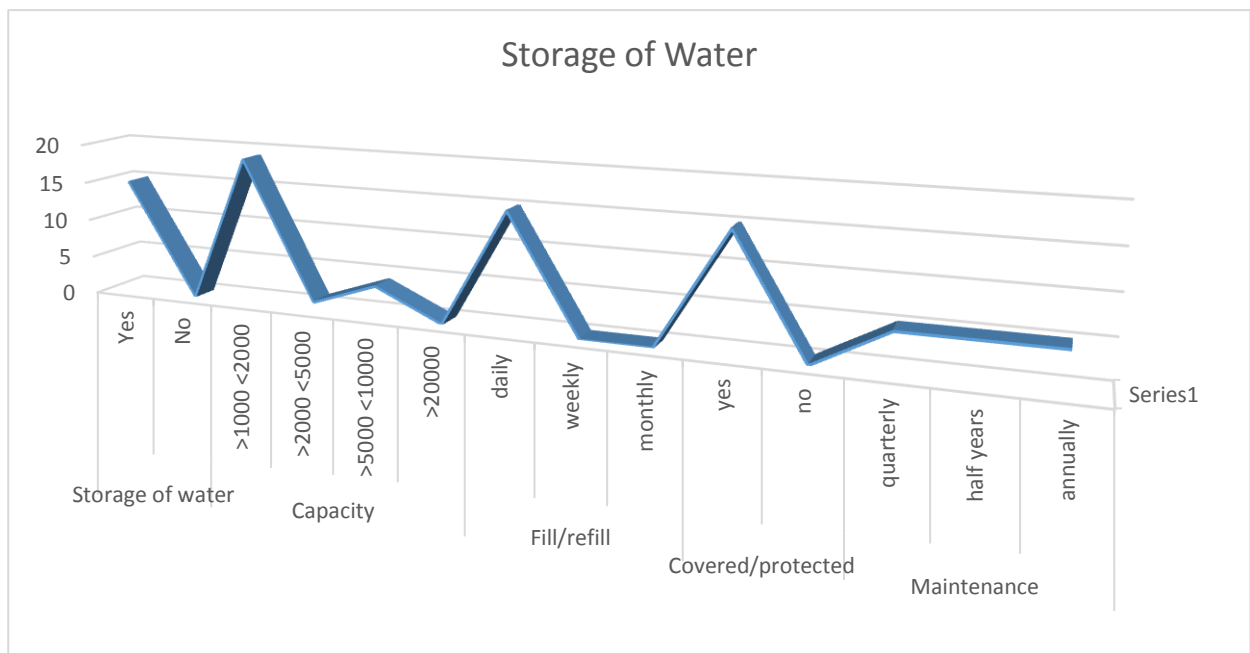


The Kali group, however, faces a serious problem of tourism services training, and are keen to work in close hands with the forest department to better themselves in terms of a capacity building in areas of information/knowledge, flora, fauna, nature interpretation and the like.

⁴⁴ Management plan of DATR (2008-2018), Karnataka Forest Department, Dandeli.

Storage of Water

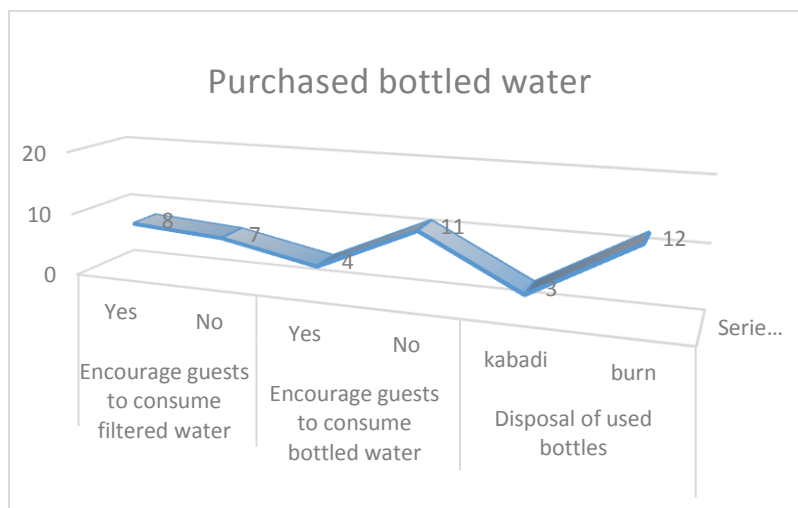
STORAGE OF WATER		CAPACITY				FILL/REFILL			COVERED/PROTECTED		MAINTENANCE		
YES	NO	>1000 <2000	>2000 <5000	>5000 <10000	>20000	DAILY	WEEKLY	MONTHLY	YES	NO	DAILY	WEEKLY	MONTHLY
15	0	19	1	4	0	15	0	0	15	0	5	5	5



Considering the number of homestays in Dandeli tourism area, and the visitations that happen, besides the usage of water by the locals; it is clear all the homestays make use of storage tanks for storing water that too in a rain bearing area. Most of the homestays have tanks in excess of 1000 liters, which helps to satiate the water requirement. This is apart from the water that is used at the regular house hold, which we are given to understand is far less than the usage by a visiting guest; which stand at an average, a home stay with two rooms is using about 2000 liters of water per day (refer chart and illustration), as against 200 liters of water, used by a household per day which is ten times less than the guest, homestay usage. This clearly symbolizes the competition for water between the tourist accommodation facility and the local people.

Purchase of Bottled Water

ENCOURAGE GUESTS TO CONSUME FILTERED WATER		ENCOURAGE GUESTS TO CONSUME BOTTLED WATER		DISPOSAL OF USED BOTTLES	
Yes	No	Yes	No	Kabadis	Burn
8	7	4	11	3	12



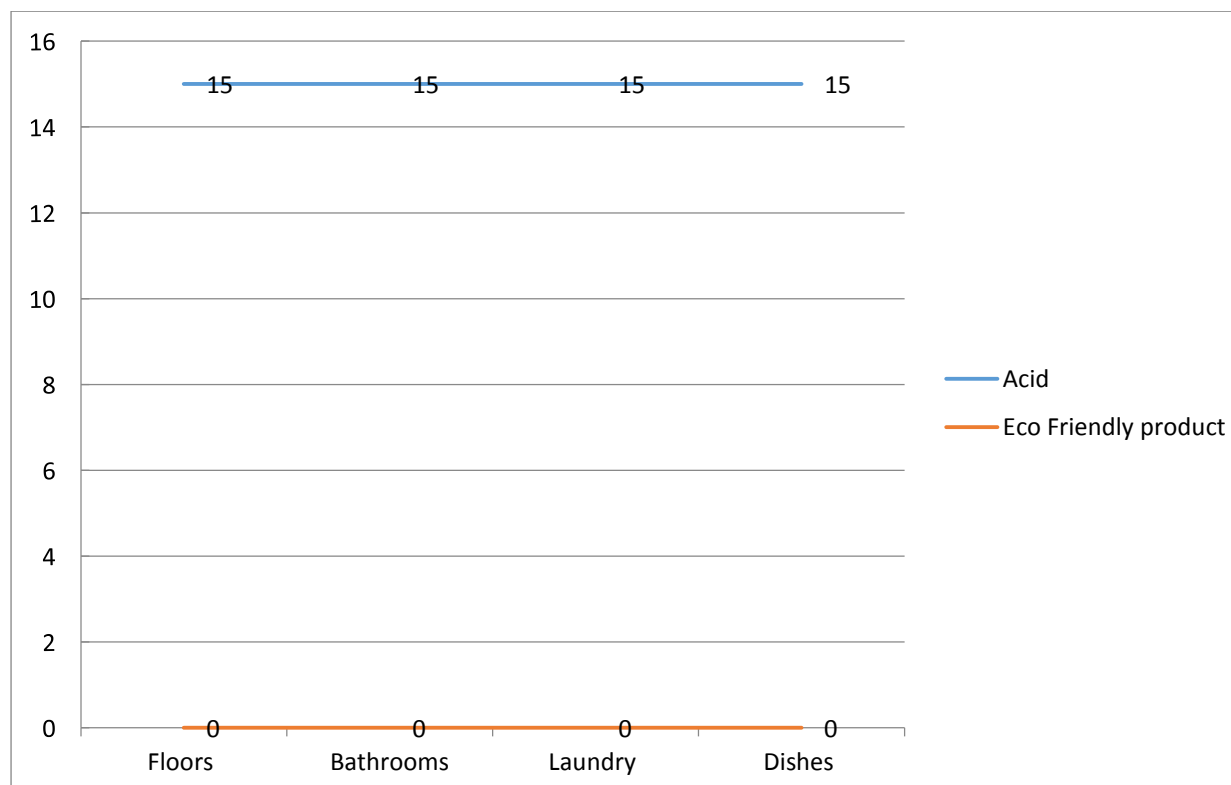
By encouraging the guests to consume filtered water, available on the premises, reduces the burden of purchasing bottled water which otherwise adds to plastic waste. The researcher observed that, in Dandeli, a lot of waste is collected and burnt, leading to issues in the environment. This considering the fact that 8 of the 15 homestays have stated that they allow the guest to consume

filtered water, whilst just 4 homestays have mentioned that they allow guests to consume bottled water. This brings us to a dichotomous situation, wherein instead of disposing the waste generated through *kabadis*, the same is being burnt.

Cleaning

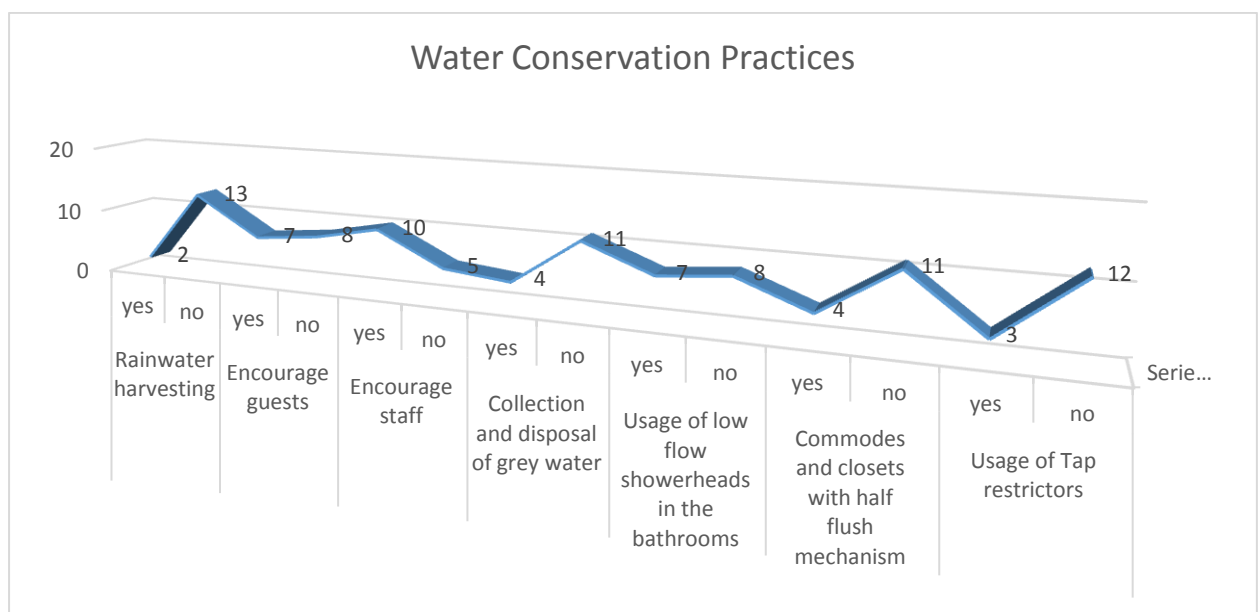
Eco tourism operator should imbibe in a tourist, a sense of education towards using environment/eco friendly products. The very aspect of education is flouted in Dandeli, because all of them do not use eco friendly products to clean and wash. It was deduced that all the 15 respondents, use acids of various kind for their cleaning/washing purposes. It should be mandated that eco friendly products be used for the above purposes, thereby spreading a eco friendly message.

	Acid	Eco Friendly Product
Floors	15	0
Bathrooms	15	0
Laundry	15	0
Dishes	15	0



Water conservation practices

RAINWATER HARVESTING		ENCOURAGE GUESTS		ENCOURAGE STAFF		COLLECTION AND DISPOSAL OF GREY WATER		USAGE OF LOW FLOW SHOWERHEADS IN THE BATHROOMS		COMMUNES AND CLOSETS WITH HALF FLUSH MECHANISM		USAGE OF TAP RESTRICTORS	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
2	13	7	8	10	5	4	11	7	8	4	11	3	12



The following are few good environmental practices that any tourism system needs to adopt and follow and also educate.

Rainwater harvesting:

Considering the area is in the rain bearing region; it is surprising to find that there has been issues of water requirement during summers. Hence rain water harvesting should be encouraged. Thence, it is not surprising to find that only two resorts/homestays in the area have focused on rainwater harvesting and 13 are yet to join the bandwagon. It is suggested that when a framework is created, rainwater harvesting is made mandatory.

Encourage guests to preserve water:

Do's and don'ts have to be meticulously advertised and followed. A total 7 respondents encourage guests to conserve water, wherein 8 still need to provide the do's and don'ts to encourage guests to conserve the depleting resource.

Encourage Staff to preserve water:

As we say, charity begins at home; 10 of the homestays encourage the staff and the family members managing the homestays to preserve water and ensure. Through a mandated framework, a system has to come in place which will help in educating and training the staff to perform and pursue aspects that will encourage in the conservation of water.

Collection and disposal of grey water:

Grey water, is generated on a day to day, and the same has to be disposed without hindering the environment. In this aspect, only 4 homestay owners have arranged for collection and disposal of grey water in a manner desirable, whilst 11 are letting the grey water into the open environment. A framework with a built in audit, and involvement of pollution control board will help assuage any further damage in this regard.

Usage of showerhead controllers in the bathrooms and half flush systems for commodes:

Considering the fact that there is a disparity in the usage of water by the local vis-à-vis the guests who stay at the homestays; it is advisable that showerheads with adequate controls for water flows will help save as much water for the homestays. 7 homestays have adopted showerhead controllers, whilst 8 have not adopted the same.

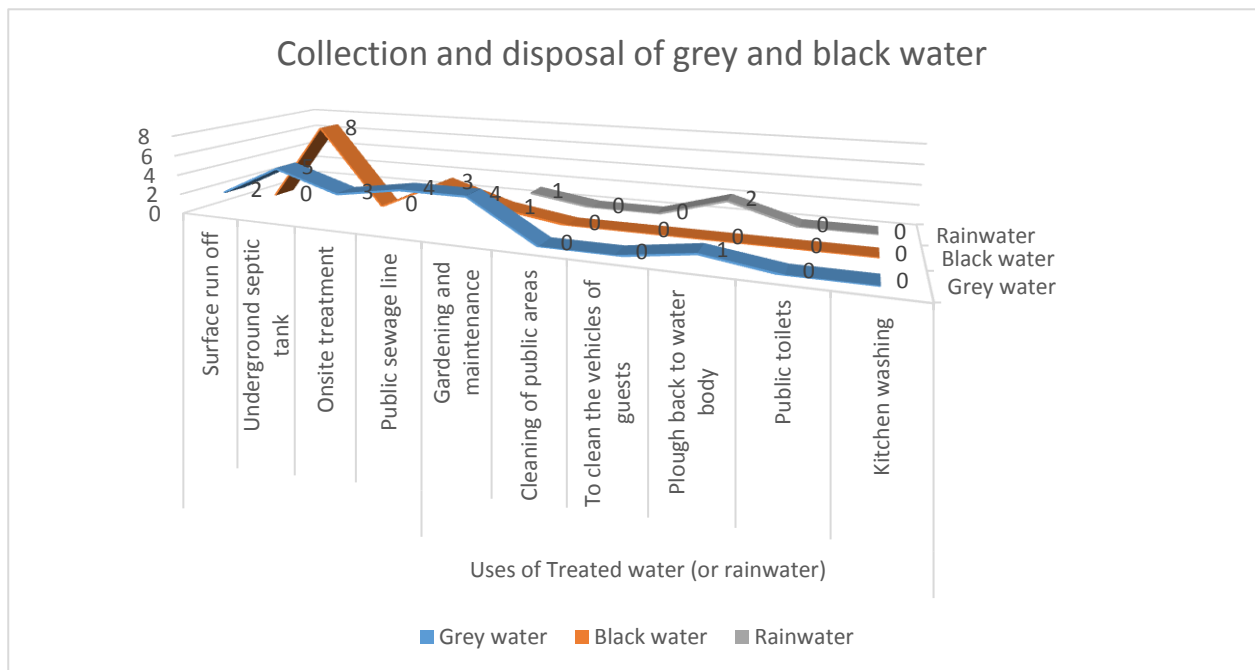
The half flush mechanism actually helps in conserving a good amount of water and a total of 11 respondents have confirmed that they do not have the measure in place, which means, loss of water through the commode. Only 4 homestays have responded in the positive, which clearly brings to question a framework, a law to regulate the minute factors for environmental protection.

Usage of tap restrictors:

Only 3 respondents confirmed that they had tap restrictors in their properties, 12 homestays are neither aware nor have incorporated the same in their facilities. Tap restrictors will add to facet of saving water in the resorts.

