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Resource Availability and Utilization – A Perspective on the Monpa Tribe of Dirang Circle, Arunachal Pradesh

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Abstract*: In the common parlance plausibly, everything available in the environment which can be used to satisfy our needs in various context and is technologically accessible, economically feasible and culturally acceptable is called a resource. In other words, A resource can be described as something that humans deem as useful in life and therefore has a purpose. Prosperity of any nation or region depends on the availability and utilization of different quality and quantity of resources. Interestingly, while Globalization has exerted substantial impact by opening up potential drivers, and creating images of outcomes of resource wealth effects and development on one hand, one cannot overlook the broad debate on deciding whether it is fair to characterize natural resource as a wealth or as a curse on the other. This is because in the present scenario of climate change, food shortage and hunger, most of the evidence derived from the cross-country analyses, provides indication of a looming threat of not only a disbalanced ecological system but also wide social impact. Such impacts are circuitously felt by the local groups who face the threat of reduced sustainability of ecosystems and their vital services both in the physical and socio-economic context. The myriad social consequences of resource use are related to issues such as the distribution of raw materials, access to clean water, food security, labour and economic outcome. Such effects are more intricately felt among those groups who are dependent upon the natural resource for their survival for generations. Arunachal Pradesh stands out as an example where the dominant tribal population continue to depend upon the surrounding forest resource for their day-to-day survival, making it the most important local resources. Off late however there seems to be a shift in the situation due to inroads of modern development, and the impacts are being felt as social paradox. Within this back ground the paper is an attempt to understand the locally available resources, its utilisation and the resultant impact and issues emerging thereof.

***Keywords*: Ecosystems, globalization, livelihood, local resources, sustainability.**

1. Introduction

Resource availability means having the information about the nature and type of resources in a spatial context along with condition of their accessibility and obtainability for usage and utility. Resource availability is one of the main factors determining the ecological dynamics of populations or species. Instabilities in resource availability can increase or decrease the intensity of resource competition. Resource availability and competition happening both within as well as between inhabitants of a territory usually leads to changes in livelihood patterns of the community/people, consequently reshaping the economic, social and cultural practices in the given physical setup.

The significance of Resource and its proper utilization is evident from the fact that has become the major factor of economic development and planning on global level, across the boundaries of countries. Undoubtedly, globalization has played a major role by creating avenues of effect and development through resource. However, at same time one cannot ignore the fact that there is a continuous debate regarding the nature of resource exploitation and its conservations and that the cost of the impact is actually as boon or bane. This is because one cannot overlook the emerging threats that is causing climate change, food scarcity and is evident for creating disturbance of ecological system.

The state of Arunachal Pradesh, the easternmost state of India, located between latitudes 26°28'N -29°30'N and longitudes 91°30'E -97°30'E, occupies an area of 83,743 square km and is the largest among the seven north-eastern states. Popularly known as the land of the rising sun, the state recorded a population total of 1,382,611 persons as per census report of 2011. Known erstwhile as the North-East Frontier Agency or NEFA, Arunachal became the 24th Indian state on 20th February, 1987. The state has a very long international boundary with Bhutan, Tibet, China and Myanmar to the west, north-west, north and east respectively and shares its inland boundary with Assam and Nagaland in the south and south east. The area represents a terrain consisting of sub-mountain and mountainous ranges inhabited totally by hill tribes and sub-tribes and thereby reflect a variegated mode of life and livelihood sustained through the age-old traditional practices that must have evolved in the constant efforts of adjustment within the accepted surroundings.

The state of Arunachal Pradesh abounds in natural bounty and has a very rich biodiversity that is sustained by the undulating topography, extreme variations in altitude ranging

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from150 m to 6,500 m with equally varied climatic conditions (Rao, 1994; Nayar, 1996; Myers et al., 2000 and Yumnam, 2008). Well known for the potential of hydro-power projects and forest based natural resources among the seven states of North East at the regional level and at the national level as well, the major resources of the state constitute of perennial majestic rivers having the capacity to for generating vast hydro energy. The Forest based resources are precious medicinal plants and herbs, bamboos which is also termed as green gold, commercially valued trees, different animal species which are found across the state varying in accordance with the locational factor. Apart from these resources there are numerous mineral resources like coal, petroleum, dolomite, lime stones et which remains yet to be properly explored and utilized. However, to a certain extent the Coal reserves have been explored and mining is done from Namchik- Namphuk mines in Tirap district.

