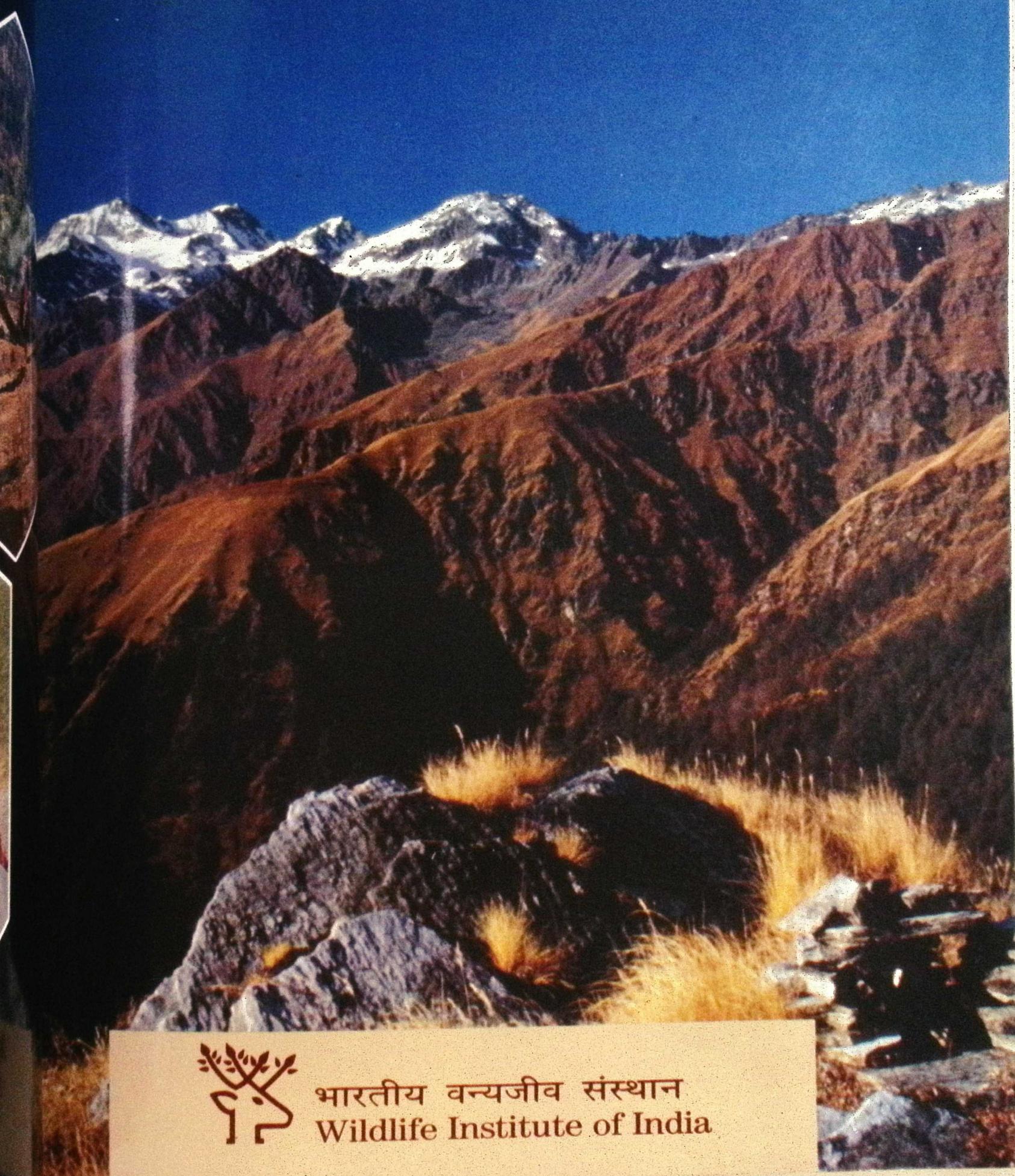


ANNUAL REPORT

1992 - 93



भारतीय वन्यजीव संस्थान
Wildlife Institute of India



ANNUAL REPORT
DIRECTOR'S NOTE

humanists who see a parallel between protected areas and the development projects insofar as deprivation of local communities is concerned.

At the root of this is a failure to see that both the local people and the natural values are at the receiving end. It is the combined impact of mounting demographic pressures, insidious market forces and insensitive development that is our basic malady. The statutory and programme support to conservation of forests and wildlife, and through them to the conservation of biodiversity, directly supports the physical and the natural integrity of our land. How can such an effort run counter to the concerns of people inhabiting and subsisting upon the forested or the non-forested natural areas? What is indeed required is a more transparent, more participatory management process that respects the basic tenets of sustainability which used to be inherent in our people's traditional lifestyles but which now unfortunately are falling apart in the face of external pressures of market economy and the internal dissensions arising from the vitiating man to land ratio.

Conservation for Development was the theme of the WII pavilion at the Teen Murti Bhawan Exhibition at New Delhi on the Children's Day-1992. Nothing could have more aptly defined the crying need of the day to balance our strategies for development and natural resources management. This pithy term while highlighting such a need also points to the inherent irony of philosophical and physical dimensions plaguing these strategies. We find that situation is hotting up for the protected areas. Some seem to be getting overrun by the mounting pressures of biomass dependent people struggling for subsistence, and some others are threatened by market forces and development projects. Adding to the dilemma is a bid by the seemingly well meaning

G.S. Rawat



Rumbak Valley,
Ladakh: On the
receiving end of
pressures from
market forces

Long-tailed Night Jar (*Caprimulgus macrurus*)

R.S. Chundawat

WII AV Library



Suhas Kumar

WII AV Library



CAMPUS BIODIVERSITY

FLORA

Species of Flowering plants: - over 315

Families	52
Ferns	12
Fruiting fungi	10

Dominant Families:

Grasses (Poaceae)	48
Legumes (Papilionacae)	32
Asters (Compositae)	23
Sedges (Cyperaceae)	15

Other notables:

Medicinal: *Dioscorea belophylla*,
Rauwolfia serpentina,
Centella asiatica,
Phyllanthus niruri,
Boerhaavia diffusa.
Ornamental: *Ipomoea* (9 spp.),

Lilies (3 spp.),
Malvaceae (3 spp.),
Barleria, *Exacum*.
Fodder/fruits: *Grewia* (2 spp.),
Bauhinia (2 spp.),
Ficus (7 spp.).

FAUNA

Species so far recorded:

Mammals	8
Amphibians - Reptiles	27
Range Extension	3
Rare	6
 Birds	 141
Resident Breeding	40
Res. non-breeding	40
Migrant breeding	9
Migrant non-breeding	51
Vagrant	1

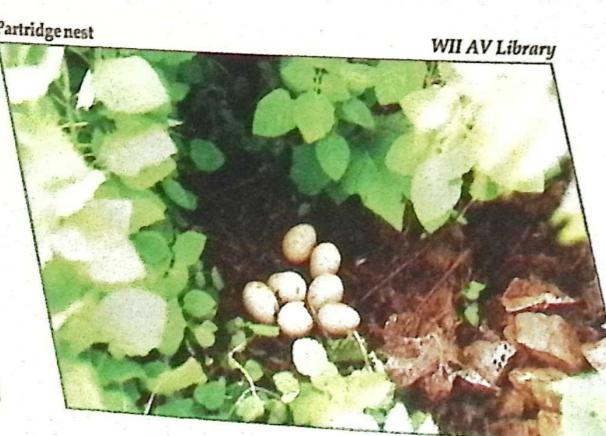
rich flora and
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that used to be
gullied slopes,
lings of sal and
ha (*Rauwolfia*
rur (*Dioscorea*
ing up more and
waliks of Doon
atives to where

H.S. Panwar



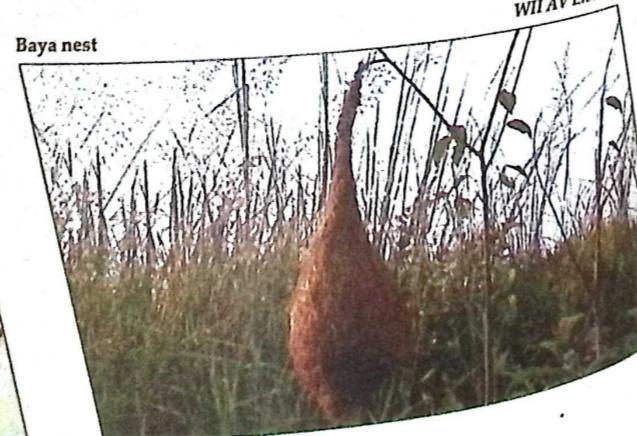
Partridge nest

WII AV Library



Baya nest

WII AV Library





There is as much need to bring in the equity question as there is the need to restore discipline in which the renewable resources shall have to be used. We must integrate land use, resource use and development over large landscapes with the interest of the local people as an overriding parameter. But then such interests cannot be perceived in the romance of 'symbiosis' of traditional lifestyles which was hardly ever there, or in their 'harmony' which lies convincingly shattered. One cannot be oblivious of the present day ground reality:

- that our life support systems are severely strained,
- that our precious gene pool resources in the natural systems are under threat,
- that the people depending upon natural systems suffer accelerating impoverishment, and
- that all these are afflicted by a common malady which is operating in an aggravating vicious cycle.

Salvation lies in enhancing productivity and in rationalising its utilisation through discipline that comes from responsible caring and sharing. Lifestyles shall have to adjust to this reality but the process need not wear out the traditional socio-cultural fabric nor strain the traditional bond with nature. We need to evolve and implement strategies and programmes that address land and resource use at large landscape levels with a balanced role for the different components, *viz.*:

- protected areas including sacrosanct samples of wilderness sans human use of any form,
- forests managed to meet the diverse needs of

the country placing local concerns at a high priority,

- reordered rural development that derives from a conscious participatory appraisal of the equations between the land and the people and which seeks to revitalise these equations, especially in the context of sustainability of the use of 'open access' areas, and
- development projects which harmonise with the physical and socio-cultural ambience of the landscape.

Is such a concept esoteric and unattainable? The answer to this question is that the difference of



the intellectual and the motives of the vested interests have hereto effectively stood in the way of honestly implementing the only cogent strategy which can solve the vexed problems confronting our natural areas and the 'nature' people.

If human greed clouds the judgement, it is only the human ingenuity and integrity which can clear the clouds. Our effort at WII is capacity building along this ethos.



THE YEAR AT A GLANCE

focussed at acquiring and disseminating a professional capability that can make conservation succeed even in the present difficult field conditions.

The year 1992-93, saw WII move ahead with a new sense of confidence that came from settling in its own well equipped premises. This was the first year that the Institute's entire activities and programmes took place at or were directed from the Chandrabani campus. Spread over 220 acres (including 20.38 acres added this year), the new campus has virtually received an attention that is accorded a protected area. As a result, in the last few years, the area's wilderness has shown strong trends of revival. The institutional block now wears a picture postcard look - with the open greens and the conical slate topped institutional buildings and residential houses, set amidst rolling downs and verdant sal trees, merging well with the Doon landscape amidst Siwaliks close by and the outer Himalayas in the backdrop - an ambience that harmonises with WII's objectives and pursuits.

In such a scenario, when environment is becoming a major influence, it becomes even more the onus of the people and institutions concerned with the various environmental fields to facilitate actions which seek to arrest the onslaught on environmental values including the natural areas and ecosystems they harbour. Wildlife Institute of India, like the many other institutions, must do its due share in such a responsibility.

The Wildlife Institute of India (WII) is now in the second decade of its existence. It is also seven years since it became an autonomous institution. Through these foundation years, in a field where there weren't paths already charted out, WII has strived at human development, for it is the aware and the skilled who can rise to the grim challenges that conservation faces today. Our effort has been

Researchers, students and trainees had moved into the hostels last year. This year most of the faculty and staff too occupied the residential accommodation. The library and documentation centre which was operating from the hostel block last year, moved to its permanent location in a separate two-storeyed air-conditioned building. Its first floor space was used as the venue for the Sixth Annual Research Seminar.

The computer section too has been appropriately fortified, and the new acquisitions, including LAN with 35 nodes and GIS, have become operational. The computer facilities and services now available here are able to meet the growing need of our researchers.



