

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

Geo-Socio-Economic Study of Ziro Valley: An Analytical Study

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ABSTRACT: The lower Subansiri is one of the oldest districts of Arunachal Pradesh erstwhile NEFA was created by the government of India. The district is inhabited by two tribes called Apatani and Nyishi. However, only Apatani tribe and its main inhabited area i.e. district headquarter Ziro and surrounding villages is selected for the study to get into the details of Geographical, Socio-Economy and settlement pattern of Ziro valley. The valley is known for the existence of diverse flora and fauna, socio-cultural practice by the indigenous people since time immemorial and fast development of social overhead in the district. Primarily the Apatanis economy is agrarian in nature and they practice the sedentary agriculture from time immemorial. Thereby, they have developed a systematic and eco-friendly system of integrated rice with fish culture. They are supported by forest products, handlooms and handicrafts and other economic activities in the valley. The objective of this paper is to identify the names of flora-fauna, mineral resources and development of social-economic overheads of the Ziro valley.

KEYWORDS: Flora, Fauna, Economy, Mineral, Social, Education, Irrigation, Industry, Agriculture.

I. INTRODUCTION

Ziro, the headquarter of the Lower Subansiri district was established at North Lakhimpur (present government IB) in December 1946 by Col Betts which was later shifted to Kimin in January 1950. Again the district headquarter of Kimin was shifted to Ziro on 24th March 1952. It is situated at a height of approximately 1524 metres above mean sea level which lies at 26° 50' N- 98° 21' N Latitude and 92° 40' E and 94° 21' E longitude. The Lower Subansiri district has largest area under permanent agriculture cultivation among all the districts of the State. The Ziro valley is also known as Apatani valley under the Sub-Himalayas climatic zone. The Ziro valley covers an area of 10,135 km². Out of the total wet area of 715.7 hectares, rice-fish culture paddy field covers approximately 592.0 hectares which is surrounded by hills and mountains covered with vegetable gardens, pines, bamboos and other trees.

The average rainfall in Ziro valley is 108.1 cm and temperature ranges from maximum 31.6° C to minimum of 1.1° C. The relative humidity varies from 36.5 per cent to 82.8 per cent. The topography of the area is mountainous valley and the soil type is clayey loamy in nature. The permeability and water retention capacity of the soil is highly conducive for rice-fish culture (Saikia & Das; 2004). The major rivers of valley includes Khree, Panior, Kime, Ranga and Pange. The neighbours of Apatani valley are Nyishi and Hill Miri tribes. The nearest railway station for the valley is North Lakhimpur in Assam which is 130 km away from Ziro valley. The word "Valley" was surfaced in 1944 when CVF Haimendorf referred to the inhabitation of the Apatanis by comparing it to the Nepal valley. He writes, "There is a certain similarity between the much larger heart-land of the Nepal and broad Apatani valley, which is so flat that though surrounded by hills it is often mistakenly referred to as Apatani plateau (Kani, 1993)". Possibly this fertile land might be the lake in the past. This was confirmed from the forefathers who migrated down to the valley and found an amphibian called *buru* (Crocodile) (Joshi, 2005). Their inhabited area is surrounded by hills and mountains and flat valleys in between hills. It lies between the valleys of the Kamla and Kuru in the North and Panior in the South. It has also some prominent peaks called Salin and Ekhadi. It is, therefore, called as the Ziro valley.

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Vol. 9, Issue 2, February 2020

II. RAINFALL

Table-1 shows the monthly rainfall of district headquarter Ziro. The heavy rain occurs during June to August which ranges from 185.4 to 199.3 MM but no rain in the month of December and low rainfall of only about 3.6 MM in January.

Table-1
Monthly Rainfall of Ziro Valley During the Year 2011 (MM)

Sl. No.	Months	Ziro HQ
1.	January	3.6
2.	February	9
3.	March	90.2
4.	April	60
5.	May	61.2
6.	June	185.4
7.	July	195.4
8.	August	199.3
9.	September	76.9
10.	October	9.7
11.	November	37.2
12.	December	Nil

Source: E.E, RWD, Ziro, Arunachal Pradesh.

The average temperature of district headquarter Ziro is shown in Table-2. The maximum temperature of about 29 degree centigrade occurs in the months of August, September and October and minimum temperature of about 5 degree centigrade occurs in the month of January.