2. Study Area

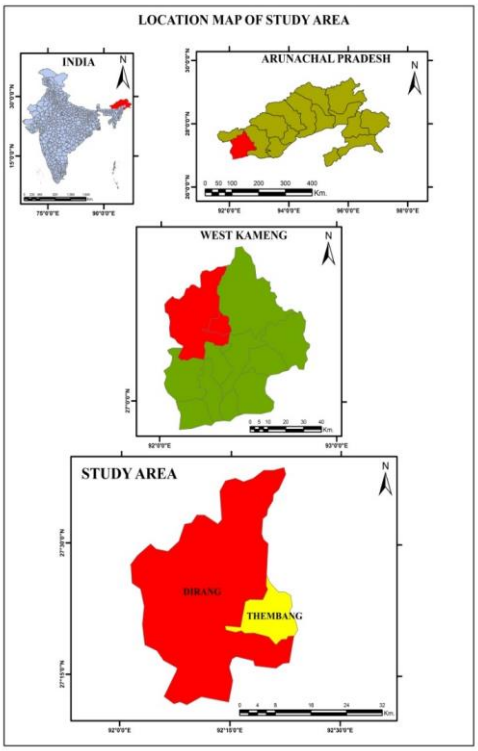

Fig. 1. Location map of study area (Source: Generated from ArcGIS 10.3)

The present study based on Dirang Circle of West Kameng district, Arunachal Pradesh. The topographical terrain of this region provides varied scenario and accordingly can be divided into three categories distinctly, a) the Mountain b) the hills and c) Valleys. Most of the terrain of the study area is dominated by Mountains and Hills and comparatively very less area can be categorized as valley. The study area is located between 27°10' to 27°45' latitude and 92°05' to 92°25' Longitude, Dirang is an unexplored gem, hidden away in the wilderness of Arunachal Pradesh, located at 4910 feet above sea level. It is 42 km away from Bomdila the head quarter of West Kameng district. This quaint village is a stoppage for many tourists heading towards Tawang from Assam. A major influence Buddhism and Monpa culture can be found here, Weather of the area varies from warm during summer season to extreme cold during winter season.

Social structures of the study area composed of Monpa tribe and Sartang tribe. Monpa tribe is major population in the study area and in very few places the Sartang tribes are found in the study area. Both the tribes have distinct dialect and identity. But they celebrate Losar festival in the month of February-March every year according to Buddhist lunar calendar.

For the subsistence the inhabitant of the area mostly engages in primary activities including agriculture, livestock rearing, horticulture and forestry. Inhabitants of study area practices both traditional and commercial agriculture. Apart from agriculture people are often engaged in other allied activities like horticulture, livestock rearing and collections from the forest.

Within this background the present paper is an attempt to assess the of availability of resource in the Dirang circle of West Kameng District and the process of utilisation of these resources by the Monpa community, who have been inhabiting the area for generations and there by reflect a coherent relationship of mutual interdependence and understanding with the surrounding forest area and the available resources therein.

In order to understand the pattern of man nature adaptation and the process of utilisation and conservation of available resources with their indigenous knowledge system the following two broad objectives were set for the study in the area,

Objectives:

a) To know the nature of local resource availability and their utilization process.
b) To understand the impact of such process on the livelihood pattern of the Monpa community of study area.

3. Methodology

The study was carried out in Dirang Circle, West Kameng district of Arunachal Pradesh in the month of February – March 2019. As there is unavailability of data particularly yearly census data, the present study is purely based on the field survey and participant observation and self-assessment.

Data for the study has been collected by following the process of random sampling in the selected universe which constituted of 18 villages amounting to 25 percentage of the total number of villages in the entire Dirang circle. Almost 25 percentages of households in each of these villages were surveyed and data were collected at village and household level using open ended questionnaire.

Secondary data though limited, were also collected from a few journals, books, unpublished paper and records and reports of different Government offices. The collected data were tabulated by using statistical methods to understand the impact of resource utilization pattern of the study area.

4. Discussion and Analysis

The present study has been carried out in the Dirang Circle

Table 1
Available resources and its possible nature of utilisations in study area

S. No.	Available Local Resources	Nature of utilisation practiced among the Monpas
1	Land	Categorised and used for, Agriculture, Horticulture, plantation crops, and built-up areas, i.e., construction of houses.
2	Forest	Firewood, Extraction of Medicinal plants and edible herbs, Logs for Construction (Floor, celling) and, Furniture.
3	Livestock	Self-Consumption, commercial supply of meat and Dairy Products to the town.
4	River	As source of Drinking water, Power generation through the small turbines, quarrying of Sands and boulders from the riverbed for construction activity, particularly in the construction of modern RCC houses.

