

Reserve forest and livelihood opportunities: A study on Buxa tiger reserve

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Abstract

Reasons for creating reserves in colonial period had been a concern for the reduction in big game species and to enhance the commercial production of timber. Reserves ensured strict regulation on traditional use of the forest, regardless of its good or adverse impact on the forest's ecology. Forest Act of 1878 and 1927 provided an excellent launching pad for denying traditional livelihood to the forest dwellers and compelling them to act as labor under forest department. The Wildlife Protection Act, 1972 coined the concept of protected area for which more and more areas of forests are declared as wildlife sanctuaries and national parks. Protected area propagates a conservation regime of not interfering in the forest so that nature can take its own course. Today, 47.64% of the total forest area of *North Bengal* falls under these categories. The objective of this paper is to look into the concept of reserve from the point of view of forest dwellers' livelihood. Buxa Tiger Reserve (BTR), the 15th Tiger Reserve of the Country has been selected for this study since it has witnessed commercial forestry as well as protected area management and it provides residence to 37 forest villages. An observation from the study suggests that the concept of reserve has forced the forest villagers to change their livelihood pattern. The study also reveals that due to lack of livelihood opportunities villagers are forced to migrate in search of alternative livelihood.

Keywords: reserve, conservation, policy, livelihood, forest village

Introduction

It is estimated that more than 1.5 billion inhabitants across the globe are dependent on forests for their livelihood though, the degree of dependence vary considerably depending on the accessibility to forest resources and people's customary practices. A conservative approximation reports that nearly 350 million forest dependent communities live in and around forests. These people are heavily reliant on the forests for livelihood. Moreover, around 60 million forest dwellers are found to be completely dependent on forest resources [2].

The survival and income generating options of forest dwellers to a great extent depended on the resources available in the forest itself [3, 19]. It is estimated by prior researchers that resources of forest contribute almost US\$100 billion including non-timber forest produce (NTFP) and timbers used by the human for varied uses over the years [29]. The contribution of NTFPs is found to be a major source of income to the forest dwellers [12]. It is well recognized by various authors pursuing research on the livelihood opportunities in the tropical regions that the resources of forests are used by the forest community for their survival [14, 37, 38]. In recent times, it is also revealed by researchers that people living in the vicinity of forests extremely rely on various types of flora and fauna and animal products for their own consumption as well as selling the same for commercial purposes [31]. There are views that the farming of NTFPs on a commercial basis may generate substantial income and also help conserving the forest [23, 24, 17].

The technological up gradation owing to industrial revolution, radically changed the pattern in forest resource uses. More and more organized timber felling were needed to feed the transport industry, paper industry, rail road expansion, war requirements (World War I & II). Moreover plantation industry like tea, coffee and rubber were created uprooting the

natural forest which changed the landscape and the forest dependent people's traditional livelihood. The competition for forest resources became intense. The British rulers started to annex forest to take the control of forest resources in the state's hand by creating reserves. Erstwhile forest users became persona-non-grata in their homestead because reserve inherently meant control over traditional use of forest resources. The colonial rulers put forward the following two arguments in support of reserves; i) a reduction in big game species and, ii) to enhance the production of timber [25]. However, the concept of 'reserves' can be traced back to the Maurya period, Kautilya advised to reserve the forests rich in fish, game and elephant. Elephant forests had great importance; this was because elephant was indispensable part of army. There have been little discussions in the existing historiography regarding the effects of the resource extraction and creation of reserves on the livelihood of forest tribes [32].

