

Women, IKS and Sustainable Development: A Perspective on the Apatani Tribal Women of Ziro Valley, (Arunachal Pradesh)

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Abstract: Sustainable development, the predominant paradigm of the United Nations, formulated and described by the 1987 Bruntland Commission Report as “development that meets the needs of the present without compromising future generations to meet their own needs.” The concept of Sustainable development has become the focus of all planning and policies across the nations and is appearing to be the plausible remedy to a large extent to mitigate the emerging and continuing threat of Climate change Hunger and economic crisis across the world. The dimensions in the concept of sustainable development are intertwined with the future in which environmental, societal and economic considerations are balanced in the pursuit of an improved quality of life. However, Sustainable Development needs the participation of the society at large along with their knowledge as a principal guiding factor and active involvement between individual and communities and other stake holders. In this context the tribal people of India in general and that of Northeast in particular exhibit an intricate relationship with a two-way interaction of optimum utilization of the available resources on one hand and that of balanced conservation of the resources on the other. These practices of the tribes are in existence for centuries and has its foundation in the indigenous knowledge system inherited and practiced for generations. Among eight North eastern States, Arunachal Pradesh stands out as unique for its rich and variegated culture of as many as 26 major and many minor tribal groups inhabiting the speckled topography practicing their exclusive system of self-sustenance. In this process however the tribal women, play a significant role as they like are mostly responsible to manage fuel fodder and food to keep the family hearth burning along with working in the field as well as maintain the household chores. The Apatanis of Ziro valley are one such example which stands out for the role played by the women in sustainable resource management and efficient economic development by practicing a system of agriculture and forest conservation based on their traditional knowledge system. The present study is an attempt in understanding the role of women in the sustenance of environment by taking the example of Apatani women whose IKS has today drawn attention from within and across the world and Ziro has been declared as world heritage site.

Keywords: Environment, indigenous knowledge system, paradigm, role of women, sustainable development.

1. Introduction

The word sustainable development implies a condition where the available resources are utilized in an optimum manner without jeopardizing the opportunities for the future generation. In other words, one can say that “Sustainable development is a pattern of development that focuses to meet the needs of the present, without compromising the ability of future generations to meet their own needs.” With rapidly changing global scenario, particularly issues of climate change, expanding urbanization food shortages and fast depleting forest and mineral resources, the need of sustainable development today has become a necessity, befittingly occupying the center stage of any policy planning, across the political boundaries of States, Regions and nations, This can be understood in terms of the increasing attempts to mitigate the emerging crisis of managing the ecosystem and continue with development process. Thus, it can be said that Sustainable development offers a vision of progress that integrates the immediate and plans for the future with long term objectives at the local and global level.

The concept of sustainable development began prominently with the initiation in 1998 by the World commission on environment and development, headed by the Norwegian Prime Minister Go-Halen Bruntland, the significance of sustainable development was highlighted for the first time in the report titled “Our common future.” The report aptly highlighted the environmental crisis as the most influencing link process for development of thru. Hence it was evident that the cause, effect and purpose of sustainable development had to be addressed critically for any planning process. The report became pivotal revealing a new dimension of development that needed to be looked into for broader social wellbeing in future. The concept and implication were more necessary for the developing nations, where mostly the occurrence of development process is evident in the form of rapid urbanization and population growth through imbalance push factor dominated migration, there by taking toll on the natural environment, like forest,

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grassland and even agricultural lands.

In India sustainable development had its origin in the form of an attempt to engage and involve the people in the planning process particularly after the 6th and 7th five-year plan. This was particularly aimed at regional imbalances surfaced with enormous threat of poverty and unemployment. The entire scenario therefore made it obvious that earlier arm chair planning had not succeeded and that the grassroots approach was a necessity and demanded active participation and involvement of people at large with their indigenous knowledge system and intricate linkage with the natural environment used and preserved for generations for their survival. The pattern of natural resources management, land use and its product therefore had to be in harmony and integration with the knowledge system developed by the community or IKS. Or Indigenous knowledge is the local knowledge that is unique to a given culture or society, and thereby forms the basis for local-level decision making in agriculture, health care, food preservation, education, natural resources management, and a host of other activities in rural communities. (Warren 1991) The traditional ecological knowledge (IKS) of indigenous peoples became a major focus of attention within the past decade (Freeman & Carbyn 1988, Johnson 1992, Berkes 1993). IKS is also increasingly recognized as a form of rational and reliable knowledge developed through generations of intimate contact by native peoples with their lands, which has equal status with scientific knowledge (UNEP 1998). IKS and wisdom is highly sensitive to the changing relationships between people and their ecological resource bases (Gadgil *et al.* 2000). However, such knowledge largely depends upon locality and time-specific content, and they must, therefore, be supported by creating new contexts for their continued practice (Gadgil *et al.*)