Table-2
Average Temperature at District Headquarter, Ziro during the Year- 2011

Sl. No.	Months	Temperature (Centigrade)	
		Maximum	Minimum
1.	January	19	5
2.	February	24	6
3.	March	24	9
4.	April	24	16
5.	May	28	12
6.	June	28	20
7.	July	28	13
8.	August	29	21
9.	September	29	21
10.	October	29	12
11.	November	22	10
12.	December	25	7

Source: RWD Ziro, Arunachal Pradesh

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Vol. 9, Issue 2, February 2020

III. FLORA

The topography, climate, rainfall, temperature and other natural factors influence the growth of different types of vegetations in the Ziro valley. The higher regions, deep sheltered valley and adjoining areas reveal sub-tropical forest, pine forest, temperate broad leaf forest and temperate conifer forest in the valley. The varieties of flora such as *Quercus Sapp*, *Mishilus Vilososa*, *Schimwallich* (Makrisal), *Cinnamomum Ceedaphyme* (*Dalchini*), *Prunus Cornata*, *Betula Spp.*, *Taxus Baccata*, *Acer spp.*, *Pieris Ovalifolia*, *Abies Delavayi*, *Castanopsis*, *Magnolia*, *Alnus Repalensis*, *Pinis Wallichiana*, *Michellia Excelsa*, *Ficus Spp.*, *Prunus Nepalasis*, *Pyrus Sapp*, *Arundinaria Callosa*, *Phyllotachys Bamboo*, *Dendro Calanus Hamilttoni*, *Bambusa Tulda*, Fern, *Calamus*, *Tenius*, *Callosa Floribundus*, *Rhododendron*, *Arunachalele*, *Rubia Cordifolia*, *Thesposia Pupulenge*, *Mahania Pichnophylla*, *Litsea Citrata*, *Zanthoxylum Armatum*, *Enasap*, *Pholiodata Sapp.*, *Angioptris Evecta* and *Monotro Uniflora* etc. are found in the valley.

IV. FAUNA

The Ziro valley is also known for its rich fauna. The forests in the valley are homes of various types of big and small animals, birds, insects etc. Its rivers are full of varieties of fish, toad, frog and crab. Some of the faunatic composition of Apatani forests are *Cervus Unicolour* (deer), *Panthera Tigris* (Tiger), *Panthera Pardus* (Leopard), *Macaca Assamensis* (Monkey), *Bo Frontalis* (mithun), *Mallarus Unrcinus* (Bear), *Refula Indica* (Squirrel), *Tytoalisa* (Owl), *Hystrix Indica* (Porcupine), *Bussros Bicorius* (Hornbill), *Varamus Bengalensia* (Lizard), *Phython Montarus* (Phython Snake), *Naja naja* (Cobra), *Sus Ecrota* (Boar), *Gallus Gallus* (Wild Fowl), *Alcedo Hercules* (king fisher), *Picus Canus* (Wood peaker), *Carvus Macrophynichos* (Crow), etc.

The amphibian fauna comprises of skipping frog, paddy field frog, tree frog, bush frog like the common Indian toad and the Himalayan toad are also seen here. The migratory birds like Brahminy Duck, Cargancy etc. who visits the Apatani valley from Siberia by flying across Tibet and the Himalaya during the winter season are also visiting the valley often. Since the Apatani valley falls under high altitude zone, the river and drainage system have number of fish species which can withstand water temperature of freezing point. Some of the common fish found here are (Tam, 2000) *Schizothorax Plagiostomans*, *Schizothzrachthy Esocinus* (Snow Trout), Golden Mahseer (*Tor-Putitora*), Deep Bodied Mahseer (*Tor-Tor*), Chocolate Mahseer (*Ascrossocheilis Hezagono truttatania*), Brown Tront (*Suhno gairnari*), Rainbow tront (*Salmo truttatania*), *Cyprinus Carpio* (Bangko Strain Common Carp), Gold Carp (*Caracins- Caracius*), Grass Carp (*Ctenophargngoeonidella*), Silver Carp (*Hypophethelmic Chthys Molitix*) etc.

V. MINERAL DEPOSIT

With the advancement of science and technology various types of minerals are discovered in Ziro valley. The wide brand of graphite has been located near Pamluk Nala, 28 km on the Ziro-Tamin road. The Pegmatite's in graphite near Ziro contains small and highly chipped fractured, strains biotic and muscovite looks. Sulphide materialization containing chiefly Pyrite with rare Chalcopyrite and speaks of Malachite and Azurite has been noticed within the periphery of Ziro valley. The country rock consisting of Grey, Silvery Mica, Schist, Quartz Biotite Schist and Cherty Quartzite Bands (Chaudhary) are also seen in the valley. The Apatani valley also has some grey Clay, Sands and thin Paet Beds belonging probably to the Pleistocene age. Extensive development of gneissic and gigantic rocks is also seen (Elwin, 1962).

