

**Summary of completed/ongoing projects, funded by IERP, GBPIHED**

**ENVIRONMENTAL MONITORING AND MANAGEMENT OF  
WATERSHEDS IN HIMALAYAN REGION: A CASE STUDY OF SIRKHAD  
WATERSHED IN HIMACHAL PRADESH**

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The report is divided into six chapters. Chapter-I introduces the area of study by discussing the concept of watershed, major hypotheses, data sources and research methodology. The hydrogeomological profile of the study area within the backdrop of geographical profile of Himachal Pradesh has been discussed in Chapter-II. The natural resource endowment has been evaluated in Chapter- III and the socio-economic structure has been dealt in Chapter-IV. The case study of some selected villages has been presented in Chapter-V in order to analyse the changes in the socio-economic structure of the villages and also to appreciate the people's perception regarding the environmental problems and sustainable development of the area under study. Chapter-VI deals with the summary, conclusions and policy implications. A model for sustainable development of watershed has also been developed in this chapter.

The important findings and policy imperatives are as under :

The analysis of geographic background reveals that Sirkhad watershed is a homogenous landscape with very little variations in geological structure, relief and soil profiles. This micro-region gets life from the water circulation from the three tributaries - the Sir, the Sukar and the Saryali khads. There is a great symbiosis in water and soil because the entire economy is controlled through this symbiotic relationship. The slope analysis clearly brings out that the major part of the area is below 20 degrees of slope. The steep slope that is more than 20 degrees is, however, a notable feature in the eastern part which forms the dividing line for the Sir watershed. This is characterised by environmental risky zone where agriculture and grazing are hazardous. The soil erosion and land cutting are common features along all the three tributaries. This needs to be managed which can be done by examining the people's perception.

The availability of water is in abundance which is clear from the analysis of maximum, minimum and average discharges of khads for a period of 33 years. Rainfall variability is between 74 mm to 110 mm. It increases from east to west. The western part of the region, therefore, is comparatively better in terms of forest cover. But the eastern part has very poor vegetation cover. This has resulted into soil erosion especially in the area of high slopes. The water logging is common feature in the southern segment of the micro-region near Govind Sagar Lake where the three Khads join to discharge into Govind Sagar Lake. There is no doubt that this area has *Khadar* land due to new deposits of sediment but owing to water logging it cannot be cultivated properly. This area also requires some management. While the ravenous and gullied land are common along the courses of three khads, a big patch of such land is found in the upper Sir and Sukar Khad doab. A detailed study of this land is required for rehabilitation and proper development.

A comparative analysis of land use based on toposheet for the years of 1974 and satellite imagery IRS IA 1988-1989 reveals that the Sirkhad watershed is predominantly characterised by agricultural land use. The important crop are rice, wheat and maize. The diversification of agriculture should be promoted without encouraging ecological imbalances, which may be caused due to soil erosion, rock movement and removal of vegetation cover. The agro-forestry and social forestry have good scope in order to improve the ecological imbalances and enhance the scope of sustainable development. But this has not picked up in the region. This can be taken up at large scale by identifying the sensitive areas such as gullied land, wasteland and even agricultural land. The area has great potential for exploitation of minerals especially building materials but the open cast mining has been causing several environmental problems. There is need to study mining sites to understand the problems and suggest the sustainable solution. The digging of the river courses for extracting the building materials has deepened the channels. This

has created artificial shortage of water for water mills. This problem also needs to be studied in detail. The area under study has great potential for some valuable minerals like gold. There is need to give due attention for scientific mining and management of this valuable mineral. The analysis of the location of different amenities and facilities clearly demonstrates that they are completely inadequate keeping in view the distribution of population and settlements. The distribution of settlements according to their sizes show that the areas between 10°-20° slopes are most suited for human habitation. This region, therefore, needs again a very careful analysis as these are the areas where man-environment relationship has better nexus. This nexus is to be properly explored at village level in order to understand the degree of ecological vulnerability and environmental problems.