The colonial state asserted control over forest hitherto managed by community. The conservationists of the post independent India propagated two arguments for keeping people out from the reserves and for creating protected areas i.e. sanctuaries, national parks, tiger reserves etc. The two mythical philosophies in support of Protected Area are: I) 'pristine' forest and (II) human land-use practices destabilizes ecosystem. However, many ecologists claim that disturbance, both climatic and anthropogenic, had played a critical role in enhancing biological diversity of various ecosystems. They elaborately accomplished that 'pristine' wildernesses of the East Africa especially the great migration of millions of herbivores crossing the Serengeti plains give us a feeling of no human intervention in them. The same is true for Amazon forest, an image is created as if the anchor of the program himself is the only person who has stepped into those forests

for the first time. In reality, the *Masai* herder and the Indians played a vital role in shaping these varied ecologies [25]. Similarly, in India the forests that are witnessed today are largely created by the forest villagers under the guidance of FD. Labor colonies, settled for the purposes of firefighting, plantation, maintenance and management of forest were termed as 'Forest village'. The shifting cultivators, who were once forcefully removed out of the forest, became the first settlers in the forest villages [8]. In North Bengal, after a recurring failure to regenerate Sal forest in the Indian *terai* during the 19th century, the shifting cultivators (*Jhumias*) whom the British once ousted from forest staged a comeback. They were asked to clear fell and burn the forest and plant trees, in exchange, they were given land to cultivate. They had to offer mandatory free labor (*begar*) of 90 days in the plantation [16]. However, the concept of free compulsory labor i.e. *begar* was abolished from late 1960s [10]. The most of the forest villages are situated in the North Bengal's *Dooars* (the land along the foothills of the Darjeeling and Bhutan Himalayas) as these areas were among the earliest in India, where extensive work was done under the colonial forest management system [4].

The examples of the above mentioned conservation model where peoples' roles in protection of nature and their livelihood opportunities get little attention, are also present in India. This suggests a catastrophic impact as a substantial number of populace in India who are categorized as BPL live in and around forest regions [27]. As per the estimates of Ministry of Environment and Forest (MOEF, 2006) approximately 40 percent of the poor people reside in these forests. These underprivileged people in India mostly belong to tribal communities who are heavily dependent on the resources of forests for their livelihood [26, 13, 1]. Another study discloses that these tribal people depend to a large extent on NTFPs comprising of medicinal herbs, edible fruits and vegetable to the extent of more than 20 percent of their household income [28].

The above discussions unambiguously establish the dependence of forest villagers on forest resources for their livelihood. However, it focuses very little on the access rights of forest villagers on forest. It is known that the access to the resources of reserved forests (here sanctuary and national park) is illegal and all sorts of external interferences (unauthorized) are considered as punishable offence under different provisions of forest laws. According to Section 2(ii) and 2(iv) of the Forest (Conservation) Act, 1980 harvesting of forest even for regeneration or reforestation, cultivation of fruit bearing trees or medicinal plants would require prior approval of Central Govt. These clauses of the Act are potential enough to influence the livelihood of forest villager, as the main occupation of the forest villagers of BTR had been to engage in forestry works.

After the declaration of Tiger Reserve the Buxa forest came under the jurisdiction the Wild Life Protection Act 1972 (WPA-1972) as BTR became a sanctuary as well as a national park (NP-117.23 Sq. km, Sanctuary 273.35 Sq. km). Under section 18 of WPA 1972, The State Government may declare any forest as a sanctuary if it considers that such area is of adequate ecological, faunal, floral, natural or zoological significance, for the purpose of protecting, propagating or developing wildlife or its environment. In this connection it must be mentioned that the definition of 'wildlife' under

section 2(37) of WPA 1972 is not only wild-animals but every single thing of the forest. According to the definition grass, NTFPs, fuel-woods all fall under the category of 'wildlife' as they form a 'part of any habitat'. Apart from the above provisions the section 27(2) of the Act makes the forest villagers duty bound – (a) to prevent the commission, in the sanctuary, or an offence against this Act; (b) to help in discovering and arresting the offenders; (c) to report death of any wild animal; (d) to extinguish fire in the sanctuary; (e) to assist any forest officer in the investigation.