Collection and disposal of Grey and Black water:

<i>COLLECTION AND DISPOSAL</i>					<i>USES OF TREATED WATER (OR RAINWATER)</i>					
	SURFACE RUN OFF	UNDERGROUND SEPTIC TANK	ONSITE TREATMENT	PUBLIC SEWAGE LINE	GARDENING AND MAINTENANCE	CLEANING OF PUBLIC AREAS	TO CLEAN THE VEHICLES OF GUESTS	PLOUGH BACK TO WATER BODY	PUBLIC TOILETS	KITCHEN WASHING
GREY WATER	2	5	3	4	4	0	0	1	0	0
BLACK WATER	0	8	0	3	1	0	0	0	0	0
RAIN WATER					1	0	0	2	0	0



Observations:

8 of the 15 homestays/resorts interviewed allow the black water into an underground septic tank, and 5 allow grey water into underground septic tank. Some of them, allow the grey and black water into the river and in soak pits leading to leaching. The researcher observed that there are no municipal sewerage lines, thereby adding to the problem. The homestays/resorts must be mandated to have onsite grey and black water treatment in place. The treated water can be used for gardening and even be ploughed back to the water body, thereby reducing pressure on the local environment.

GREY VS. BLACK WATER⁴⁵

A question that often arises in sewage treatment is that of whether a grey water effluent stream (baths, showers, bathroom sinks, laundry) should be separated from a black water stream (mostly toilets, kitchen sinks) and treated separately. The ratio of grey to black water varies, however grey water tends to be more voluminous than black water and it is for this reason that consideration is given to separating the waste streams so that a treatment plant's physical size can be a lot smaller and less costly if it is only treating the black water flow. Another motivating factor in separating the flows is the much reduced amount of pathogens in grey water compared to black water, making grey water more attractive for direct use such as irrigation on gardens, golf courses and other planted areas. Generally though, it is preferable to combine the grey and black water streams when treating the effluent for the following reasons:

Black water is rich in organic material, nitrogen and micro-nutrients. This is because black water is typically associated with the production of or processing of food. Under the right conditions naturally occurring bacteria are attracted to the black water as a source of sustainable energy and during the process of converting organic material and nitrogen into energy and biomass the

⁴⁵ http://www.viront.com/Full_Pages/Grey_v.s_Black.htm accessed and retrieved on 1st July 2013

contaminants in the black water are removed. Grey water, on the other hand, tends to have a fairly low organic composition and a high salt content, neither of which tends to excite organisms as a food source. Grey water is typically associated with cleaning and washing and the salt content is mostly in the form of bound phosphates which form part of the chemicals used in washing powders and dish washing liquids as these phosphates are readily oleophilic and attract dirt containing oils. Naturally occurring bacteria are partially attracted to grey water but to a far lesser extent than with black water and the organic material and phosphorous content is a useful source of energy up to a point. However, complete metabolism of these nutrients is not however always achieved due to the lack of micro-nutrients and inherent salinity in grey water. Consequently other types of less useful bacteria will attempt to consume the useful bacteria that first made contact with the grey water, which usually results in anaerobic conditions developing in the water with its attendant foul odours being emitted.


At a domestic level, homeowners that store grey water in a tank prior to irrigating it on their gardens will usually find that it quickly develops a noxious odour that then gets distributed over their garden and makes the property almost uninhabitable until the stench disappears. Irrigation of untreated grey water can be successful for a fairly wide range of plants, but is not suited to all plants and after a while there will be a build-up of phosphorous and salinity in the ground water. Much of this phosphorous salinity is removed by the organisms as part of their food uptake and metabolism in treating black water, making the grey water more suited to irrigation once it has been treated with the black water. Therefore the best, although not necessarily always practical method to treat grey water is to combine it with black water and treat the two streams together. In this way the naturally occurring useful bacteria benefit from the total organic composition phosphates and nitrogen. One consideration when irrigating water treated in this way, however, is the need to disinfect it first if it is to be used on grassed play areas that are frequented by people. For plants such as flower beds and grass on golf courses though this is less of a concern.

For large scale treatment plants the amount of energy consumed by electrical blowers for treating a black water effluent that has been separated from the grey water is also much the same as for the combined flow as it is the waste organic material that predominates in the black water that needs removing and which is still present, although in a diluted form, in the combined waste streams. Generally then the only additional cost in treating the combined waste flow is in the sizing of the bio-reactor treatment tanks which is a once-off capital cost that is usually offset by the cost of the additional sewer reticulation system that would be required to separate the grey water flow.

For households that want to separate their own grey water flow this can still be practical if the garden receiving the irrigated grey water is large enough to accommodate the flow without a salt build-up. Typically a garden of at least 500m² in extent will be suited to the grey water flow volumes from a 4-person household. The additional irrigation required for such a size garden also has a dilutory effect on the grey water in addition to leaching it out of the soil, provided the grey water isn't continuously irrigated in only one particular area. It is very important, however to discharge the grey water to the irrigation network immediately it becomes available to avoid it smelling terribly due to the anaerobic conditions developing, mentioned above. For this reason the storage vessel should not be too big – 500 litres should be ideal for a typical household. The 4EVR range includes a 500 litre horizontal tank that can be buried underground, solving the problem of having to get the grey water flow into the tank. A reasonable sized inlet for unhindered waste flow to the tank is also necessary and a submersible pump for irrigating the water out of the tank is preferable because it will pump small items easily, although it is necessary to watch out for fine nozzles as they tend to trap hair very easily. For irrigating the water onto the garden a cone-type movable sprinkler such as

the orange Gardena model is ideal for this purpose.

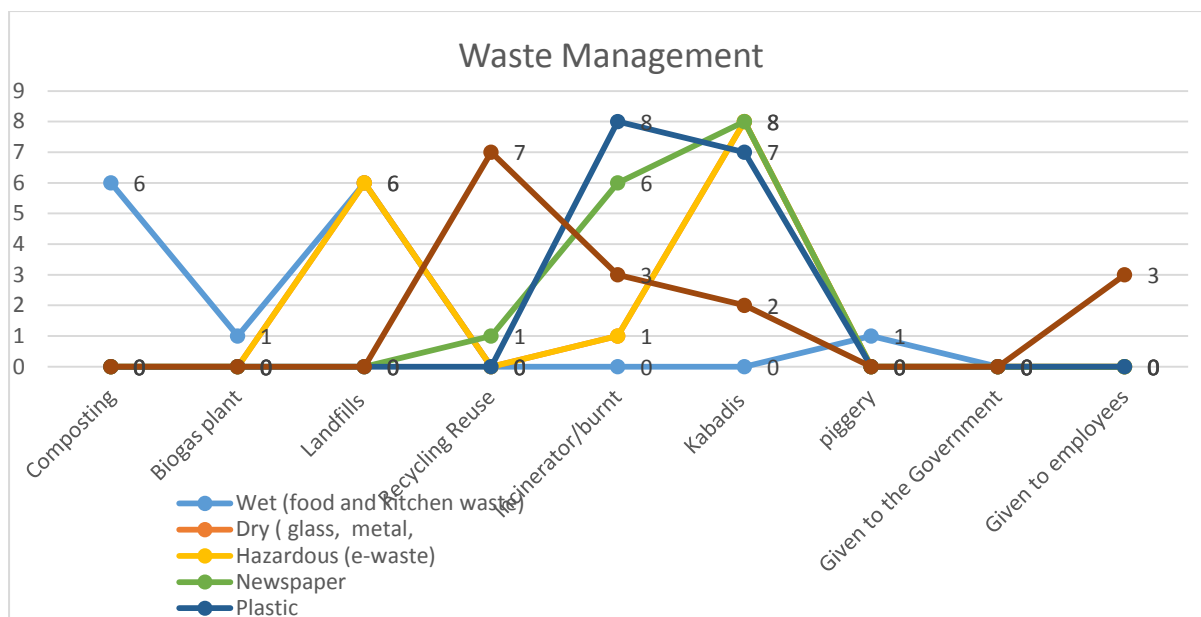
Swimming pool

CAPACITY (LITRE) (AREA)	SEWER WATER	CLEANING AGENT- CHLORINE	CLEANING AGENT- SELF MECHANISM	FREQUENCY OF CLEANING
	NA	NA	NA	NA
	NA	NA	NA	NA

Considering the size of the homestays and the economies of scale of operation 14 of the 15 homestays do not have swimming pools, nor there an intent to construct a pool. However, one of the large resorts is planning to construct a pool in their facility.

Waste management:

	Composting	Biogas plant	Landfills	Recycling Reuse	Incinerator/burnt	<i>Kabadis</i>	piggery	Given to the Government	Given to employees
Wet (food and kitchen waste)	6	1	6	0	0	0	1	0	0
Dry (glass, metal, garden, wood)	0	0	6	0	1	8	0	0	0
Hazardous (e-waste)	0	0	6	0	1	8	0	0	0
Newspaper	0	0	0	1	6	8	0	0	0
Plastic	0	0	0	0	8	7	0	0	0
Old linen/fabric	0	0	0	7	3	2	0	0	3



Waste management in eco sensitive areas, wherein larger number of tourists are proportioned to proceed, must and should be managed well. In the case of Dandeli one finds that the homestays and resorts have made efforts at waste management.

The researcher was able to establish that, the homestay and resort owners had initiated the usage of composting measures, along with landfills which are an effective way to dispose the

wet waste. Besides, composting and landfills, one of the resorts also involved in bio gas, which should be done in a larger scale as a best practice.

One disturbing factor is most of the homestays are involved in some sort of burning. The local self-government authorities are truly not involved (no municipal waste agencies) in the nuance of waste management and no measures are taken to support the homestay and resorts in the path to ensure quality waste management by reducing waste being burnt or by providing an alternative.

The NTCA has clearly articulated the fact that, there shall be a complete ban on burying, burning or otherwise disposing non-biodegradable or toxic waste in and around the tiger reserve. This is a clear indication that the tourist accommodation operating facilities should adopt scientific management of waste and not allow human made waste to decompose within the fragile forest area.

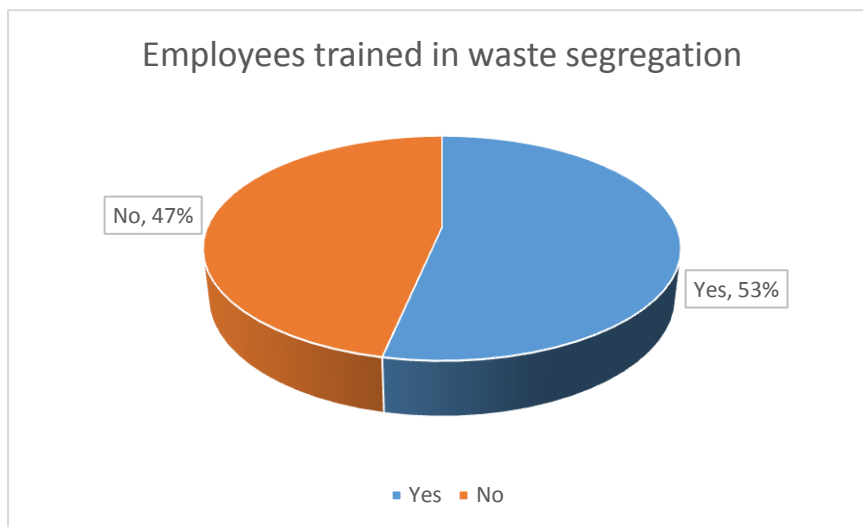


Employees trained in waste segregation

Yes	No
8	7

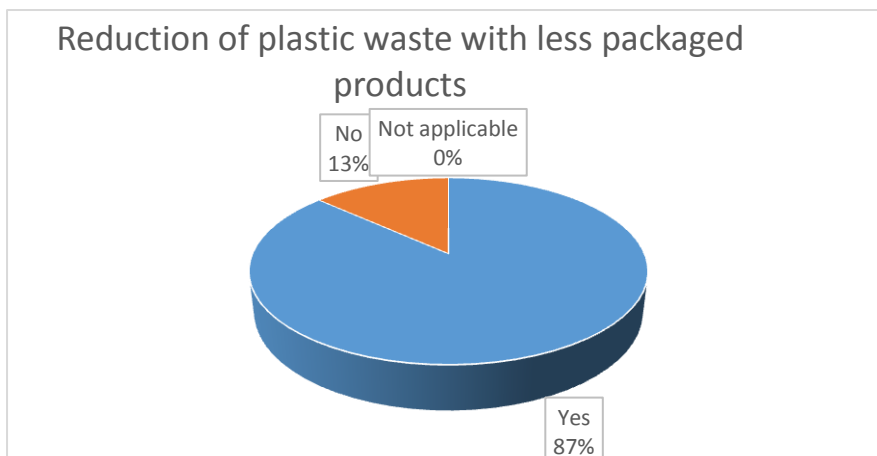
From the inputs received during the study, it is pertinent to conclude that adequate training mechanism should be place through training frameworks in the area of Dandeli, such that the employees are accustomed to managing waste in a

desirable fashion. During the research it was good to know that 53% of the respondents have confirmed that the employees are trained to manage waste and ensure. This is a good sign and augurs well for the tourism system.



Reduction of plastic waste with less packaged products:

Yes	No	Not applicable
13	2	0



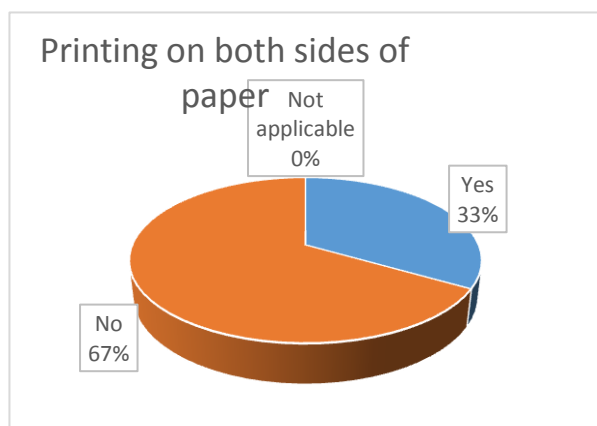
The above is a clear indication of the fact that 87% of the resorts in the area of Dandeli are making efforts to ensure reduction in the plastic waste. Considering that these are eco fragile areas, this should be mandated, and strict audits done which will help bring down usage of plastic and related items

that can damage the environment in an irreversible fashion. Considering that plastic is non-biodegradable, one should have it in the policy framework to bring about either reduction to begin with or complete avoidance. The researcher would like to make mention here, that even packaging materials like tetra packs, carry bags, should either be avoided or recycled wherever possible or even banned from the resort areas. An Executive order should be issued to ensure complete banning of plastic in the area.

It is best suggested that such of the resorts in the Dandeli area who are not making efforts to reduce plastic and related items should be encouraged to reduce and help build a healthy practice that will bring in the aspect of protecting the eco sensitive products.

Printing of paper on both sides:

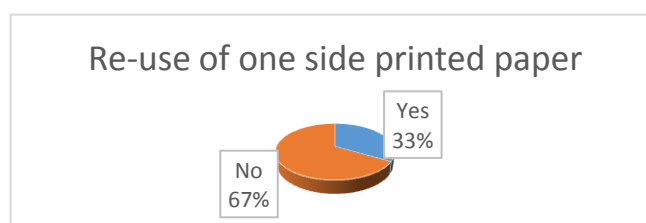
Yes	No	Not applicable
5	10	0



A total of 5 respondents have mentioned that they print on both sides of the papers; whilst 10 homestays do not adhere to the same. In fact, some of them do not print at all.

Re-use of one side printed paper:

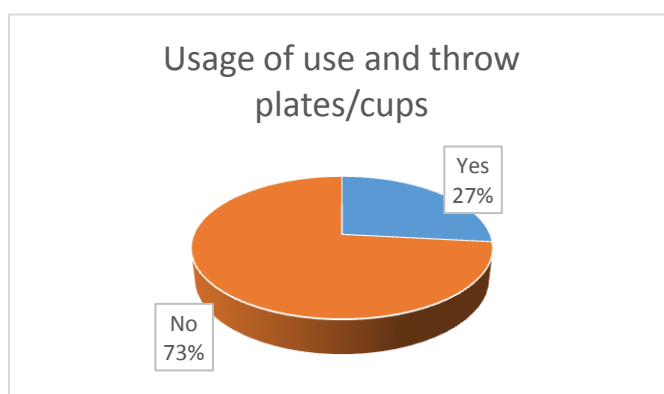
Yes	No
5	10



6 of the resorts re-use the one-sided paper for scribbling and other sundry activities. The other 9 respondents have not considered this re-use a good environmental practice.

Usage of use and throw plates/cups:

Yes	No
27	11

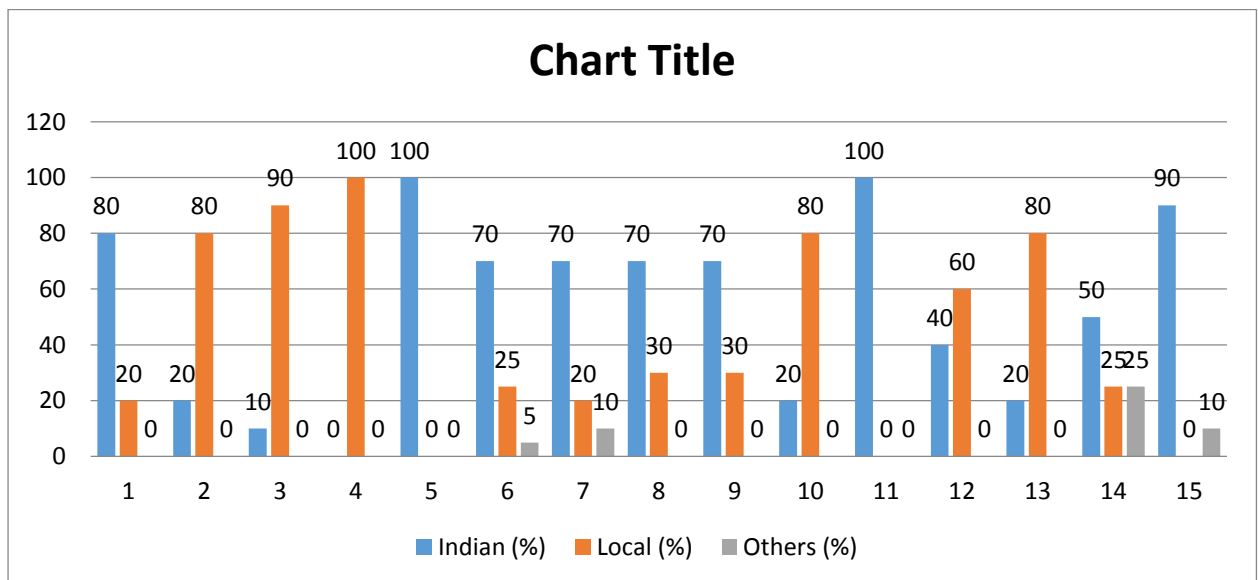


It has been found that anything that is of the nature of use and throw comes in handy. Cups, paper plates, plastic spoons, which need not be re-used, have been taken as a boon by many. However, in the case of the resorts in Dandeli, that were contacted, 4 of the homestays made use of use and throw plates and cups, whilst 73% were not in the habit of using them for the purposes of the guests who visited the resort.