This micro-region has great pressure of population as the density varies between 318 to 375 person/kg<sup>2</sup> as per 1991 census. Although the growth of population is 15.94 per cent which is below state (19.39 per cent) and national (23.56 per cent) averages, yet urbanization is picking up through the process of tertiarisation. In 1981 Ghumarwin was the loan town, but the number of towns increased to three in 1991, thereby increasing the proportion of urban population. Even though this is significantly low, there is need to promote urbanization by providing better infrastructural facilities, horizontal linkages, greater agricultural production and better marketing facilities for collection and distribution. Urbanization is an important parameter of modernisation and there is necessity to accentuate this process.

The sex ratio is not balanced because there are more females than males. According to 1991 census the sex ratio of Sir Khad watershed is 1129 which was 1074 in 1981. This reveals the trend of migration of males in search of job opportunities. The out migration is very alarming and needs to be curtailed by promoting employment opportunities at village level. This could be done by encouraging household activities by formulating policies at the Govt. level.

The sectoral work force shows that the degree of dependency is very high. Even though work force has improved from 29 per cent to 30 per cent during 1981-1991, the marginal workers have increased significantly. The primary sector provides the major scope for living as cultivators and agriculture laboures constitute 71.00 per cent of the total work force. But what is most alarming is the tertiarisation of economy and declining work force in the household activities which need to be tightened up by giving greater incentives at different scales and locales. The scope of industrialization is also to be explored. The industries could be agro-based, mineral-based, electrical and art and handicraft-based at cottage and small scale levels. This again needs through probing.

**RESOURCE INDIFICATION AND TECHNOLOGY TRANSFER FOR WATER  
HARVESTING IN NAYAR WATERSHED AREA FOR GARHWAL  
HIMALAYA**

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Hills, full of natural resources are facing serious problems of saving its glory due to mindless exploitation in the past. The resources are diminishing, dwindling, and now present in its extreme conditions. Water, one of the major resources for life of all living beings, is also escaping due to environmental hazards created by man in the past. Being an origin point of Ganga and Yamuna, who are the major resources of water for big part of the country, the hill people are facing serious water crisis for drinking and other purposes. Rain water-harvesting technologies, being one of the tools as remedy, can solve the problem of the people.

Present project work investigated the various socio-economic conditions, water status and water quality of the target area. The various technologies, available for rainwater harvesting have been surveyed and most fruitful and cheapest technology has been tested at field level through implementation. The total mason and craftsmen have been trained in the technology for its implementation and extension in other areas. Local people, particularly women groups have been demonstrated about the technology to reduce there water crisis problem.

## COMMERCIAL VIABILITY AND STRATEGY FOR SUCCESS OF ECO-FRIENDLY AGRO-BASED AND FOREST-BASED INDUSTRIES IN U.P. HILLS

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The main objectives of the project was to identify some of the potential and viable agro and forest based industries for Uttar Pradesh Hills.

An inventory of possible industries was prepared on the basis of review of literature, analysis of units registered with department of industries, analysis of resource endowment and expert opinion survey. After a conceptual analysis of resource availability, demand and skill availability five product categories (*vis-à-vis* fruit preservation, small bakery and confectionery, woolen products, ringal products and ayurvedic drugs) were selected for detailed viability study.

The viability studies are mainly based on in-depth case study of a few selected units and a market survey followed by a detailed survey of existing units in the region in relevant product category. The studies are divided in four phases viz. technical and cost studies, market studies, financial appraisal and detailed field survey.

In fruit preservation industry 14 products were analysed on the basis of operational data collected from 5 units. All products were found profitable with P/V ratio of more than 30. Break Even sale (including cost of capital) was found Rs. 10 lakh and minimum economic size of investment is Rs. 8 lakh. The market survey show that the hill products have vary low market share even in local market and they need of put sincere effort to promote their products. The survey of existing units reveal that seasonal nature of operations reduces the profitability the units require to diversify their products and operations. Efforts are also required to promote new products for proper utilisation of hill fruits like plum and pears.