VI. SOCIAL AND CULTURAL PROFILE

According to 2001 census, the total population of the Apatani valley was about 24,703, of which 12,572 and 12,131 are settled in urban and rural areas while 12,478 are male and 12,225 are female. The population is spread over thirty five villages of which seven villages are traditional viz. Hija, Dutta, Mudung-Tage, Bamin-Michi, Hong, Hari, and Bulla; while the rests are modern villages. Recently, some new settlements have come up in places like Subu-Lapang, Dura, Tarin, Hakhe-Tari, Siro, Manipolyang, Dilopolyang, Sibe and Kelia. Despite settling in different villages they strongly maintain their social relations, economically dependent with similar culture. They are belonging to the

International Journal of Innovative Research in Science, Engineering and Technology

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Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

Tibeto-Mongoloid stock. They are descendent of one ancestor called Abotani. The word Apatani is derived from two words viz., Apa and Tani. The former is prefixed to the later, which is used in regard sense. To quote Takhe Kani, "It is a mark of regard or affection which can be used against any name" (Kani, 1993) for instance Apa Kacha. On the other hand, the word "Tani" is derived from the earliest ancestor called "Abotani". Here "Abo" means father and "Tani" signifies of the human race (Kani, 1993).

However, the origin of word "Apa" and its meaning is still in mystery as it is not yet known to any elderly people of this valley. Probably, Haimendorf called the people of this valley as Apatani at the instance of his personal interpreter who belonged to the Nyishi tribe because the neighbouring Nyishi tribe who earlier used the word Apatanang for the people of this valley (Habung, 2010). Early visitors of the valley like C.T.Dalton, R.B.Maccabe and H.M.Crowe and others named the inhabitants of this valley as Miri, Anka Miri, Ankas, Apa-Tanang, Tanang, etc (Kani,1993). It was only in 1944 that CVF Haimendorf called them as Apatani. Since then they are known as the Apatanis. Originally the Apatanis have confined themselves in seven villages at Ziro valley i.e. Hija, Dutta, Mudung-Tage, Bamin-Michi, Hong, Hari and Bulla. Some villages were later on amalgamated into one village and finally Kalung Reru and Tajang villages were merged together and called Bulla. Of all these villages, Hong is the largest one. With the rapid increase of population, the people are slowly migrating out of the villages to settle in new areas such as Siiro, Biiri and Kelia, etc as well as to urban areas like at old Ziro and Hapoli. According to the statistical hand book of Lower subansiri district, 2007-2008, there were fifty one villages. Some of the newly established villages are Nenchaliya of Hija and Dutta, Biiri of Mudang-Tage, Siiro of Hong, Lempia of Tajang, Suluya of Kalung, Manipolyang of Hong, Siibe of Bamin-Michi and Kelia of Hija, etc.

Despite this Apatanis are also settled in different villages, they are culturally homogenous, economically interdependent and they have strong social bondages through its family and marriage relations, festivals and friendships. Basically, the festivals and rituals like *Subu-Murung*, *Myoko*, etc. are carried out only in the traditional villages. This leads to the Apatanis to have a farmhouse individually at their respective traditional villages and nearby so that they could witness and easily participate in such festivals. With this the villages are thickly populated ranging from few hundreds to thousands. Typical traditional village houses are long in length and short in breadth. These houses are compact in nature. Each clan occupies a specified segment in most of the villages excepting in few cases where some clans are mixed because of the less population. However, from a wooden platform locally called *Lapang*, the name of the clan could be identified. The traditional village has its distinctive and uniform indigenous pattern of dwelling houses. The granaries of the villages are generally constructed in safe distance from the village main households, so that it is not easily caught fire at the time of fire accident. The Apatani society is patriarchal in nature. A rural nuclear family consisting of a couple and their unmarried children is considered as the social and economic unit. As soon as the sons get married they settle themselves independently with their wives. The eldest son inherits the parents' main home and gets the lion share of the family property like agricultural paddy field, bamboo and vegetables garden, etc. and daughter gets the ornaments from their parents if available. Generally, marriage is considered as a personal affair in which the parents and relatives do not interfere to a great extent with young people's choice of their partners (Haimendorf, 1962). They look upon marriage as a means to provide for a lifelong partnership of two congenial individual (Haimendorf, 1980).

The socio-economic and cultural practices of Apatanis have become part and parcel of their life. Music and dance is an integral part of the cultural life of Apatanis since time immemorial. They perform this formally and informally in festivals like *Dree*, *Murung* and *Myoko* in single as well as in group. They perform dances such as *daminda*, *pakhu itu*, *free dance*, *takutam* etc. They are expert in the art of acrobatics or rope swinging (*bua beniing*) usually done during *Myoko* festival at host village which is however not much usually practiced at present.