Further, Section 33(d) of the Act empowers the forest officials to regulate or prohibit grazing in sanctuary. Under section 35(7) no grazing of livestock is allowed in National Parks³⁹. These provisions of the Act have the potentiality to influence on the livelihood of forest villagers. The Act also prohibits extraction of minor minerals like boulders, sand etc. from the riverbeds if river bed is in a national park or in a wildlife sanctuary. It is evident a sizeable population of forest villages of BTR was engaged in boulder, stone chips and sand lifting from various streams (riverbed) flowing through BTR. The provision of the Act allegedly created complexities. The present paper makes an attempt to look into the declaration of reserve forest and the outcome of that on the livelihood opportunities of people living in BTR.

Objectives of the paper

It can be discerned from the discussion in the previous section that a significant change has taken place after the BTR was formed. In this context an endeavor has been made to understand the occupational shifts that have the villagers had to undergo to maintain their livelihood. It is indeed very difficult for these marginalized forest dwellers to search for alternate livelihood opportunities owing to dearth of market connectivity. In view of these developments this paper focuses on the available livelihood options of forest villagers in BTR and how they have attuned themselves with the provisions of Tiger Reserve. In this backdrop the objectives of this paper are:

- I) To explore the narrowing of livelihood opportunities of forest villagers from a historical perspective,
- II) To investigate the present pattern of occupations of forest villagers
- III) To look into the problems associated with the present occupations
- IV) To integrate the objectives mentioned above and to suggest policy implications.

Survey methodology

This study is carried on using a participatory action research (PAR) and subsequently a descriptive research methodology has been followed to process the data as revealed by the respondents. A considerable effort has been made almost for one year to collect the responses from the forest villagers to apprehend the livelihood opportunities available to the villagers of BTR backed by evidential reasoning. The methodology involved fact finding and gathering of knowledge through continuous understanding of their occupational habits as well as opportunities. A structured questionnaire was designed to gather relevant data by employing nominal scales to obtain the data required to address the issues mentioned in the objectives. Considering the background of the respondents, multiple item scales have

not been administered which require comprehending the scales and providing accurate response. Keeping in view the major objective of the study a few non parametric tests have been employed to process the data. Tests suitable for nominal scale data have been employed to arrive at meaningful conclusions. Villages are selected following stratified purposive sampling method based on forest Ranges, ethnic composition and geographical location. Finally, 12 villages are chosen forming a village sample size of 32.43 percent of the 37 forest villages of BTR, distributed across 11 Beats and 8 Ranges. After selecting the villages, 5 percent of the registered forest villagers are interviewed, and the Panchayat members of the concerned village with two distinct structured questionnaires. Relevant primary data on forest villagers collected through survey are incorporated in the paper. The paper tries to focus on the history of alienation of forest villagers from the forest resource base and the institutional provisions that were constituted at different point of times. The paper tries to suggest paths to follow, for the betterment of the forest villagers as well as the forest. Thus, the paper is mainly divided into four parts: I) Narrowing of livelihood opportunities of forest villagers from a historical perspective, II) Findings of the case study III) Findings: A Summary and IV) Conclusion.

Justifying Selection of Buxa Tiger Reserve (BTR)

BTR has been selected as the study area because this forest has experienced virtually every forest policies; right from *commercial forestry* to the present day's *protected area management*. Secondly, this forest has relatively higher concentration of forest villages. Out of 168 officially recognized forest villages in North Bengal, 37 are situated in BTR. Thirdly, BTR is a part of the flagship conservation program of 'Project Tiger' in India. Before 1980s, employment in Forest Department (FD) was the most important source of livelihood for the majority of the forest villagers of BTR. Other supplementary sources of livelihood along with subsistence level of agriculture were NTFP (non-timber forest produce) collection, livestock rearing etc. The declaration of 'tiger reserve' seriously regulated these livelihood options³³. The situation provides a scope to compare two periods i.e. before the declaration of tiger reserve and after the declaration of tiger reserve.