Bakery and confectionery industry is a demand-based industry as raw material and other resources are not locally available. This product category was selected for the study in view of a large number of units registered with DICs [76 units]. The viability was analysed for two different categories of units - a small urban unit, and a cottage scale rural unit. Three products - biscuits, bread and bandh (bread roll) were selected for analysis. The small-scale units requires a capital investment of about Rs. 7 lakh and its break-even sale is about Rs. 6.85 lakh. A cottage scale unit requires an investment of about Rs. 35 thousand and its break-even sale is about 32 thousand. However, the technical capacity of a small scale unit is Rs. 60 lakh per annum and that of a cottage scale unit is Rs. 7 lakh. All the three products were found profitable at both the level of production, however comparative profitability differs in urban and rural markets. The profitability of most of existing units was found satisfactory but further scope for this industry is limited as it depends on local demand only.

Woolen handloom industry is a traditional industry of Bhotia families in this region. Most of the units are single production units employing a capital of Rs. 6 thousand. Annual turnover is quite low (about Rs. 25 thousand) because the activity is seasonal in nature. Although profitability of the products (blankets and carpets) was found satisfactory, the total profit of the units was very low because of low turnover. Availability of local raw material is decreasing because of deteriorating condition of animal husbandry, and the artesian has to depend on external supply. They are also unable to register their place in the international carpet market because of low quality of outputs. Therefore, they are dependent on local market and because of low market price their profitability is quite low. The survival of this industry depends on technical assistance for improvement of products and proper marketing.

Ringal and bamboo products are another traditional craft products of this region mainly used in agricultural activity. The size of this traditional market is about Rs. 90 lakh p.a. However, this can be expanded through innovation and targeting the products beyond agriculture sector particularly as decorative items. The conventional single output unit employ a vary nominal capital of about Rs. 1000. The annual capacity is Rs. 16,000 and factor income on full time basis

is Rs. 51. Although the income is quite low, it can be improved through including the innovative product in product mix. The profitability of conventional products was found very low. Contrasting availability of raw material is also affecting this industry. Excessive exploitation of ringal from forest may also endanger the existence of this plant.

Ayurvedic drug industry is often referred as a prospective industry for this region. Information was collected from three units to evaluate the commercial viability of this industry. Four common products - chyawanprash, baljivan ghutti, shilajeet and chandraprabhawati were selected for analysis. The profitability of all these products were found satisfactory. However, the market share of local products even in the local market was found quite low. These units are needed to strengthen their marketing efforts. Himalayas are always thought the source of medicinal plants and this can be used as USP by units located in this region. In contrast to common belief the availability of raw material from local sources is quite low in ayurvedic drug industry. Farming of medicinal plants should be given top priority for development of this internationally growing industry in this region.

**WANO MAIN AGNI KE PRATI JANJAGROOKTA EVAM WAIGYANIK  
SHODH TATHA WAN SANRAKSHAN SAMBANDHIT WIBHINNA  
GHATAKON KE MADHYA SAMANJASYA STHAPIT KARNA**

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The district Garhwal also known as Pauri, one of the twelve district of UP Himalaya is located 29°20'-29°75'N Latitude and 78°10'-78°80'E longitude, covering about 5540 km<sup>2</sup> area. The district is one of the most fascinating segments of the Himalaya, stretches from the Ramganga river that separates Pauri-Kumaun Border in the east, and to the Ganga demarcating the western border.

The forest cover in the western Himalaya (Garhwal and Kumaun) was 85.88% in 1911 (Sharma 1978) which has been reduced to 39.3% in 1984, however, for Garhwal Himalaya only, the total forest cover was interpreted only, 24.9% by satellite imageries (Singh *et al.*, 1984).