Currently, many of the Apatani women earn their livelihood from the buying and selling of ornaments in the market they consider it as their supplementary source of income besides their agricultural activities. Earlier almost each household was weaving dresses and shawls for their own requirement and for sale also. However, with advancement of education peoples are engaged in government jobs. The most of the remaining villagers prefer to work as daily wage earners. Thus, only few of them are still having weaving activities at their own home and also at private weaving

International Journal of Innovative Research in Science, Engineering and Technology

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Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

centers. The products are available in the government and private emporiums at departmental stores and market respectively.

VII. EDUCATION FACILITY

Education plays a vital role towards economic growth, social upliftment and cultural progress of the area. The productive use of educational facilities serves the need of economy among the tribal and poorest section for the upliftment of the society. Arunachal Pradesh, up till India's independence, lagged extremely behind with only four primary schools and literacy rate of less than 1 per cent. A modest beginning were made right from the first five year plan, despite formidable constraints like inaccessibility, nature of topography, People's unawareness of the need of education and traditional dependence on children for domestic and field work. The first lower primary school was opened at Ziro in the year 1949. Later on a few more schools were established for the tribal children in the valley including L.P. School at Drebya which was later shifted to present Govt. higher secondary school, located at Hija. As on 2015 there are 18 Govt. Primary Schools, 11 Govt. Middle Schools and 4 Govt. Secondary Schools across the valley. However, there are only 2 government Higher Secondary schools in Ziro-I to which most of the students from all the secondary schools of the valley come for their higher education.

The Ziro valley has become the hub of private educational institutions of Arunachal Pradesh. The pleasant summer and chill winter climate is conducive for the children's education with the flow of students from other districts of the State. Table-3 shows that at present as many as 6 private primary schools, 15 private middle schools, 9 private secondary schools and 6 (six) private higher secondary schools spread over the Ziro valley. The growth of educational institutions especially the private schools imparts the quality education to the local population as well as the people from other districts. Thus, the local people of the Ziro valley are immensely benefitted from the private schools.

Table-3
Distribution of Educational Institutions in Ziro Valley

Sl. No.	Type of School	Government	Private
1	Primary school	18	6
2	Middle school	11	15
3	Secondary school	4	9
4	Hr. Sec school	2	6
5	College		2
6	Total	35	38

Source: DSO (statistic), Ziro, 2019

VIII. HEALTH and MEDICAL FACILITIES

The state of good health of people is crucial for socio-economic prosperity and development of the area. Before independence, the district did not have any hospital or dispensary. It was only after independence due importance was given for health services by the government. The health service in Arunachal Pradesh has made spectacular development since then. Thus, it has succeeded in creating a solid progressive impact on the society and people of the area. In good old days the local people used to use varieties of medicinal plants, roots, leaves, herbs for their treatment. They were having little knowledge of modern medicines. With the development of education and world exposure the indigenous community is gradually believing and using medicines for their health care and curing diseases.

The medical and health facilities are developing slowly with the advancement of education and growing population in Ziro valley. Presently the valley has one district hospital at Ziro and a primary health centre has been

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

upgraded to the community health centre at old Ziro. The five new medical sub-centers have been established at villages namely Bulla, Hari, Hong, Manipolyang and Siro to impart immediate health care facilities to these village people. One T.B. Hospital is functioning at Hapoli (Ziro) with indoor patient treatment facilities. The state government has attached one Ayurvedic dispensary which was established at Raga in 1988 and it was later shifted to Ziro in 1992. One Homeopathic dispensary is also functioning in the district since 1988-89. Both the dispensaries are functioning well under the umbrella of district hospital Ziro. The details of health units in Ziro valley are given below in Table-4.

Table-4
Medicals Facilities in Ziro Valley

Sl. No.	Name of Medical	No. of Units
1	District Hospital	1
2	T.B.Hospital	1
3	Community Health Centre	1
4	Sub-Centre	5
5	Ayurvedic Dispensary	1
6	Homeopathic Dispensary	1
7	Total	10

Source: - DMO, Ziro, 2019

IX. DRINKING WATER FACILITY

The public health engineering department (PHED) has taken over all the water supply schemes for both rural and urban areas in 1995 from public work department (PWD) and rural work department (RWD). Under the rural water supply there are two main programmes viz. minimum need programme (MNP) and accelerated rural water supply programme (ARWSP). The common main water tanks are provided to all the seven traditional villages and water is being supplied from these tanks to the public. Initially, the people of Ziro valley rely on the naturally available well water before the government took over to supply the water to these traditional villages. With the increased participation of government the provision of water supply has immensely improved in the valley. Thus, it has improved the drinking water facility and socio-economic status of these villages.