Source: Field survey

of West Kameng district of Arunachal Pradesh, predominantly inhabited by the Monpas along with the Satrang tribe. As already mentioned, the dominant practice in the entire state of Arunachal Pradesh has been agriculture, and as such it continues to remain the main livelihood of the inhabiting communities across the tribes. The Monpas too, have been practicing agriculture as their livelihood from a long time, and is still strongly is prevalent as their prime livelihood option. It is interesting to note that unlike other tribes, the Monpas have been engaged more in the practice of settled cultivation than the usual practice of Jhum prevalent among other major tribes in the state. The difficult terrain and consequent limited agricultural land availability along with associated harsh climatic condition with severe winter can be attributed for the growth and continuation of settle form of cultivation in the area.

Along with cultivation the Monpas largely depend upon the nearby forest for their day-to-day sustenance particularly for fire wood to use as fuel for cooking and mainly to light the (bukharis) indigenous fire places (mostly made in the middle of the house) which compulsive necessity is given the very harsh weather condition. Under the given condition land, forest resources, livestock and river can be termed as the most valuable local resource available in the region, and the access and pattern of these resources have sculpted the livelihood pattern of the Monpa tribe that gets manifested through the socio-cultural practices of the community. The age-old traditions have been sustained in the form of social taboos and restrictions that has preserved these resources in the most optimum manner and have also simultaneously enabled to use them in the larger context of the society through their indigenous knowledge system. At same time one has to accept that the nature of resource utilisation is undergoing change as impact of exposure to other culture, modern education and the consequent changing approaches and penetration of consumerism as the product of globalisation.

In the table 1, classification of the nature of local resource availability and its utilisation has been attempted in order to assess the dimension of resource utilisation among the Monpa community.

From the table 1, it becomes evident that the availability local resource of the area and its utilisation has carved out the explicit livelihood pattern for the inhabitants of study area. Thus, the study area shows a predominance of agricultural, horticulture practice along with dependence on collection of forest products like, timber and fire wood and more significantly extraction of medicinal plants. Domestication of animals is especially done for dairy products and meat for self-consumption as well as commercial purpose. While the rivers are utilised as source for limited irrigation as well as for quarrying of sands and pebbles, it is worthy to mention that quarrying activity is fast becoming a preferred activity particularly among the new generation and can be attributed to the expanding construction activities in the area as the impact of expanding urbanisation.

The major local resources:

1) Land

Of all the local available resources in the area arable land which though is very much limited due to the nature of the mountainous terrains prevalent in the study area is one of the most important local resources for the people of study area. Agriculture being the main livelihood of the people Land is utilised for different types of agricultural practices both as continuation of traditional practices as well as in the form of plantation and horticulture. As evident from the table 2, majority of the Monpas of the study area are found to be engaged in agricultural activity (including all the major type of practices in the traditional and modern context) almost 89.12 per cent (303 the total 340 selected sample house hold surveyed in the area) are engaged in agriculture and about 15 household amounting to about 4.41 per cent are engaged in horticulture activities. A small proportion of about 22 house hold are engaged in livestock rearing as their main livelihood.

Table 2
Percentage of population engaged in agriculture in the study area

Activity	Actual numbers of Households	Percentage
Agriculture	303	89.12
Horticulture	15	4.41
Livestock	22	6.47
Total	340	100.00

Source: Field Survey 2019

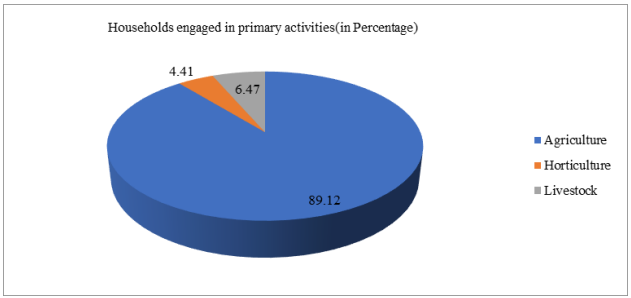

Fig. 2. Households engaged in primary activities (in Percentage)
Source: Field Survey 2018-19