Food/cuisine

	INDIAN (%)	LOCAL (%)	OTHERS (%)	PAX/COVER COUNT PRIOR TO ACTUAL COOKING (Yes/No)

1	80	20	0	YES
2	20	80	0	YES
3	10	90	0	YES
4	0	100	0	YES
5	100	0	0	YES
6	70	25	5	YES
7	70	20	10	YES
8	70	30	0	YES
9	70	30	0	YES
10	20	80	0	YES
11	100	0	0	YES
12	40	60	0	YES
13	20	80	0	YES
14	50	25	25	YES
15	90	0	10	YES



In the Dandeli homestay network, considering the economies of scale and the size of the resorts, all practice the finer aspect of ensuring a head count of the number of guests who stay in the resort whilst preparing food. When the researcher was administering the questionnaire to the Dandeli tourism stakeholders, it clearly came out that most of them preferred to consume the local food considering that most if not all the stakeholders had rooms attached to their homes. As and when the need was there, they would make a different variety of food for the guests to savor.

Pollution

Dandeli:

Area Code	Category of Area/zone	Limits in dB (A) Leq	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

The aim of the researcher was to primarily identify the number of vehicles entering the safari over the weekend, which is the peak season for any forest area, when a majority of the tourists enter. In order to ensure the tourists

move into the safari route/zone (actual stop points to be mentioned), at times a good number of vehicles ply into the forest area. The below chart represents the total number of vehicles along with the noise levels that were captured on a Saturday evening and a Sunday morning safari. The above parameter has been taken on account of the fact that, a number of tourists check in to the resort on a Saturday morning, engage the Safari on Saturday and Sunday and check out on Sunday morning. The survey was conducted

during the peak season of April, where maximum numbers of tourists visit; hence this can be considered as a representation of the maximum number of tourists visiting the destination for the area of Dandeli. During the period of the research, the Kali River Lodge, one of the mainstay resorts had maximum occupancy.



For this study, the researcher adopted and adhered to the rules laid down by the Noise Pollution (Regulation and Control) Rules 2000 of Government of India. For the purpose of the study the following is taken as the benchmark, which is part and parcel of the Rules as enunciated by the

Government. The forest area would fall under (D) Silence Zone as mandated by Law.



Protocol: The researcher tested the noise levels in the tourism safari routes of BNP at different zones which are as follows:

Safari route: Phansoli Gate → Sangreli Village → Amga Village → Kavala → Bethgi → Shanmuga sunset view point (center point) → Shirol → Amga Village → Kavala → Sangreli Village → Phansoli

Gate. The Safari route is a singular route within the forest area. The Entry-Exit point is Phansoli Gate.

Observations: There is an overlap of vehicles considering the route crisscrosses; there will obviously be lesser animals to be sighted on account of the noise, smoke and dust, created by the vehicles. The researcher also observed that some of the EDC vehicles were using kerosene as their fuel for the safari purposes. The EDC vehicles were not cleaned and maintained properly. The drivers were not in a specified dress code. The researcher observed one of the drivers to be chewing betel whilst

driving which showcased the unprofessional attitude of the EDC. The number of tourists per vehicle far exceeded the fixed number of 6 to 10 per vehicle.

Weekend data: (start time/end time: 06.00 to 08.00)

Vehicle type - number	Time of data collection	dB	Additional details
KFD, KA 31 G 639	06.09	74.3	There was insects and forest noise as well
KFD, KA 31 G 168	06.10	72	There was insects and forest noise as well
KFD, KA 31 G 125	06.11	72.9	There was insects and forest noise as well
EDC, Safari jeep, KA 29 M 1089	06.15	75.5	There was insects and forest noise as well
EDC, Safari jeep, KA 26 M 2194	06.21	74.8	There was insects and forest noise as well
Scooter of KFD, KA 31 S 9502	06.24	67.3	There was insects and forest noise as well
EDC, Safari jeep, KA 22 M 5779	06.27	71.1	There was insects and forest noise as well
EDC, Safari jeep, KA 31 M 1937	06.28	73.2	There was insects and forest noise as well
EDC, Safari jeep, KA M 1878	06.28	70	There was insects and forest noise as well and noisy guests, there was kerosene smell and plenty of smoke emission.
JLR, Safari jeep, KA 03 MG 2463	06.33	74.7	There was insects and forest noise as well
EDC, Safari jeep, KA 28 8838	06.34	75.9	There was insects and forest noise as well, driver was telling guests to see animals in a loud voice.
EDC, Safari jeep, KA 31 M 1223	06.37	74.6	There was insects and forest noise as well, noisy guests. There were a total of 13 guests in the vehicle.

EDC, Safari jeep, KA 35 M 1709	06.53	76.6	There was insects and forest noise as well, noisy guests
EDC, Safari jeep KA 29 M 1089	07.20	77.5	There was insects and forest noise as well, smell of kerosene from the vehicle and emitting plenty of smoke.
Scooter of local			
TOTAL number of JLR Safari jeeps: 1			
TOTAL number of EDC run Safari jeeps: 9			

Weekend data: (start time/end time: 16.00 to 18.00)

Vehicle type - number	Time of data collection	dB	Additional details
EDC, Safari jeep, KA 31 M 1878	16.16	76	There was insects and forest noise as well
EDC, Safari jeep, KA 25 M 3150	16:18	70.6	There was insects and forest noise as well
JLR, Safari jeep, KA 03 ML 5776	16:42	74.2	There was insects and forest noise as well
JLR, Safari jeep, KA 03 MG 2463	16:47	66.1	There was insects and forest noise as well
Scooter of a local,			
JLR, Safari jeep, KA 25 N 3347	17.02	75.8	There was insects and forest noise as well
EDC, Safari jeep, KA 25 N 3150	17.30	73.0	There was insects and forest noise as well
EDC, Safari jeep, KA 31, M 1878	17.42	72.2	There was insects and forest noise as well
JLR, Safari jeep, KA 03 ML 5776	17.55	69.1	There was insects and forest noise as well
TOTAL number of JLR Safari jeeps: 4			
TOTAL number of EDC run Safari jeeps: 4			

	Vehicle type	Number of vehicles	Seating capacity (per vehicle)	Make of vehicle and year of manufacture	Engine capacity (CC)	Fuel type (petrol – diesel – electric)	Fuel consumption per month	Owner – operator (JLR-KFD- Others)	Noise level (dB)
1	Buses Large	NA	NA	NA	NA	NA	NA	NA	NA
2	Buses Mini	NA	NA	NA	NA	NA	NA	NA	NA
3	Multi Utility vehicle (safari jeeps)	14	6 to 10	Mahindra Campers	1700	Diesel		EDC members	Average 75 dB
		4	6 to 10	Mahindra Bolero + jeep	1700	Diesel	30,000 to 40,000 per month	JLR	Average 75 dB
4	Tractors	NA	NA	NA	NA	NA	NA	NA	NA
5	Trucks	NA	NA	NA	NA	NA	NA	NA	NA
6	Two wheelers	NA	NA	NA	NA	NA	NA	NA	NA
7	Others (please specify)	NA	NA	NA	NA	NA	NA	NA	NA

Calculating the Physical carrying capacity/Safari in the Dandeli Tiger reserve

Physical Carrying Capacity (PCC)⁴⁶: This is the “maximum number of visitors that can physically fit into a defined space, over a particular time”. It is expressed as:

$$PCC = A \times V/a \times Rf$$

Where,

A = available area for public use

V/a = one visitor / M2

Rf = rotation factor (number of visits per day)

In order to measure the PCC to Dandeli, the following criteria must be considered and taken into account:

⁴⁶ Formula adopted from the NTCA (Annexure 1) and reworked on the Dandeli safari route organized by the Phansoli EDC. The distances that have been taken after from the President of the EDC and all other variables have been adopted as per the NTCA guideline.

- ❖ Only vehicular movements on forest/tourist roads are permitted
- ❖ The “standing area” is not relevant, but “closeness” between vehicles is important. There is a required distance of at least 500 m (1/2 km.) between 2 vehicles to avoid dust (2 vehicles/km.).
- ❖ At least 2 hours are needed for a single park excursion.
- ❖ The protected area is open to tourists for 9 months in a year and 6 hours per day
- ❖ Linear road lengths within the tourist zone are more relevant than area, and the total lengths are:
- ❖ Total 12 kms (one road for safari till the sunset/view point) {entry exit is the same gate} (25sqkms area)
- ❖ Total 16 kms (if the safari is undertaken till Kavala caves)
- ❖ Due to constant vehicular use, the entire road length of 12 km is prone to erosion.
- ❖ Rotation Factor (Rf) = Opening period Average time of one visit

Physical Carrying Capacity (PCC) for Dandeli (only till sunset/view point) = 12 km. X 2 vehicles/km. X 2 = 48 visits/day

Physical Carrying Capacity (PCC) for Dandeli (only till Kavala caves) = 16 km. X 2 vehicles/km. X 2 = 64 visits/day

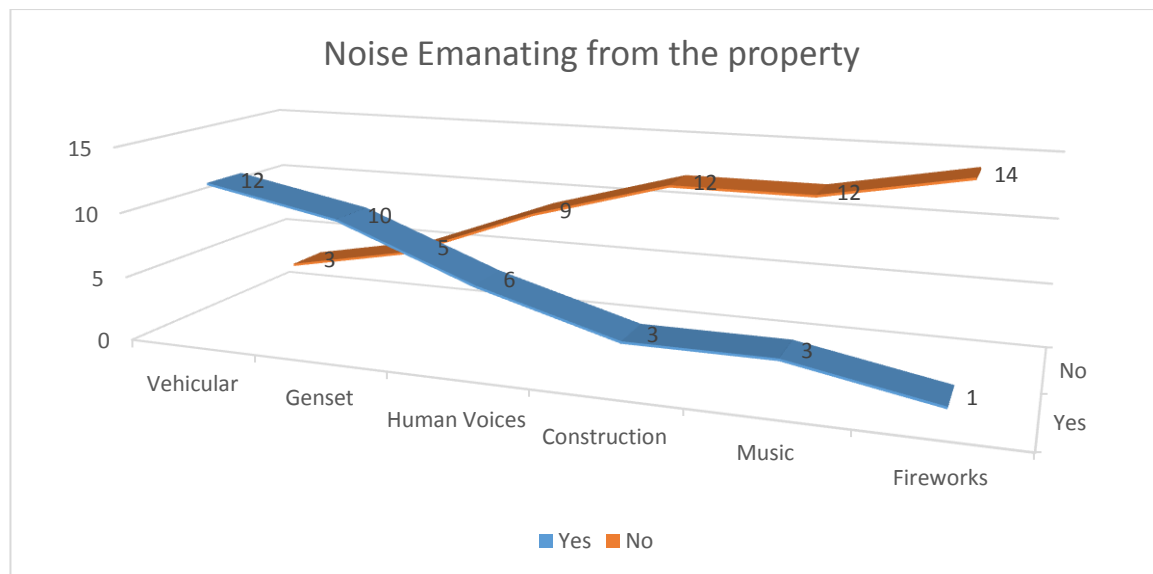
From the formula adopted from NTCA it is clear the Phansoli EDC is far exceeding the carrying capacity by allowing far more tourists than the tourism system can take. On a given day (week end) it was found, as per the records of the EDC and the gatekeeper to the safari route that a total of 16 safari vehicles⁴⁷ had entered on one day (am and pm) and a total 160 (at an average of 10/vehicle were allowed).

NOISE EMANATING FROM YOUR PROPERTY

Noise from the property in the Dandeli tourism system only comes from Vehicular and generators, whilst all other variables that the researcher enquired into are well under control. The aspect of generators can be further controlled by adopting to mechanisms of non-conventional energy viz., solar, bio-gas, and wind energy as applicable.

SL. No.	VARIABLE	YES	NO
1	VEHICULAR	12	3
2	GENSET	10	5
3	HUMAN VOICES	6	9
4	CONSTRUCTION	3	12
5	MUSIC	3	12
6	FIREWORKS	1	14

⁴⁷ Records available with the KFD at the Entry (and Exit) gate at Phansoli. The researcher saw the same physically with the DRFO and the President and made a note. A Copy of the same was not taken for repository purposes by the researcher.

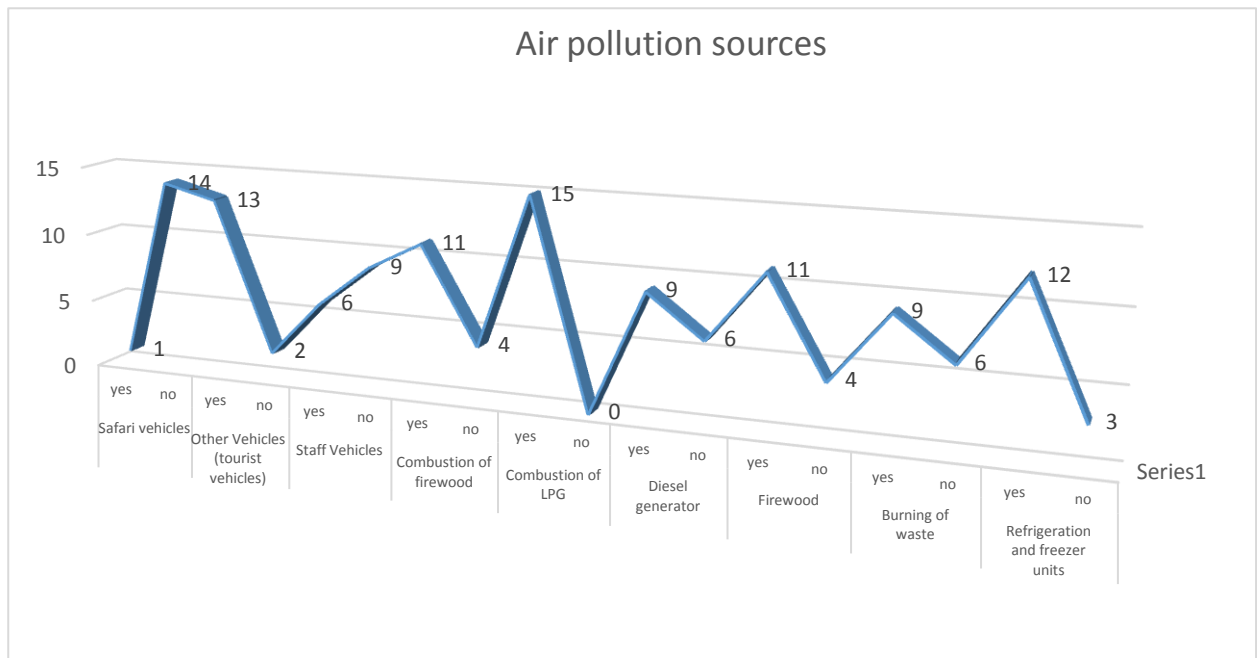


Sources of Air Pollution:

SAFARI VEHICLES		OTHER VEHICLES (TOURIST VEHICLES)		STAFF VEHICLES		COMBUSTION OF FIREWOOD		COMBUSTION OF LPG		DIESEL GENERATOR		FIREWOOD		BURNING OF WASTE		REFRIGERATION AND FREEZER UNITS	
YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
1	14	13	2	6	9	11	4	15	0	9	6	11	4	9	6	12	3

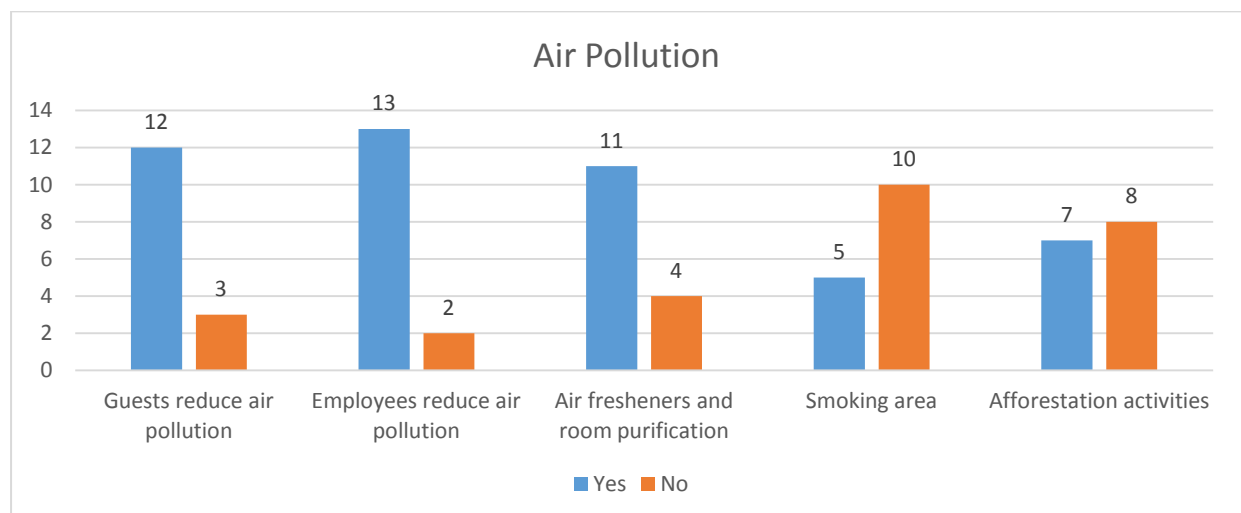
From the point of view of air pollution it is established that other vehicles/tourists are contributing to the pollution in a great

way. Since most of the homestays are small and medium enterprises, it is clear that the usage of generator for power generation is the least. However, one needs to watch out for the growth factors in the future as this will increase the impact on the local resources. Hence, the aspect of sustainability should be forayed to the greatest extent possible.