Narrowing of livelihood opportunities of forest villagers from a historical perspective

Commoditization of forest and loss of livelihood

Introduction of railway connectivity in 1850s witnessed a major change in Indian forest policies and practices. The network of railway tracks increased from only 56 kms in 1853 to over 51,650 km in 1910^[41]. Timber resources in India were declining rapidly under the pressures of high timber demand in the British Empire^[34]. During the World War I. timber and bamboo were supplied to war zone for building bridges, buildings, ships etc. Approximately 1.7 million cubic feet timber (mostly teak) were exported annually^[7]. Indian forest department became the sole supplier of timber in Middle East, and to the allied forces during World War II. War need exposed the remotest forests, the most accessible forests got felled to meet the demand of the war, and margin of profit there in some cases rose to as many as 400percent. In this plunder, the question of forest dwellers' livelihood lost voice.

The erstwhile right holders were given specific quantum of timber and fuel, while the sale or barter of the same was banned in 1878's forest act.

Few ecologists/historians explained the process of creating reserves as mere confiscation of resources, not conservation. The reserves were either dedicated to producing timber or were amounted to open-access lands that suffered overuse and degradation^[9]. As commercial forestry means more and more revenue and revenue mainly comes from large timber forest as a result the FD was forced to neglect shrubs and pasture land. Ironically these two types of land provide varieties of livelihoods to the local communities. Moreover, plantation of tea, coffee and rubber brought a major transformation in forest ecology. Plantation economy itself requires a high level of timber demand for fuel and packaging. This new economy engaged the erstwhile forest people as captive labor in tea, coffee and rubber plantations^[7].

Passion for industrialization and forest dweller's livelihood

Independence brought little change in forest dwellers' life, ironically the 'concessions and privilege' enjoyed by them in British period were viewed as overly generous in 1952's National Forest Policy^[20]. The conception of restructuring forest to maximize commercial gain already strong in the colonial era got even stronger now^[22]. An extensive commercial forestry operation continued until 1980 with little emphasis on regeneration. This destroyed the forest, its ecology and the forest dependent people's livelihood^[21, 18]. The zeal of industrialization after independence was so intense that forest resources were awarded to industrial houses at throwaway prices. One such example may be cited; in 1960s bamboos were supplied to industry at Rs.1.50/tonne, when the prevailing market price was Rs.3000/tonne^[9].

New conservation regime and forest dweller's livelihood

A nationwide census on tiger population was conducted in 1972 and figure found to be at around 1800, much below the earlier estimates of 2500. The census proposed two corrective measures (I) to select few sites having tiger's habitats- each with a core area of at least 300 sq. km. (free from any kind of human intervention) (II) to create a large surrounding of buffer zone, where limited access of local people would be entertained. However, the buffer will be repopulated by the growing numbers of tigers in the core area. This project came to be known as 'Project Tiger' launched in 1973, at that time it was the largest wildlife conservation Project in the World. Nine forests across the country were selected for 'Project Tiger', some of them were old princely hunting grounds and some had been reserved forests since British period^[22].

Community's pattern of resource use in protected areas is always not compassionate, not all of them harmful either. In certain cases the eviction or ban on resource use in protected areas has resulted in a negative way. For example the Keoladeo Ghana NP, Rajasthan, a World Heritage site for various dazzling diving birds. From a sanctuary it was upgraded to a national park in the year 1981. Until 1981 a large number of buffaloes of the pastoralist communities around the park used to graze in the park's grassland. They used to collect firewood and fodder from the forest. With the change of the status, grazing was banned. In the absence of the buffaloes weeds roamed over the surface of the water bodies; as a result the diving birds find it impossible to dive into

water. The ecological impact was instantaneous, drastic reduction in diversity in bird's variety was witnessed [25].