The settlements, shifting cultivation, rapid urbanization, migration of natives to urban areas, overgrazing associated with frequent and unplanned burning are some of the prime causes for such a tremendous reduction in forest cover of the Garhwal Himalaya. Landscape burning is a common practice in this region and most of the fires are set in the summer months.

The research work has been carried out from April, 1997-April, 1999. Garhwal Himalaya forests in general and pine forest in particular, experienced the wild forest fire of unprecedented magnitude during the summer months in the year 1995-1996.

Two experimental sites have been selected in Pauri and Khirsu blocks. Out of these two sites one was burned and other unburned. In each situation (burned and unburned) an area of 1 ha was protected against herbivory and herbage removal by natives. The prescribed burning was done by staff members, society members and forest officials under the prescribed fire programme on April 2, 1997 and April 11, 1997 respectively, at Pauri and Khirsu site. The study brings out the following results:

- The fire history of the burned sites of Pauri and Khirsu were taken from the forest department, civil and soyam forest office, Pauri and rural social workers of the area. Besides these the staff members of the project have collected all these valuable information, which were essential to fulfill the research objectives. These data were taken after interviewing the person in the questioner form. Both the burned sites did not experienced any type of fire since from the June 1995 and May 1996 forest fire. During the study period both the burned sites were completely untouched through the forest fire.
- Both burned and unburned sites of Pauri and Khirsu were dominated by *Pinus roxburghii* and other companions *i.e.*, *Cupressus torulosa*, *Cedrus deodara*, *Rhododendron arborium*, *Myrica esculenta*, and *Pinus wallichiana*. The dominant shrub was *Berberis asiatica*, associated with *Rhus parviflora*, *Rubus ellipticus* and *Pyracantha crenulata*. Chief grass components include *Heteropogon contortus*, *Chrysopogon aciculatus*, *Themida anathera*, *Apluda mutica* and *Imperata cylindrica*.
- The peak growing season was rainy. The other forbs contributed highest percentage to total aboveground biomass. The grasses were second to forbs. Among the other forbs *Anaphalis* spp., and *Rainwarditia indica* contributed maximum biomass; *Heteropogon contortus* was the major contributor among grasses. During these study period, shoot biomass showed almost identical trend on all the sites. From March until August-September, the shoot biomass increased and declined in the following months until February. The biomass values were higher on burned sites than on unburned ones. During 2<sup>nd</sup> and 3<sup>rd</sup> year, the shoot biomass was decreased in all the sites. The maximum shoot biomass was recorded on Khirsu burned site and minimum was on Pauri unburned sites. The below ground biomass as higher on burned sites than unburned sites. Litter biomass varied significantly throughout the study period on all the sites. The minimum litter biomass was recorded in April on burned sites and maximum in May-June on unburned sites.

The above ground net production (ANP) was maximum on burned sites. During 2<sup>nd</sup> and 3<sup>rd</sup> year, the ANP was decreased in both the burned sites, while it was increased in remaining unburned sites. The below ground net production (BNP) was highest on unburned sites. The BNP increased during 2<sup>nd</sup> and 3<sup>rd</sup> year in all the study sites. Little production was maximum recorded in Khirsu burned site followed by Pauri burned, Pauri unburned and Khirsu unburned in 1<sup>st</sup> post burned year and during 2<sup>nd</sup> and 3<sup>rd</sup> year the annual litter production was increased.

- During the study period, the highest amount of litter fall was observed in June on both burned and unburned sites of Pauri and Khirsu. The lowest amount of litter was noticed in January and February on burned and unburned sites. An analysis of litter decomposition in different sampling months indicates that the litter decomposed most rapidly during rainy season in both the study sites of burned and unburned areas. However, minimum decomposition of litter was recorded during October-December on both sites of burned and unburned areas.
- There was a definite trend of standing state of nitrogen on all the study sites for live shoot biomass. The maximum values were recorded during rainy and minimum in summer season. Maximum amount of phosphorus was recorded during rainy on all the sites. Across the sites the maximum and minimum was recorded on Khirsu burned and Pauri unburned sites respectively. Standing state of potassium in live shoot biomass was recorded maximum during rainy season on the burned sites while it was recorded maximum during summer season on the unburned sites. The minimum values of potassium in the live shoot compartment did not show any definite trend. After 1<sup>st</sup> poor-burned year, the values were decreased in all the study sites.