Air Pollution:

	GUESTS REDUCE AIR POLLUTION	EMPLOYEES REDUCE AIR POLLUTION	AIR FRESHENERS AND ROOM PURIFICATION	SMOKING AREA	AFFORESTATION ACTIVITIES
YES	12	13	11	5	7
NO	3	2	4	10	8



Rafting, the Dandeli USP:



The white water rafting which is organized under the supervision of trained guides⁴⁸, starts near Iluva Village, near Ganeshgudi and covers a distance of 9.5 kilometers in about 1.5 hours with the adventure culminating at Dandeli Maulangi falls. The rafting is coordinated by JLR, and a total of 12 rafts, with a provision for additional rafts being hired from Bison River Resort, as and when required. The capacity of the rafts is 6, 8 and 10. The rafts are kept in the safety of the Ganeshgudi resort. During monsoon, there is no rafting considering the

raise in water levels on account of heavy outflow from the Supa dam.

The tourists are acclimatized and trained by the guides, who ensure adequate protection and security. Besides, care is taken to avoid carrying of plastics⁴⁹ and other substances that are not eco friendly. Thereby the start and end points of the rafting arena has been well taken care from the point of view of cleanliness and an eco friendly atmosphere has been maintained considering the sensitivity of the area. The guests are not allowed to carry any of their personal effects to the rafting arena. White water rafting is conducted three times in a day during the season, morning at 07.00, Morning at 10.30 and afternoon 15.00. White water rafting may be get canceled if the water level is low. The researcher concludes that rafting of this fashion is environment friendly and does not leave any negative foot prints behind.

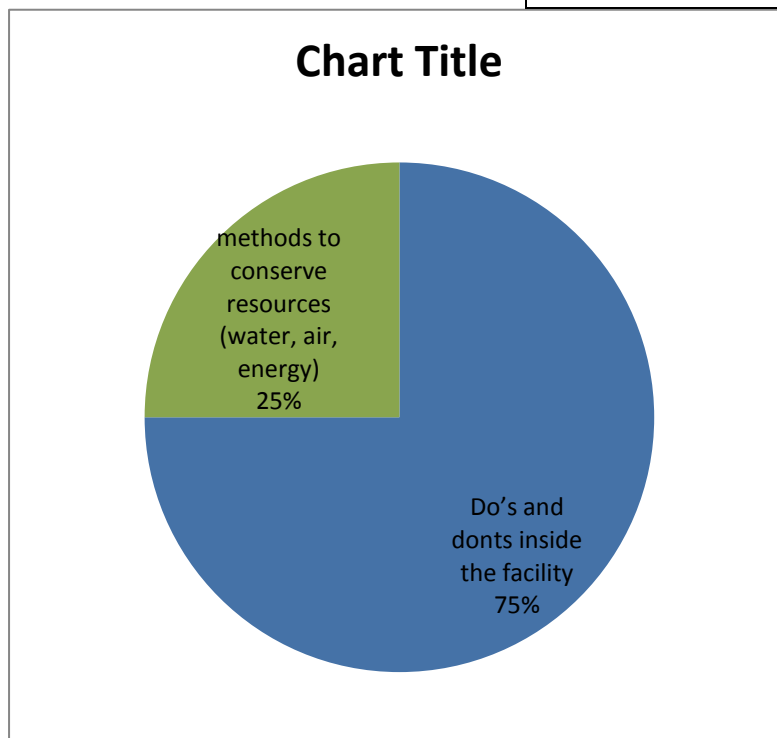
⁴⁸ <http://www.dandeli-tour.com/dandeli-activities.html> accessed and retrieved on 2nd July 2013

⁴⁹ The researcher would like to make a mention that, the rafters and the trained supervisors have ensured the start and end points of the rafting area and during the course of the movement on the river are managed and maintained as per norms; but it is at the end point, i.e., Dandeli Maulangi falls, where the day tourists, who come in large numbers have played havoc, by littering the place with beer/liquor bottles, plastic bottles, food left overs. Hence, it is suggested that, there should be a control mechanism to ensure that tourists do not carry the above, or if they, the same should be disposed, and later collected as required, thence maintaining the cleanliness of the place.

EDUCATION, CONSERVATION AND COMMUNITY DEVELOPMENT

Note: two of the resorts do not engage in any of the activities as prescribed for the study.

DO'S AND DONT'S INSIDE THE FACILITY	9
METHODS TO CONSERVE RESOURCES (WATER, AIR, ENERGY)	3
ECOLOGY OF THE AREA	0



The researcher through the responses has been able to establish the fact that they are placing inputs in regards to the 'do's and don'ts', methods of conservation of scarce resources; but then it is surprising to find that none of the 15 respondents provide any information on the ecology of the area. The NTCA has categorically stated the following which needs to be incorporated in any plan, policy document or administrative action that one takes, through whichever Department or Administrative machinery that would be implementing the

guidelines.

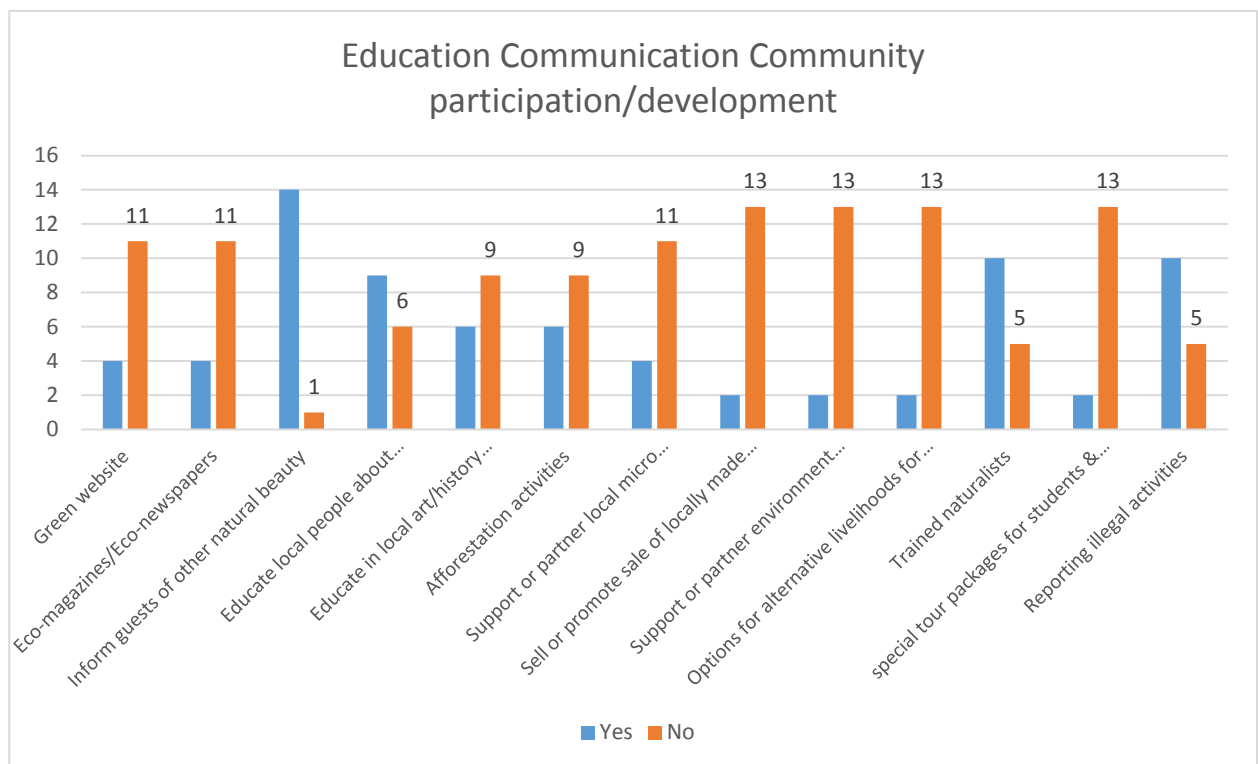
- i. Highlight the biodiversity richness, their values and their ecological services to people.
- ii. Highlight the heritage value of India's wilderness and tiger reserves.
- iii. Build environmental, cultural awareness and respect.

The above three facts are a clear indication of the planners and administrators who want to promote quality eco-tourism in areas that have been considered as fragile.

Communication:

	YES	No
GREEN WEBSITE	4	11
ECO-MAGAZINES/ECO-NEWSPAPERS	4	11
INFORM GUESTS OF OTHER NATURAL BEAUTY	14	1
EDUCATE LOCAL PEOPLE ABOUT BIODIVERSITY/CONSERVATION	9	6
EDUCATE IN LOCAL ART/HISTORY (PERFORMANCES,PUPPETRY,STORYTELLING,DOCUMENTARIES	6	9

ETC)		
AFFORESTATION ACTIVITIES	6	9
SUPPORT OR PARTNER LOCAL MICRO ENTERPRISES	4	11
SELL OR PROMOTE SALE OF LOCALLY MADE ITEMS	2	13
SUPPORT OR PARTNER ENVIRONMENT EDUCATION/COMMUNITY DEVELOPMENT INITIATIVES/ORGANISATIONS	4	11
OPTIONS FOR ALTERNATIVE LIVELIHOODS FOR PERSONS ERSTWHILE ENGAGED IN ENVIRONMENTALLY DETRIMENTAL ACTIVITIES	2	13
TRAINED NATURALISTS	10	5
SPECIAL TOUR PACKAGES FOR STUDENTS & TEACHERS	2	13
REPORT ANY ILLEGAL ACTIVITIES (VIZ.,QUARRYING, MINING, DEFORESTATION ETC IN YOUR SURROUNDINGS TO THE GOVERNMENT	10	5



Considering the fact that the resorts and homestays have opened up to the tourists and are contributing to the tourism environment; one needs to focus on aspects that have a deep impact on the local political-economic-socio environment; that too in the form of support to the local populace

and taking support of the local network to ensure participation. The NTCA guidelines are very clear in this aspect, so as to pronounce the following:

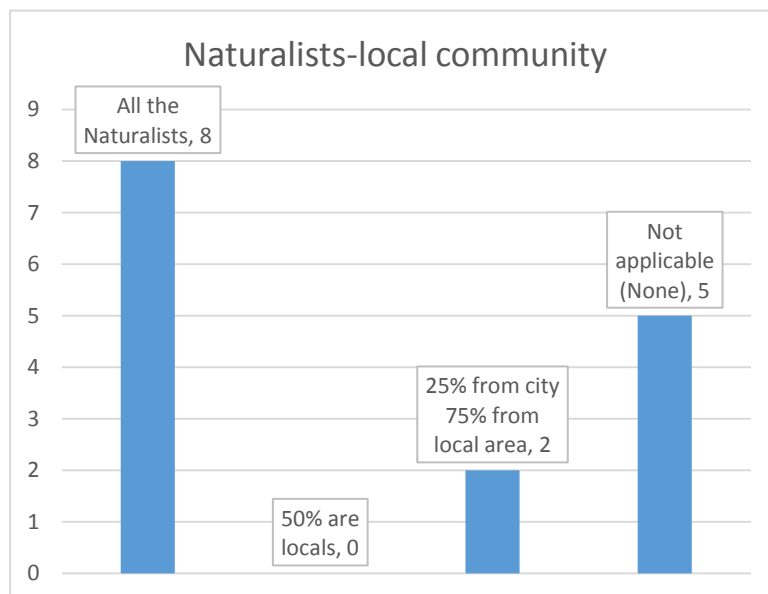
1. Engage with *Gram Sabhas* as defined in the Scheduled Tribes and other Forest Dwellers (Recognition of Forest Rights), Act 2006 (FRA) and *Panchayat* (Extension to Scheduled Areas) Act 1996 (PESA) to facilitate decision making.
2. Ensure free participation and prior informed consent of *Gram Sabhas* and all other stakeholders.
3. Develop mechanisms to generate revenues from wildlife tourism for the welfare and economic upliftment of local communities.

NCTA has also focused on aspect of a social cause wherein the Government order has categorically mentioned that, the ecotourism system should provide for subsidized visits of students while fostering educational extension activities. This is a clear indication of support the future generations leading to the preservation of the natural resources, but also gets juxtaposed with the nuance of corporate social responsibility (CSR), which brings business closer to the people.

Naturalists-local community:

It can be rightly said, Naturalists, who front the end the resort and the various products/services are the heart of the eco-tourism scenario. Should they be local, or should

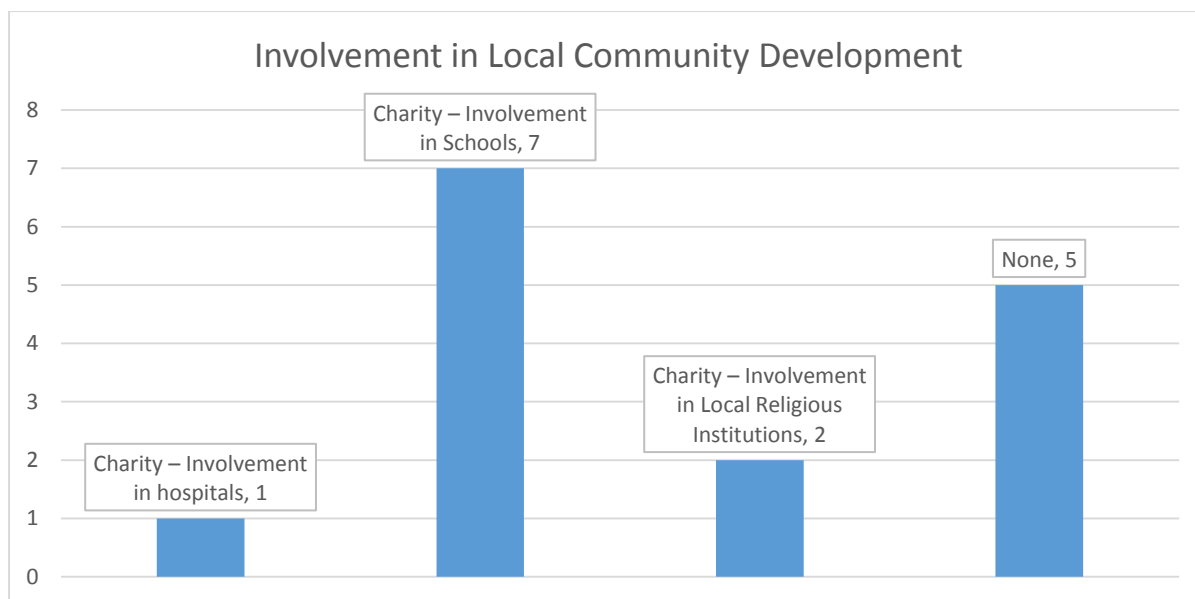
All the Naturalists	8
50% are locals	0
25% from city 75% from local area	2
Not applicable (None)	5



they be come from cities is an issue that the administrator's eco-tourism face. It is here that we need to have a committed understanding of the nuance and ensure that the locals, who will know the area of operation all too well be part of the same in a big way. In that case, the argument would be how does one train the locals to ensure interaction with the tourists? Who would bare the bottom-line? Should there be an administrative guideline to ensure implementation? Should there be an aspect of licensing of

naturalists, as is the case of Tour Guide who are trained and licensed by the Indian Government and/or by the State Governments or the Tourism Directorates or Corporations, viz., Karnataka State Tourism Development Corporation (KSTDC).

Involvement in Local Community Development:



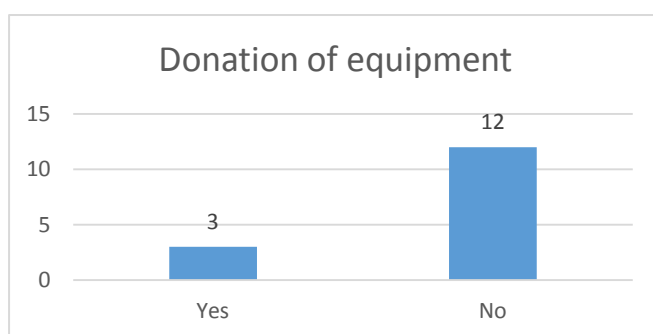
In the Dandeli tourism system 1 of the homestays provides support to the local hospital, whilst 7 are involved with schools and 2 with religious institutions. 5 of the homestays do not get involved in any CSR activities. This being a voluntary setup,

Charity – Involvement in hospitals	1
Charity – Involvement in Schools	7
Charity – Involvement in Local Religious Institutions	2
None	5

one needs to inculcate a spirit of sharing with the locals and thence bring in the element of working in tandem with society which will become mutually beneficial for all the stakeholders. Call it corporate social responsibility (CSR) or involvement of the stakeholder at the grass root level, it becomes mandatory for the resorts to ensure, participation of the local population and institutions to bring in a symbiotic relationship that will go a long way to have a healthy relationship between all the participants. It has been seen that, all lines of business, in the corporate world, the interaction between the local population and the functionaries, besides, the users of the facilities is a must, and should be provided the highest attention possible. Resorts add a unique challenge to the *Suo Moto* participation of the locals. More than the participation, it is the way the managements make efforts to bring about locals on to their side and have a healthy format of business.