Mascot of wildlife conservation faced existential crisis so does forest dwellers

Sariska, Rajasthan came into limelight in 2005, when it was exposed that tiger has vanished from the Tiger Reserve. A Tiger task force was created to look into the crisis which in turn instituted National Tiger Conservation Authority or NTCA. The NTCA revised the earlier norm of 300 sq. km. 'inviolate' area to an area ranging from 1000 to 3000 sq. km. and an extra area of 800 to 1200 sq.km. As buffer zone for 20 breeding tigresses. However, BTR has 760.87 km² area comprising core and buffer together and only 10 reserves out of the 48 have more than 1000 sq. km in their core area [43]. The official data suggests 79 percent of the tiger reserves have less than the viable population of tiger. The NTCA believes that forest dwellers in the protected area are detrimental for wildlife as a result; priority has been given to relocation ('millennium goal') of forest dwellers from the tiger reserves to make the reserves 'inviolate'. On this pretext, relocation of

forest dwellers of 27 hamlets spread across core and buffer of Sariska was started after 2005 on the basis of 'mutual understanding'. However, available study suggests neither the relocation was mutual nor the forest dwellers' happily accepted the rehabilitation package [30].

**Findings of the case study
Demographic profile of the sample**

Survey is done on 56 registered (agreement holder) families of 1011 of BTR [40]. Average family size of the sample is 6.86 persons per family. The number of families presently is almost 6 times higher than what is shown in the record of forest department as registered family. The numbers of persons who can work are 3.89 persons/families.

Working members of the sample families are engaged in 10 types of occupations. 96.43 percent of families are involved in agriculture. Only 3.57 percent of families are found to be landless. Agriculture is a major source of livelihood till date. Though, Panchayat started functioning in Forest Villages since 1998, it has emerged as the 2nd most important employer in the forest villages.

Table 1: Occupations of the forest villagers of the BTR

Occupations	No. of families	Percent of families
Salaried Job	9	16.07
Agriculture	54	96.43
Work in Forest Dept.	43	76.78
Live-stock rearing	47	83.93
Wage Earner	30	51.79
NTFP collectors	17	30.36
Self employed	10	17.86
Panchayat's work	51	91.07
Pension holders	14	25
Others	6	10.71

Note 1: While assessing NTFP collection as a profession, fuel wood collection is not included here. Others include professionals or skilled labor like carpenter, mason etc. Note 3: Kolmogorov-Smirnov Z: 1.527, p<0.019

It is evident from the above table that the types of occupation are many and varied, and overlapping in nature i.e. the same member of the family is involved in different occupation. A one sample Kolmogorov-Smirnov test has been employed to investigate the uniform occupational pattern of the forest villagers. In this case the null hypothesis is rejected at p<0.019 implying that the occupations do vary significantly among different families included in this study. Forest villages were established, primarily to carry out forestry works. The villagers' main livelihood options hovered around cultivation, livestock rearing, NTFP collection and forestry work before the declaration of tiger reserve. However, it is evident that villagers have drifted to other occupations including skilled jobs. It's perhaps due to the narrowing down of traditional livelihood opportunities.

Livestock rearing in forest villages is an age old profession. The forest villages were established primarily to carryout forestry works like plantation, cleaning, harvesting, fire-line making etc., it is significant to find that presently, 23.22 percent of the family don't work under forest department. In the survey it is found that only 30.36 percent of the forest villagers collect NTFP. The new sources of livelihood are service, self-employment and pension.

Livelihood Options in Forest Villages of BTR

1. Forestry work under FD before and after Tiger Reserve
Forestry works under the FD was the most important work for forest villagers. After completing 90 days of mandatory *beggery* (work without wage) they used get wages on the remaining days of work. However, from 1969 they started to get wages for their entire work under forest department. Pattern of work has changed dramatically, before the declaration of the TR the 92.86 percent of the villagers used to do harvesting work which has dwindled down to 4.5 percent. Average man days of work that the villagers get now under FD have come down to 15 from 185. If two villages are excluded from the sample than the average work under FD in a year would stand in between 5 to 7 days. The villagers stated that they had their best times during 1970s and 1980s because there was lot of works in the forest, as well as wages for work. Moreover, they used to cultivate in between plantation (inter-cropping). However, plantation and cleaning as a form of forestry work still holds a strong position even after the declaration of tiger reserve, this is particularly due to grass plantation for wildlife and some patch of tree plantation in Buffer Zone of the reserve. Surprisingly, Nursery work and firefighting are not done by the forest villagers now.