Interestingly, most of these knowledge systems have inherent methods and mechanism of sustainable environmental conservation in the form of rituals, and belief systems that mostly involves the community participation in them. Such practices though inherited across generations by are now almost vanishing among the modern urban society due to fast changing livelihood pattern and infiltration of modernity. Hence it not inimitable that the indigenous knowledge system continuation and practice is can be found among the Tribal people who continue to preserve an intricate relationship with the natural surroundings which forms their habitat. It is also noteworthy that in a tribal society women play a very crucial role in the management of resources, and as such they become more intricately linked to the natural environment surrounding them. This interaction with the ecological system has enabled the tribal women to acquire knowledge both about the optimum use and conservation of environment and natural resource. Thus one can say that women form the backbone of rural economy by virtue of their IKS in management, right from the smallest unit that is home to the whole community at large. Their indigenous knowledge on farming and resource management therefore needs to be cherished and looked in to as models for generating livelihood means.

As it is well perceived and accepted through the experiences of various planners and policy makers and implementing

agencies, that Sustainable development cannot be achieved by the policies alone, rather it needs the participation of the society at large, as a principle guiding factor between individual and communities which in turn can promote sustainable development. As social security and economic freedom are the necessary prerequisite for promoting sustainable development, the grassroots approach is the necessity along with active participation and involvement of people at large. In this context the role of women become more significant as women are more closely associated with nature because of her role as framer, animal tender, and water and fuel collector and as labour in agricultural work. Hence Women in any given context face the daily management within the given environment and the associated imbedded constraints makes them more aware and adoptive of the existing environmental scenario. Undoubtedly such conditioned are handled with the help of their IKS learned from generations ahead and carried on efficiently to manage the situations and fulfill the needs of the home and community at large without exploiting the available source of the resource. The Rio earth summit and the Beijing conference identified the role of women, as a major group, critically important for achieving sustainable development. This role was identified as crucial by world leaders because they recognized that women worldwide are fundamental to the management of local resources and the sustaining of local communities. Yet majority women who forms ½ of humanity are the poorest in terms of resources and are mostly under represented at all level of society and often restricted even to decide their own way of living. Such situation may vary in relative degrees but are common across the social, economic and political boundaries of nations. However, with the present context of changing environmental conditions even the rigid social system had to acknowledge the intricate relationship between women and her surrounding and accordingly the need to utilize and use her knowledge for better management of resource became important. Within this framework the present paper is an attempt to understand and asses the practice and prospects of use of indigenous knowledge system towards attainment of sustainable development goals taking the role of Apatani tribal women of Ziro valley as role models.

1) Study Area

The study area chosen for the present paper is the of ziro valley, in the lower subansiri district of Arunachal Pradesh. Ziro, lies approximately between the latitude 27 32' N to 27 37' N and longitude 93 48'E to 93 52'E, with the altitude of about 1525 mt above sea level. The plateau is situated about 167 km from Itanagar, the capital of the state and is the headquarters of Lower Subansiri District Hapoli the district head quarter is one of the oldest towns in Arunachal Pradesh. The place has an imposing landscape of beautiful lush green forest, rivulets and elevated patches. It is famous for paddy-cum-pisciculture cultivation. The area is renowned for the terrace paddy fields where the unique system of poly-culture and water management is practiced by the local tribal people, the Apatanis. The unique land use pattern, resources management and culture of conservation of the Apatanis have made them a focal point of attraction. The area compasses of seven main villages. The

valley has an total area of 1058 sq km of which 43 sq km is under agriculture and remaining under forest, plantation, agriculture and settlement. The beauty of natural scenery, man-made landscape of the plateau and the specific farming and conservation technique of the Apatani have led UNESCO to nominate Ziro for becoming a world heritage site in 2006.

2. Objective

The research was undertaken with the following two objectives

1. To understand the relevance of indigenous knowledge system in resource management and
2. To study the role of Apatani women in sustainable development.