Donation of equipment

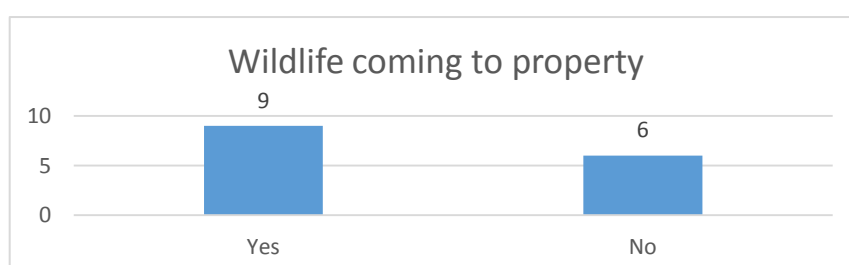
Considering that the CSR activity is being observed by a few homestays, it is obvious that 12 of the stakeholders do not donate any equipment to any of the stakeholders in society.



Yes	3
No	12

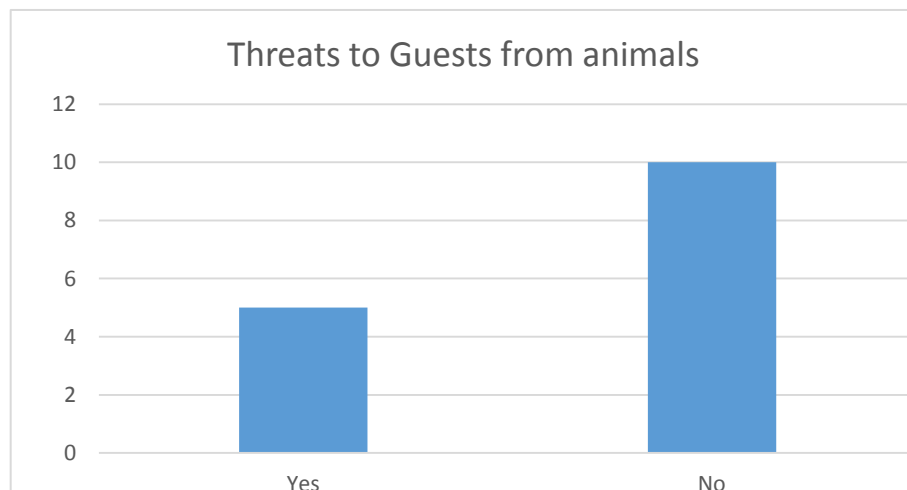
threats:

Wildlife coming into the property and the



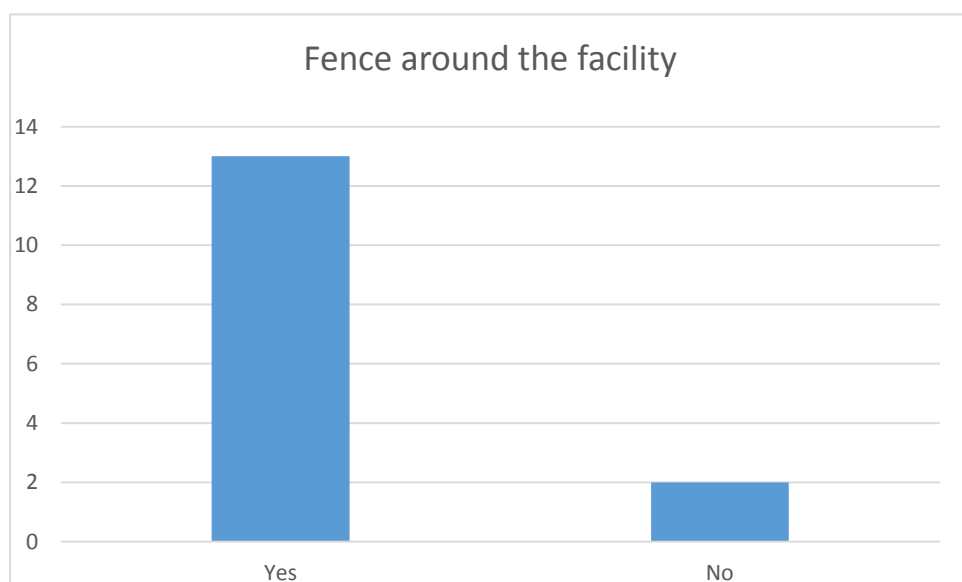
Yes	9
Yes	5
No	6
No	10

Threat to Guests:



Fence surrounding the facility:

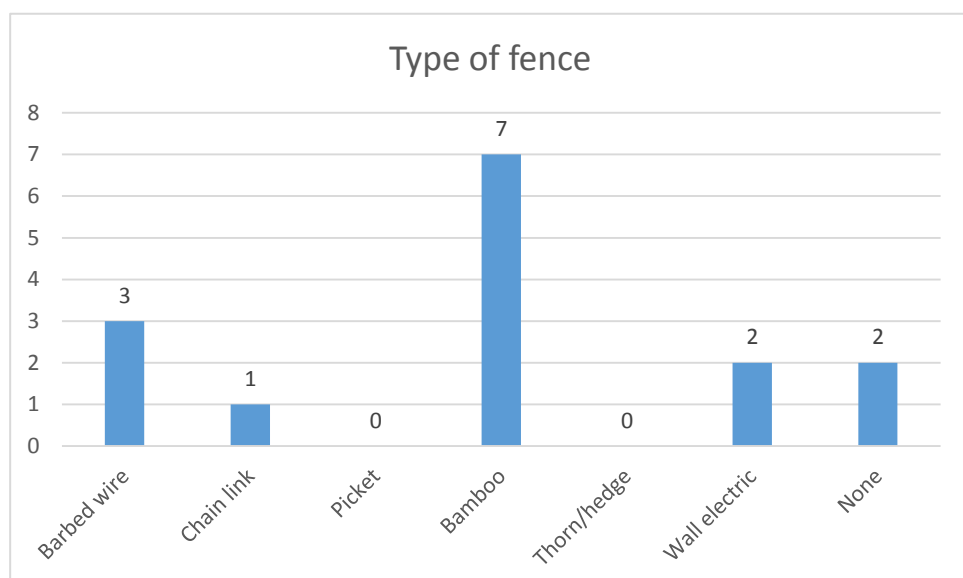
Yes	13
No	2



Type of fence:

Type of Fence	Response
Barbed wire	3
Chain link	1
Picket	0
Bamboo	7
Thorn/hedge	0
Wall electric	2
None	2

9 of the 15 homestays have confirmed that wildlife does come to the resorts; however, only 5 of the

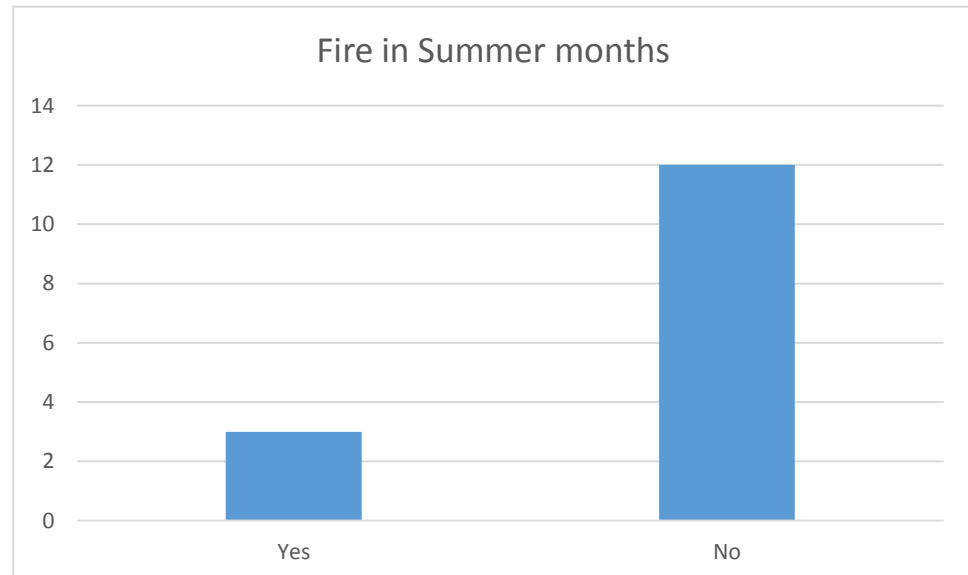


homestays have confirmed that the wildlife is threatening to the guests, whilst 10 have specified that there is no threat. One good aspect to learn from the Dandeli tourism system is that 13 of the homestays have fence facility ranging from barbed wire (3), chain link (1), bamboo (7), and electric (2). This augurs well for the tourism system, as the homestays have taken adequate care of the resorts and the guests. The homestay owners also advise the guests not to venture out in the nights as a preventive measure.

Fire in summer months:

Yes	3
No	12

Only 3 of the homestays have confirmed the issue of fire in the summer months. 12 have stated that there have been no fire related incidents in the area.



Pets in facility:

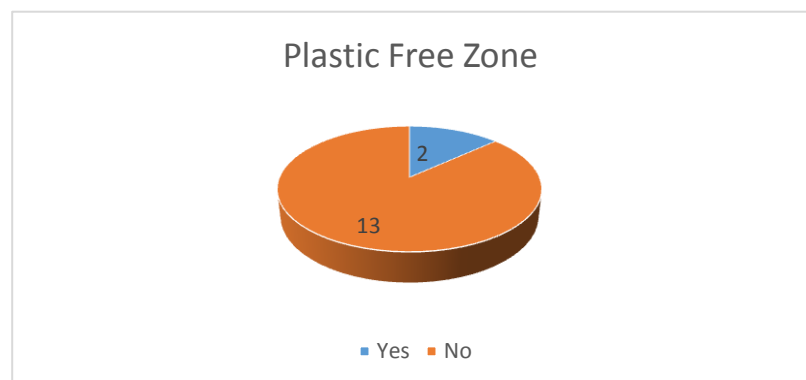
Yes	
No	

None of the homestays in Dandeli allow guests to bring in pets; however, they do have cats, dogs, and one homestay has cows in the premises, and 2 have swan, turkey and a chicken farm in the premises. This clearly provides a variety to the tourist, who will surely be interested in the domestication of animals. Bringing in pets or having pets on the facility in an area, where wildlife frequents, can post a threat to the wildlife by spreading diseases and to the pets can be attacked by the wildlife.

Plastic Free Zone:

Yes	2
No	13

There is a serious concern of homestays/resorts not being plastic free. They do not have any regulation on plastics entering the facility or segregating the brought in plastic and proper disposal of the same. The researcher observed plastic being strewn around the properties and being blatantly burnt. There should be strict regulation and laws passed in the area of Dandeli, to ban plastic and its usage and make it a plastic free area.



EDC:



The Dandeli Tourism System, has a total of two EDCs: i) Phansoli and ii) Aurli.

Eco Development Committees (EDC) have come into existence following the Government Order No. FEE 81 FWL 97, Bangalore, Dated: 14.03.1998, wherein it says, EDC, shall be formed for a village/hamlet/cluster or hamlets consisting of eligible households including those headed by women, all Schedule Castes and Schedule Tribes. Phansoli and Aurli, fall under the

above category and have been providing services as follows:



Aurli: Aurli, part of Uttara Kannada district, has an EDC that has been functioning from 2005 and has within itself the village of Nandigadde (Gund Panchayat). The EDC has a total of 10 elected (unanimously elected) members (5 men and 4 women) from the village, which is headed by a President, and supported by a Secretary, who is the Deputy Range Forest Officer (DRFO) of Aurli. The EDC has a Governing Body, and the body takes important and critical decisions in regards to

the functioning of the committee. Forest Department provides support, and local village inhabitants create the EDC and inform the Revenue department about the aims and objectives. Then on the forest department supports in the cause of the EDC. The main objective of the EDC is to ensure growth and development of the area earmarked for the EDC.

The Aurli EDC has a total of 54 households and a population of 190. Primarily an agricultural economy, Arecanut, Paddy, Plantain are some of the major produce. Vegetables are grown for household need and requirement.



The village has a school till 7th standard, however, there is a dearth of teachers. Currently there are two teaching staff, one of whom functions as the Head of the Institution. There is no hospital or primary health center and Joida (Taluk headquarters) has hospital, which is the nearest to Aurli at a distance of __kilometers.

At present, the EDC has embarked upon the following as its goal;

1. Tourism Management of the Syntheri rocks,
2. Program support to the villagers, by providing fence protection from the wildlife (elephants, monkeys, porcupines) [total of 4 kilometers fencing has been provided, 4 more kilometers has to be fenced and is being done in a phased manner]; afforestation, electricity is received



through a Government grid (by providing for solar lamps to households, priority has been given to the downtrodden, single women, schedule castes and tribes to begin with. A total of 10 solar lamps with the EDC generated income has been provided to the local population. In the next phase the others are to get the same) {solar lamps becomes important as there is no power for 10 to 12 days during the monsoon, where there are tree falls}, LPG, road maintenance, patrolling for poaching, forest fire control, and support the authorities as and when required for various activities.

The Aurli EDC by providing for Tourism Management support at the Syntheri rocks has taken total control of the area and collects maintenance fee vide selling of tickets for individuals and the vehicles that are allowed entry. Domestic and International tourists are charged INR 10 for adults and INR 5 for children respectively. A parking fee for vehicles is also collected. In order to maintain the entry facility to Syntheri rocks, a manned (two personal, locally employed by the EDC, the two personal would also collect disposed plastic and other materials left behind by the tourists) gate has been constructed. The EDC has employed two locals for overseeing and supporting the tourists when they visit the Syntheri Rocks. The four locals employed by the EDC have been given training on good environmental practices for them to educate tourists on aspects like no burning of waste, no smoking, no usage of plastic to mention a few. 25% of the funds collected go to KFD, which in turn is funded to Project Tiger. A total of INR 40,000 has been contributed to the KFD.

There is no telephone connectivity in the area and hence communication is an issue. The researcher also found that some of the village folks did carry mobiles, but they were never charged for usage.

Wells in all households are to be found, but there is an issue of potable water. Some of the households have bore wells, but there is no power to pump the water.

Bad roads, does not allow for proper movement of men and material, and in case of emergencies though the Government has provided for ambulance services (108 is available in the area); ambulances never make it to the houses on account of bad roads, and at times the fear the ambulances breaking down.

Waste management of the village is in good hands, as the waste generated goes to the bio gas plant, and also as cattle feed. The plastic however, is burnt, the ashes of which are put in the fields. In terms of environment education; some members of the EDC were sent to Dharwar for tourism training. Children of the village lack of environment education, which needs to be done at the earliest. The very presence of the EDC and the involvement in tourism has brought in the minds of the local population healthy practices towards the environment which they are a part of.

Income from the EDCs can be used to address the following of the Aurli village:

1. For fencing, to protect the village from wild animals
2. For building roads in the village
3. To empower and educate the teachers of the village
4. To build toilets
5. To provide for solar lamps
6. To support cottage industry
7. To solve drinking water problems

8. To start local business by constructing a permanent structure
9. Training can be provided for information on Syntheri rocks
10. To create literature for the local tourist spots
11. To have one telephone connection to ensure connectivity in case of emergency

Phansoli:

The Phansoli EDC has a total of 65 households with a population of 630. Phansoli is wonderful case study, as there is a direct involvement not only to look into the nuances of



Development and Ecology but also the economic activity of tourism. Phansoli represents an unique picture, wherein the complete safari of the area is managed by the EDC. Consisting of 10 members, the Phansoli EDC was formed in 2005, and from then on, has lead from the front on the aspect of tourism in the area and contributed well to the economy of the area as well. All efforts are made to have adequate representation of the population and the members are elected through a unanimous vote. Let's make a deep dive and understand the functioning of the EDC for the benefit of the people, and the issues if any faced.

Women no doubt are members of the EDC, they are ironically not involved in any activity/activities; they are just called to be part of the meeting. The women, however, when the researcher spoke to them in front of the President and forest staff would like to take up activities and would like to be involved in all the efforts. Serious concerns were expressed by the women in regards to their involvement in the activities in the open meeting. The researcher and the team were surprised that the women voiced their concern (s) and clearly mentioned that they were not involved in any manner; and were treated as ornaments in the EDC. They were only there for representation.

As per the routine, the EDC is headed by a President and the local DRFO is the Secretary. The EDC has 5 men and 5 women as members. Agriculture and menial labor are the occupations of the population of the village. The village consists of Hindus, Marathas, Scheduled Castes, Muslims and Christians. As and when required the meeting (s) are called for. The President informs the available members to come and deliberate. Minutes are recorded by the Secretary along with the attendance. If the members are working in fields and other vocations, the attendance is normally thin. Development and growth of the area are the main criterion and objective of the EDC. But the focus primarily has been to operate Safari into the Dandeli forest area.

The village boasts of a lower primary school (5th standard) and also has an Anganwadi attached to it. There is no hospital of any category and emergency health care services too are lacking. Besides,

the support provided by 108, the population has to proceed to Joida or Dandeli for any health related issues.

75% of the village boasts of toilets in the households, whilst the others defecate in the open. This should be addressed by the EDC and other authorities with immediate effect.

Kitchen waste generated is provided to the cattle, and plastic is burnt.