Table 2

Types of Work	Families involved after Tiger Reserve	Percentages of families involved	Families involved before Tiger Reserve	Percentages of families involved
Plantation	28	63.64	54	96.43
Fire line making	1	2.27	38	67.86
Cleaning	29	65.91	52	92.86
Sal seed collecting	9	20.45	12	21.43
Road repairing	26	59.09	30	53.57
Fire fighting	0	0.00	16	28.57
Nursery work	1	2.27	24	42.86
Harvesting	2	4.55	52	92.86

1. Respondents recalled an approximate no of man days they get from FD now in a year.
2. Respondents recalled the period before tr was declared & gave an approximate detail of their work under the FD.
3. In some villages like Uttar Poro and Dakshin Poro, works under FD in the year 2014-2015 are extremely high as compared to other villages because of the works under MGNREGA have been clubbed with FD's work.
4. No. of families involved in forestry work under FD at present is 43 based on which the average of man days are calculated. Wilcoxon Signed Ranks Test: $Z=2.521$, $p<0.012$

The Wilcoxon signed rank sum test is a non-parametric or distribution free test. As for the sign test, the Wilcoxon signed rank sum test is employed to test the null hypothesis that the median of a distribution varies for a set of paired data. In this particular situation, the signs have been found to be all negative when one considers the difference, various works under the forest department before and after the declaration of tiger reserve. A cursory observation simply reveals that the opportunity of getting employed under the forest department has nosedived after the declaration of tiger reserve. The test simply suggests that the median values differ significantly justifying very less opportunity left for the villagers to work under the forest department. The difference is found to be significant beyond $p<0.012$.

2. Agriculture

Agriculture is one of the most popular occupations of the forest villagers of the BTR. Productivity of the land of the forest villagers is reasonably well. Despite being mostly non irrigated land, there are 53.7 percent of total lands which produce two crops. Nearly 30 percent of the families can sustain close to whole year by lands' produce. The small farmers (nearly 59 percent of the land owners) can sustain only 1 to 6 months from land's productivity. A sizeable portion of farmers are found to be depended heavily on the cultivation of beetle nuts. It is found that 27.78 percent of the respondent families earn more than Rs. 5000/year by selling beetle nut.

Collection of NTFP

The collection of non-timber forest produce or NTFP was a major source of livelihood to forest villagers not only in BTR but throughout North Bengal. The survey suggests only 17 families i.e. 30.36 percent of the sample is engaged in collection of NTFP, almost 70 percent of the families are not engaged in this profession. In a vein to enquire into this phenomenon it is found that 14 families were never been an NTFP collector and 31.91 percent respondents don't collect NTFP because of non-availability of the same in the Jungle. Surprisingly, only 2.13 percent blames the restriction from the BTR authority as the reason behind not collecting NTFP.

Livestock rearing

The survey shows that 40.43 percent of livestock keepers' sale milk. Among the sellers 42.11 percent earns Rs. 1000 to 5000 per month which is fairly good, especially where expenditure on cattle rearing is virtually nothing. It's significant to find that 10.53 percent of the milk sellers earn more than Rs. 10000 per month. Here, it is worth mentioning that nearly 60 percent of the cattle keepers produce some amount of milk. Moreover, forest villagers in BTR earn a reasonable amount by selling livestock. It is observed that nearly 92 percent of the goat keepers' earn more than Rs. 1000/year; almost 93 percent of the pig keepers' earn the same amount in a year. In these two categories, 33.33 percent and 40 percent of goat and pig sellers earn more than Rs.5000/year.

From the survey it is evident that migration from the forest villages has increased in recent years. The most important livelihood option of forest villagers i.e. work under forest department has virtually come down to zero. The agricultural land has got fragmented; most of the unregistered families don't have land. Agricultural productivity is seriously hampered by lack of irrigation and crop damaged by wildlife. Collection of NTFP is mainly done for consumption purposes. Moreover, it's no more a viable option of livelihood. Livestock rearing faces 3 fold problems in BTR namely i) death due to attack from wildlife, ii) death due to disease, and iii) low quality breed of livestock. Drying up of livelihood options has pushed the already cornered forest villagers to go out of the jungle and the city life has lured the aspirant youths.