3. Methodology and Database

In order to realize the objectives, a questionnaire-based survey was done to generate primary data, as there is no record available in this context either in district census hand book, or in the block office. No land holding record/patta or cadastral map is available as the agricultural land is community owned and the plots are mutually agreed upon in presence of the Gaon Bura or the village headman and the chief priest or the sermon. Survey was done by selecting a sample and using the random sampling method. with a sample size of twenty percent of the total women population of the selected villages was undertaken, amounting to about 220 women (out of 1222 female populations,) comprising of both housewives and the working women residing in the study area. For compiling the data, along with information gathered through interview method and secondary sources such as official document, reports and the relevant publication have been taken into account. These compiled data have been analyzed by using statistical techniques like correlation, ANOVA to understand the socio-economic status and important component and variables in determining the role of women in n Agro-forestry, horticulture, forest resource management and agriculture.

1) Locational map of the study area

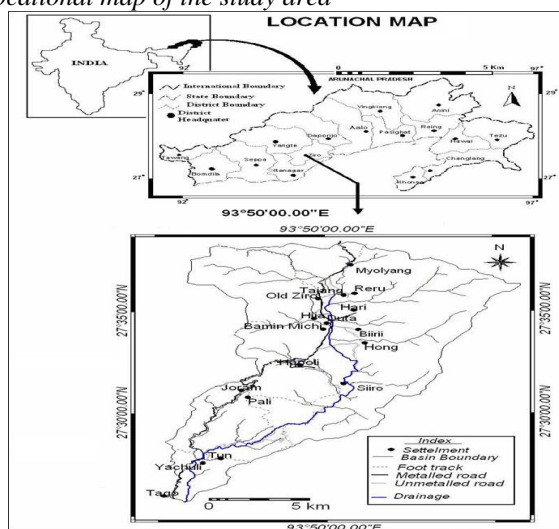


Fig. 1. Location map

4. Discussion and Findings

Indigenous knowledge contributes to the maintenance and preservation of biodiversity and forest development. Indigenous women's traditional knowledge and practice have been found to be effective in securing food, conserving their culture and tradition and contributing to sustainable natural resource management in their community. Women have developed a sustained interaction with nature through their daily household chores of collecting and nurturing the forest and forest products. They depend on land and water for food and nutritional security, medicine, fuel wood and other product that are used for household subsistence. Such sustained interaction with ecological system has enabled the women to acquire knowledge both about the environment and the natural resources and its uses. The development of the society depends on the active role played by women in various field the role of women is very important not merely because it would mean efficient use of resources but their status and opportunities are closely related to demographic variables.

In any traditional tribal society, the role of women is substantial. They play a crucial role in development due to their direct and greater participation in tribal economy. Their interaction with forest, and traditional ways in which they manage nature resources with maximum utilization but without depleting the resources. The role of tribal women is much intricate as a major link in sustainable development more prominent than that of tribal man folk. Women have been stalwart of conservation for centuries protecting, nurturing and supervising the natural resources without much recognition and representation in decision on environment matters. Women are also the back bone of rural economy, and their indigenous knowledge on farming is to be cherished in generating livelihood means. Hence women being the steward of local, regional and global natural resources and biodiversity, their role need to be increasingly acknowledged.

Women in Arunachal Pradesh enjoy good deals of respect in the society they are independent to a great extent. They spend considerable time in forest for their livelihood and are called guardian of biodiversity. Their contribution is much more than the man folk in running various errands. In Apatani society, women maintain better position, but the duties assigned to them were different as it was done according to the traditional norms and value to maintain status. They are known for their hard working and meticulously and judiciously using the natural resources for the sustainability of the environment.

1) Apatani women

Women in Apatani society maintain better position. Being self-dependent, they not only manage resources on their own for the sustenance of their families but also stand out for others in need. It is noteworthy to mention that the Apatani women of do not play the role of a home maker or housewife, restricted or limited within the household periphery only, rather they are found engaged throughout the year in farming, horticulture and weaving activities and are well marked among the other tribes for optimum way of utilizing the prevailing environment and natural ecosystem of the area. Consequently, their interaction with the forest and traditional ways of engaging the resources

makes their role in sustainable development more prominent than the men folk.