S. Wilson



**The WII campus:
merging well
with the Doon
landscape**

During 1992-93, developmental and organisational activities at the institute kept pace with its growing training, research and consultancy programmes.

The major programmes of WII - Diploma and Certificate courses in wildlife management - were conducted concurrently this year. The Diploma course (XIV) had three overseas trainees as well - two from the People's Republic of China sponsored by WWF-International, and one from Nepal who participated as a SAARC Wildlife Management Fellow under a regional cooperation scheme of the Ministry of Environment and Forests.

Like last year, two capsule courses in 'wildlife management' for Indian forest officers were conducted this year also. This course is conducted to give a modicum of ability to those trained in orienting various operation to favour biodiversity and wildlife conservation, and to understand the importance and concerns of our protected areas. The

longer (3-week) capsule course enables the trainees to acquire skills in providing at least the essentials of scientific management to our protected areas. This is because the number of officers being trained in the Diploma course is small while the number of protected areas in the country is much larger. It is in the interest of good PA management that more people are trained. These short courses are thus an interim effort to support conservation endeavours in protected areas.

The short-term course in 'zoo management' is being successfully organised since 1990-91. This year, it was organised in collaboration with Nehru Zoological Park, Hyderabad. This course has been receiving a very encouraging response.

In response to requests, courses on some topical issues and courses for specific target groups, such as in PRA techniques and ecodevelopment for field directors of various protected areas, or for senior army commanders were organised.



A capsule course was started last year for IAS and central services officers. But this could not be held this year due to lack of nominations by the Department of Personnel and Training under the Ministry of Personnel, Public Grievance and Pensions.

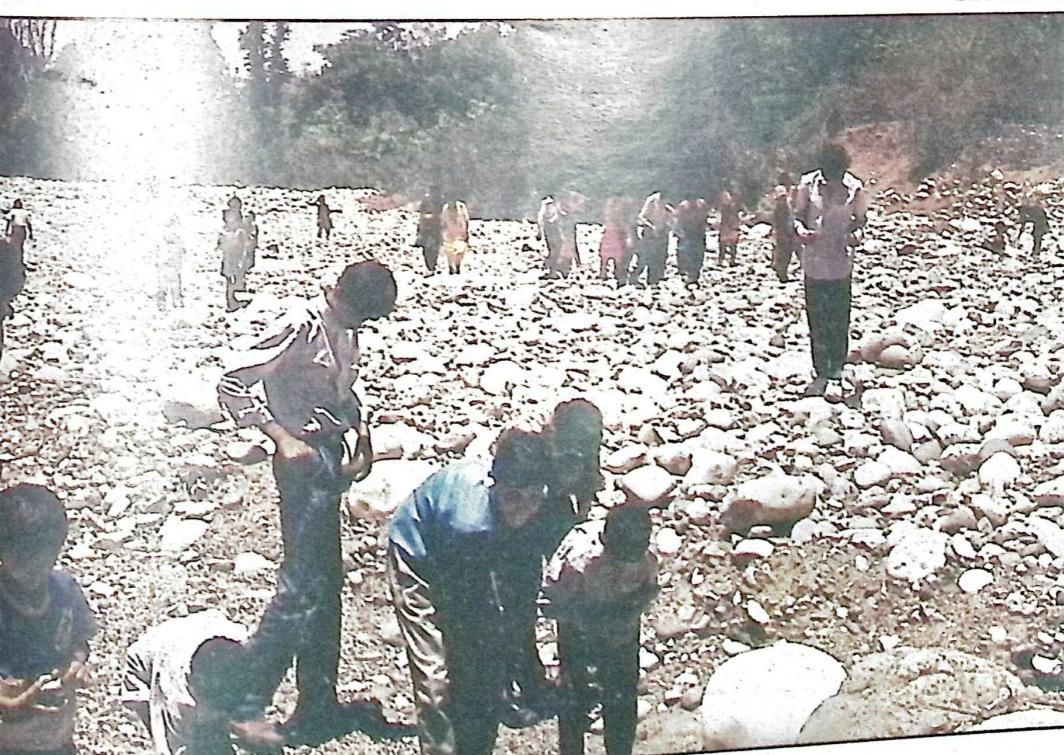
The 'protected area ecdevelopment planning' course was to start this year but could not, as the nomination of trainees and various clearances and sanctions could not come on time. However, preparations are now complete to launch the first ever course in this crucial subject area in April 1993. Also could not be held the workshop on 'interpretation and conservation education'.

The research at WII is multi-disciplinary and inter-disciplinary, covering priority wildlife related subjects and areas in the country. WII can now feel satisfied that several of its early research projects are getting completed. Their findings have been valuable, enabling the Institute to make practical recom-

mendations for improved results in the respective fields. The emergence of trained biologists and socio-economists from these research projects is heartening, and though the States, as yet, do not have enough opportunities for them, some of them are finding employment in universities, NGOs and other organisations. The *Sanctuary* magazine brought out a special issue (Vol. XII, No 5, 1992) on the research at WII, publishing articles contributed by the Institute's researchers and faculty.

Two new research projects launched this year were - Study of *terai* grasslands, and sero-epidemiological investigation of some infectious and parasitic diseases of wild ungulates. Also, the Research Advisory Committee approved five projects during the year, covering diverse subjects such as mammals, animal damage assessment, forensic techniques and landuse planning. The Project study on the sero-prevalence of infectious diseases and their epidemiological significance in canids, viverrids and mustelids had to be temporarily sus-

B.K. Mishra



*Getting the feel of
Nature's wonders:
children in a camp on
World Environment Day*



pended as the research assistant appointed left on being offered employment elsewhere. Attempts to recruit a suitable replacement are underway and hopefully work will be resumed early next year.

The World Environment Day (5 June) was observed with the usual solemnity. Environment messages were disseminated by distributing leaflets within newspapers. Message slides were also displayed in the cinema halls in Dehra Dun. For the Wildlife Week (1st week, October) numerous articles were sent to the English and the vernacular press all over the country, of which quite a few got published.

On both these occasions children from the neighbouring villages were taken on awareness field tours nearby and also involved in essay and debate competitions on nature conservation. Through these

children, an effort is being initiated to involve their parents in ecodevelopment oriented use of resources. Also, on 3 October 1992, a film on the various activities of the institute was telecast by Doordarshan on the national network. The film was widely appreciated as became evident from copious responses received from different parts of the country.

WII also participated in an exhibition on environment, organised at the Teen Murti lawns in New Delhi, by the Ministry of Environment and Forests on the occasion of Jawaharlal Nehru's birth anniversary - 14 November 1992. The theme of the Institute's pavilion was "Conservation for Development".

The following is a detailed account of WII programmes and activities during the year 1992-93.



S. Wilson

*School children
at the exhibition
held at Teen
Murti Lawns
New Delhi*



BACKGROUND

Being a developing country, India's major concern is to pursue the twin objectives of development and conservation in a way that will make them complementary rather than contradictory to each other. Population growth, neglect of rational landuse, and a host of similar problems have widened the gulf between the haves and have-nots. This, in turn, has had a damaging effect on the natural resources, in a vicious cycle of cause and effect.

This degradation is most stark in the wilderness areas and the interspersed habitations throughout such tracts. Protected areas cannot achieve their aim of biodiversity conservation if they are afflicted by a syndrome whereunder enforcement seeks to conserve habitats and biological communities giving it a picture of plenty while deprivation and hardships abound in their neighbourhood. Conservation can be achieved neither in isolation nor at the cost of the people living in and around the protected areas. In such a situation, it becomes imperative to find ways and means to preserve and maintain the richness of the natural resources but, at the same time, provide for the sustainable development of the people in the adjoining areas.

When signs of ecological degradation and declining natural resources generated serious concern in the early sixties, the attempts at meeting the situation had to be organised along an enforcement

approach. It did not take long to understand that the use of statutory and enforcement measures could only be adopted on a short-term basis, and unless conservation effort acquired a greater understanding of local people's problems and provided for them, the programmes could become counter-productive in the long run. Conservation programmes, while providing for scientifically required measures would have to be supported by sustainable socio-economic measures. The situation demanded a type of professional ability that combined ecology, biology and scientific management, and yet had a compassionate human face. This gave birth to an altogether new field oriented discipline through research and human resource development - the 'wildlife science', relevant to India and other developing countries.

It was with this basic thought that, in 1982, the Government of India set up the Wildlife Institute of India (WII) under its Ministry of Environment and Forests. The specific agenda was to develop the new discipline of wildlife science in the Indian context and, based on researched scientific and socio-economic data, teach this science and train management personnel to plan and execute the measures. The institute became autonomous in 1986.

Now, after just a decade of its existence, WII is already recognised as the premier institution in the developing world for the study and teaching of wildlife science. Our keenness to learn from and constantly readjust our programmes to focus on the harsh realities in the field, continues to be just as sharp as it was in the beginning. Our plans and programmes reflect this understanding of the national and global concerns for the sustainable conservation of biodiversity and preservation of the life-support systems.



OBJECTIVES

It is toward finding workable solutions to the various field problems that WII has set itself the following objectives :

- * Training managers and biologists for protected area management and wildlife research;
- * Training education and extension specialists for protected areas to get public support for wildlife conservation;
- * Providing orientation courses for those involved in landuse management;
- * Conducting and coordinating applied wildlife research and evolving relevant techniques suited to Indian conditions;
- * Creating a database for building up a wildlife information system employing modern analytical techniques and computer equipment; and
- * Providing advisory and consultancy services to central and state governments, universities, research institutions, and other official and non-official agencies.



INSTITUTIONAL STRUCTURE

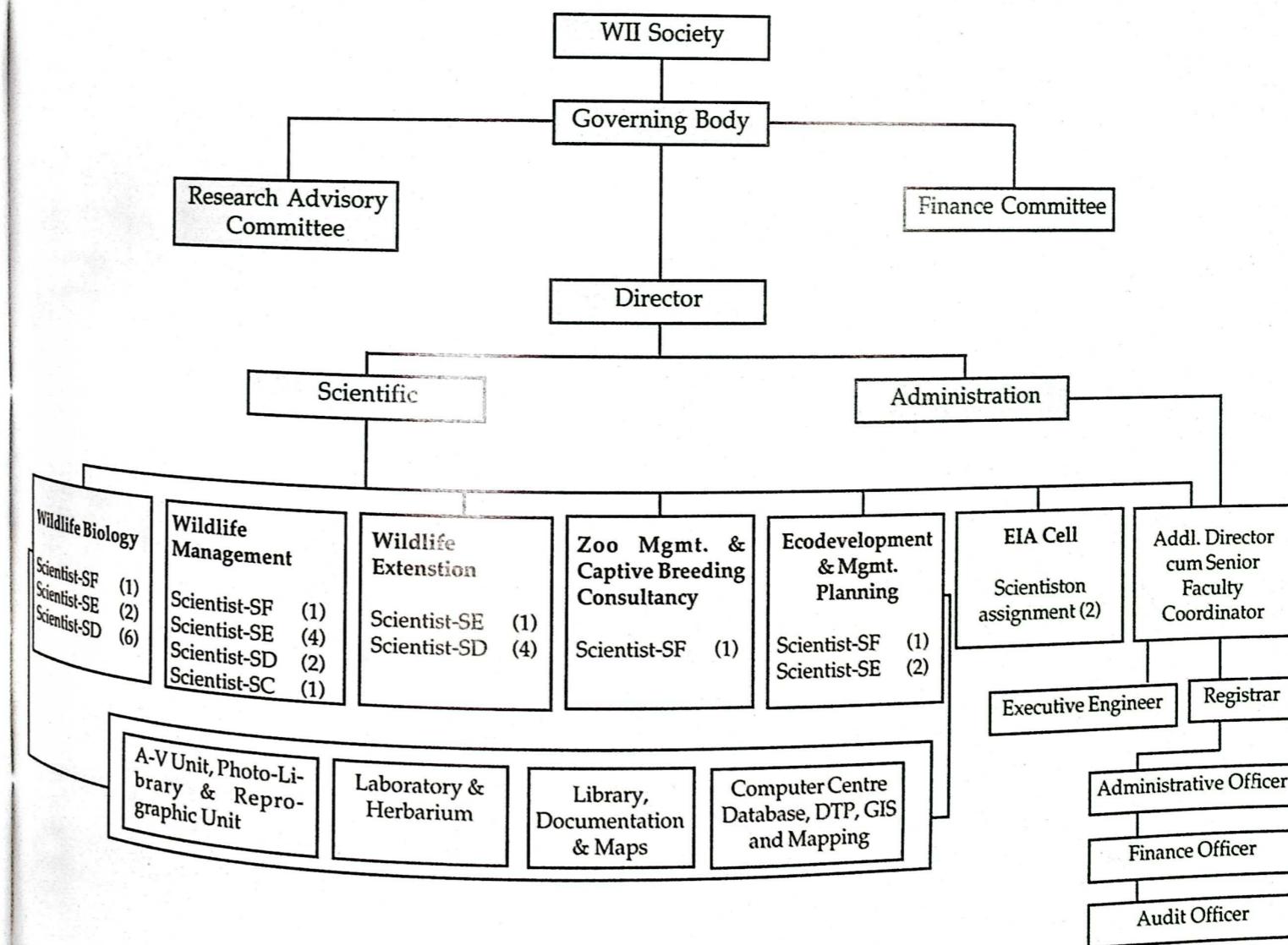


the Registrar to assist him. Scientific, technical, administrative and maintenance are the categories for the employees. To support its various scientific and academic functions, there are the library, laboratory and computer facilities available. (See charts 1 & 2.)