Migration

A society or a group of people who are living in a particular geographical location or a group of people who are dependent on identical livelihood, if, migrates from that location, then it can be assumed that the viable alternative livelihood options have dried up. Another reason may be that the aspiration of the youth who are looking for city life. The dream for better life and city life sometimes become synonymous and the only feasible option to them is migration. Migration in forest villages is a new phenomenon it started only after 2000.

Table 3: Migration from forest villages of the BTR

No. of Families	1st. Time Migrant	Destination	Numbers	Percentages
23 (41.07percent)	20 (86.96percent)	Gujarat	0	00.00
		Kerala	3	10.71
		Delhi	4	14.29
		Haryana	2	07.14
		Punjab	0	00.00
		Karnataka (Ch.)	7	25.00
		Bhutan	2	07.14
		Nearby Town	3	10.71
		Others	7	25.00

Note 1. 1st. Time MGT.FAM stands for the families from where first time migration has happened. OTHER include U.P., Tamil Nadu, Meghalaya, Tripura

Note 2. Of migrants is more than the no of migrant families because often it is found that the husband and wife both have migrated

It is found that 41.07 percent families of the sample have migrant members. Table No. III shows that among the migrant families 86.96 percent of families are first time migrants. Among the total of 28 migrants 25percent have migrated to

Karnataka, surprisingly forest villagers have not migrated to, much claimed industrial state like Gujarat and urbanized state like Punjab.

Table 4: Migration Scenario in the BTR

Details of Migration	Year of migration			Av. Earning/yr	
	Before 2000	Between 2000-2010	After 2010	0.5 - 1 lac	1 lac +
Total Number	0	15	13	22	6
Percentages	0	53.57	46.43	78.57	21.43

The Table IV shows that all the migration has been happening after 2000. Among the migrants 46.43 per cent has migrated after 2010. In 1990s, it is observed a virtual halt in forestry activities in BTR with the declaration of TR. Its ripple effect might have touched the forest villagers from 2000 onward and the impact surfaced in the form of migration. It is observed that most of the people are engaged in unskilled and semiskilled works. It is found that 78.57 per cent of the migrants are earning a yearly income of Rs. 50000 to Rs.1lakh. This suggests that this migrants were forced to leave their locality, it's not that handsome wage lured them from their current position.

Findings: A Summary

1. Lack of plantation work has made the forest villagers redundant in forest. They are forced to find alternative livelihood options. It is found that the forest villagers have switched to works under the Panchayat (MGNREGA) and to works on daily wage. A good number of the forest dwellers are migrating to other states in search of livelihood; it's a new phenomenon among them. One sample Kolmogorov-Smirnov test signifies that forest villagers' have adopted new livelihood options as traditional options of livelihoods have narrowed down. The null hypothesis that the pattern of livelihood remained same is rejected at $p < 0.019$. The stoppage of plantation work has made the forest degraded. This, in a sense reduced the opportunity of NTFP collection and the option of intercropping that they used to do. Easy accessible forest patches are heavily degraded today; mark of overuse and CFC is evident in every such site. This type of forest conceivably is not suitable for any wildlife either. Wildlife, mainly elephant, raid on forest villagers' crop on a regular basis in BTR; this is possibly due to the poor quality of the forest. The Wilcoxon signed rank sum test significantly (beyond $p < 0.012$) justifies that

very less opportunity is left for the forest villagers to work under the forest department after the declaration of tiger reserve.