2) Forest

Forest can be cited as the most valuable local resource available the study area. It is interesting to note that, despite the influence of globalisation and fast-growing consumerism there is continuation of the age-old tradition of an in intricate relationship and dependence with the forest that spans out to a number of activities like from collecting of firewood to edible

Table 3
No. of Households engaged in collection of forest-based resources in the Study area

Forest products	HH. Consumption		Commercial		Total
	Actual	Percentage	Actual	Percentage	Percentage
Firewood	481	96.78	16	3.22	100.00
Logging	220	92.44	18	7.56	100.00
Medicinal Plants	65	59.09	45	40.91	100.00
Edible plants	490	98.59	7	1.41	100.00

Source: Field survey 2018-19

herbs and rare medicinal plants. Of all the forest resources mainly, timber now is gaining much significance. The collected wood from the forest can be categorised in two categories a) twigs as well small branches and shrubs mainly collected by families and are used for firewood, b) logs and other big trunks which are later made into planks and posts and are mostly used for construction of houses and making of furniture. While earlier collection of big logs for timber was done mainly for community usage, of late this has stared being sold for commercial usage as well particularly to the town areas and also some times to different far-off areas also. The change in the nature and purpose of collection is the outcome of demand of wooden planks in the construction activities in the form of expanding town areas and even change of housing pattern in the rural areas as well. However, significance of collection of fire wood remains unabated as this is the main source of cooking and as much needed thing to for warming purpose to face the harsh cold weather in the area.

As depicted in the table 3, out of the total 490 households surveyed it was found that about (481), 96.78 per cent of households are engaged in collection of fire wood firewood for cooking and warming purpose at the household level, and only 3.2 per cent of household supply firewood in nearby towns like Bomdila and Dirang. In the nearby town area, as most of the household uses firewood particularly during winter seasons staring from early November to end to early March, for warming of house there is heavy demand of firewood and accordingly there is total dependence upon the nearby villages for the supply.

The modern ways of living standard and demand new pattern of furniture's is also another turning point in the consumption pattern of timber. This has given rise to furniture making factories though in a small scale and are developing retail let outs, mostly owned and managed by the younger generation, most of whom have been exposed to different cultural contact. The collection of different medicinal plants from forest however, still continues to be predominantly a village-based activity, as the traditional knowledge and its practice can be found in the villages. However, in the recent trends as found from the survey, some villagers now collect the medicinal plants and sell them to a number of middlemen or agents for generating income to meet the newer requirements of the fast-changing living conditions which have already penetrated the rural areas in the form of consumerism-based modernity. Some of the very important and rare medicinal plants available in the forest area of the study are can be broadly categorised as a) Ginseng b) Yarsagumba (Caterpillar Fungus), c) Illicium Griffithii (lishi), d) Texas, and e) Bitter sticks (Chirata). Almost all of them are highly valuable and has broad spectrum medicinal use.

However, as the traditional knowledge about these plants was restricted to the families of the medicine men of the villages, there is lack of information among the youth as well as some middle-aged villagers also and consequently hey hardly take interest in collecting these plants. Also, since most of these herbs require specific nature of uses which sometime becomes difficult if not used properly, preference for modern medicine is becoming more of a trend. Further availability of the allopathic medicine in stores makes it more convenient for the people to access and use it. As evident from the diagram given below it becomes clear that only 59.09 per cent of house hold people are engaged in the collection of medicinal plants, while 40.91 per cent of households engaged in commercial activity. However, a dominant percentage of households constituting almost 98.59 percent are engaged in collection of edible herbs and plants as this form the integral part of their daily cuisine. Interestingly some of these wild vegetables and herbs are now visible in the local markets of the towns and often wins over the visiting tourist. It not unusual therefore that some of the households do these collections for commercial purpose which account about 1.4 per cent and can be seen selling at the road side in the towns or even in the rural markets.

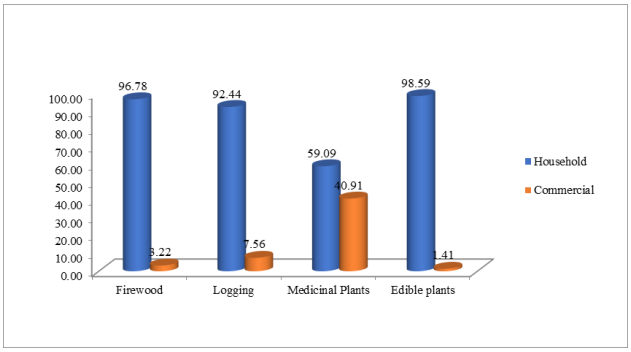

Fig. 3. Percentage of households engaged in forest-based resources
Source: Field Survey 2018-19