WII plans and programmes are divided under three broad categories :

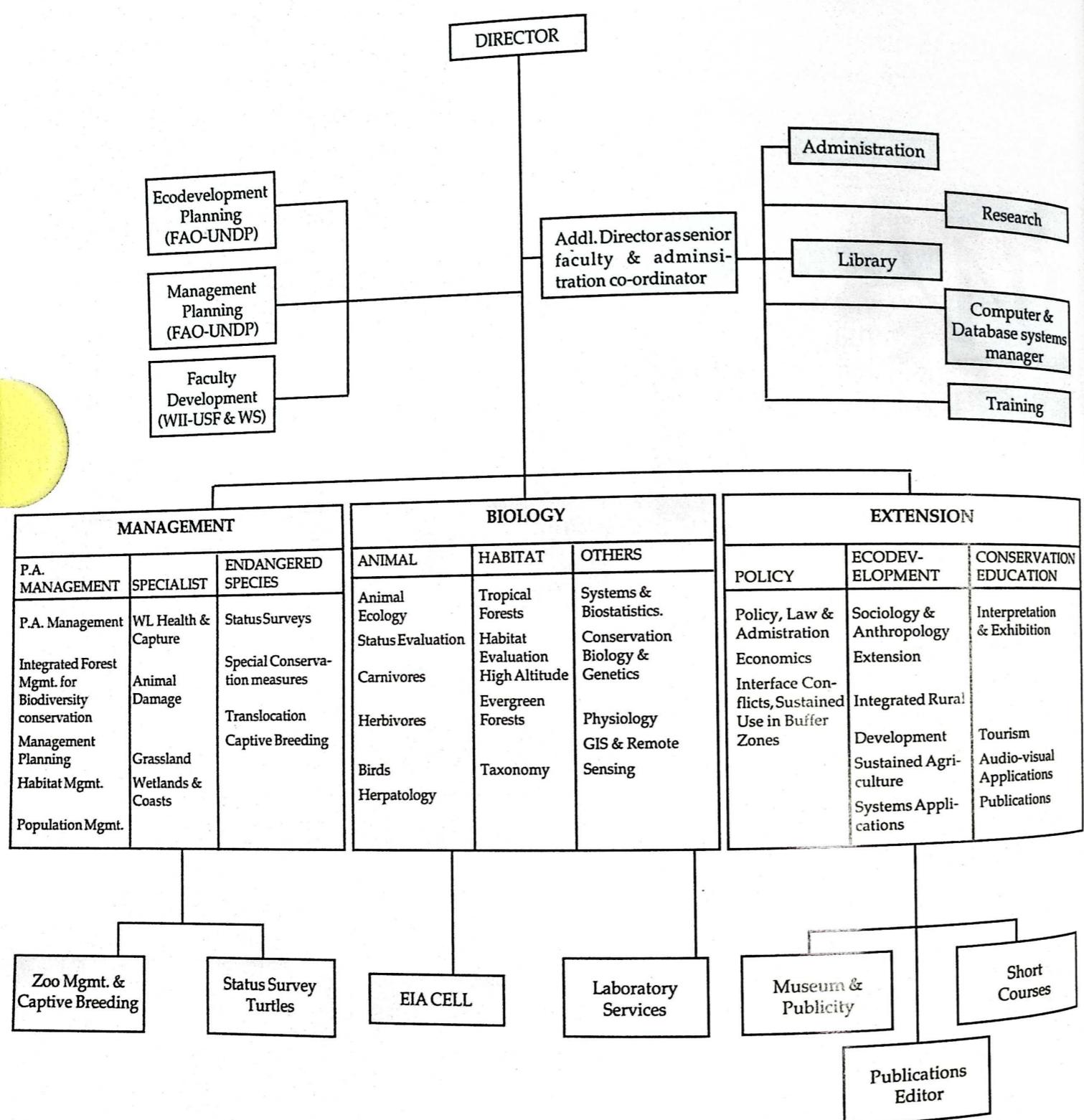
- * Academics
- * Organisation
- * Development

ORGANIZATIONAL STRUCTURE - ADMINISTRATIVE





ORGANIZATIONAL STRUCTURE - SCIENTIFIC



ACADEMICS

TRAINING PROGRAMMES

Post-Graduate Diploma in Wildlife Management : This is a nine-month course open to in-service officials of the protected area manager level. The participants are trained in techniques for management planning and implementation in accordance with the current conservation needs and situations. They are particularly prepared to handle the buffer zones of the protected areas (PA) where wildlife-people interface conflicts pose a major challenge to the managers. Wildlife and forest laws and other legal aspects of PA management form an important component of the training, as also tours to various wildlife areas including field exercises in preparing management plans for protected areas.

During the year under review, the XIIIth Diploma course, the details of which have been



Towards better scientific management of wildlife: a field class in progress

reported in the Sixth Annual Report (1991-92), concluded on 30 April 1992. All the 19 officers trainee from 10 states and two union territories besides one from Nepal completed the course successfully. While the trainee from Tamil Nadu attained the top position in the course, three others - from Gujarat, UP and Orissa - also received the various awards.

The XIVth Diploma course started on 1 September 1992. There are 17 officers trainee representing 12 states and one union territory. Among these is a woman forest officer (Rajasthan cadre). Besides, there are two trainees from the People's Republic of China who are sponsored by WWF-International and one from Nepal as the SAARC Wildlife Management Fellow under a regional cooperation scheme of the Ministry of Environment and Forestry, Government of India. At the time of reporting, the course is still in progress.

Besides theory classes, the course has completed four tours of various duration. The one-week Orientation tour was taken in the Rajaji national park, Uttar Pradesh. For the Techniques tour, the trainees went to the Sariska tiger reserve, Rajasthan, where various methods of vegetation analysis and habitat evaluation, estimation of the wild ungulates' population, assessment of biotic pressure on wildlife habitat, data computation, etc., were discussed and detailed.

The first Management tour, spread over four weeks, took the trainees through Bandipur, Periyar, Simlipal tiger reserves, Mudumalai, Parambikulam, Chilika and Bhitarkanika wildlife sanctuaries and the Banerghatta and Nandan Kanan zoological parks. Apart from looking into the management issues in these protected areas, the trainees learnt of their problems and mitigation strategies, interpretive roles and the potential for conservation education.

Unlike the first, the second Management tour was conducted in only one location - Pench tiger reserve, Madhya Pradesh. For two weeks, the trainees were assigned tasks that covered a whole gamut of issues within the tiger reserve. Their efforts were developed into term papers and each was later presented at a seminar.

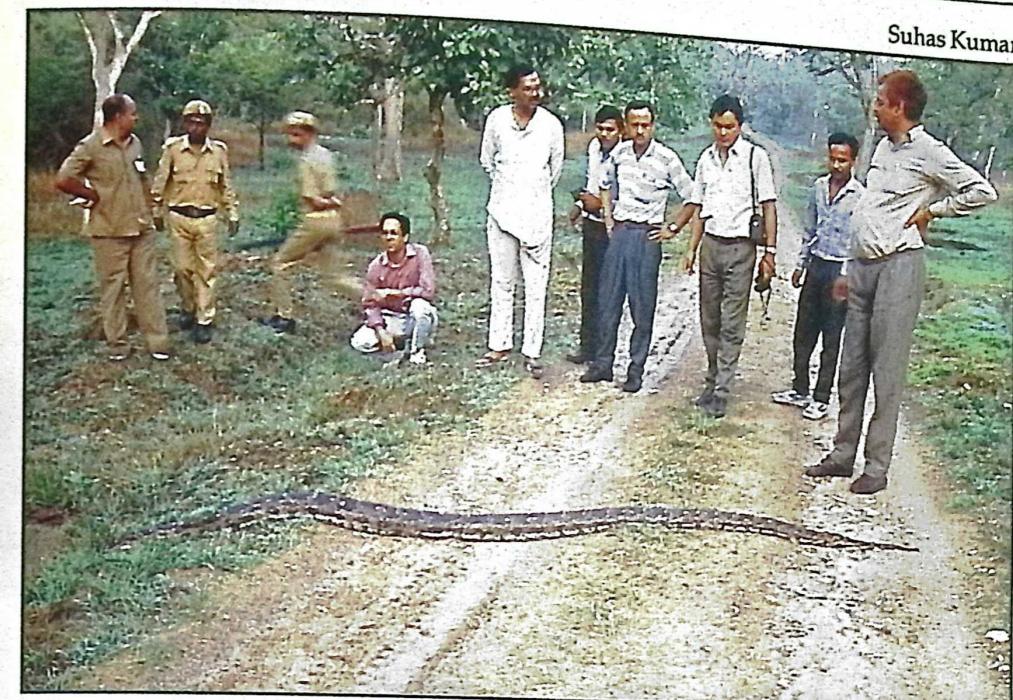
During the term, a special two-week course on computer application was also organised.

Certificate in Wildlife Management : This course is quite similar in curriculum to the Diploma course except that it is of a three-months duration. Open to in-service personnel at the field executive or range forest officer level, the course's emphasis is on the practical aspects of wildlife management so that the trainees, in their jobs later, are able to translate the studied ideas on to field situations.

The IXth Certificate course which commenced on 12 October 1992 had 17 trainees from eight states and one union territory. They attended eight weeks of classroom lectures including film and slide shows, popular lectures and open discussions; and five weeks of field tour that provided them with on-the-spot demonstrations regarding improved use of wildlife techniques and developing managerial capabilities. Animal capture, radio tracking, census techniques, habitat evaluation, electric fencing and impact assessment were the special aspects discussed and demonstrated.

As part of the Management tour, the course visited the zoo and the National Museum of Natural History at New Delhi, National Chambal sanctuary, Morena, Shivpuri national park, Karera bustard sanctuary, Bharatpur, Ranthambore and Sariska tiger reserve.

Besides this tour, the trainees, along with the



Close encounter in Bandipur: WII trainees stop in their track as a python slithers across

Diploma course trainees, attended a two-day workshop on "Strategic Planning for Wildlife Management"

The course concluded successfully on 12 January 1993. One trainee each from Maharashtra and Andaman & Nicobar qualified for the Honours Certificate.

Short term courses : These are organised to meet the special training needs of the different target groups. Another reason for such courses is that the long-term courses are as yet not able to turn out trained personnel at the desired rate, considering the large number of protected areas in the country.

* During 1992-93, the Compulsory course in Wildlife Management for Indian Forest Service officers was conducted twice. The first was held at Bandipur national park, Karnataka on 4-8 May 1992. This was a vertically integrated course for officers of the additional chief conservator to deputy chief conservator level. In all, there were 20 participants from seven states.

The aim of this course was to, i) orient the participants toward critical issues in PA management and discuss strategies to deal with these issues, and ii) enable them to appreciate the need for addressing socio-economic problems of communities adjoining the protected areas, and enhancing the productivity of buffer zones with multiple landuse as a strategy for effective wildlife and forest conservation.

The second course was of a longer duration (1-17 February 1993) and was held at a hotel in Rishikesh, adjoining Rajaji national park. Of the 32 officers (deputy conservator to chief conservator level) nominated for the course, only 17 attended. Additionally, however, three other officers from Karnataka and Andhra Pradesh, though originally not nominated, were sent by their respective states under intimation to the Ministry of Environment and Forests.