Safari into the Dandeli forest:

As mentioned earlier the Phansoli EDC owns the running of Safari inside the forests of Dandeli, end to end. The vehicles, the management, the manpower, the entry fee, the information being provided; every aspect of Eco tourism comes as a contribution from the EDC members. As per the norms fixed, the cost/tourism for a safari is INR 400/- and the capacity of each vehicle is 6 to 8. The owner of the vehicle gets INR 800/trip. From the overall collection, the KFD gets a contribution of 25% which in turn is used for activities pertaining to conservation and preservation. The expense that the EDC endears for printing of tickets and management of the Safari entry and exit gate which is done by a local gatekeeper, who is paid by the EDC.

Records are maintained by the EDC management in regards to the vehicles that proceed into the safari with the tourists. The details of the vehicles are as follows:

Joida: A people's tourism movement:

Kali Tourism Association (KTA) (*Kali Pravassodhaya samsthe*) is a creation of the tourism system of Joida. Joida, a sleepy hamlet that has realized the potential of tourism and ensured a collaborative approach through the KTA. Consisting of members from all walks of life, including, homestay owners, taxi/cab owners, travel agents and tour operators, shop keepers, cooks, milk vendors, those involved in working with the local tribes, guides, landlords, social workers; KTA is a sure cauldron of diversity. However, it is the factor of diversity that has ensured KTA to move ahead and ensure a sustainable approach to promoting tourism in the Joida area. In fact, KTA and the members can be considered as a best practice to the finer aspect of Community approach to promoting tourism in the general and eco-tourism in particular. KTA thereby, represents a total of 15,000 people in about villages, which provides for a huge potential to promote Community based eco-tourism.

Members who participated in the discussion and their stakes in the Joida tourism system:

1. **Ramchandra hedge**: Amara homestay (3 cottages): doing CSR (Amara Foundation, focus on forestry). Cleanliness is key. Training also provided.
2. **Vikram Sogi**: Sangway homestay (Dandeli) (4 cottages) (Madhuvana homestay, Joida) (Virnoli). Only homestay. Eco Tourism concept, Wants to focus on licensed homestays.
3. **Ajit Tengse**: Green valley homestay, Bomboo cottages (5 cottages). Only tourism; CSR by providing school bags to children and other charitable work.
4. **Dutta B Desai**: member of KTA, supports KTA, farmer, forest development, no homestay/planning for a cottage. Landlord: Paddy, arecanut,
5. **Satish Naik (Hudsa village)**: helps Ajit Tengse; is also a guide for other homestays. Planning for homestay. Supports in cooking activity.
6. **Vishnu M Desai**: member of KTA; water activity, keen to pursue water activity. Agriculturist by profession, interested in tourism, owns a vehicle as well, which could be used for

transportation.

7. **Sudarshan Hegde:** member of KTA, involved in folk dance, Tribal dance. Operates through Sahyadri a local NGO. Conducts cultural program as and when required. Speaks on Environment and Ecology, and prevents fire. Has been working on the same for about 7 years. Also works as a guide though not certified.
8. **Wilson Dias:** Tiger Heritage (1 cottage). (one house with two rooms) (total three rooms). CSR: helps old people, ayurvedic medicines supply free of cost. Has adopted destitute children in the area.
9. **Shripad Madival:** member. Probable homestay owner. Social worker, supports KTA in a big way as and when required.
10. **Narasimha Mutt:** President, KTA. Kadu Mane homestay (house, tents/26. 50 to 60 people) Kadu Mane: home products. 15 to 16 girls are dependent. SHG: pappads, jackfruit based items, banana. Kadu Mane Nature education center (seven years). Believes in word of mouth publicity. On a 3 acres of land has planted many species of plants, including 120 medicinal plants.

It is an irony that the apathy of the authorities in the area that brought about the creation of the KTA (established 2008) in Joida. A voluntary association with 25 founding members, the KTA today boasts of 40 members from different walks of life which makes the whole exercise different. With issue and experienced based learning, leading to discussions, KTA has created a niche for itself and created a benchmark. Discussion leading to collaboration and collaboration leading to best practice can be considered as the hall mark of the KTA team. The members religiously attend meetings on the 25th of every month; and there is no advance notice or agenda fixed, which clearly implies the interest to govern themselves and ensure a community based benefit leading to a qualitative multiplier effect from an economic perspective.

KTA has created a niche for itself by engaging in the following:

1. Purchasing items required for the homestays locally, leading to complete support to the local business, thus fulfilling economic obligation of money staying within the system and helping it to evolve. Anything else that is not available within Joida is sourced from Dandeli.
2. KTA and its members have realized the potential of local employment and have ensured locals get all the jobs. Besides homestays having local workers, Kadu Mane a place for curious and anything that can be purchased locally and located at Bapeli Cross, has about 16 women working and manufacturing handicrafts, candle making, household items, kitchen *masala* powders which are purchased by the tourists and even locals. To encourage the tourist vehicles reaching Kadu Mane, the drivers are incentivized with Kadu Mane paying a commission. Kadu Mane boasts of repeat visitors and buyers who have now become regulars.
3. Tariffs for vehicles have been fixed by KTA. The rates are not published, but everyone follows the same and ensures uniformity, this clearly ensures the tourist gets the benefit.

4. Some of the homestays are making efforts to generate power. In fact, Ajit Tengse who runs the Green Valley Homestay, generates 1 KV of hydro power. Not surprising, Gopal Bhat Shivpur who comes from a remote place also generates power. The power for the area comes from the facility in Ganeshgudi, however, when there



are issues, the locals bank on solar power, but this needs to be subsidized such that more adopt to the same. Another aspect worth noting is that, KTA has made efforts to avoid the use of generators which will surely cause lot of harm to the local environment via, noise and air pollution. Hence sources of non-conventional energy (NCE) have to be encouraged such that the ecology, the locals, the tourists get to benefit a better environment. Most of the homestays have started the use of CFL which is helping in saving of energy.

5. All homestays have septic tanks and they recycle grey water for plants. Some of them have Gobar gas plants and the bio gas generated is used in the kitchen.
- I. Issues faced:
- II. 60% of the villages have no toilets. The locals defecate in the open. Government should with the facilities for toilet.
- III. Issue of Tiger reserve and relocation: KFD should say in a concrete way or should mandate the same i.e., the issue of Eco Sensitive Zone. There is no collaboration between KFD and any authorities and people of Joida/KTA. Hence, the issue appears to be in a limbo. Discussions with the local stakeholders will lead to an understanding of the scenario. Educating the locals will go a long way in helping one to tow the line of the administration, which will surely focus on sustainability.
- IV. Issue of dumping plastic in the forest area. Waste of Goa dumped in Karnataka (Anmode, border of Goa and Karnataka). KTA folks have participated in collecting plastic at times, and burning the same.
- V. No scientific study to plant saplings, the KFD plants any sapling; some of them do not grow at all. There is a lot of corruption. Teak and Acacia creating a dry environment. Suggestion from the KTA: June plantation of saplings should be done and then on efforts to save them will help in regeneration, this is because most of the saplings die out before they mature to become trees.
- VI. Most of the hard waste, plastic included is burnt by one and all. This issue has created an impact on the environment. The researcher suggests that, the Government support in the establishment in a pay to use incinerator facility and ensure the local body fulfills the long felt need to avoid burning of waste by the locals.

- VII. Joida depends on the Phansoli EDC for support whilst sending the tourists visiting the homestay for safari. However, there was a lot of disconnect and discontent. The general feel of the KTA is that the safari organized is not suitable, as the drivers and guides are Marathi speaking, and the cost person is INR 400, which is ok with the KTA, however, when there are just 2 tourists, the EDC asks for a payment of INR 2400 (i.e., minimum seating capacity of 6 X 400). Hence, this becomes a loss making event for the KTA members. Besides, the accompanying executive of the homestay also pays for the safari. The EDC should look into the same in an amicable fashion and ensure that the executive accompanying the tourists should either not be charged or the same should be subsidized. At times, it has found that, even there is a road block in the safari route, money is collected and the safari does not take place. However, the KTA members did not corroborate the same with metrics. The complaint from the KTA was that the safari has lot of vested interest, and it does not augur well for the tourism system and the larger role of ecology and its preservation. Another aspect that should be highlighted such that administrative action can be initiated is that, the information provided is not uniform in regards to the safari and other issues of the forest. The forest department should publish booklets for use of tourism stakeholders and the tourists, such that quality information is provided. The KTA members even mentioned of "night safari" being undertaken, but the researcher was not able to corroborate the same with any evidence.
- VIII. Rafting is another mainstay activity of the tourism system of Dandeli and the Kali; however the cost of INR 1400 appears to be exorbitant to the KTA. The KTA did not mention the numbers that they provide for rafting, hence, further comments cannot be made with conviction. The researcher did ask for numbers, but nothing came forward. One or two of the homestay owners mentioned that there is a 'lobby' working in regards to rafting. The researcher did not probe further into the same, as the aspect of 'lobbying' was beyond the scope of the study. One suggestion that the researcher received from the KTA is to have a changing room at the end of the rafting facility. One finds that the men and women are literally changing in the open that does not augur well with the tourism system.
- IX. The KTA members brought up the issue of 'prostitution' in some of the homestay, wherein locals use the facility for a short time. This the KTA members mentioned is on account of outsiders coming a renting premises, and because of low occupancy and load factor, renting out for illegal activity. The researcher here would like to comment the following: i) Ensure only locals having their own house/houses and those having additional rooms to rent out should be allowed to be part of the homestay schemata. ii) Have a system of licensing initiated through the tourism system which will help in relegating the non-locals out of the system. iii) Promote a mechanism of annual inspection with an intent to ensure quality and uniformity of the homestays. iv) The policy for homestays should include the aspects of commercial power supply is avoided, provide adequate license for liquor as and when required by the tourist; however, there should be checks and balances adopted. [Note: Two liters allowed; quantity to be increased for the home stay (Excise department has to step in)].

The Joida/KTA illustration is a qualitative step towards Community Based Tourism system, which will understand the nuances better than any other system. Joida/KTA should be encouraged in a way such that the local population gets to benefit.

Dandeli a land of unending forests and perennial water systems, a land of deep rooted culture and age old tourism, a land of poignance and an eerie silence.

A land struggling to find its identity and resolve social issues, a land waking up to the modern era and new environmental practices, a land so optimistic to changes and adaptations.

One will find the best of EDC run tourism, managing a natural formation- Syntheri Rocks and another in the form of the Phansoli EDC which runs safaris into the forest, having plenty of scope to do better. A stark difference, both not so far away from each other. The same kind of people, the same kind of management, why the lacunae?

The woods are lovely dark and deep, and miles to go before you sleep... Dandeli is all about this!





Environmental Impacts of Ecotourism In Bhadra Tiger Reserve (BTR)

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Introduction

Introduction

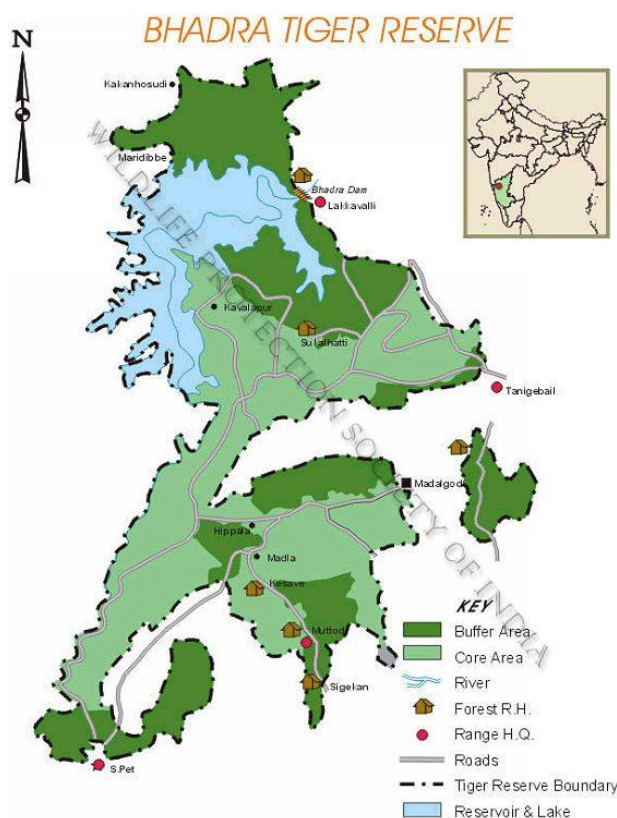
Bhadra Wildlife Sanctuary is a protected area and a Project Tiger tiger reserve located 38 km northwest of Chikmagalur town in Karnataka state, India⁵⁰. Bhadra Tiger Reserve is a biodiversity hotspot, with dry deciduous forest, moist deciduous forest and semi evergreen forests.⁵¹ Elevations ranging from 615 m (2,018 ft) to 1,875 m (6,152 ft) above MSL allows a variety of ecotypes including the unique shola forest/mountain grasslands complex at Bababudan Giri and other patches higher than 1,400 m (4,600 ft) above MSL.⁵² The 1,875 m (6,152 ft) above MSL Hebbe Giri is the highest peak in the sanctuary.

Bhadra sanctuary consists of two adjacent sections. The main western Lakkavalli-Muthodi section lies from 13°22' to 13°47' N latitude, 75°29' to 75°45' E longitude and the smaller eastern Bababudangiri section from 13°30' to 13°33' N latitude and 75°44' to 75°47' E longitude.

Elevation varies from 615 m (2,018 ft) to 1,875 m (6,152 ft) above MSL, the highest point being Kallathigiri on the eastern boundary⁵³. The sanctuary is surrounded by the scenic hills and steep slopes of the Mullayanagiri, Hebbegiri, Gangegiri and Bababudangiri hills. 1,930 metres (6,330 ft) Mullayanagiri peak in the Baba Budan Giri Range near the southeast edge of the sanctuary is the highest peak between the Himalayas and the Nilgiris.

The 551 ft (168 m) high Hebbe Falls are in the eastern part of the sanctuary. The Manikyadhara Falls is located on the nearby sacred Baba Budan Giri Hill. The tributaries of the Bhadra river flow west through the sanctuary. The western border of the sanctuary abuts the Bhadra Reservoir and is part of its catchment area of 1,968 km² (760 sq mi).

Jagara village is located near the sanctuary. Bhadravathi, Tarikere, Channagiri are cities nearby the sanctuary. Larger metropolitan cities in South India are well connected to Bhadravathi city by bus and rail. There is frequent local bus service from Bhadravathi to both Bhadra Dam and Bhadra WLS. The nearest airport is in Hubli, around 170 km (110 mi) from Bhadravathi.



⁵⁰ [bhadra on project tiger](#)". Retrieved 2011-03-09.

⁵¹ y I, Krishnamurthy (2010), "[Vegetation structure and floristic composition of a tropical dry deciduous forest in Bhadra Wildlife Sanctuary, Karnataka, India](#)", *Tropical Ecology* (International Society for Tropical Ecology), 51(2): 235–246, [ISSN 0564-3295](#)

⁵² [About The Sanctuary](#)", *Sanctuaries - Bhadra Wildlife Sanctuary* (Karnataka State Wildlife Board), 2011, retrieved 2012-02-01

⁵³ k karanth, krithi, [Economic and Political Weekly](#), retrieved 2011-03-12

The area was first declared as 'Jagara Valley Wildlife Sanctuary' in 1951 by the then government of Mysore covering an area of 77.45 km² (29.90 sq mi). After a systematic survey of the flora and the fauna of the area and its surroundings, the area was extended to its present extent and renamed to Bhadra Wildlife Sanctuary in 1974.¹

The Wildlife Sanctuary was declared as a Project Tiger Tiger Reserve in 1998. Bhadra is the first tiger reserve in the country to complete a successful village relocation program. The original relocation plan was introduced in 1974 and was implemented completely by 2002 when the 26 villages in the sanctuary were successfully relocated to M C Halli which is about 50 km (31 mi) from the Sanctuary.⁴

Lakkavalli (A Case Study)

Lakkavalli is part of the Bhadra Tiger Reserve (BTR) along with the areas of Hebbe and Tanigebyle. Lakkavalli has emerged as a tourist destination due to the Bhadra dam and the reservoir that has created islands and provides the River Tern, a local migratory bird who flock in large numbers and make the islands their homes for a stint. JLR authorities found it fit to construct the River Tern lodge, where tourists get sightings of the bird and also can delve to enjoy the flora and fauna of the Bhadra Forest area/BTR.

Lakkavalli, 30 kilometers from Shimoga, 22 kilometers from Tarikere and 260 kilometers from Bangalore. The Lakkavalli state forests coming under the Bhadra Wildlife Sanctuary, now rechristened as the Bhadra Tiger Reserve (BTR) constitutes a total of 139.95 sq. km. is the northern boundary of the reserve. The main water source is the Bhadra Reservoir. The bio diversity of the place is well known since the British⁵⁴. Even the hunter Kenneth Anderson, in one of his book, claimed to have killed a Man eater here.

Lakkavalli has one of the most valuable Teak forests in Karnataka and was once famous as one of the finest Teak producing regions. The Lakkavalli range is surrounded by Singanamane, Tyvaragatta, Gonibeedu, Malligenahalli, Thammadihalli and Byrapura where the land is used for cultivating paddy and growing coffee with estate holders, farmers, marginal farmers and landless labor. The landless laborers work in the coffee estates, rear cattle and collect honey. Portions of Lakkavalli range is under illegal grant and encroachment and is prone to fire wood collection by locals⁵⁵.