2) *Role of women in Indigenous agricultural*

Agriculture is the mainstay of livelihood for many tribes of Arunachal Pradesh. Traditionally, most of the tribe practices Jhuming on hill slope. However, Apatani tribe practices one of the advanced agricultural techniques in Arunachal Pradesh, which solely depends on human labour, in which women plays the major role. Women are extremely meticulous in taking care of their agricultural field where even the agriculture plot bunds are supplemented with millet (sarse). The bunds (agar) are bounded on paddy field to prevent the water from leaking/flowing out, which comes from irrigation canal called (bogo in local dialect) dug and fed by the single rivulet that sustains the entire valley. The (phakho) channel is prepared to shift water from one side of paddy field to another side. To close channel is (phakho) managed, so that water dose not flow out from the paddy field. These channels or Phakho is stuffed with grass/straw along with mud (gartin nanii), and when the water is not needed, pakho is opened, letting the water to flow out. The management of agriculture, including water resource, the maintenance of foot track along the agricultural fields, fences and drainage, preparation of field for sowing, transplanting and harvesting are all done singlehandedly by women group on rotation basis. Such groups are called (patang ajing). There are three kinds of groups or (patang). The table no. provides a glimpse of the level of involvement and workshare contribution of the Apatnai women in the sustenance of the tradition agricultural system.

1. Tanser patang, who works during day time
2. Konchi patang, who works early in the
3. Alying patang, who works from 5 to 6 p.m.

3) *Agricultural calendar and the work schedule of the Apatani Women*

The so-called group (Patangs), contain generally around ten to fifteen members. These groups do not work for any monetary/payment arrangement but it is community based mutual assistance. The persons in a group or (patang) work on alternative day or day's basis, and fields of each member plot/field is covered on rotational basis. On a day, a member who hosts the group in her field is expected to provide a mid-day meal, generally comprising of local beer, along with traditional dishes. Nevertheless, with modernization and change of food habits, traditional dishes are often supplemented with modern food stuffs. With passage of time and peoples changed life style, the tradition of patang is fast vanishing. People are turning more into government sectors for white collar jobs or are venturing into self-entrepreneurship for one's livelihood, forcing them to migrate to places closer to their wok. In such cases, village population have decreased to such an extent that it becomes hard to find people for Patang Ajings. This has brought in the role of money as the mode of purchasing labour to carry on with farming. Daily wage workers have virtually replaced the age old patang system. They are hired on day basis for Rs Rs/300 to 400/Rs a day for cleaning, leveling, transplanting and harvesting according to the season. Though patang system is drifting away from tradition, it has become a

source of income for unemployed and landless laborer to earn their livelihood.

Besides agriculture, women are also engaged in the kitchen garden (ballu) which is present in almost every household located backside or at the adjoining side of the dwelling houses. Vegetables and sometime some cash crops also are planted in its kitchen garden. These are done in such a way that it meets the immediate requirement for the household and the excess if any is sold in the market to pitch in some extra money as the family income. The most common chilly, ginger, cucumber, coriander, beans, pumpkin, maize, cabbage, cauliflower, potato etc. The upland area, a bit away from dwelling houses are used for distant garden (yorlu). Primarily the produce of distant garden is for domestic consumption but is made commercially available if surplus arise. The Apatani women by using their IKS use the piggery and poultry excreta, (Piggery and other domestic animals are usually kept in space created below floor of the houses, which are raised from the ground by using bamboo poles), firewood ash and paddy straw as fertilizers for the soil to increase the yield of crop. Another important thing in this agriculture system is fish rearing in the paddy fields. Fishes are allowed to grow for a period of three months i.e. from April to June and are caught from the paddy fields in a traditional way using cane baskets, in June-end to early-July. The priority after catching fish from paddy field is for domestic consumption but huge bulk of it is sold in the market as well.

4) *Role of women in management of Farm forestry*

The Ziro plateau has a number of plantation forestry in the forms, locally known as bije, sati, sansu etc. Apatanis are known for their traditional skill in management of bamboo plantation located at the adjoining site of the kitchen garden or away from the house. The bamboos are maintained as an alternate wealth for its uses like construction of house (ude), fencing (sullu), granary (nesu), for making ropes and flower like decorative ritual items called (somey/sopu). Fresh bamboo shoots (byapu/behe) are boiled as vegetable and eaten with rice. It is also used in kind of spicy dish called (pikey), which has a delicacy of its kind. Also, shoots are sliced to prepare hikhu/hiyi which is fermented and used in various Apatani dishes. Various items prepared from bamboo are sold in the market by the women as a commercial basis in a nearby area which also adds to the income of the family. The indigenous way of preparing the shoots and food delicacy like (pikey piila), which have been carried on for generations, have led to the preservation of the bamboo plantation in the area.