An entire gamut of issues from management problems, techniques and strategies to conservation



awareness and ecodevelopment including the role of NGOs in wildlife management were discussed. The course was conducted in an informal sort of an



Trainees engaged in a PRA exercise with villagers in Kanha National Park

atmosphere through field visits (to Rajaji and Corbett national parks) interspersed with class sessions, panel discussions, demonstrations and hands-on experience on the use of various techniques and equipment.

In both the courses, the participants were provided with extensive reading material for use during the course as well as carry-away for use later in the discharging of their functions.

□ Urged by a concern for the status of management of wild animals in captivity, the problems faced by zoos and with the idea of accelerating the availability of personnel trained in the modern zoo concepts, WII has been organising a Course in Zoo Management since 1990.

This year, the course was conducted in collaboration with and at Nehru Zoological Park, Hyderabad on 16-29 November 1992 and was attended by directors/superintendents, senior cura-

tors and veterinarians from various zoos managed by the forest department, trusts and public sector undertakings such as SAIL. In all, 40 nominations

Sanjeeva Pandey were received but due to constraints in the infrastructural facilities available, only 29 nominations were accepted. Ultimately, however, only 22 nominees from 14 states and union territories attended.

Planned in the context of the Indian conditions, the course's aim was to acquaint the participants with, (a) the redefined objectives, modern techniques and approaches, for improvement of the zoo management standard, and (b) the essential components of zoo management so that they can cost-effectively attain a minimum level of standard for the upkeep of wild animals in captivity.

The daily schedule of the course comprised several lectures, field demonstrations, and presentations by participants focussing on the activities at their respective wildlife facilities. Study tours were organised to (1) Vanasthalı Deer Park on the outskirts of Hyderabad which has an exemplary interpretation centre; and (2) Indira Gandhi Biological Park, Vishakhapatnam to look at the plans for the country's first marine park under construction. The overall response of the participants to the course was very encouraging.

□ The country's efforts at conserving her rich biodiversity through a representative network of PAs is facing severe problems of biomass dependence of the local communities. There is a commonality between the causes of the problems of PAs and the impoverishment of people and threats to life support systems. There is need for an integrated



approach to sustainable development for the people and the PAs, and that ecodevelopment measures be evolved through participatory planning process and implemented jointly by PA managers and the people. The Government of India too, in pursuance to the National Forest Policy 1988, has issued a circular seeking to provide impetus to people's involvement in forest management.

Against this background, at the plan-meeting for Project Tiger's 20th anniversary, it was decided that WII should organise an **Orientation Course in Ecodevelopment and PRA Techniques**. Accordingly, one was organised on 7-11 December 1992, which was attended by 20 officers from 12 states.

The specific objectives of the course were to discuss the various facets and possibilities of ecodevelopment with reference to the conservation of PAs and acquaint the participants with the techniques in Participatory Rural Appraisal (PRA). Through lecture demonstrations, it was highlighted how the various existing government sponsored schemes and funds for rural development could be

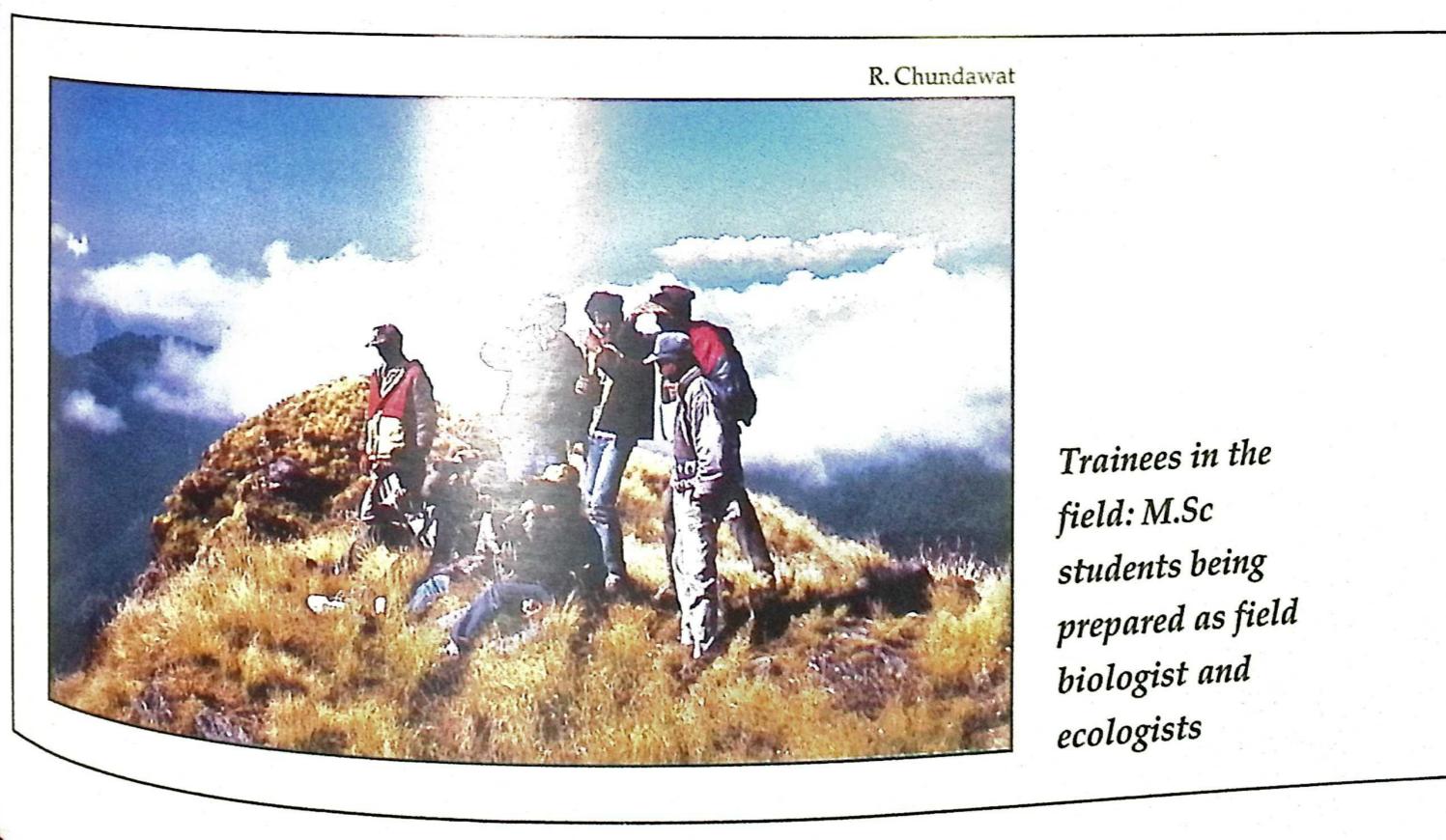
coordinated under the ecodevelopment plans. In fact, a PA manager's success in carrying out ecodevelopment would largely depend on the planning and implementation of relevant and site specific schemes of various departments as well as NGOs working in the vicinity of PA.

A visit was also organised to Rasulpur village on the fringe of Rajaji national park where the participants did a field exercise in PRA techniques.

EDUCATION PROGRAMME

With the aim of producing qualified field biologists and ecologists who could garner and contribute vital information to support conservation and take up career in wildlife research and teaching, WII conducts a two-year course M.Sc in Wildlife Science. Saurashtra University, Rajkot (Gujarat) conducts the examination for this and awards the degrees.

The present course, which started in July



R. Chundawat

Trainees in the field: M.Sc students being prepared as field biologist and ecologists



1991, is the third batch. There are seven students and all have been granted fellowship of Rs 1000 per month (four of these funded by the IUCN) besides free hostel accommodation.

The IIInd semester culminated with exams in wildlife biology and ecology; environment, conservation and statistics; and conservation, management and behaviour, during the first week of June 1992, followed by a 10-day high altitude Techniques tour to Kedarnath wildlife sanctuary, Garhwal, UP.

In the IIIrd semester, the course units taught were human ecology, elective topics in habitat ecology, wildlife biology & management, and other optional course. During this semester, the students also undertook a thorough literature search on topics of their interest and wrote detailed review articles under faculty supervision. A short course on computer applications was also conducted. The semester ended with a Conservation Practice tour to Parambikulam, Annamalai and Periyar tiger reserve in south India, followed by term examinations.

At the time of reporting, the IVth semester is in progress, and the students are in the field researching on their individual projects. These are :-

- Habitat use by goral, Magthal Harsang wildlife sanctuary, Himachal Pradesh;
- Habitat use, group structure and activity pattern of goral, Simbalbara sanctuary, Himachal Pradesh;
- Habitat use by chital in Dholkhand, Rajaji national park, Uttar Pradesh;
- Home range and habitat use of Indian giant squirrel, Bori wildlife sanctuary, Madhya

Pradesh;

□ Study of the avian communities in riparian areas of Bori wildlife sanctuary, Madhya Pradesh;

□ Habitat selection by Indian peafowl, Gir, Gujarat;

□ Diurnal and seasonal activity pattern of water monitor lizard, Bhitarkanika wildlife sanctuary, Orissa.

WORKSHOPS, MEETINGS, SEMINARS

In a yet another attempt to further reach out to target/subject specific groups, WII organises workshops and seminars.

□ Under WII-USFWS collaborative project a workshop on **Strategic Planning for Wildlife Management** was organised on 21-22 November 1992. This was held at WII and was attended by faculty members, research scholars and trainee officers of the Diploma and Certificate courses. The workshop methodology was to allow the participants to explore their own insights and ideas on wildlife management, identify problems and obstacles in their own planning in achieving their objectives and then work out strategies for overcoming the obstacles. The participants were also given tips on writing mission statements, undertaking stakeholders analysis and environmental scanning.

□ Scientist-SD and veterinarian in the Management faculty conducted a one week workshop on **Capture Techniques and Immobilisation of Wild Ungulates** in the Pin Valley national park, Himachal Pradesh in January 1993. This workshop was essentially conducted for the two research scholars work-

ing on Himalayan ibex there but was also attended by two faculty members of the institute and the Director of the national park.

□ As a component of WII-USFWS collaborative programme to develop and standardize field research techniques in wildlife science, a workshop on **Field Research Methods** was convened at WII on 26 February-1 March, 1993. Participants included park managers, wildlife wardens, researchers and representatives from universities and research organisations. Topics covered were status survey and conducting census, behavioural research methods, quantification of habitat variables, human-wildlife relationships, environment impact assessment and other aspects of wildlife research.

□ As part of the ongoing WII-USFWS Turtle and Tortoise Conservation project, a workshop was conducted on **Freshwater Turtle and Land Tortoise Conservation, Research and Management in India** at Gwalior, Deori and National Chambal sanctuary, Madhya Pradesh on 10-13 March 1993. In all, 18 university researchers, eight field officers, three government officers (from other than forest department),

five NGO representatives, five WII faculty members and researchers and two US advisors participated in the workshop.

The topics covered in lectures and discussions were the status, survey and research techniques, impact of trade and utilization, ex-situ conservation and the Conservation Action Plan. Field training was imparted in species identification, survey and census techniques, breeding biology, nest predation, critical habitat assessment and captive breeding techniques. The participants made groups and developed and presented action plan for states and for various biogeographic regions.

□ Under the joint sponsorship of World Heritage Fund of UNESCO and US National Parks Service, WII is conducting a unique **Mobile Training Seminar** for protected area managers from south and central Asian countries. The participants were from Afghanistan, Bangladesh, Bhutan, India, Iran, Myanmar, Mongolia, Maldives, Nepal, Pakistan and Sri Lanka. The seminar started in Dehra Dun (WII new campus) on 16 March 1993 and travelling through several protected areas in India and Nepal will end

B.C. Choudhury



Participants at the Mobile Training Seminar of WII, sponsored by UNESCO and US National Park Service : in Gulf of Mannar Marine National Park



on 14 April 1993. The participants are being exposed to an entire gamut of conservation situations with an objective of sharpening their managerial capabilities.

□ The growing concern for the environment has touched the Indian army as well. A recent mandate from the Chief of the Army Staff has sought the army to help in conservation. The army could also be a very good ally in undertaking status surveys and eco-restoration work, particularly in re-

to provide the participants a primer on the techniques of collecting, collating, analysing and disseminating scientific information.