3) *Livestock*

The next important local resource that has a direct impact on the livelihood of the people of the study area is the livestock. In general practice, most of the tribal communities are fond of keeping animals at their home more as a cultural tradition. Keeping herds of domesticated animals is still considered as a social status and the Monpas of the study area also carryon the similar trend. The common domesticated animals found are cow, goat, pig, sheep and horses. In addition, yak adds further distinction as they are selectively available in these areas and even in more high-altitude zones. The domesticated animals serve the requirement of meat and dairy products. Draft animals

like horse and ox, horse is mostly used for carrying load particularly on the hill slope, while ox is used for the ploughing the limited agricultural land. Good herd of Sheep is often much treasured as these animals serve the purpose for meat and most importantly for wool which is used for both self-consumption in the form for making woolen garments, blankets, and even carpets as well as for the commercial purpose to be sold in the local markets as handicraft product. The pattern can be best understood from the table 4, that gives the picture of nature and dominance of domesticated animals as a major resource in the study area, and the economic impact and trend thereon. Out of total surveyed households in the study area, dominance of cow was seen, which accounted for about 53 per cent of the total domesticated animals. This can be attributed to the rising trends of dairying in the area to carter to the demand of milk and milk products to the nearby towns. The rising trends of dairying is also become new mode of livelihood for many as this is bringing in more cash return than traditional agriculture. The next important domesticated animal that dominates the study area are Yak, which constitute almost 18 per cent of the total domesticated animals. Keeping of yak among the Monpa tribe of the study area is more of a cultural tradition as it is considered to be prized possession. Yak milk, meet is also used for consumption, while yak hair is considered sacred and is often found in the traditional head gear. Sheep goat and horse forms the next categories with goat having a share of 5 per cent sheep 2 per cent, horse 1 per cent, in the study area. What is notable is that there is a sharp decline in piggery and goat rearing, while there is a sharp rise in poultry farming with 20 per cent in the area. This again can be attributed to the nature of demand from the local market as well as the nearby towns and the upcoming tourist rests and hotels.

Table 4
Preference and dominance of domestication of animals in the study area

Domestication of Animals			
S. No.	**Animals**	**Total**	**Percentage**
1	Cow	1492	53
2	Yak	512	18
3	Goat	139	5
4	Sheep	56	2
5	Horse	37	1
6	Poultry	576	20
7	Pig	2	0.02
	Total*	2814	100

Source: Field Survey 2019, (*Total no. of cattle in the sample area)

4) Water resource

The main water source of the study area is river which plays a very significant role as the source of agriculture, aquatic life and above all for the source of drinking water. Fishing is one of the main activities among the Monpa communities. They have community fishing system, netting system, angling system and hammering method for catching fish. Traditionally the stream water is used rotating handles of the stone grinding machine, commonly used for grinding maize, wheat and buckwheat by the community. Though electric machines have stated to operate in these areas, the traditional system still works parallel and is often serves thing a tourist attraction as well.

Another substantial usage of the river as an important resource is for generation of hydroelectricity, which is bound to bring in development in the entire area. Already the river water is used for power generation in minimal capacity from small stream and river by constructing low gravity dam by the state government and even some local agencies generating 3 to 4 kilowatts of power for local usage mainly for domestic lights.

Apart from this, of late river is appearing as a source of quarrying activity particularly for sand and pebbles. As depicted in the given table 5, of the total house hold surveyed in the study area about 50 (accounting to 10.11) of the total sampled house hold and about 42.74 percentage of house hold are engaged in sand quarrying, making it the most dominant of the quarrying activities. This is followed by pebble or stone quarrying which accounts for 32.48 of the totals engaged and 7.75 of the total sampled households in the study area. Small pebbles and crushed stone chips are a prerequisite for construction of any concrete structure including laying down of all-weather roads in any area. While both the mentioned groups are engaged in specific quarrying activities there is the third category accounting for almost 24 percent of the total (and about 5.91 percentage of the sampled 490 households in the study area) those are engaged in both of these activities and accordingly control the construction activities in the study area to a large extent. These developments and change of livelihood among a noticeable section is the result of changing mode of resource utilization and the associated inevitable development activities. It was found during the survey that; the trend of change is more dominant among the new upcoming generation. The reason for such shift can be attributed to change in approach and attitude for better living standards, more inclination towards western education system, outmigration of the youth and exposure to other culture and assimilation.