After bamboo, Pine trees are considered as precious species of the forestry. Pine trees which are usually located little far away from the villages and are called as Sansu. The Pine Forest has immense significance in the rural life pattern of the Apatanis and have been used as the basic material for housing, particularly planks for flooring and roofing. Pine wood is also very popular for furniture items. Apatanis maintain private and community land, which are looked after by privately by individuals or by nominated/selected members of the community the size of which varies according to the size of holdings. Interestingly most of the bamboo groves and the pine

forest is managed by women with occasional help from their men folk, particularly in cases of cutting and felling of trees if required. Though women have less role in forest they have great knowledge regarding its uses and final products are sold in local market which adds to their income for the sustaining the family.

Besides these, the surrounding jungle adjacent to villages constitutes an integral part of the Apatani community in general and that of Apatani women in particular. The jungles which are known as Morey is often a plot of wild forest, belonging to a particular community, identified and demarcated by boundaries marked with natural signs like stone, trees or a flowing stream. The resources from this forest starting from medicinal plants to edible herbs forms the part and parcel of the Apatani life. It is interesting to mention that it is the Apatani women are solely responsible for collection, utilization and preservation of these resources. The Apatani women by their IKS not only efficiently manage these to fulfill the daily needs in the form of food items but they also manage to sell these in the local market to earn and contribute to the economy of the household.

The farm forestry in the plateau is an integral part which is judiciously and meticulously maintained. The rich natural resources combined with the traditionally conservationist attitude provide solution to many of the economic needs of the Apatani tribe in Ziro valley. Women of this region, though have a lesser contribution in farm forestry, their indigenous knowledge regarding the uses of the forest resource has a greater contribution in sustainability of the environment. They not only have a deep knowledge about the resources but their role in the economic activities has also a connection for the sustenance of the family and society as a whole.

5) *Role of Women in Rural Tourism*

Rural tourism is becoming a major sector of Sustainable growth and development in the rural areas, attracting mostly urban tourists with an aim to showcase the rural lifestyle, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially on one hand, as well as enabling interaction between the tourists and the locals for a more enriching tourism experience on the other. Ziro plateau by its scenic location, favourable weather conditions and abundant bounty of nature along with lively inimitable cultural heritage stands out as a major attraction for tourists. It is noteworthy here to mention that homestay is now becoming a popular form of tourism and by virtue of the responsibility of managing the household chores, Apatani women have come forward and are playing the lead role in managing these homestays at large with almost all activities starting from managing the rooms for stay to food preparation and acquainting the guests with the cultural heritage and values of the tribal life. Their apt knowledge of the daily life maintenance and forest and forest products act as the guiding factor for the visitors to understand the bounty and beauty of nature. Often beautiful chada homes (made of bamboo) built in typical Apatani style amidst the garden and bamboo forest are the homestays for the visiting tourist which gives them a feel of the village. At the same time such tourism is able to bring in better economic returns without disturbing the eco system of the area.

6) *Role of women in handicraft and weaving.*

The Apatani women are expert weavers and carry forward the knowledge from one generation to another. They traditionally weave in a bamboo loom tied to the waist and use the local dye made from the forest plants and vegetables. The colourful weaving gets manifested in the finely woven 'Gale' or the cloth which is used as a skirt and the blouse. The antique designs of the jacket, and the shawl is a marvelous example of the mastery of blend of colours design and weaving skills. It is interesting to note that these designs and style has made a niche in the national and international arena, and is one of the major attractions for the visiting tourists.

7) *Role of women in small scale cottage industry.*

Besides weaving bamboo basketry and other kitchen utensils made of cane, and wood are also made by women folks. However big planks and other building materials are done by men. Apatani women are now playing a major role in making and marketing though at local markets in the form of fruit processing from the horticulture fruits like kiwi, passion fruits, plum and peaches. Local fish pond also is another area where women are playing a substantial role by managing the ponds often small in size and usually in the backward of the house or in community land. The traditional knowledge of smoked fish, and bamboo fish can be mentioned as the enterprising area and is gaining fast popularity not only in the nearby areas but is getting recognized beyond the boundaries of North East.