Analysis of soil samples reveal the acidic nature of soils. Yet the burned soils had higher pH than those of unburned sites. Organic carbon (%), total nitrogen ( $\text{gm}^{-2}$ ) and exchangeable phosphorus ( $\text{kgha}^{-1}$ ) were higher on burned sites whereas, potassium content was higher on unburned sites than the burned ones. During 2<sup>nd</sup> year the nutrients was increased in both the burned and unburned sites.

- The mean maximum temperature during the study period ranged between 17°C and 33°C, and minimum from 7.0 to 24°C in both Pauri and Khirsu sites. The maximum rainfall was recorded in August and minimum in May at Pauri and Khirsu sites. The relative humidity was minimum in February and maximum in July.
- Staff and society members organised various *Sangosthi*, information meetings, competition in easy writing and poster design in between the villagers, students, social workers, local group of NGO's and research scientist of the related fields. In these *Sangosthi*, invited teachers, students, *Gram Pradhans*, *Block Pramukh*, members of *Mahila Mangal Dal*, *Yuva Mangal Dal* and also the villagers, expressed their views about the nature of forest fire, causes and impact of fire in different ecosystems. All the protecting associations of the area and especially the women emphasised the formation of co-ordination group between forest department and local inhabitants to reduce the fire hazards. Staff members and invited resource persons discussed, and demonstrated the impacts and extent of fire in Garhwal Himalayan forests and highlight the Pauri and Khirsu forests as a role model with the help of posters, slide films, charts etc. and also distributed prepared articles in Hindi to the participants. Local inhabitants highly appreciated the awareness programmes and emphasised the need of such programmes in future also. During these programmes, debate, poster designing, essay writing have also been organised on the subject related to the forest fire. Participants were also encouraged by prize and certificate distribution.

In the 2<sup>nd</sup> phase during the first step of summer awareness campaigning were initiated during February and March, in different villages of Pauri and Khirsu block. Staff members have collected data on cause and extent of fire, and also encourage and suggests them various uses of forest fuel materials, especially the use of pine needles, appropriate fire suppression techniques, prescribed burning, etc. During the study period staff members collected the data after interviewing the person in questioner form.

Assessment of impacts of awareness camps and people participation to control the wild fire were made with the help of forest-records and spot-to-spot information from the natives. On

the basis of our findings, public education and awareness about co-operation, co-ordination with forest department and others, as a means of forest fire prevention, does not yield immediate results and it is indeed often difficult to assess its value, but with patience and persistence it can serve as a very real weapon in the struggle against fire.

**BAGWANI VIKAS EVAM PRASAR PARIYOJNA (Horticulture Development  
Project)  
IN DISTRICT CHAMPAWAT**

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Meetings were held with the community informing them of the project, objectives of the organization and the benefits from horticulture development in the area if adopted, with scientific inputs. These initial meetings resulted in selection of 10 villages viz., Kota amori, Kot bhumta, Ijara, Chamtola, Mamola, Khet khola, Sanarkha, Sajoli Lekh amori and Nanla. Three beneficiaries were selected from each village totaling to 30 nos., 200 nali land was agreed upon to be planted. With due consideration to the climate and the area citrus, mango, litchi, lemon, malta and omegranade fruits were planted. Awareness camps and workshops were held with the community. *Bagwani Samitis* and women growers group were formed to propagate the project philosophy among the greater mass. The *Samitis* and the women growers group will look after the marketing aspects of the production and later will develop the area into a fruit belt. The women group will also look after the health and child education aspects in their community. The *Bagwani Samiti* has 7 members each with 40-50 percent female representation. The overall community response is very good and apart from the project requirements people have planted fruits trees of their own. The land agreed upon was 200 nali in the beginning but another 115 + 95 nali of land has been planted, totaling to 410 nalis. 10 nurseries have been developed by the community which contain ginger, dal chini, jackfruit and reetha. Another two nurseries, one for herbal plants and one for citrus fruits is also being developed by the community.