The following is an account of workshops, seminars, etc., attended and overseas study tours undertaken by the faculty members and research scholars, during the year 1992-93.

□ The Head of the Biology faculty attended a meeting of the Asian Elephant Specialist Group of



S. Wilson

New Partners in conservation: Senior army officers at the workshop on environment and nature conservation

mote areas. As a first step toward this, WII and the Army Adventure Cell of the Indian army jointly organised a one-week workshop on Environment and Nature Conservation for senior army officers at the institute campus on 31 March - 5 April, 1993. In all, 35 officers of the rank of Lt Colonels and above attended this workshop, and these officers would be the facilitators for creating and spreading conservation awareness among the army cadres, their children and the local people. The objective of the workshop was to provide an overview of the environmental issues and insight into its problems, and

the IUCN at Borgor, Indonesia on 20-22 May 1992. The meeting was held to discuss elephant conservation issues in the region and chalk out the future plans. India's Project Elephant was appreciated. It was also realised that very little is known of elephants in the Indo-China region for which a survey needs to be done and the elephant population established. The WII faculty member presented a paper.

□ Six faculty member and one research associate, who were on study tours to the USA, attended the International Symposium on Biodiversity in



Managed Landscapes in Sacramento, California, USA on 13-17 July 1992. The symposium was co-sponsored by the USDA Forest Services, USFWS, IUCN and a host of other organisations. The Head of the Management faculty and a Scientist-SD (Management) presented a paper under joint authorship.

□ The Seventh International Snow Leopard Symposium was held in Xining, Qinghai Province, China on 26-30 July 1992. Co-sponsored by the International Snow Leopard Trust (ISLT), the Northwest Plateau Institute of Biology in Xining and the Qinghai Bureau of Agriculture and Forestry, the theme of the symposium was "Parks, People and Snow Leopards". It was attended by over 60 wildlife researchers, zoo managers and regional policy makers who shared thoughts and plans on the practical approaches to protecting biodiversity in high altitude reserves with snow leopard populations, while simultaneously recognising the needs of the local economies and cultures.

The symposium recommended formulation of trans-boundary parks, creation of specific new nature reserves, assistance for the development of management plans and a system for exchange of critical ecological data across the snow leopard's range. WII was represented at the symposium by one Scientist-SD from the Biology faculty and a research scholar, and two papers were presented.

□ A Scientist-SD from the Management faculty along with a research fellow participated in a seminar Conservation of River Dolphins of the Indian Sub-continent organised by The Whale and Dolphin Conservation Society (GB & USA), one of world's biggest funders of non-intrusive research

of cetaceans. The seminar was held in New Delhi on 18-19 August 1992 and the WII representatives presented two papers. At the seminar, the IUCN/SSC Cetacean Specialist Group selected WII to represent India in the Regional Committee on Asian River Dolphins; the other representatives being from China, Bhutan, Nepal, Pakistan and Bangladesh.

□ The Librarian attended the International Congress of Librarians (IFLA-1992) at New Delhi from 30 August - 5 September 1992. Held to coincide with the birth centenary of Dr Shiyali Ramamrita Ranganathan, the father of the library movement in India, the congress was attended by about 1500 delegates from 81 countries. The theme of the congress was "Library and Information Policy Perspectives".

□ World Pheasant Association (WPA)-International, in collaboration with WPA-Pakistan and the Punjab Wildlife Department organised the Fifth In-

WII AV Library



Monal Pheasant, found in the Western Himalayas

ternational Pheasant Symposium in Lahore and Islamabad in Pakistan on 28 September-4 October 1992. The theme of the symposium was - Conservation of pheasants in Asia, particularly of the western Himalayas. The discussions revolved around



the status and prospects of endangered species, selection and management of protected areas, aviculture techniques, conservation education and translocation and re-introduction.

Over 50 delegates from several Asian and European countries and the USA attended the symposium. WII was represented by one

Scientist-SD from the Ecodevelopment project and a research scholar, and four papers by various authors were presented.

□ Participatory Rural Appraisal (PRA) techniques, even though still evolving, are a systematic, relatively quick and semi-structured way of learning from the local people about the key problems and options in a particular area. Using these methods, an outsider can learn about rural conditions with optimal precision and in a cost-effective manner.

MYRADA, an NGO, organised a **Participatory Rural Appraisal Workshop** in Mysore on 16-20 November 1992. The participants were mostly from Sri Lanka, Indonesia, Kenya, Zimbabwe, South Africa, UK and USA. The only Indian participants were from WII - a Scientist-SF and Scientist-SD from the Ecodevelopment project and a Scientist-SD from the Extension faculty.

□ Scientist-SD in the Extension faculty attended a workshop **Towards a South and South-east Asia Network for Environmental Education**. This was jointly organised by the IUCN and the Centre for Environment Education, Ahmedabad, at Ahmedabad on 10-12 February 1993. The faculty member presented a paper.

□ The Director, six other faculty members and one research scholar participated the **International Symposium on Tiger** sponsored by the Ministry of

Environment & Forests, Govt. of India, at New Delhi on 22-24 February 1993. Among the overseas participants were representatives from Bangladesh, Bhutan, China, Indonesia, Nepal and Thailand. The Delhi Declaration addressing the complex ground reality and proposed strategy direction, and the resolution for drafting a Global Action Plan for the conservation of the tiger, were the two important outcomes of the symposium. WII presented seven papers at the symposium.

□ The Indian members of the IUCN/SSC Crocodile Specialist Group conducted a **Workshop on Crocodile Conservation and Management** in India at Madras on 1-3 March 1993. From WII, one Scientist-SD from the Management faculty, who is also a member of the above mentioned specialist group, attended the workshop. The workshop reviewed the current status of conservation management of crocodilian in India and recommended several immediate measures to be adopted.

□ Scientist-SF, who is incharge of the Zoo project, attended several meetings of the Central Authority for Zoos constituted by the Ministry of Environment and Forests. He also contributed toward formulating the policy on the captive breeding programmes for zoos.

STUDY TOURS

□ Under the WII-USFWS collaborative project of specialized faculty development, seven faculty members visited the USA for studies in the various, respective field interests.

The Head of the Biology faculty visited Switzerland, USA and Canada from 11 June - 14 August 1992 to learn about research and field techniques in the studies on large mammals, zoos and natural history museums.



The Head of the Management faculty along with one Scientist-SD were in the USA from 30 June - 31 July 1992 to study integrated management for the conservation of biological diversity. The tour acquainted them with a variety of management applications based on sound scientific information, catering to the needs of wildlife, timber, ranching and recreation - both tourism and sports hunting.

Three other faculty members - two from the Management and one from the Biology faculty had gone for studies in field research methods. The Scientist-SD (Management) was there from 4 June - 4 August 1992 for developing a better understanding and appreciation of some endangered species recovery programmes in captivity and wild, looking specifically at the methodologies and techniques for research, data collection and animal capture.

The other Scientist-SD (Management) was in the USA from 13 June - 13 August 1992 for studies on fire ecology and management, wildlife and habitat relationships, integrated forest management and the use of DNA techniques in conservation biology.

The Scientist-SD (Biology) was on tour from 15 August - 10 September 1992 to study high altitude ecology and the various research techniques and management approaches undertaken.

The Head of the Ecodevelopment project, who is also the coordinator of the collaborative project, undertook the study tour from 21 June - 21 August 1992 primarily to study the management aspects of wildlife in a managed forest.

□ A Research Associate in the Management faculty was awarded fellowship under the USAID programme for training in animal genetic resources conservation from 6 July - 11 August 1992. Conducted at the University of California, the course includ-

ed in-situ conservation techniques and visits to a number of wilderness areas. At the completion of the course, a certificate was awarded.

RESEARCH

Wildlife science which is essentially field-based, multi-disciplinary and an applied science must necessarily have research as its major component. The thrust of the research studies at WII is on applied research covering ecological, management and sociological aspects. These generate vital scientific data that supports field conservation and helps the faculty keep abreast of the technological advances and contemporary field situations. No wonder, WII has already become the premier centre contributing to the development of wildlife science and its study in the region.

A Research Advisory Committee (RAC) comprising eminent conservationists, academicians and representatives of scientific organisations, guides WII's research activities and ensures that these conform to the national priorities. The RAC coordinates the screening and evaluating procedures for the research projects.

During the year 1992-93, the RAC met once, coinciding with the Annual Research Seminar and approved five new projects - behavioural ecology of the desert caracal, assessment of animal damage problems, developing forensic techniques, resource study in a buffer zone and ecological significance of crocodile burrows.

The Annual Research Seminar, providing an opportunity for an effective appraisal of the ongoing studies, was held this year on 16-18 September 1992. This was the sixth such seminar being conducted and the first to be held at the Chandrabani campus. Besides the RAC, it was attended by the Advisor to



the Ministry of Environment and Forests, four members of the Governing Body, chief wildlife wardens from Gujarat, Tamil Nadu, Andaman & Nicobar, and Dadar & Nagar Haveli, and their representatives from Uttar Pradesh and Orissa. Others who attended included representatives from research and training institutions in Dehra Dun from the forestry,

types, individual animal species and the network of protected areas in the country. This year saw the Phase II of the project begin.

During the year, the database software has been extensively modified, elaborate checks made and output inconsistencies removed. The program

Building an effective appraisal system: A presentation in progress at the Annual Research Seminar



remote sensing, geology and biological survey disciplines and from NGOs including WWF-India and Zoo Outreach Organisation. In all, 22 presentations were made at the seminar, spread over seven different technical sessions, representing four completed projects and 14 ongoing ones. Five best presentations were awarded with merit certificate and books worth Rs 500 each.

The following are the summaries of the research projects for the year 1992-93.

The National Wildlife Database

The objective of this computer based project is to provide an up-to-date assessment of the conservation status of biogeographical regions, vegetation

has also been modified for all local area network (LAN) users and put on a File Server along with complete necessary data required for handling the database software. It has also been made more user-friendly with menus being provided for all selection of data files. 'Help' and pop-up menus have been added for entering difficult scientific names for species, biounits, habitat types and protected areas. The data file structures of the species related location files could earlier take up only 254 protected areas, but has now been completely changed so as to incorporate as many protected areas as possible. The Bibliographic search was always time consuming, but has now been speeded up and the Biblio file has been split up into alphabetical files based on author's names. Besides, an entirely new menu-driven proce-



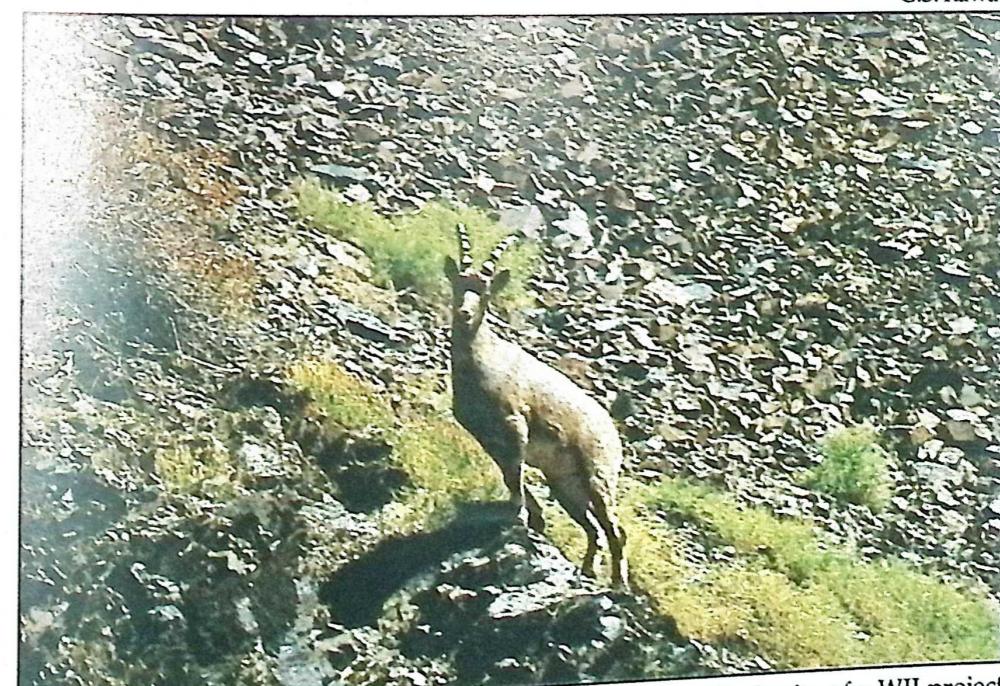
Ecology and genetics of Himalayan ibex in India (Himachal Pradesh)

The project is located in Pin Valley national park (Lahaul & Spiti, Himachal Pradesh) which lies in the cold desert region of the trans-Himalaya with an altitude ranging from 3600-6000 mts asl. The objectives are to determine the status of the ibex here; study its ecology, behaviour and genetics, and develop a habitat index model for it in order to facilitate management strategies and activities in the national park. There are two scholars carrying out the research. While one is studying the ranging pattern and habitat utilization of the Himalayan ibex, the other is looking at its feeding ecology.