Table 5
Household engaged in quarrying activities in the study area

Quarrying	**Actual No. of HH**	**Percentage out of total and actual in the study area**
Sand	50	42.74/ 10.20
Pebbles	38	32.48/7.75
Both	29	24.79/5.91
*Total	117/490	100.00/23.86

Source: Field survey 2018-19
(*Total No. of House hold engaged in these activities out of the sample 490 HH of the Study area)

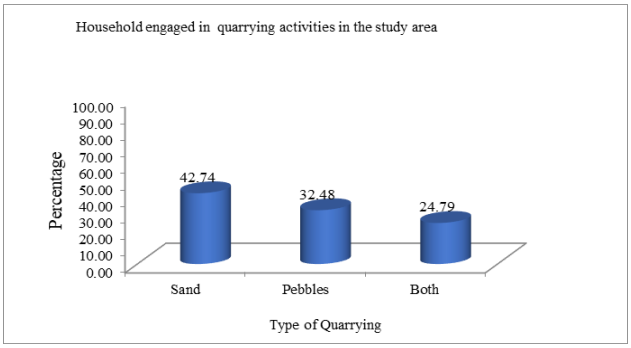

Fig. 4. Household engaged in quarrying activities in the study area
(Source: Field Survey 2018-19)

This development can be associated with the rising construction activities in the study area both in the rural context and definitely in the towns where rising population is creating a constant demand for more residential accommodation resulting in to expansion of the built-up areas.

Fig. 5. Bird eye view of Dirang town

Fig. 6. Apple nursery at Zimthung village

Fig. 7. Planks for making furniture and house construction

Fig. 8. Tomato cultivation at Namthung village

Fig. 9. Firewood collection for household use at Yewang village

5. Issues and Impact

One of the major issues demands attentions and needs to be planned for is deforestation in the study area. Though there are here are ample forest resources if seen in the present context, urbanization, commercial agriculture like plantation farm have already started affecting the forest resources particularly endangering numerous precious of resources like rare and variety of flora, fauna and available in the local context which has been playing an important role in day to day living of the local community, starting from daily food habits to their household items. Loss of numerous shrubs, herbs and medicinal plants due to illegal felling of tree mainly for firewood, construction, logging and other domestic use. This trend is further causing the change in the livelihood pattern of the Monpas. Urbanization is also playing major role in deforestation and shrinking of agricultural land in the periphery of urban as well as rural area.

Economic issues: The differential usages of resources have brought in issues in context of changing in livelihood pattern of the Monpas of the study area. There a noticeable shift from traditional agriculture to commercial agriculture and that of plantation agriculture. This on one hand has definitely brought in better return in terms of cash flow but at the same time has started creating dependence on the market for food grains. The entire process is creating a shift from self-sustaining village economy to market oriented depended economy. This has changed to very certain extent the nature of traditional cuisine and food preference mainly because of their dependency on the type and nature of food grain in the public distribution system (PDS), while economically the PDS makes available cheap rice and sugar on monthly basis but the local variant is slowly weening out.

Social issues: The fall out of the economic system becomes evident from the changing social structure in the study area. Commercialization of agriculture has also started to bring in the concept of private property ownership, breaking of joint family system and also lesser kinship orientation. The practice of, hired labor has already started to change the community integration on one hand while in migration of hired labour is bound to bring in different population dynamics in the future context. The dominance of nuclear family system in the study area is causing another important change in the economic context, in the form of division of property among the stake holders.

6. Conclusion

It is evident from the study that the nature of availability and utilization resource plays a dominant role in role in the sustenance and development of the local community. However, what makes it more inevitable is the extent of its usage in a manner which enables the utilisation to the optimum level but does not lead to exploitation so as to cause any imbalance. While development is essential and change is unavoidable, conservation of resources, both in terms of physical, social, cultural and human are to be focused on for a futuristic planned growth and continuity.

Thus, in the present context where emerging issues of climate change, hunger and resource depletion is becoming incipient, the only possible way out appears to be acceptance and implementation of sustainable development, where people's participation along with their traditional idea needs to be in use to manage the available resources to its best possible manner for the development of the community, area, and region as a whole. What is needed here is, a synergetic interaction approach that balance in both ends between maximum utilization of resources without exploitation at same time continues to sustain the traditional social and cultural set up in the given context.

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