## ASPECTS OF ASCARIASIS AND HOOKWORM INFECTIONS IN TROPICAL AND MOUNTAINOUS HIGH RAINFALL AREAS OF MEGHALAYA: AN INVESTIGATION INTO TRANSMISSION DYNAMICS AND ANTHELMINTIC EFFICACY OF A PUT ACTIVELY CURATIVE PLANT

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The proposed study aimed to explore the prevalence of hookworm infection among human populations in different climatic zones of Meghalaya, and to study the development of the infective larvae, their survival and viability in varied environmental conditions; to ascertain similarities or differences between *Ascaris* materials of porcine and human origin; and to ascertain the anthelmintic effect of plant-derived components on the motility, survival and structural organization of the parasites so as to find out clues to possible route and mode of action of the plant materials used as anthelmintic in traditional medicine.

- The surface fine topography and composition of the free amino acid pool of the adult *Ascaris* from human and swine sources were analysed for differences, if any, between the two.
- The whole village populations of Nongkya village (near Umsning, Ri Bhoi district), Sutnga village (Jaintia Hills district), and rural community in and around Williamnagar (East Garo Hills district) in Meghalaya were surveyed for hookworm infection. Coprological and soil samples from the study site were collected and examined. Identification of the hookworm species was made from the infective larvae recovered from the soil samples and also from those raised from faecal cultures.

The optimal periods of development and hatching of eggs and development of L<sub>3</sub> larvae of human hookworm seems to occur at warmer temperatures (22-28°C) and high humidity (RH>80%) which also favour a longer period of survival of L<sub>3</sub> larvae. The present study suggests that the ambient climatic conditions of summer months in the rural subtropical, high rainfall area of Meghalaya are better suited for transmission and recruitment of infection as compared to cold winter months, when no development of eggs and hence no infective larvae would occur.

- The root-tuber peel of *Flemingia vestita*, the indigenous plant of putative anthelmintic use in traditional medicinal practices among the natives of Meghalaya, was tested for its anthelmintic efficacy. Test worms (representing all helminth types, viz., nematode, cestode and trematode) were treated in vitro with the crude root-peel extract and the active principle, genistein. Changes in the motility, physical status of the parasite, and alterations in the organisation of its body surface at the morphological and ultrastructural level were observed following exposure to the test plant material. These changes provide some clues about the mode of action of the plant-derived component on the parasite.

With the localization of NSE and ChE, the organization of the cholinergic components of the nervous system in toto could be visualized in the cestode test parasite. The specific ChE in the parasite is AChE. Both NSE and ChE were found in close association with the central and peripheral nervous components, besides being present in the tegument and muscular parts of the male terminal genitalia. The whole tissue homogenate also showed a high AChE activity. After exposure to the crude peel extract and to genistein, pronounced decline in the visible stain intensity in the cholinergic components of the nervous system and tegument was noticeable, indicating extremely reduced activity of NSE and ChE in these sites. The total AChE activity was also reduced to 49.07% and 56.77%, following treatment with the peel extract and genistein, respectively. The reference drug, praziquantel also caused reduction in the enzyme activity, somewhat at par with the genistein treatment.