Jungle Lodges and Resorts (JLR):

As the publicity material on the JLR website goes, "the river tern lodge is the ideal spot to get acquainted with nature in its serene beauty."⁵⁶ JLR has created a perfect blend of nature and wildlife. With 24 twin-bedded rooms spread across 10.3 acres of hill terrain which have a veranda overlooking the beautiful backwaters; the accommodation facility is sure success with the tourists. Besides, the beautiful backwaters, the lodge also offers sailing, kayaking, water cycling, water trampoline, joy fishing, guided trekking, bird

⁵⁴ <http://en.wikipedia.org/wiki/Lakkavalli> accessed and retrieved on 19th July 2013

⁵⁵ Management Plan for Bhadra Wildlife Sanctuary (2005-2015), Karnataka Forest Department.

⁵⁶ <http://junglelodges.com/index.php/resorts/river-tern-lodge.html> accessed and retrieved on 19th July 2013

watching, mountain biking, rock climbing and times star gazing. From the lodge there are optional tours to the Tyverekoppa Lion, Tiger Safari and Sakkrebyle Elephant camp. The opportunity for wildlife sighting at the BTR which is only 4 kilometers from the resort is another plus for the visitor, as they can come across the Tiger, leopards, black panther, elephant, marsh crocodiles, Palm civet, Stripe necked mongoose, Sloth bear, Large brown flying squirrel, Sambar, Spotted deer and the Wild boar. Bhadra Wildlife Sanctuary has been recently adopted under 'Project Tiger' and thence the name BTR.

The cottages at Lakkavalli have been constructed using thatched wood hay, which is the primary raw material which has been procured from outside as local procurement was the least. The source of electricity is the Government grid, Generator and solar. With erratic power cuts throughout the year, generators and solar power come in handy. The Generator consumes about 700 liters of diesel/month. For utilizing the Government grid, an amount of INR 60,000 per month is spent. It is in the summer months that solar energy comes in for support from the point of view of power generation.

Considering the log heads are located all across the area, they are not centrally connected to heating, cooling and hot water. Despite the fact the cottages with good ventilation, fans and large windows and are perched atop the hillock, making the place windy and salubrious; air conditioners have been put to use in all the cottages. Except for the use of CFLs and LEDs no other energy saving measures have been adopted, like, room key guards, motion sensitive power activation etc., nevertheless division wise central switches have been employed as follows: Hill 1, Hill 2, Kitchen, reception, Golghar, office, rooms where the power equipment can be switched if the respective areas are not occupied.

For water heating purposes individual rooms geysers have put to use. The researcher observed that, this was a negative environmental practice, as the guests who are not very environmentally sensitive can switch the geyser on and at times will forget to put off the same. It is observed that there is no written information placed to inform the guests to put off the geyser after use. Even while the guests are briefed, the same is not being discussed. LPG cylinders are being used for cooking purposes and fire wood is used for bon fire, which is procured from the forest department depot located in Lakkavalli.

Water is being procured from the Bhadra reservoir for drinking and non-drinking purposes which go through a simple process of filtration. The perennial availability of water in the reservoir calls for no shortage of water and coping strategies of in case of scarcity. Water gets stored in a 10,000 liters overhead tanks, which is covered and protected and filled one or twice daily. The storage tanks go through a monthly maintenance to check for cracks and leaks. The guests are encouraged to consume filtered water rather than bottled water, but if the guests particularly insist, then, they are provided with bottled water that is procured from Metro located in Bangalore. Thus used water bottles are disposed to the local *kabadis*, who recycle the bottles for tarring roads etc. The resorts has not imbibed any rain water harvesting practices, which is the need of the hour. They do not encourage the guests to conserve water, but the staff are briefed to conserve the same. The resort does not employ water conservation practices like low flow shower heads in the bathroom, commodes and faucets with half flush mechanisms or usage of tap restrictors.

Being an eco-friendly resort and calling themselves as eco-tourism operators, the resort does not seem to be using eco-friendly products for cleaning purposes. Phenyl to clean floors, harpic to clean bathrooms, surf for laundry and vim bar for dishes are used in the facility.

The grey and black water get collected in an underground septic tank and allowed to seep through. In terms of waste management, the wet waste generated from the kitchen, is being composted on site. Dry waste such as plastic, glass and metal are given away to *kabadis*. Dry leaves and wood are allowed to stay on site. Hazardous waste is collected and stored over a period of time. Once the storage is full, they are dumped in the bins provided by the local self-government. Newspapers are burnt and old linen and fabric area given away to staff. There is a serious issue of monkeys in the river tern lodge, who get into the waste bins positioned throughout the property and consume the items deposited, besides, throwing waste, the animals scare the tourists as well. The researcher observed a lot of waste being strewn around on property across the foot hill. Despite availability of waste bins, for segregating waste, the employees are not adequately trained to segregate the same.

They use large containers and tins to procure products for the kitchen, thereby considerably reducing the plastic waste. In the office, it is ensured that both sides of the paper are put to use for printing purposes and one-sided papers get re-used for other writing and scribbling purposes. The resort does not use, use and throw plates and cups for the guests.

Any eco-tourism venture should aim at showcasing local cuisine; at the River Tern Lodge, however, 85% of the food prepared is of Indian origin, 10% is continental and Chinese etc. Only 5% being local. They do reduce a lot of food by counting the number of pax prior to cooking.

The river tern lodge perched atop a hillock is prone to the sound of gentle waves and bird calls. This apart the vehicles of tourists and in-house safari vehicles do emanate vehicular noise. The property is serene and tranquil with not much of noise pollution except, for that



of the generator. There are 4 safari vehicles (Mahindra Camper of various models) that run on diesel with a seating capacity of 11 including the driver. There is one pick up vehicle with a seating of 11 including of 2005 make which is diesel run. The pick up van is used for safaris when there are more number of guests over and above the numbers that can be housed in the campers. The guests divided between jeep and boat safari thereby reducing the pressure on the tiger reserve. The safari route is 26 kilometers in length with an entry through a main gate from where the safari moves to the *Sukalatti* bungalow; from here on the road branches out in *Sargod* road, backwater road, link road, *Mavinalla* road, pickup road, *Koramala gudda* road, *Chinnadagani* road and *Kati* road. The safari vehicles and the generator consume 70 liters on a day to day basis. In order to record the noise

made by the safari vehicles, a machine manufactured by the Quest Technologies, model, 1100 integrating logging sound level meter was placed on one of the safari routes and the average dB produced by the safari vehicles was 74 dB⁵⁷. The physical carrying capacity of the tourism zone is calculated below.

Physical Carrying Capacity (PCC)⁵⁸: This is the “maximum number of visitors that can physically fit into a defined space, over a particular time”. It is expressed as:

$$PCC = A \times V/a \times R_f$$

Where, A = available area for public use

V/a = one visitor / M²

R_f = rotation factor (number of visits per day)

In order to measure the PCC to the Lakkavalli range, the following criteria must be taken into account:

Only vehicular movements on forest roads are permitted. The “standing area” is not relevant, but “closeness” between vehicles is important. There is a required distance of at least 500 m (1/2 km.) between 2 vehicles to avoid dust (2 vehicles / km.). At least 2 hours are needed for a single park excursion. The protected area is open to tourists for 9 months in a year and 4 hours per day.

Linear road lengths within the tourist zone are more relevant than area, and the total lengths are:

Total of 26 kilometers

Due to constant vehicular use, the entire road length of 26 km. is prone to erosion,

Rotation Factor (R_f) = Opening period

Average time of one visit

Physical Carrying Capacity (PCC) = 26 km. X 2 vehicles/km. X 2 = 104 visits/day

The Lakkavalli tourism system has ensured that with 5 vehicles operating at peak time with a total capacity of 55 tourists for each session they are close to the PCC as per the NTCA guidelines. The researcher did not find any negative impacts/negative foot prints, due to safari.

Boating, a USP at Lakkavalli:

⁵⁷ The sound meter was standing on 55dB on initiation due to the natural sounds (cicada and other noise) of the forest.

⁵⁸ Adopted from the NTCA document

The river tern lodge boasts of boating in the back waters of the Bharda reservoir which has islands/islets, where the river terns flock in thousands during the season⁵⁹ (January to June). Two boats (one petrol/24 seater and one Kerosene/20 seater) are operated for the benefit of the tourists. Both consume 20 liters of petrol and kerosene per day respectively. The boats have been brought from Kabani to river tern⁶⁰. The sound levels emitted from these boats are as follows:

- ❖ Petrol boat: 80 dB
- ❖ Kerosene boat: 85 dB

The boats are taken very close to the river terns and left to anchor on the islands and the tourists are allowed to photograph the birds. The noise generated by these boats will disturb the breeding and feeding of the birds. The researcher noted that there was one team which arrived to film the terns, wherein the boat was allowed enter into the reservoir for a continuous stretch of 4 hours and the boat was anchored on the island. The picture represents the same.



In terms of air pollution on the property, is from i) safari vehicles ii) tourist vehicles iii) staff vehicles iv) combustion of fire wood v) combustion of LPG vi) emissions from the diesel generator vii) burning of waste viii) refrigeration and freezer units xi) smoking and x) air fresheners and room purification. The guests and employees are briefed to reduce air pollution and also the lodge is involved in afforestation activities.

The resort does provide information on 'do's' and 'don'ts' inside the facility, methods to conserve resources (water, air, energy) and information on ecology of the area.

The lodge does have a green website, which is part of the JLR website. They also stock magazines of ecology and environment in the reading section. Guests are informed about other areas of natural beauty viz., Bababudan, Muthodi, Chikmagalur, Mullayangiri, Hebbe, Tanigebail to mention a few. The resort is also involved in educating local people about biodiversity/conservation and supports/partners/ local micro enterprises. The lodge also supports/partners environment education and community development initiatives. However, the lodge is not involved in educating tourists on any local art, history, performances, puppetry, and storytelling. Nevertheless they do telecast documentaries on wildlife and related aspects for the tourists to view. The lodge do not promote or sell the locally made items, nor have they appointed persons who were erstwhile engaged in environmentally detrimental activities. They are not involved in reporting any illegal activities to the Government. The lodge is involved in charity to the local school and local religious institution. They donate old equipment, computers, books to the local

⁵⁹ <http://travel.india.com/travel-blogs/lakkavalli-birding-paradise-in-karnataka> accessed and retrieved on 11th July 2013

⁶⁰ The waters of the Bhadra reservoir are rough with strong waves, where as in Kabini it is calmer. This calls for a question if the same boats can be used in two different strengths of water.

Government school (MN Camp) and Mother International School. They have 2 trained naturalists of which 1 (50%) of the naturalists is from the local community.

The resort has wildlife coming on to the property viz., porcupine, spur fowl, monkeys, mongooses, snakes like Russell's viper, vine, python coming on to the property. The resort claims that they do not pose any threats to the guests. There is fencing (chain link) only near the parking area and the other places/areas are exposed. The guests do get instructed in regards to safety measures and anti-venom serum is provided by the lodge to be kept in the local hospital in case of any eventuality. There is a likelihood of fire spreading to the campus in summer months, to handle, fire extinguishers are placed at vantage points; fire lines have been created and continuing watering takes place. No pets are allowed to be carried by the guests into the property. The lodge premises is definitely not a plastic free zone.

Muthodi (Nature Camp)(A Case Study)

Considering as magical and mysterious, Muthodi Forest Reserve (MFR) is one of four reserve areas of the Bhadra Wild Life Sanctuary, along with Lakkavalli, Hebbe and Tanigebyle. The eerie silence brings about what is in store for the wildlife enthusiast and tourist alike. Considering the variety of fauna and flora, MFR teems with animals and birds that will surely help one to take back good memories of the forest.

Brief History:

The area was declared as "Jagara Valley Wildlife Sanctuary" by the Government of Mysore in 1951, vide Government Notification No. A & F. 6175/90/10 FT-112-40-2, dated 21.2.51 covering an area of 77.45 sq. miles. After a systematic survey and census of the entire area including animals, birds and plants, it was thought to bring some more area under the Jagara Valley Forests. The adjacent area, which were rich in wildlife was surveyed and the Sanctuary was reconstituted in the year 1974, as Bhadra Wildlife Sanctuary", vide Notification No. AFD-25-FWL-74, dated 6.9.74, covering an area of 492.46 sq. km. as per section 18 of Wildlife Protection Act 1972 (Intention), and confirmed under section 26 of Wildlife Protection Act 1972, vide notification Fee-58-FW-96, dated 9.3.98. This was the 25th Tiger Reserve in India.

Area: 177.59 square kilometers⁶¹. **Tourist zone:** 20 Square Kilometers. **Safari route:** 18 kilometers [Game Road]

Districts (spread) in Karnataka: Chikmagalur

Distances: From Chikmagalur: 33 kilometers; Mangalore (nearest airport): 213 kilometers; Kadir (nearest rail head): 73 kilometers; Bangalore (capital): 273 kilometers.

Climate and Weather:

⁶¹ Government of Karnataka, GO. No. FEE 122 FWL 2009 dated: 29/01/2010

Rainfall: 1200 mm to 2600 mm
Temperature Minimum: 10° C in winter
Maximum: 32° C in Summer
Seasons:
Winter - November to January
Summer - February to May
Monsoon - May to October



Water Sources: MNC, has a unique illustration when it comes to water sources, wherein the officers of the camp have identified a Natural/Original stream about 3 kilometers from the Inspection Bungalow (IB) (a water storage tank of 20 feet X 20 feet has been made near the IB and water gets replenished and recouped on a real time basis), set up a tank store and have ensured water is moved through pipes to the MNC. The water is being used directly for consumption and provided through the taps to the inhabitants of the camp. This is one of the best of example of sustaining without any external intervention. The same source of water has been used for power generation through a turbine that has been fixed near the IB, which generates 2 kilo watts of power per day (the machine can generate 10 kilo watts). Truly speaking this illustration speaks leaps and bounds about the commitment of the officers to ensure sustainability in the resources that are available. All this despite the river (*Somavahini*) flowing just adjacent to the MNC the water of which has not been tapped.

The Muthodi range receives higher rainfall than other ranges. 80% of the rain is received from the South West Monsoon. Monsoon winds from the Arabian Sea, which come saturated with water vapor cool on ascending the steep hill slopes and call forth during the rainy season almost incessant precipitation. The average rainfall in the range is between 1500 mm to 1700 mm. On an average, there are about 98 to 104 rainy days in a year, and there are records as much as, 85 mm of rain being received on a single day.

A few aspects to ponder over (+ve):

The MNC tents and accommodation facilities do not have Room Geysers, Central Boilers, however, they have the Gujarat boilers, which generate hot water through Solar power.

The MNC ensures avoidance of paper plates and cups; the kitchen unit of MNC has stalked about 50 steel plates in the kitchen to be used by tourists, who come in large numbers during weekends or during occasions. This has been well received by one and all. This has led to plastic not being allowed at any cost.

Pet's not being allowed reached a high in MNC, when a guest who arrived with a pet (dog) was sent back without being allowed entry into property.

There is no air conditioning in the property; the conditions are good, hence, the practice can continue. By having good ventilation facilities, the guests could get a feel of natural breeze, that would provide for different experience.

A few aspects to ponder over (-ve):

In regards to waste disposal, the wet waste is disposed of into the flow in the gutter; considering that the number of tourists and the flow is low; it appears reasonable. However, over a period of time, the wet waste disposal should be made efficient and eco-friendly such that the aspect of wet waste management is as per norms.

Grey water is being channelized to 'pits', leading to leaching into the earth over a period of time. This needs to be avoided and proper pits without leaching should be put in place.

Considering the fact that the vehicular traffic is allowed in order to ensure locals to travel to nearby villages (check on the villages) by the forest department (FD); the research team recorded 61 vehicles during the time frame of 8 am to 8 pm⁶² and found the following readings; which brings us into a dichotomous situation of the silent zone, minimum dB level of 50. The Lmax and Lmin for Muthodi noise data assessment stands at 93.4 dB and 43.9 respectively. The data collated was from the sound level meter that was kept near the entry gate into the safari area. This is a clear indication that the MNC route on account of heavy transport and other vehicles moving through the MNC creates an increase in the sound levels which will surely act upon on the wild animals. The administrators need to take a clarion call as to the movement of vehicles, whilst getting suggestions of alternative routes for the benefit of the people who move through the MNC.

Whilst speaking with the home stay owners, the researchers were informed that, at times, tourists, move into the forests of Muthodi with the help of jeeps provided from Malandur a small village about 17 kilometers from Muthodi. One has to check on the veracity of the statements and ensure, if such sorties are being done by locals, this should be avoided in its totality.

Sl. No.	Type of Vehicle	dB
1	Motorcycle	62.0
2	Motorcycle	63.3
3	Jeep	73.4
4	Motorcycle	70.0
5	Motorcycle	62.2
6	<i>Kabadi</i> Motorcycle	65
7	Car	62.9
8	Motorcycle	72.1
9	Motorcycle	69.1

⁶² The Range Forest officer's team informed the researchers that the vehicles ply on the forest route between 8 am and 8 pm. The intensity of vehicular traffic increases in the morning and the evening.