During the year under review, information on habitat parameters, e.g. vegetation cover, community composition, phenology, feeding ecology and domestic livestock, general distribution and diurnal habitat use pattern of ibex was collected. It was also intended to radio-collar some individuals and collect blood samples for genetics studies, but the attempts so far have not been successful.

Information has also been gathered on the human use pattern, and people-wildlife interaction.

G.S. Rawat



Ibex at Pin Valley National Park: site of a WII project



Also, three sightings have been made of snow leopard in the study area, one of which was observed for as long as seven hours.

Abundance of and habitat use by the Himalayan ungulates in Kedarnath wildlife sanctuary, Uttar Pradesh

The project seeks to research the abundance and habitat use of mountain ungulates such as Himalayan musk deer, Himalayan tahr, serow and goral; specifically, their current status and how they are coping with the impact of human activities in their habitat.

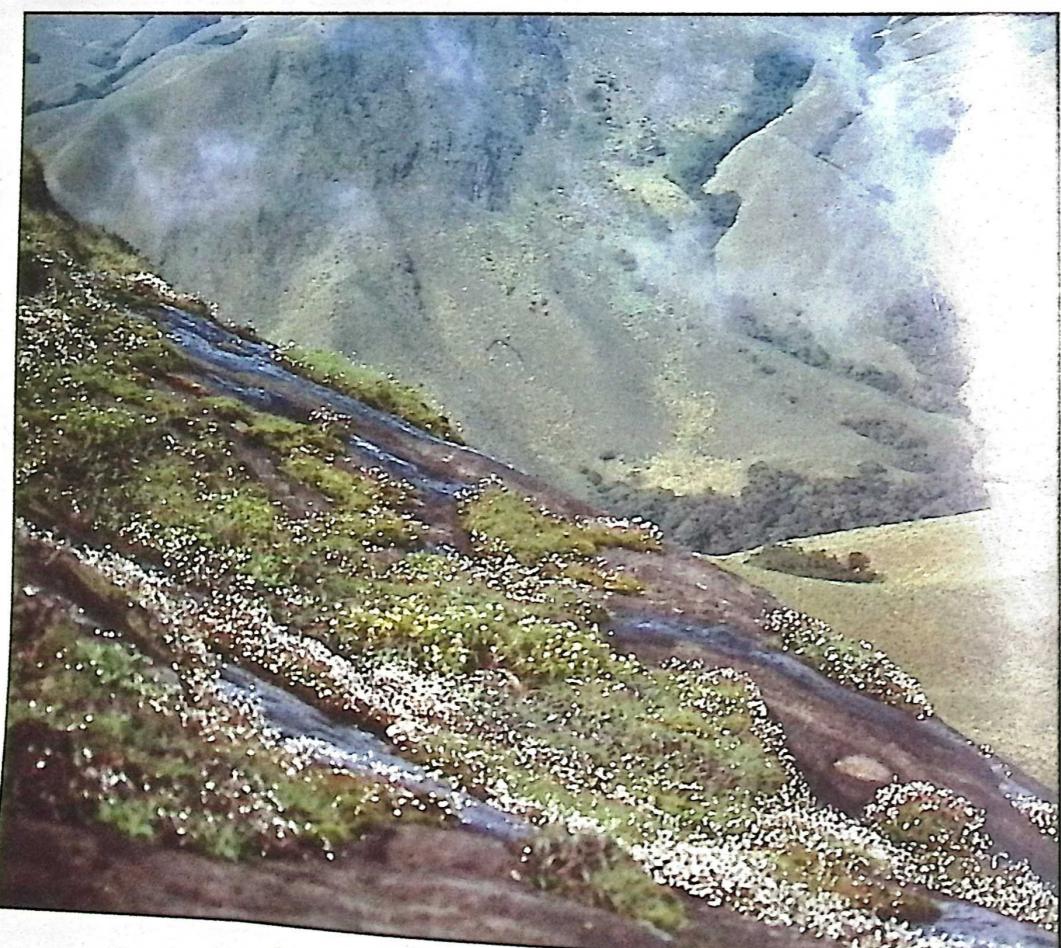
The study reveals that their population, especially that of the musk deer is decreasing. While poaching is an important factor for this, it is habitat destruction which is now becoming the major threat



to their survival due largely to rapid rise in human population and summer over-grazing.

Comparative rapid assessment survey were also conducted in Govind Pashu Vihar in UP (where Kanawar wildlife sanctuary and the great Himalayan national park in Himachal Pradesh. In all these, the musk deer density is extremely low.

The study has generated valuable baseline data for conducting training in high altitude ecology. Techniques have been standardised for population estimation and monitoring of the endangered musk deer in its difficult terrain; and suggestions for protection strategies required for its long term conservation have also been made. Identified potential sites in the Himalayas which cover a wide array of wildlife



G.S. Rawat

An inventory of the floristics is under way at the Eravikulam National Park (Western Ghats)

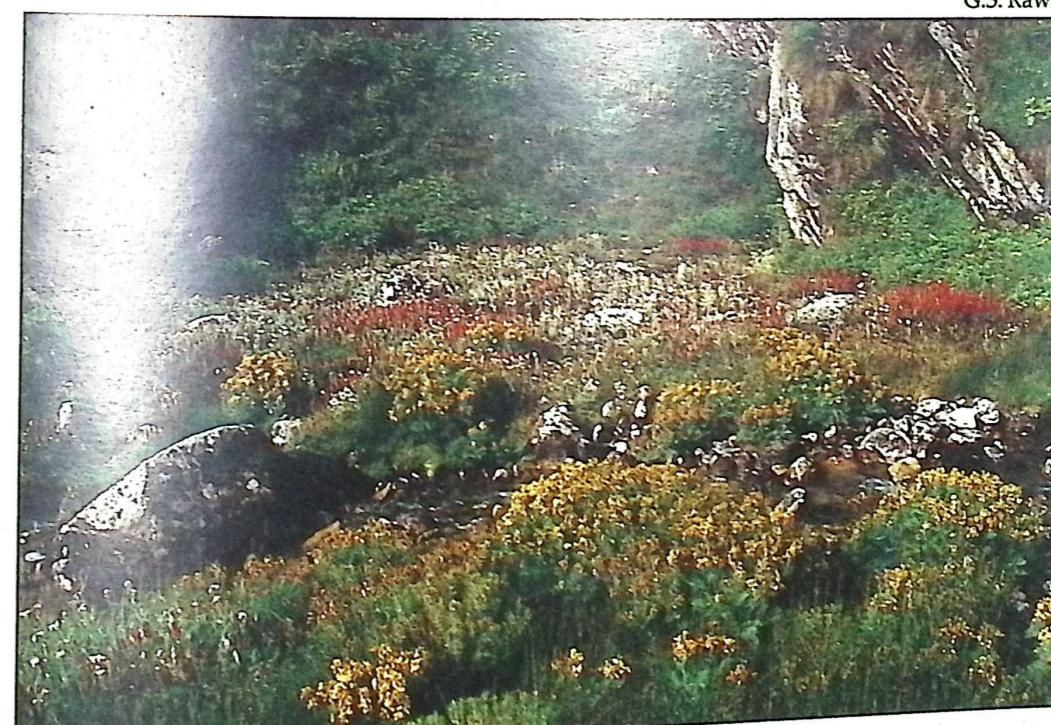
habitats (including musk deer habitat) have been proposed for being declared as protected areas. If implemented, these additional 28 locations will increase musk deer security from the existing 4.7 % to 10-15 % of their original habitat. It is also suggested that in areas which have already been over exploited, grazing should be stopped while in less degraded areas the livestock should be numerically controlled depending on the area's carrying capacity; and where alternative pastures are available, rotational grazing would be the answer.

The final report is nearing completion.

Study of montane grasslands in the Valley of Flowers (Himalayas) and Eravikulam National Park (Western Ghats)

The project which was scheduled to begin in October 1991 got underway only after the appointment of research scholars for Eravikulam in April 1992 and the Valley of Flowers in March 1993.

An inventory of the floristics is being done at



G.S. Rawat

WII is studying the montane grasslands in the picturesque Valley of Flowers

Eravikulam which would lead to community studies and intensive ecological studies on grasses. Sites have also been identified for intensive monitoring and laying enclosures for experiments.

The Himalayan component of the project was delayed for reasons of logistics. A research scholar has been appointed even as the field work in the Valley of Flowers would be possible only between June and mid-October.

Study of inter-relationships between the village ecosystem and elephant corridor habitat, in the forest linking Rajaji and Corbett national parks, with a view to devising compatible management strategies, UP

Field work relating to quantification of dependency of the villages on the forest, assessment of biotic pressures on the forest corridor and intensive study of the resource utilization pattern in four selected villages has been completed. During the period under review, data analysis has been completed. High pressure areas around the forest corri-



dor have been identified. Site specific ecologically sustainable alternatives to forest resources are being now developed. The report writing is also in progress.

Movement and habitat utilization by elephants in north-western Uttar Pradesh

During the study, a cow and bull elephant were radio-collared and followed intensively for two years for information on home range, habitat use, activity patterns and group size and composition. It has been observed that for both the cow and the bull, more than fifty per cent of the home range lies outside the boundaries of the park. It was accordingly recommended that the boundary of the national park be modified so that the home range of these animals be fully protected. According to the study, though group size has not varied significantly on an annual basis, the group composition has varied between seasons which is largely the result of birth and growth of calves. Such information is essential to understand the factors influencing the social organisation of elephants in Rajaji national park.

The data is being analysed and report writing is in progress.

Ecology of the Indian wild ass in the Little Rann of Kutch, Gujarat

This study is aimed at collecting information on the biology of the Indian wild ass as also on the socio-economy of the people in and around the sanctuary.

In the Little Rann of Kutch, the wild ass has been found to be in much larger groups than its other Asiatic sub-species reported. Good rainfall and drought years do have an effect on the group size and harem maintenance, further emphasizing the resource distribution. The grass forage quality estimated during the pinch period (March-June) was far less than the recommended level for maintenance.

The area required for foraging is inadequate for the wild asses in the 100 sq km intensively studied area.

It is suggested that salt pans which are located within 2 km of the sanctuary boundary need to be shifted further interior, away from the wild ass preferred area, in a phased manner. In fact, disturbance needs to be minimised in the area upto 6 km outside the Rann boundary. However, the area outside the sanctuary must simultaneously be developed through improvement of the pasture lands and plantations of fuelwood species native to the region.

The field work has been completed and data analyses on the biology aspect are in the final stages of completion. The report on the socio-economy part of the study has been submitted.

Ecology of aquatic mammals in National Chambal sanctuary

The overall objective of the project on the smooth Indian otter is to integrate the findings with those of an earlier project on the ecology of crocodilians and turtles, and develop a compatible management strategy to benefit all aquatic species in the Chambal river.

One of the three sub-species of otters found in India, the smooth Indian otter of the Chambal sanctuary is a gregarious creature which prefers to live in groups of an adult female and her juvenile offsprings, with the father joining the group only occasionally. For the first time, radio transmitters were fitted on four otters which are largely nocturnal or crepuscular in their habits.

Symbol as they are of the health of the waterways they inhabit, they are the first sufferers of a degraded aquatic environment. Since they do not live in 'jungles' their habitat, like scrublands and wetlands, is always under assault. In the Chambal



itself, otter habitats are fragmented and disturbed by limestone quarrying, and illegal fishing and trapping.