Table-5
Town/Villages Covered Under Drinking Water Supply in Lower Subansiri
District of A.P (as on 31-3-2013)

Sl. No.	Lower Subansiri District	Number	Total in A.P.
1.	Town fully covered under drinking water supply.	1	13
2.	Villages fully covered with drinking water supply.	147	2989
3.	Habitation (Rural & Urban fully covered with water supply).	148	3002
4.	% of villages covered with water supply to total villages.	45.51	83.92

Source: Chief Engineer, (2014) PHED, Itanagar, A.P.

Table-5 shows that the number of towns fully covered under drinking water supply was only one and 147 villages were covered till 2013. The percentage of villages covered with water supply to total villages were about 45.51 per cent in Lower Subansiri district whereas 83.92 per cent in Arunachal as a whole till 2013. The perennial sources of drinking water are limited in the valley. From this limited sources of water, the department of public health engineering collects water to fulfill the potable drinking water needs of these traditional seven villages.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

XI. ECONOMY

Primarily the Apatanis economy is agrarian in nature. They practice the sedentary agriculture from time immemorial. Thereby, they have developed a systematic and eco-friendly system of integrated rice with fish culture in a traditional way. They are supported by forest products, handlooms and handicrafts and other economic activities like horticulture products, contract works and business and also as daily labour throughout the year. The utilization of the land is categorized into three type viz. (a) Agricultural land (b) Grove land (c) Forest land. The lands which are in the vicinity of the villages are used for paddy and millet cultivation. The immediate surrounding areas of paddy field are basically used for growing bamboo, pine tree, etc. while the far away land is covered with evergreen forest. Cultivating households have three different types of land holdings viz. individual or private own land, clan land and village or common land. The individual lands are those which are inherited from ancestors and some of them are purchased from others. The pasture lands and nearby forests used for grazing and collection of firewood come under the clan land. The burial ground and play ground are owned by the entire village.

XII. AGRICULTURE

The agricultural operations in the valley are completely carried out through human labours. The topography and terrace type of cultivation are not feasible for the use of modern farm tools like tractors, power tillers etc in the valley. The role of women is predominant in agricultural operation though men folk are involved in activities like construction and repairing of dams, channels and bunds. They also share the works like preparation of nursery bed, boundary fencing, harvesting and making of bamboo, fencing to prohibit the Mithun and other domestic animals to the crop fields. The entire paddy field is bounded by bund (*Aager*) so as to store water which comes from natural rainfall and irrigation canal. Bund supported by splitted bamboo and timber (*Myode nii* and *Dingia*) serves as boundary between two paddy fields. In the month of December, men construct the dam, main servicing channel for its tributaries, fence of groves and gardens. The women become busy in spreading of manures from decomposed pits, etc. in garden and paddy fields. The maintenance of bund (*pager nii*) followed by leveling of field (*kutu mudu*) are done during the month of February (*pasar piilo*). During the month of March (*myoko piilo*) sowing of paddy seed on nursery bed (*miding*) is done and then in April and May months (*halying piilo*) the transplantation of seedling are done. The weeding of the paddy field is done at regular intervals for two to three times before harvesting. The harvesting begins from the last week of September and continues till first week of November.

The climate of region is the deciding factor for timing of crops production and also the nature of human settlements. Each household has a granary basically for the storage of paddy, millet, maize and other household items. The individual household granary was normally constructed only from the locally available raw materials like bamboo, wood and cane. With the passage of time this has also been changed into modern type with RCC pillar, wooden plank wall and CGI-sheet roof. The owning of number of granaries depends on the quantity of food grain production from the paddy fields. Generally, the place of granaries is away from the heart of the village and concentration of settlements because of the frequent fire accidents during the winter season. It is found that there is indifference in the owning of granaries between traditional and modern villages in Ziro valley.