10	Camper with plantation workers	76
11	Motorcycle	69.9
12	Trax	80
13	Motorcycle	68/9
14	Bus	86.9
15	Tempo Traveller	81.0
16	Motorcycle	68.3
17	Motorcycle	73.9
18	Motorcycle	70.7
19	Motorcycle	68
20	Jeep	72.2
21	Motorcycle	65.9
22	Bus	77.3
23	Jeep	72.5
24	Camper	68.7 (80.0)
25	Motorcycle	83.7
26	APE auto	79.2
27	Motorcycle	82.5
28	Motorcycle	67.1
29	Motorcycle (gearless)	62.0
30	Luggage Camper	71.1
31	Motorcycle	67.0
32	APE Auto	77.5
33	Car	70.2
34	Car	68.0
35	Car	67.6
36	Car	74.4
37	Plantation Camper	78.1

38	Motorcycle	72.1
39	Motorcycle	75.0
40	Motorcycle	70.1
41	Motorcycle	73.0
42	Bus	82.4
43	Scooter ()	64.1
44	Motorcycle	68.7
45	Tempo Traveler	82.9
46	Motorcycle	67.4
47	Plantation Camper	70.1
48	Bus	76.8
49	Luggage Camper	74.6
50	Jeep	72.5
51	Motorcycle	71.6
52	Jeep	71.7
53	Tempo Traveler	85.5
54	Motorcycle	63.2
55	Jeep	75.5
56	Motorcycle	64.4
57	Bus	81.5
58	Motorcycle	69.6
59	Jeep	74.0
60	Jeep	73.4
61	Motorcycle	64.9
Total Weighted Average (TWA)		54.4

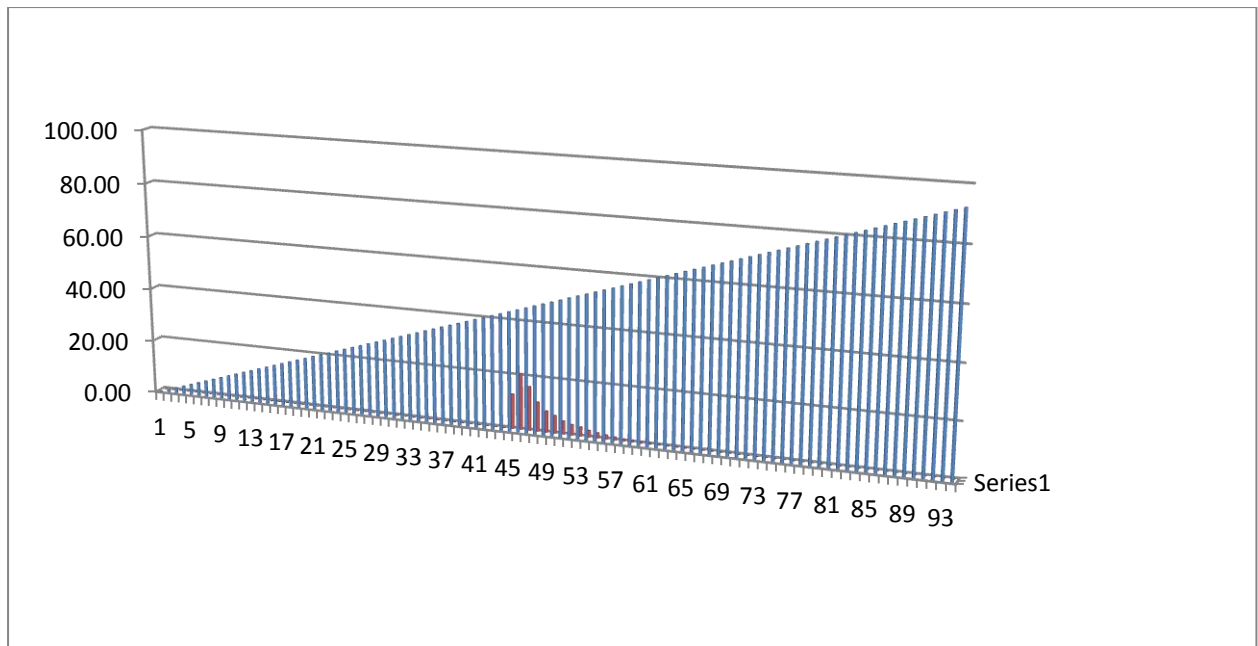


Illustration: Noise data gathered at Muthodi Safari gate.

Plastic free zone:

All eco sensitive zones, must and should be made plastic free zones. The resorts studied do mandate the nuance of plastic free zone; however, it is not effectively passed on to the tourists, who do come to some of the properties in large numbers. One finds that, a direct sensitizing program is lacking with the tourists. In the case of MNC, the area is no doubt a plastic free zone; and bins have been placed in the property premises to ensure the tourists/guests drop the plastic items that are to be disposed. Which in turn are collected by the MNC staff and disposed to the *kabadis* who come from Mallandur. The solid waste of the Kitchen however, is thrown out and the same disintegrates. This may be efficient for the time being, but in the long run, any place has an extent to which it can carry on (carrying capacity). Scientific waste management and in particular plastic that takes a years to decompose should be disposed appropriately to avoid the contribution to negative footprint of the facility.

Additional Details:

Official Name of the Reserve: Muthodi State forest (Muthodi Nature Camp (MNC), Muthodi Range), Bhadra Tiger Reserve (BTR)

KFD official structure: Conservator of Forests (1) → Assistant Conservator of Forests (1) → Range Forest Officer (1) → Deputy Range Forest Officer – Team 1 → 2 to 3 Forest Guards → Permanent Watchers and Temporary Watchers <-> Deputy Range Forest Officer – Team 2 → 2 to 3 Forest Guards → Permanent Watchers and Temporary Watchers

Soil type: the forest has a central small belt of Keratophyre. This is surrounded by a wider belt of hornblendic schist and trap composed of both fine and coarse varieties. Some diorite porphyrite also occurs in the south east of Muthodi State Forest. The outermost ring is one of ferruginous beds.

Flora: The prevailing type of forest is mainly constituting southern mixed deciduous

Fauna: Gaur, chital, sambhar, elephants, tigers, wild dog, leopard, barking deer, flying fox, mongoose, elephant, panther, macaque, babbler, barbet, blue jay, kingfisher, robin, weaverbird, and drongo are to be enjoyed in their elements in Muthodi.

Villages under the wildlife range of Muthodi: Kesavinamane, Melinahulavathi, Kolagame, Jagara, Malagar, Byravalli, Siravase, Sugadavani, Melugiri, Hippala. At the Post rehabilitation, the land use pattern of the Muthodi has primarily been forest land, for the regeneration of forest and protection of species. The land has not been used for specific purposes.

SC order: No entry to Muthodi forest

Chikmagalur, Jul 25, 2012, DHNS :

The fun and frolic by tourists at Muthodi nature camp in Bhadra Tiger Reserve has finally been curtailed.

In response to the report on the parties 'Nature camp turns into 'messy' that was published in Deccan Herald on Monday, Bhadra Wildlife Reserve Department Conservator of Forest Krishna Udupudi has ordered for a ban on any human activities within Muthodi nature camp zone with effect from July 22, in accordance with the Supreme Court order.

Responding to the report, Krishna Udupudi said that the report has opened the Department's eyes. "We regret that such activities were taking place in the eco-sensitive zone like Muthodi.

Though we used to check the visitors before letting them inside the nature camp, a few visitors used to gain entry without the notice of the forest officers and staff. We will ensure that such activities would not repeat again," he has assured.

He has further stated that no activities should take place in Muthodi which is in the heart of the reserve forest. "As it is our responsibility to create a congenial atmosphere for the animals, we had written a letter to the higher officials requesting for the ban on human activities in the region.

Now with the Supreme Court ordering for the ban on tourism and safari in tiger reserves across the nation with an objective to save the tigers, our decision has received a strength," he said.

"The Department has realised that as Muthodi core of the reserve forest, it is not right on our part to operate nature camps, Department quarters and offices here. The process of shifting the nature camp from Muthodi region has started and will be carried out in different phases. We are looking out for land outside the core area," said the officer.

In response to the Department's decision, wild life activist G Veeresh has urged the Department to stop the tourism activities completely. The order should not be limited to words, but it should be brought in to action.

Analysis of environmental impacts: Tourists accommodation facilities situated around Muthodi Forest Range, who are close the Bhadra Tiger Reserve.

This part of the study is based on the fact and on the below two premises;

1. To consider Bhadra in terms of Lakkavalli and Muthodi.
2. To study the homestay and their functioning despite the fact that they do not depend on the Reserve Forest; to understand the environmental practices that they have adopted or follow, considering that they are situated close to Bhadra, which will help in the generation of information and data that can go a long way to help in the planning and strategy.

The sampling includes the following tourist/accommodation facilities:

1. Giri Resort
2. Jungle Green home stay
3. Holiday home stay
4. Kumble's Misty mount home stay
5. *Muggillamane*
6. Nature Nirvana home stay

Sl. No.	Parameter	Findings
1	Construction material	Interestingly brick, wood, cement, stones and glass have been sourced locally (Chikamagalur town). Most of the other materials have been sourced from Mangalore.
2	Energy and Electricity	Erratic electricity supply from the Government grid, and the availability of power being 6 to 8 hours a day, dependence on generators and the use of 25 to 30 litres of diesel. One home stay uses kerosene to run the generators. One of the home stay uses solar lamps for purposes of lighting.
3	Heating water	Usage of firewood, Gujarat boilers and gas geysers
4	Air-conditioning and ventilation	None of the home stays have air-conditioning; all have adequate ventilation, large windows and balconies in the properties. The place does not require any air-conditioning hardware as the place enjoys a salubrious climate throughout the year.
5	Energy saving measures	All the home stays have energy saving CFL bulbs, one of them has a skylight and a few have central switches.
6	Type of fuel	All the home stays use firewood either for cooking purposes or for bonfire, boiling water. LPG used for cooking and heating water purposes.
7	Water	Five of the six home stays rely on nearby streams, rivulet for water. There are no bore wells in the home stays that were part of the research. The rivulet water goes through a simple filtration process and is used as relevant, after being stored in tanks (capacity 2000 to 5000 litres). The tanks get filled/refilled once every day on an average. The guests are encouraged to consume the available filter water and they do not allow for bottled water except for the times the tourist insists on bottled water. The bottled water has been procured locally and the used water bottles are burnt.

		None of the home stays are involved in rain water harvesting. They have not employed water conservation measures such as usage of local water shower heads in the bathrooms, commodes and flushes with half flush mechanisms, and/or usage of tap restrictors. The black and grey is collected in underground septic tanks and are not used in any manner on collection.
8	Cleaning and washing	None of the home stays are using eco friendly products. They make use of acids of various kinds for cleaning and washing purposes.
9	Swimming pool	None of the home stays have a swimming pool.
10	Waste management	The wet food is fed to cattle, dog, and chicken and thrown in plantations as fertilizer. Other types of waste such as garden waste, hazardous waste, dry waste, cloth get burnt. There is no scientific segregation of waste.
11	Plastic	None of the home stays come under any plastic free areas; plastic gets burnt out rightly and they do not reduce the use of plastics by opting for less packaged products. This has to be noted in relation to the fact that the city of Chikamagalur has been declared as a non plastic zone by the authorities.
12	Pollution	Air and noise pollution is caused due to vehicles, gensets, construction, fireworks and human voices. Air pollution is caused due to tourist and staff vehicles; combustion of LPG and firewood; diesel generators; burning of waste; refrigeration and freezer units. The guests and employees do not receive information to reduce air pollution. There is no separate for smoking in the area, in fact somoking has been allowed in the home stay areas.
13	Information, interpretation, community involvement	None of the home stays have any information about the do's and don'ts inside the facility and information on methods to conserve resources or information on ecology of the area. None of the home stays have a green website, though they store eco magazines and newspapers. The home stays inform the guests about the other places of natural beauty. None of the home stays encourage the locals about the bio diversity and conservation, not do they showcase the local art/history. Few of the home stay owners are involved in afforestation and none of them support or partner local micro enterprises or do they sell or promote locally made items. They do not partner or support, with organizations for environment education and community development initiatives and none of them have employed persons who were erstwhile engaged in environmentally detrimental activities.
14	Employing Naturalist	None of the home stays have appointed trained Naturalists, who are local or trained.
15	Good practices	Except for one home stay which has considered a flag post in the Mallandur circle and another home stay which gives funds to the local Government schools situated in Mallandur. No home stay management is involved in charity, involved in local hospitals and religious institutions. None of the home stay managements print on both sides of the paper or re-use one side printed paper.
16	Fencing and wildlife trespassing	Only two of the 6 home stays have fencing have barbed wire and hedge wall. None of the home stays have faced issues of wildlife entering the respective properties.

Chikamagalur:

Chikamagalur has many resorts around the Bababudangiri and Mullayangiri ranges. Though the focus is on estate/plantation tourism; at times, following the demand of the tourists, the resort owners/managers have sent the visitors to Muthodi, for safaris. These resorts fall out of the 10 kilometers radius of Muthodi and hence cannot come under the purview of the study/research. But they have been considered for the interview and questionnaire administration in order to understand their functioning and to primarily look at their environmental practices, which will be vital, considering they are in an ecologically sensitive area.

The following resorts and hotels were considered on account of the use of resources that the stakeholders have adopted.

1. The Serai
2. The Taj Gateway
3. Woodways resort
4. Beanstalk Bagmane
5. Goodearth resort



In the five facilities that the research team visited and administered the questionnaire; one can find that, The Serai and The Taj Gateway are built as independent facilities providing accommodation to the guests/tourists. Whilst Woodways resort, Beanstalk Bagmane and Goodearth resort; are part of the houses built in the plantations; and are being provided to the visitors/tourists as homestay.

The Taj Gateway does not inform any of the guests about the tourism facilities in the forest areas of Chikamagalur; and the Serai, on account of non-availability of vehicles to ferry the tourists into the forest area for safari have avoided sending guests to Muthodi or any other nearby forest. However, Woodways resort, inform the guests to take the safaris into the forests. But then, like the Serai, Woodways too has faced issues of non-availability of forest vehicles, who are only permitted to take tourists into the forest area on the safari route.

Unlike Serai and Gateway, Woodways, Beanstalk and Goodearth, are locals who own ancestral homes in the plantations and considering the potential for tourism have converted their homes into accommodation facilities for the tourists. One of the resorts owners has started a Non-Governmental Organization (NGO) and has got involved in local conservation, and is in the forefront to fight for the rights of the locals, is of the firm belief that homestays have to be set up by people who are native to the land and who are in a position to imbibe a sense of culture to the tourists. It is the affinity to the land the homestay that has lead the homestay/resort owners to join the bandwagon of tourism and promote healthy, conscious and a sustainable tourism.

One of the resort areas, has two streams running through the plantation area, has been sharing the water resource with the others in the areas and ensured a co-existence. Hence, it can

All the resorts/homestays depend on the Government grid and they still have power generation facilities in the form of solar, and inverters. Considering the size of the homestay, generators have not been put to use by the property owners. Whilst Serai, a leading resort has generator facilities owing to the scale of operations. The common complaint is that during monsoons the power cuts are many, hence the homestay owners have to depend on other alternative sources of power.

For water heating purposes, the homestay owners have used solar energy and gas geysers. None of the homestays are air conditioners in the property premises. On the other hand, Serai and the Gateway have centralized air conditioning in all the areas.

All the homestay properties have used energy saving CFL bulbs, whilst Serai and Gateway have besides, CFLs, have centralized switches, motion sensitive power activation and even room key guard. Homestays have made use of solar lights as required.

The homestays use firewood that is gathered from the plantation for cooking, bonfire and heating at times.

The Serai and Gateway have the facility of bore wells and water tankers; whereas, the homestays depend on the water from the local streams and bore wells. The need for water tankers have not been considered by the homestays.

Packaged water is purchased in plenty by the Serai and Gateway; whereas the homestay facilities have encouraged the guests to consume filtered water.

Except for Serai, who use Johnson Diversy products for purposes of cleansing, whereas, all others interviewed use acid.

Rainwater harvesting to preserve and recycle water, as a system is adopted by Serai and Gateway. The same has not been adopted by the homestay owners considering the investments and the levels of maintenance.



One of the homestays have installed low flow shower heads, but have not used it, instead they have provided the guests, two buckets one being copper (helps to retain the heat of the water longer) and other being plastic which will fetch the initial cold water that comes out of the heater. The guests and the employees are taught to preserve the same and to ensure that water is conserved.

The homestays are allowing black and grey water to seep into the earth. The Serai and Gateway are treating the black and grey water and are using the same for maintaining the garden. The Serai and Gateway have swimming pools and bore wells are used to fill up the same. None of the homestay properties have pools, considering the size of operation. Pools in the Serai and Gateway are cleaned with the usage of chlorine, hence plenty of water goes a waste.

Waste Management:

The Serai has employed waste segregation and management at source, with colour coded bins and thus the segregated dry, hazardous waste and newspapers are given away to the *kabadis*. Wet food from the kitchen is sent to the piggery that is in the Plantation owned by Serai. Plastic is given to the Government agencies and old linen and fabric is given away to the staff. The Gateway burns the wet waste; and all other waste is given to the *kabadis*. One of the homestays have a composting facility and are involved in burning old linen and fabric. Another homestay gives away the wet waste to the cow farm which is owned by them; the dry waste is given away to *kabadis*. Hazardous waste, like bulbs gets powered and is put to bandicoots. One homestay burns all the waste that is generated.

It can therefore be seen that the homestays have created an impact for themselves; though their involvement in forest based tourism is at the minimum. They have established practices that have helped in building a scenario for tourists to visit Chikmagalur. In fact, any policy for homestays, if created by the Administration; should have the following:

1. Ensure only locals participate in the homestay system.
2. Those involved in the homestay mechanism are able to bring in the element of sustenance.
3. Ensure a system of licensing; such that only genuine players are in the market.
4. Provide subsidies required, in the areas of alternative (non-conventional energy) power generation.
5. Locals know the terrain well, they have to be allowed to manage the eco system on their own, considering the knowledge they possess.
6. The Administration should facilitate in every manner possible support to the homestay mechanism and bring about the necessary augmentation in the accommodation system.



The dense evergreen forests that take you back to the times of the kings- The undulating terrain is dotted with lush valleys and misty peaks and tales to tell! Bhadra is where the bamboo swings to the tones of the winds, where silence befalls everything else.

A calling comes to the hearts of the men, to come restore the virgin ferns! And rejoice in the tranquil outdoors. With air so clean and waters crystal clean, Bhadra is a call for all!