The field study is complete. The findings have helped WII in advising sanctuary officials on the management of aquatic fauna. The final report is being prepared.

A study of the ungulate-lion habitat in Gir forest, Gujarat

This study undertakes the evaluation of prey-predator equations, their habitat use, the impact of Maldhari relocation on the habitat, and suggests a plausible course for habitat management.

Information on habitat has been gathered at the tree, shrub and ground levels. Map to the scale 1:50,000 have been prepared of every drainage, road and 'ness' network, ungulate distribution and vegetation cover for GIS use. A vegetation community map based on 1984 aerial photo interpretation and ground surveys has also been prepared. A fluvial map based on a recent satellite imagery will now be prepared.

An interpretation of aerial photographs indicates 14 vegetation types. All the common species exhibit good regeneration though most of this is emerging as coppice after the death of the older individuals. Maldharis affect vegetation - teak is used for construction, the thorny species as protective cover against lion and leopard, and other trees for fodder. Besides, during drought years, large grazing herds from Saurashtra migrate into Gir forest, thereby accentuating the pressure.

The field study is continuing.

Ecological factors pertinent to the improved management of the Asiatic lion in India, Gir, Gujarat
The Gir forest in Gujarat is the only home of

the Asiatic lion in the wild. Even here, its population had reached an all time low of 12-20 animals in 1913. However, according to the Gujarat forest department's figures, their current population is estimated at 284.

The study has found that for these lions, inbreeding and other numerous problems are cropping up increasingly. For their effective management, it is therefore suggested that a second home be set up for them. This is an urgent necessity and should be done on the basis of an indepth understanding of the animal's ecology, careful site selection and a long-term monitoring programme.

The final report is being completed.

Ecological studies to evaluate crop damage by nilgai and blackbuck in Haryana and to formulate mitigation strategies

The study was conducted in Nahar and Kairu areas of Rohtak and Bhiwani districts respectively in Haryana. Study on the relative abundance, social organisation, habitat use, activity pattern, food and feeding habits and reproductive aspects of nilgai population were completed. Qualitative and quantitative assessment of damage to 'rabi' (wheat, mustard, gram) and 'kharif' (bajra, jowar) crops using fenced and unfenced plots in crop fields was also done.

The field work for this project has been completed. The data is being analysed and will be followed by the writing of the final report.

Study of the impact of the Narmada Sagar Project (NSP) on flora and fauna with attendant human aspects, Madhya Pradesh

An all-encompassing study, this project has the following thrust areas — evaluation of vegetation and wildlife habitats (both terrestrial and aquat-



ic); determination of the status of large mammals in terms of abundance, distribution and habitat utilization; evaluation of ornithological species for impact identification on terrestrial and aquatic ecosystems; and assessment of the socio-economic conditions of the people in the project area.

Twentyseven species of wild animals were recorded in the project area, although the overall habitat suitability is low due to high biotic interference like cattle grazing, wood removal and seasonal fires. Development activities in the project area have further deteriorated the habitat quality. The nearby forest areas were also surveyed to assess their habitat potential and suitability for being declared protected areas.

In the project area, five species of turtles were collected, and 35 species of indigenous fish and 32 species of wetland birds were recorded. While fish species adapted to sedentary waters will benefit with the creation of a reservoir, the migratory species would be severely affected. Submergence of rocky stretches along the two banks will adversely affect the otter population. Downstream, the effects of impounding may also result in decline of aquatic mammals because of the changed hydrological and landuse regimes.

Vegetative biomass has been quantified in different study zones - submergence, impact and outside forest areas. Although the diversity index shows little variation for the three areas, the restricted occurrence of some plant species in the submergence area suggests presence of some micro-habitats, distinct from the rest of the project area. The overall high tree density in the submergence areas would result in the loss of MFP and timber yielding species in proportion which cannot be compensated in the other two zones. Also, the inhabitants of the project area have varied ethnobotanical uses for

nearly 175 plant species - as food, fodder, timber and fuel, besides use as herbal medicines.

To compare and predict the impact of NSP on the aquatic fauna and socio-economic conditions, was studied. Resource potential of the compensatory afforestation scheme to meet the demands of rehabilitated people was quantified.

Efforts are now on to use the GIS to analyse the data collected on the different parameters that address the project objectives so as to predict the likely impact on wildlife values in the affected areas. The analysis is also expected to identify potential wildlife habitat outside the impact zone of NSP that would help in planning effective mitigatory measures.

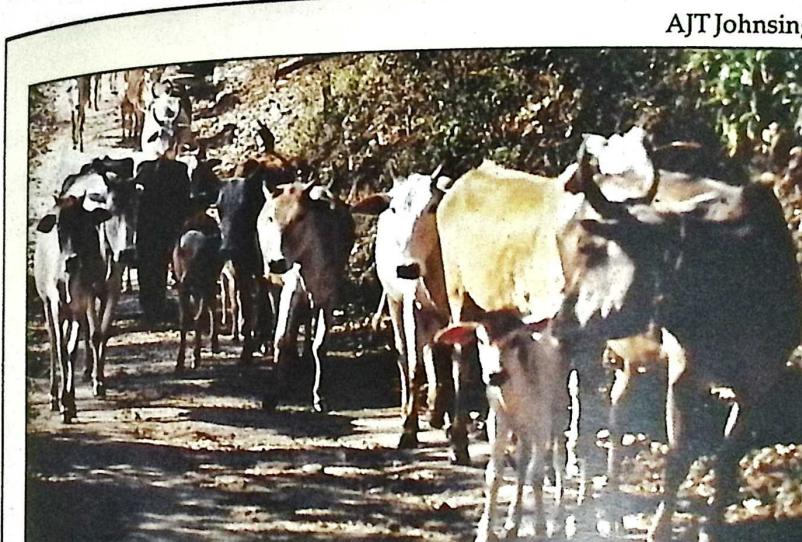
Study of the ecosystem of Masinagudi village in the Mudumalai wildlife sanctuary with a view to evolving a model ecodevelopment plan to ensure compatibility between the village community and the sanctuary, Tamil Nadu

The elephant corridor between Mudumalai wildlife sanctuary and Sigur reserve forest is composed of Moyar-Avarhalla sanctuary forest and Singara-Kalhatti reserve forest. During the year, data was gathered on vegetation composition and productivity, and the human pressure on this crucial corridor. Vegetation here is dominated by fuelwood species followed by elephant food trees. It was estimated that the villagers removed 1800 m ton of fuelwood, 800 m ton of grass and gathered 450 m ton of cattle dung annually from these forests. The effect of cutting was most severe on elephant food trees. The elephants use the disturbed area within 3 km radius of Masinagudi village more than the adjoining areas because of availability of forage species, water, natural salt licks and gentle terrain.



About 75 per cent families in Masinagudi are landless; 33 per cent families own about 8000 cattleheads in all, of which 90 per cent are unproductive and raised only for manure. The villagers sell about 2100 m ton of cattle dung annually to the adjoining tea and coffee estates.

The field study is continuing.



A Major source of sustenance for villagers: Cattle dung export from Masinagudi



Monitoring of rhinoceros introduced in Dudwa national park, Uttar Pradesh

The great Indian one-horned rhinoceros was reintroduced here in two batches - from Assam and Nepal. Monitoring of these reintroduced rhinos was carried out after establishing the methodology for observation and record of activity pattern and habitat use. The field staff of the forest department was trained in these methods and procedures, and given the technical know-how for the maintenance of power fence.

Findings reveal that while the Dudwa habitat is suitable and the rhinos are able to breed and raise

calves, the present reintroduction area is small and that more animals need to be brought in. Further reintroductions should maintain a 1:4 ratio between males and females. The males should preferably be sub-adult so as to avoid fights with other males in the early phase and help settle the spatial pattern of use within the group. The issue of having a sizable population is more urgent than that of preventing

Unproductive cattle at Masinagudi help villagers survive at the cost of biodiversity

B.K. Mishra

inbreeding because decimation in the face of random natural events have the potential of acting at a far greater pace and magnitude on a smaller population than the time taken by inbreeding depression to express its deleterious manifestations on it. A good population is the most persuasive justification and should, in fact, prevent inbreeding. It is recommended, however, that before the reintroduction, a complete scheme of expansion of the translocation area and management implications need to be planned out.

The report of the project is being finalised.

The management and ecology of the swamp deer in Dudwa national park, Uttar Pradesh

The Dudwa national park in the terai of UP has the largest population of the endangered northern swamp deer in India. However, from an estimated 2500 individuals here in 1980, its population had declined to less than 1500 by 1988. This project was launched in 1989 to study the ecology and management of the species, determine the reasons for the decline, and accordingly recommend appropriate managerial actions for its recovery.

The project established and standardised the techniques for population estimation of the swamp deer, and the forest department staff was trained in this. The general conclusion arrived at was that the habitats were utilized significantly, but disproportionately to their availability. Fire, flood and the availability of rutting and fawning sites influenced the habitat use pattern. The choice of rutting habitat depended on its composition. Shallow segments of wetlands with a mosaic of tall grasslands were preferred. Fawning usually occurred in *Saccharum munja* dominated high ground within the park or in sugar-cane fields in high ground outside the park.

Data analysis suggested that the density and group size had a positive correlation with the food quality. The deer's choice of early and mid-successional stages maintained by fire and fluvial action indicated that planned management was necessary to maintain these habitat segments. The fawning and rutting habitat of the swamp deer in the remaining grassland patches outside the park were vulnerable to threats of encroachment and poaching. This was reported to the authorities and suggestions for detailed protection strategies were made.

The final report is under preparation.

Ecology and population genetics of the swamp deer in Kaziranga national park, Assam

The Asiatic wild buffalo was once widely distributed over the tracts of tall grasslands and riverine forests in the country. Today, it is found only in a few scattered protected areas and is facing the problems of interbreeding with domestic buffaloes, inbreeding among individuals of small and scattered populations, and of habitat destruction.

Last year blood samples were collected from domestic, hybrid and wild buffaloes through chemical immobilization. These samples were used for preparation of DNA fingerprints this year. This was done in collaboration with the Centre for Cellular and Molecular Biology, Hyderabad. It was for the first time in the country that such a technique using blood samples of large mammals collected through immobilization was being applied and standardized.

Suggestions to the Madhya Pradesh state wildlife authorities were made regarding urgent action required for the conservation of wild buffaloes in that state and their translocation from Udanti wildlife sanctuary to eastern Kanha.

During the latter half of the year, project activities were temporarily suspended to allow the research scholar to attend his Ph.D. semester course work at the University of Wisconsin, USA. Report based on field and laboratory work done so far is already written.

The ecology and biology of Phayre's leaf monkey in Tripura

Phayre's leaf monkey is so called because of the tender leaves forming the major part of its diet. In India, it is widely distributed in the primary forests in Tripura and Assam. Over the last decade, however, these primary forests have been getting converted into secondary forests, largely as a result of shifting cultivation.

ing cultivation. The objective of this study was to assess the impact of shifting cultivation on the long-term survival of this species.

This study was carried out in the Gumti wildlife sanctuary. The assessment was made through - (a) survey of the sanctuary to estimate species densities; (b) intensive ecological study of a group in a secondary forest; and (c) study of the regeneration in areas left fallow after *jhuming*.

The study is complete. The major recommendations are that there should be no further conversion of existing primary forests in the sanctuary; corridors should be planned between existing patches of primary forests; and there should be a re-examination of the practice of shifting cultivation so that some areas are untouched by *jhuming* or that secondary forests 15 or more years old are available. Besides, soil conservation measures be adopted in *jhumped* areas to prevent soil erosion and domination by weeds, and a study be undertaken to assess the feasibility of breeding Phayre's leaf monkey in captivity.

A pilot study for the conservation of the Malabar civet

Malabar civet is the most endangered viverrid in India. There have been no definite sightings by the scientific community in the last 60 years and, in fact, it was considered 'extinct' until 1987 when two dead specimens were recovered from north Kerala. A preliminary survey was conducted and though it too did not result in any spotting, it was learnt that most of the remaining populations were confined to the heavily populated areas where habitat conversion and hunting threats were alarming.