- Most of the forest villagers are traditional shifting cultivators. Even today, they feel comfortable in cultivating their land. Two major problems with this occupation are crop damaged by wildlife and lack of irrigation facilities. The first problem may be avoided by choosing crops that do not attract elephants. Moreover, fodder plantation deep inside the forest, plantation of mixed vegetation having fruit trees, bamboo etc. may be affective. Forest villager's main objection against compensation for crop damaged by wildlife has been, 'too little too late'. The arrangement of compensation close to actual loses and speedy payment may repair the acrimony against FD. Irrigation canals may be dug with the help of MGNREGA.
- Forest villagers sell their livestock on the eve of major festival and at the time of urgent financial requirement. Livestock rearing in forest villages face mainly two types of problems; diseases and attack from wildlife. It is proposed to club the veterinary facilities with Beat Offices, as most of the beat offices are in the forest and they are nearer to forest villages. It is further proposed to improve the quality of the cattle as it is found that too many cattle are producing too little amount of milk. There is no justification to this kind of venture, especially when the fodder is scarce. However, since the forest villagers are naturally ardent to livestock rearing, this profession may bring prosperity to them if quality of cattle is improved through artificial means and through replacement of the existing cattle with high yielding variety.
- NTFP collection in BTR has reduced considerably over the years owing to various reasons including non-availability of NTFP in the forest. NTFPs like

broomsticks provide an opportunity to set up value addition centers in the locality. Moreover, medicinal plant cultivation in the hills of BTR may offer livelihood options to forest villagers.

5. During the survey it is found that a sizeable a portion of families in the hills were engaged in maintaining orange orchards, an age old profession but the BTR authority uprooted these orchards in the year 1998. Hills of BTR are good for orange plants, a second thought may be presented to the whole matter and a feasible alternative can be worked out.
6. In recent years tourism in BTR has emerged as an alternative livelihood option for the entrepreneurs, mainly from outside the forest villages barring a few exceptions. The same can be done in forest villages of far-flung areas on home-stay basis by imparting training on housekeeping and providing marketing linkages. This initiative would provide the nature lovers an opportunity to enjoy the serenity, natural beauty of the tiger reserve at the same time; it would create attractive business opportunities for the forest villagers.
7. Panchayati Raj system is widely regarded as local government as it is the sole agency to carry out rural infra-structure development. Most of the developmental works performed by this body are land based. Forest villages are situated in forest land so, the developmental works tantamount to conversion of forest land under FCA 1980. This legal tangle creates problems for panchayats and in turn problems for forest villages. In this respect it must be mentioned that since the forest villagers are situated within the jurisdiction of forest, panchayat members require an NOC (no objection certificate) from FD. The survey shows that this compulsion sometimes poses a stumbling block for the panchayats. However, the panchayat members having influence in the political parties do the work without an NOC or with a verbal permission from the Range Officer or DFO. However, 41.04% of works undertaken had to go for an NOC and 35.58% of works got delayed due to timely non availability of NOC.

Conclusion

It is noticeable from the one sample Kolmogorov-Smirnov test that the occupations vary significantly among forest villagers, the null hypothesis is rejected at $p < 0.019$. The forest villagers' have adopted new livelihood options as traditional options of livelihoods have narrowed down. While investigating the status in forestry related works under the FD, Wilcoxon signed rank sum test is employed to test the null hypothesis that the median of distributions varies for a set of paired data. It is found that the median values differ significantly (beyond $p < 0.012$) justifying very less opportunity left for the villagers to work under the forest department after the declaration of tiger reserve. However, a cursory look justifies that new avenues like skilled jobs, tourism have opened up but these could employ very small number forest villagers as they require expertise knowledge. The amount of money that the Central government is spending on relocation of forest villages is quite large. A Parliament Committee recently argued for speedy release of Rs. 24 corer for relocation of 2 villages from *Mudumalai* Tiger Reserve in Tamilnadu ^[42]. With this amount of money the development of the forest of a

particular locality is achievable, which in turn improves the symbiotic relationship of the forest people with forest. Often it is observed organizations like NTCA, National Park Authority, NGOs accuse the forest people as the only impediment in creating the forest 'inviolable'. In this myopic view, the big chunk of the problem like mining, forest de-notification (de-reservation), supplying forest resources to traders, industries, widespread tourist entry and developmental activities (big dams) etc. remain grossly unnoticed.

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