The agricultural activities of these villages are closely attached with the culture of the people in one way or the other for good harvest of crops. The Apatani Dree festival is celebrated in July every year to protect field from all kinds of pests, insects. This festival is basically celebrated for the harvesting of pest free bumper crops and also for the production of good horticultural products like cucumber, maize, millet, pumpkin, chilli etc. In this festival people participate from all walks of life. It involves cultural extravaganza for two to three days before start of the festival. This is followed by the grand celebration of festival on 4th, 5th and 6th July of every year with sacrificial of mithun, goat and hen on the beginning of the festival after chanting in Dree alters by priests. To coincide with this festival the Gora (select group of people along with priest) perform *Yapung* to appease sky God and Goddess for good rainfall during the entire crop season. A taboo of not carrying out any work in paddy fields and horticultural gardens for 3-6 days is observed during this festival.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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Vol. 9, Issue 2, February 2020

The Myoko festival is celebrated in every two years in turn wise in a cyclic manner by seven traditional villages. These villages are divided into three groups for the Myoko festival celebration among these villages. Thus it relates among these three groups. This festival is also related to the agriculture and a taboo is observed by not working in the paddy fields during entire festival. The festival is concluded by performing the last ritual in the paddy field at the end of the festival. It is found that the agriculture and myoko festival are inter-dependent for the well being of the family as well as paddy crops. There are also occasional festivals like *Korlang*, *Yapung* which are usually performed in the middle of agriculture season to appease the God and Goddess for good rain and hailstorm free at the time of agricultural season. The performance of Murung festival is not compulsory for every household but they can take part in other household' celebration. The livestock of the families are considered to be equally important and the survival of these household animals is believed to be dependent on the blessing of home God.

XIII. IRRIGATION

The agriculture in Ziro valley mostly depends on rain water. There are limited sources of perennial rivers, streams and springs. This water is canalized at the rim of valley through cooperative efforts of the beneficiaries. It is further diverted by the network of primary, secondary and tertiary channels from which the water is allowed to enter into the paddy fields through the bamboo pipe or ditch from the bund by manually opening and blocking mechanism as per requirement. The water flows down from one field to another field through the series of network channels. Thus, the outlet of one paddy field functions as the inlet for the paddy fields at lower level. The amount of excess water is drained out into another plot based on the angle of placement of inlet or outlet system placed on the dyke of the plots. Before the harvesting of paddy the farmers drain out water from the paddy fields from the higher plot to the lower plot and this will go on and then meet the major rivers at the lowest level of elevation. Some of the major rivers of Apatani valley are Suker, Siibe, Sukae, Hakhe, Phuchi (Moda, 2000) Dango and Myoche etc. These rivers flow to the south and meet the main tributary called Panior river at Yachuli.

XIV. HANDLOOM and HANDICRAFT INDUSTRIES

The handloom and handicraft industries are one of the age old household economic activities of Apatanis. Almost in every Apatani household they produce various items with the help of available resources in order to fulfill their basic needs. Handicraft products basically comprises of well artistic cane and bamboo works like baskets, tray, mats, haversacks, mugs, table, chairs, etc; which are generally made by men folk. On the other hand, handloom products like of beautifully designed coats, jackets, bags, skirts, shawls, blankets, shirts, table cloths, bed sheets, pillo covers, etc; are weaved by women folk. The instruments used for preparing these products are mostly local made and the thread is procured from the market which was earlier produced by them from cotton. Almost every Apatani women are very good weavers. The weaving skill is normally inherited from their elder ones. The traditional products of Apatanis are rich and have varieties of designs. Considering the need and importance of handloom and handicraft in the tribal society and also to commercialize and popularize the products, the government of Arunachal Pradesh is taking active interest by providing assistance like training, subsidy, product improvement and marketing etc to the local youths Apart from craft and weaving centers, there is also existence of emporium at each district headquarter. Besides, local entrepreneurs of the area are being encouraged by State government to participate in various fairs and exhibitions organized within and outside the State.

Table-6 shows the craft and weaving centers and other activities of handloom and textile industries in Lower Subansiri district. Three craft and weaving centers have eleven trainees. There is only one dyeing unit and an emporium in the district.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

Table-6
Craft/Weaving Centers and Other Activities in Lower Subansiri District,
Arunachal Pradesh (As on 31-03-2013)

Sl. No.	Particulars	In Numbers/In Rs.
1.	Craft / Weaving Centers	3
2.	Trainee in Craft and Weaving Centers	11
3.	Handloom Development Centre and quality dyeing unit	1
4.	Number of Emporium	1
5.	Value of Production of cloth/craft during the year in Rs.	282,021
6.	Annual sale of emporium and show room cum sale counters (Credit and Cash during the year 2012-13 in Rs.	307180

Source: Director of Textile and Handicraft, Arunachal Pradesh, Itanagar

The annual sale of emporium and show room including credit and cash during the year 2012-13 was Rs.3,07,180 whereas the value of production of cloth and craft during the same year was Rs. 2,82,021. The economic condition of the Apatani village households is basically supported by the forest along with agriculture and horticultural activities. The hunting and fishing along with the handloom and handicraft products are the age old practices of Apatanis. With the advancement of science and technology and availability of substitute modern products, only few households among the Apatanis produce these products with the help of locally available resources.