AcPase, AlkPase, ATPase and 5'-Nu are predominantly distributed in the tegument, subtegument, and somatic musculature. After exposure to the crude extract (50 mg/ml of the incubation medium) or genistein (0.5 mg/ml), a pronounced decline in the visible stain intensity was noticeable indicating very little or no activity in these sites. Quantitatively the activity of AcPase, AlkPase, ATPase and 5'-Nu was found to be suppressed by 97%, 95%, 88%, and 57%, respectively, following genistein treatment. The reference drug, praziquantel (0.01 mg/ml) also

caused a reduction in the enzymatic activities, somewhat at par with the genistein treatment.

Phosphoserine, taurine, phosphoamine, threonine, serine, glutamate, proline, glycine, alanine, citrullin, valine methionine, isoleucine, leucine, tyrosine, phenylalanine,  $\beta$ -alanine,  $\alpha$ -aminobutyric acid,  $\gamma$ -aminobutyric acid, tryptophan, histidine, ornithine, arginine, and ammonia were detectable in the tissue homogenate of the parasite. After exposure to the crude extract (50 mg/ml) and genistein (0.5 mg/ml), alterations were noticeable in the free amino acid pool. Following genistein treatment, quantitatively the contents of Ph.ser, Tau,  $\beta$ -Ala,  $\alpha$ -AiBA, Trp, His and Val were significantly lower and Glu, Met, Ile, GABA and ammonia were slightly higher than those in the control; PhNH<sub>2</sub>, Cit and Orn were not detectable in the treated parasite. The amino acids excreted by the control worm and as detected in the effluent were Ph. ser, Glu, Val, Met, Ile, Leu, Tyr, Phe,  $\beta$ -Ala,  $\alpha$ -AiBA, GABA, His, Orn, Arg and ammonia, in the effluent of the genistein-treated parasite Gly, Ala, Met, and Orn were not detectable. The reference drug, praziquantel (0.01 mg/ml) also caused a quantitative reduction in the free amino acid contents of the parasite, somewhat at par with the genistein treatment.

**EXPLORATION OF AMPHIBIAN FAUNA OF ARUNACHAL PRADESH  
WITH EMPHASIS ON THE CONSERVATION MEASURES, REPRODUCTIVE  
BEHAVIOUR AND ETHNOZOOLOGICAL INFORMATION**

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This report presents the data based on the outcome of the project over three years and emphasises the need for further extensive survey in this high biodiversity zone. A.K. Ghosh (1984) collected 14 species of Amphibia from the proposed Namdapha Biosphere reserve. Chanda (1994) on the basis of earlier work and his own collections reported 22 species of Amphibia from Arunachal Pradesh. We have been able to collect and record 26 new reports from the state and 6 (Six) first reports from the North Eastern region of India. Eleven districts of Arunachal Pradesh have been surveyed for exploration of Amphibian faunistic diversity. The upto date list prepared on the Amphibian fauna of Arunachal Pradesh records 52 species. Chanda (1994) has reported 54 species from the whole of North Eastern region, India.

Ethnozoological study on Amphibian population is a fertile field of research attempted for the first time in Arunachal Pradesh. Names of various frogs used in food and medicine have been recorded with photographic documentation. Analysis of ecological characteristics was done on selected breeding habitats which will be a pioneering work in India. Similar studies have been done in other countries in recent years.

Due to present day ban on capture and killing of Amphibian species food spectrum of five species of Amphibia were analysed which were either killed for other purposes or died a natural death.

Planktonic biodiversity of Amphibian habitats was done for the first time in Arunachal Pradesh. So far there was no record of Phyto and Zooplanktons of the water bodies of Arunachal Pradesh.

Study of reproductive behaviour was restricted to 10 species (5 species not yet ascertained) only due to inherent difficulty in this type of work and DAPTF (Declining Amphibian Population Task Force, of IUCN-SSC group) guidelines circulated all over the world to Amphibian researchers.

The study has opened up a new trend of research in the unexplored high biodiversity zones of Arunachal Pradesh, a part of Eastern Himalayan region, one of the global hotspots of biodiversity.