Fig. 1. The Spread-out Paddy fields in different season amidst the Picturesque scenic background. The farmer women returning from the fields



Fig. 2. Kiwi and Cardamom plantation, women selling forest products, pine and bamboo forest



Fig. 3. Traditional Apatani dress, Shawl with traditional motif, Women with tattoos and wooden nose plugs, Traditional Old Couple



Fig. 4. Apatani Houses made of bamboos and tin roof

The Home stays at Ziro Tourists getting the feel. The central traditional Kitchen in a Apatani house,

5. Conclusion

The Apatanis are progressive agricultural community who have their own indigenous knowledge system; with highly developed valley, cultivation of paddy over centuries has often been suggested to be one of the relatively advanced tribal societies in the north eastern region of India. Forming one of the major tribes of lower Subansiri district of Arunachal Pradesh the Apatani women of Ziro valley are glaring example of practice of environmental sustainability, where they have been guarding and preserving the biodiversity through their traditional knowledge for generation. They have been practicing settled cultivation, which is unique as every square of land is cultivated with great care using only one single water source. The system is so different from all other communities found in the state. Today, Globalization, modern life and westernization has greatly affected on the environment in the valley. The changes in the lifestyle have affected the agricultural system as a whole. The growth of population has brought in the expansion of human dwelling sphere. In consequence, construction of houses has spread to paddy fields, which not only lessens the beauty of the valley but has also a negative impact to the environment. It has also affected the traditional knowledge of the agricultural practice. The change is also due to movement of the local people to other region, and lack of knowledge among the young generation regarding the agricultural and forestry practices as most of them are sent to school mostly outside the district. Also, conversion of religion has also played a role which has changed the traditional belief system of the people and has brought in end of many traditional believes, rituals and value system. In spite of such changes, the tribal women in general and Apatani women in particular have been playing a vital role in preserving and conserving natural resources though their traditional knowledge and the role they play in the sustainable development has not been regarded

important. The need of the hour is Popularization of IKS, in the form of documentation, as most of these communities including the Apatanis do not have any script and totally depend upon the oral traditions. To make this knowledge available for the new generation it therefore necessary to preserve in the form of audio-visual documents. Social awareness regarding the traditional knowledge and its uses should be imparted to the local people specially the young generation for the sustainability of the environment. Another important issue that remains as a bottleneck, is the lack of Proper transportation and market linkage that could facilitate the local product grown by the women of the valley to be made reachable to the markets. Entrepreneurship also needs to be encouraged and provided for to enhance and explore now it is on the hand of the present generation about how to utilize the inherited indigenous knowledge in assimilating with the latest trend for their next future generation.

References

- [1] Bhattacharya T.K. The status of women in Arunachal Pradesh, Itanagar, DPR, Itanagar, 1993
- [2] Bhargava, G Environmental challenge and ecological disaster, Mittal Publication, New Delhi, 1992.
- [3] Brundtland Relatório. Our Common Future, Sustainable Development Goals, Report of the World Commission on Environment and Development Under UNO Environment Program, Oslo, Norway.
- [4] Carbyn, Ludwig N. Traditional knowledge and renewable resource management in northern regions, Freeman publishers, Australia, 1988.
- [5] Dasgupta, S: Role of forest in socio-cultural life of the Birjia some observation, Journals of Indian Anthropological Society, 1992.
- [6] Johnsson-Latham, G., "A Study on Gender Equality as a Prerequisite for Sustainable Development", Report to the Environment Advisory Council, Sweden, 2007.
- [7] Malhotra, K.C. People and Biodiversity, Arunachal University Research Journal, 1996.
- [8] Macharia, P.N and Ekalaya, W.N: Masai Indigeneous Knowledge on Range Vegetation Analysis, Utilization and Management, Journal of Human Ecology, 2001.
- [9] Mishra. Women in a tribal community a study of Arunachal Pradesh, Vikas Publishing House, New Delhi, 1991.
- [10] Nimachow, G, Towards the sustainability of forest resources: A case study of Akas of Arunachal Pradesh. Indian Journal of Traditional Knowledge vol. 6, no. 2, 2003.
- [11] Rashid et.al Environment, resources and sustainable development. A Multidisciplinary Approach to the Theory and Practice of Sustainable Development vol. 16, pp. 276-28, 2008.
- [12] Rao.V.M. Tribal women of Arunachal Pradesh-socio Economic Status, Mittal Publication, New Delhi, 2003.
- [13] Khan.T.I and YS Shisodia (2003): Environmental conservation depleting resources and sustainable development. Biodiversity conservation and sustainable development, Pointer
- [14] Steven, Are women the key to sustainable development? Sustainable Development Insight, 2010.
- [15] United Nation Environment Program (UNEP), Women and the Environment. Publisher United Nations Foundation Jaipur, 1-116, 2004
- [16] Kani Takhe. The Advancing Apatanis of Arunachal Pradesh. Purbadesh Mudran, Rehabari ,Guwahati. Some Glimpses of the Apatani plateau, 1993.