XV. TRADE AND COMMERCE

In old days there was barter system in Apatani valley. They used to exchange one commodity for another within the village and inter-villages. They started with direct exchange of commodities between the customers. When required commodity was not available in nearby area, the middle woman used to carry the commodity faraway places to get the required commodity from others. With the increase in population they developed trade relation with the people of neighbour tribes like Assam, Nyishi and Tibet. The entire trade transaction was based on Apatani trade system. Before the introduction of transport movement in the year 1961-62, the people of Upper Subansiri traded with Tibetians. The traded articles carried by them were mainly hides skin, musk, rice, local salt, Assam salt etc. The traders from Tibet used to bring down wool, blankets, bronze and brass vessels bells, cymbals, beads, pones, bee-wax, basket and chilies etc. They bartered Tibetan rock salt, swords and other articles of Tibetan manufactured (Talley, 2003).

The Apatanis have long trade relations with neighbour Assam even before the start of transport facilities. It was said that the people of Assam were more advanced economically. The Apatanis trade routes to plains of Assam were frequently intercepted by Nyishi of foothill areas. The Apatanis, therefore, usually sent their dependents to the plains for trade. This provided ample opportunity to them for making profit (Elwin, 1962). H.M.Crowe (1962) reveals that the Apatanis were dependent on the plains for their supply of salt. The Apatanis were keen trader. The Apatanis used to barter chilies, bamboo shoots and other forest products such as ruffs, the red dye and in exchange took home metal bowls plates, spoons, beads, daos and axes, cloths particularly *endi*, cotton and silk pieces and other articles of daily use.

Besides having trade relation with Assam people, there is an inter-tribal trade between the Apatanis and the Nyishi. There was an exchange of friendly visit among them after the harvesting of paddy as well as during festivals like *Murung* and *Myoko*. Apatanis carry with them like *Eppo* (yeast), salt, cotton cloth, meat and rice in exchange they get back commodities like paddy (*Missang Emmo*), maize (*tanie*), bamboo shoots, etc. The Apatanis exchange number of items like fine cotton, textile, axes and knives and bamboo shoots, yam, etc. from Nyishi. (C.V.F.Haimendorf, 1962) quoted that the trade and barter between Apatanis and their neighbour was based on the complementary primary items

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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Vol. 9, Issue 2, February 2020

like the surplus production of rice was bartered for procuring mithuns and cattles from Nyishi.

XVI. BANKING

The savings of people play an important role for the economic development of the society. The peoples' thrifts and savings and mobilization of savings into investment for rural infrastructure is crucial for development in the society. The establishment of banks in the valley helps and encourages the people for their savings. These banks give loans and advances to the people for their various economic activities like agriculture, horticulture, animal husbandry, housing, vehicle, business, etc. Thus, the establishment of banks in rural area boosts the rural economic activities. It is observed that all the surveyed villages are depending on the two types of banks within the radius of one to seven kilometers in the Ziro valley. The State Bank of India (SBI) was opened its branch during the year 1971 at Ziro (Hapoli). Since then this bank has been functioning smoothly and rendering services to the general public as well as the various Departments of Government of Arunachal Pradesh and public sector companies. The Arunachal Pradesh State Co-operative Apex bank Limited opened its branch for the first time at old Ziro during 1981-82. Another branch was established at Ziro (Hapoli), district headquarters in 1998 and recently Central Bank of India has opened its Branch at Hapoli. All together, the Ziro Valley has four banking service units in the entire Apatani Valley.

Apart from modern financial institution, there are micro finance saving system among the various age categories of the people irrespective of sex, age, caste, clan and village for the welfare of their respective group in the valley. The people formed various groups and contribute money equally as per the capacity of group members for common fund raising. In order to increase the contributed fund, they lend out the money to borrower at certain rate of interest per month. It generally gets matured at the expiry of one year. It is up to the borrower whether he would refund entire money along with interest earned during the period or to pay only interest after the expiry of one year. Sometimes borrower pays only interest, then the principal amount remains as the borrowed money again. In this way the modern banks help the micro finance saving system as a safe custodian of people's fund of Ziro valley. It is observed that about 75 per cent households in the valley have joined in this micro finance system.

XVII. CONCLUSION

The work force structure in all the traditional villages has changed significantly. With the development of village economy the people's participation in primary occupation has considerably diminished while in secondary and tertiary sectors has increased. The transportation and communication facilities of these villages are improved significantly with the black topping of village main link roads and introduction of mobile net-work services to the entire valley. All the household of these seven traditional villages are accessible to the drinking water facility through tap either from the common water pipe or they individually connected at their home from the main pipe. There is also the provision of free elementary education at the village level and primary, middle and secondary schools are established by government. Besides, some private schools have come up in some traditional as well as modern villages in the valley. Thus, the living standard of the people has changed significantly with the more accessibility of education, medical and other modern facilities at the village level. Further, the construction of houses are now a days attached with the modern toilet and bathroom facilities giving more comfort and hygiene and has improved the living style of the village people.

REFERENCES

- 1.Arunachal Darshan 1999 : "Glimpses of Land and People". Directorate of Information and Public Relations, Govt. of Arunachal Pradesh.
- 2.Arunachal Panorama 2000 : "Directorate of Information and Public Relation". Govt. of Arunachal Pradesh.
- 3.Bharatakur, J.K. 1972 : "Census of India, Arunachal Pradesh"; Part-I-A, General report, P.27.
- 4.Choudhary, S.D. 1989 : "The Gazetteers of Lower Subansiri District".Govt. of Arunachal Pradesh, Shillong.
- 5.Crowe, H.M. 1962 : "Account of a Journey to a Pattang country". India's North East Frontier in the 19th century, London, pp.196-197.
- 6.Chowdhery, J.N. 1999 : "Arunachal Panorama". Himalayan Publishers, Itanagar, P.117.
- 7.Tripathy, B. and Pandey, D. 1997 : "A Comprehensive History of Arunachal Pradesh". Bani Mandir Publication, Pasighat, pp.17-18.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 9, Issue 2, February 2020

- 8.Panchani, C.S. 1889 : "Arunachal Pradesh; Religion, Culture and Society". Konark Publication, Delhi, pp.1-5.
- 9.Haimendorf, C.V.F. 1962 : "The Apatanis and their Neighbours, Free Press of Gleycoc", New York, P.92.
- 10.Elwin, V. 1962 : "India's North East Frontier in Nineteenth century". London, P.203.
- 11.Habung, T. 2010 : "Gorra: Socio-Religious Institution of the Apatanis". Unpublished Ph.D. Thesis (2010), R.G.U., Arunachal Pradesh.
- 12.Haimendorf, C.V.F. 1980 : "Himalayan Tribe from Cattle to Cash". Vikas Publishing, Ghaziabad, P.105.
- 13.Haimendorf, C.V.F. 1962 : "The Apatanis and their Neighbours". Free Press of Gleycoc, New York, P.92.
- 14.Joshi, H.G. 2005 : "Arunachal Pradesh; Past and Present". Mittal Publication, pp.1-2.
- 15.Joshi, H.G. 2005 : "Arunachal Past and Present". Mittal Publication, New Delhi, P.64.
- 16.Kani, T. 1993 : "The Advancing Apatanis of Arunachal Pradesh". Purbadesh Mudran Publication, Guwahati, P.8.
- 17.Kani, T. 2000 : "Traditional Art of Cotton Spining and Dyeing in Apatani Society". Silver Jubilee Dree Sovenier, Itanagar, P.43.
- 18.Kaning, K. 2000 : "The Bulyang of the Apatani and its need for the Revitalization for judicial purpose". Dree festival, pp.58.
- 19.Moda, T. 2000 : "Pisciculture Development in Apatani Plateau". Dree Sovenier, Itanagar, P.7.
- 20.Ruja, K. 2000 : "Development of Handicraft and Textile Industries in Arunachal Pradesh with special reference to Apatani design". Silver Jubilee Dree Souvenir, Itanagar, P.15.
- 21."Statistical Abstract of Arunachal Pradesh" 1999 : Directorate of Economics and Statistics, Govt. of Arunachal Pradesh; Itanagar.
- 22.Sakia, S.K. 2005 : "Diversity of Periphyton with Emphasis on feeding Ecology of fish in rice-fish culture system of Apatani plateau". Arunachal Pradesh; unpublsh Ph.D thesis, R.G.U., Itanagar.
- 23.Statistical Handbook 2001 : District Statistical Office, Lower Subansiri, Arunachal Pradesh, pp.5-6.
- 24.Tam, N. 2000 : "Forest Ecology of Arunachal Pradesh with special reference to Apatani plateau". 'Dree Sovenier'pp.4-5.
- 25.Talley, H. 2003 : "Hao Langker". 'Golden jubilee Celebration Souvenir', Govt. Middle School, Hari, pp.47-48.