This project was a follow-up of the preliminary survey, and the objectives were to identify habitat requirements and survey the Western Ghats to locate other populations. The ecological study was carried out in Nilambur, Kerala for three months following which four districts in Kerala and two in Karnataka were surveyed. Most of the animals were reportedly in private lands in the lower slopes of the Western Ghats, feeding mainly in the paddy fields in the valleys, and resting during daytime in the cashew thickets on hill slopes. Survey revealed that it is declining rapidly due to hunting, and habitat loss and degradation.

It is recommended that a captive breeding programme be initiated. At the same time, hunting be prevented and greater protection accorded to lowland swamp and riparian forests.

Developing area specific management guidelines for conservation of biodiversity in Satpura Conservation Area, taking into account the forestry objectives and local people's needs, Madhya Pradesh

The study, launched last year, addresses floral and faunal diversity in relation to abiotic environ-

V.B.Sawarkar



Satpura Range



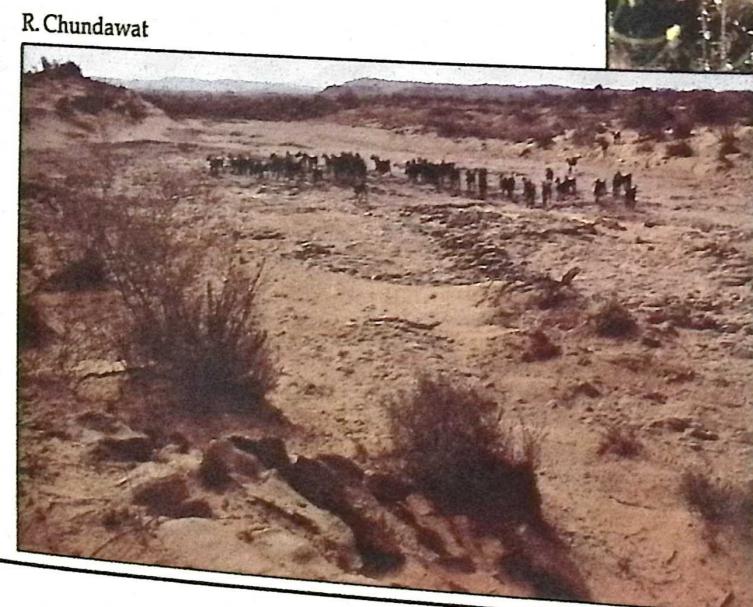
mental factors, forestry practices and human pressures for developing suitable management strategies for maintaining biodiversity, seeking cooperation and coordination between the forest department and the people living around the forests.

During the year, two research fellows were appointed and after their orientation, the field station was set up in the Bori wildlife sanctuary. In the initial phase, investigations of the vegetation and vertebrate fauna across the sanctuary have been taken up. This data is being reviewed to test the hypotheses made on relationships between forest structure, composition, levels of perturbations and selected vertebrates. The data would be periodically analysed for emerging patterns and testing the sensitivity of the methodology. Species with restricted distribution or those that are endangered, rare or believed to be of special significance will accordingly receive due attention.

Survey of the status of the Indian wolf

The Indian wolf is distributed widely, though

Terai Habitat (Gorumura WLS): Fragmented and rapidly shrinking



Wolf Habitat: A WII project looks at a little known area

in patches, in the peninsular India. However, very little information is available on its population, the ranging and dispersal pattern, extent of habitat and its conservation related problems. In this project, surveys are being conducted in Maharashtra, Rajasthan, Gujarat, Madhya Pradesh and Karnataka. The objectives are to determine the status and distribution of the wolf, its natural prey, general assessment of threats and determination of sites for future conservation programme.

After an initial survey of several sites in Maharashtra, Gujarat and Rajasthan, the Nanaj grasslands in Sholapur district (Maharashtra) was considered a good location as an intensive study area. Secondary information on the status, distribution and habitat is being collected.

NEW PROJECTS

Study of terai grasslands

The terai is among the most fragile wildlife habitats in India, restricted in its distribution along a



narrow belt in the flood plains following the Himalayan foothills. Extremely rich and diverse in plant and animal species, it is now highly fragmented and undergoing rapid shrinkage.

Earlier, the UP terai was surveyed independently as an extension of the swamp deer project in Dudwa, using the deer's presence/absence as an indicator of quality. Based on this, the kind and extent of problems were assessed. Among the most critical issues were the rapid shrinkage of area and fragmentation, overgrazing by livestock, uncontrolled fires and inadequate protection. It will be unreasonable to expect that the terai values can be protected over the widely scattered small patches of tall wet grasslands. This would be possible only within a protected area system.

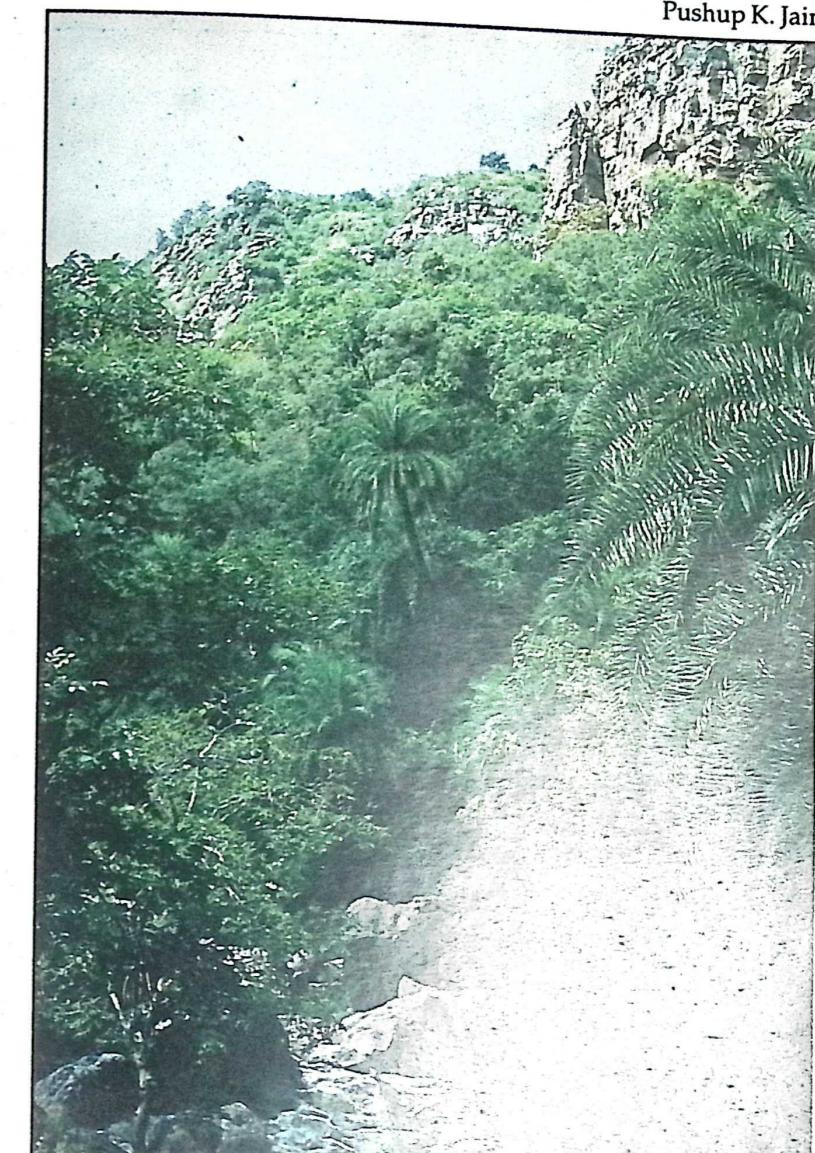
Two other terai areas were considered important - the West Bengal duars and Bihar terai. In West Bengal, two sites - Jaldapara and Gorumura wildlife sanctuaries - were surveyed, this time using rhino distribution and use an index of habitat quality, further assessing the community types and structure with the objective of enhancing ecological knowledge of the sites and ascertaining habitat potential for the rhino. Work was also taken up in Valmikinagar tiger reserve in Bihar. Though the research fellow doing the study left following a job offer elsewhere, another research fellow will shortly be appointed to complete the project there.

The data collected in UP terai was analysed and the report for that portion is being prepared.

Sero-epidemiological investigation of some infectious and parasitic diseases of wild ungulates in Sariska national park, and their relationship with livestock, Rajasthan

The study will enable identification of health problems of wild ungulates and suggestions for

Pushup K. Jain



Sariska National Park

preventive measures. After scanning relevant literature and looking at the various possibilities, it was decided to conduct the study in Sariska national park, Rajasthan.

A research scholar with MSc (Bacteriology) has been appointed and is expected to join soon. Permission for field study has also been obtained from CCF (WL), Rajasthan. The Hissar Veterinary College, Haryana, and Indian Veterinary Research Institute, Izatnagar have agreed to provide laboratory support for the project. Besides, a small laboratory for parasitological work and routine bacteriology is also planned to be set up at WII.

COLLABORATIVE RESEARCH PROJECTS

The following two projects are being carried out under a joint WII-USFWS programme :

Turtles and tortoise conservation project

The objectives of this project are to determine the current status of freshwater turtles and tortoises; identify viable turtle populations and habitats to establish protected areas for protection and conservation; set up captive breeding units for endangered turtles and tortoises for reintroduction; and provide scientific information and training to field officers and conservationists.

Survey has been completed throughout most of the country except some sectors of Punjab, Haryana and Uttar Pradesh. Twentyseven species and other sub-species have been recorded. Maximum chelonian diversity has been recorded in north-eastern India and the Gangetic plains, with the north-east alone accounting for 18 species.

A field workshop was conducted at the National Chambal sanctuary, Morena during March 1993. (See section on Workshops, Meetings, Seminars.)

Indian giant squirrel project

This is an arboreal squirrel living on mature, diverse forest with continuous canopy connections and can be found in all types of forests. As such, it



Indian Star Tortoise

can be singly used as an indicator of intact or nearly intact mature forest within a major portion of the country. The objective of this project is to collect information on the Indian giant squirrel regarding its habitat size, population structure and density, key resources utilised by it, relationships and behaviour, breeding success and spatio-temporal dynamics of habitat patches and dispersal of offspring, etc.

So far, Gujarat and Goa have been surveyed completely, and the survey in Maharashtra, Madhya Pradesh and Tamil Nadu is continuing. The survey in Gujarat reveals that a sub-species may have existed here 20-30 years ago, particularly in the Mahal area of north Dang, but is now extinct due to extensive habitat degradation and hunting by the local

B.C. Choudhury

CONSULTANCY SERVICES

Being a premier institution involved in wildlife research and training, WII is often consulted by various government and other organisations on matters of wildlife conservation of current relevance.

□ A major consultancy project for the Central government is in progress. This is **Management in captivity, including captive breeding and rehabilitation of threatened and endangered species**, and

the standards/norms evolved for zoos was field-tested for assessing several zoos, and then finalized after receiving comments and suggestions.

During the year, Nehru Zoological Park, Hyderabad; Indira Gandhi Biological Park, Vishakhapatnam; Jawaharlal Nehru Biological Park, Bokaro and the Jamshedpur Zoological Park were visited.

□ In the last week of December 1992, the Head

J.H. Desai



Participants at the Zoo management training programme. A blow pipe is used to tranquilise zoo animal

the design and management of zoos. During the year under review, information on additional three zoos (i.e. now 63 zoos in all) has been entered in the database. Of these, inventory/stock position of 44 zoos has been computerised, while information on the stock position of the rest of the zoos is being gathered.

As part of the project, a two-week training programme on zoo management was organised (see section on Workshops, Meetings, Seminars). A format for assessment of zoos developed on the basis of

of the Biology faculty visited Kalakadu-Mundanthurai tiger reserve to advise its field director on the **Damage caused by floods to the lowland riverine forests** which are the prime habitat of the Nilgiri langur. The faculty member also initiated a short study to quantify the impact of floods on the riverine vegetation and arboreal mammals.

□ The Steel Authority of India Ltd (SAIL) requested WII to suggest measures for **Controlling aquatic snails** which have been posing problems in the water cooling systems of Bokaro Steel Plant. The

SAIL authorities had earlier experimented with controlling the snails by using chemicals.

Two faculty members of the institute examined the source of the aquatic snails and their life support system in the aquatic weeds in the cooling ponds. Based on the biology of the snails and the weeds, the prospects of biological control of snails through introducing indigenous fish (carp) and freshwater turtles in the cooling ponds are being examined. A pilot study is also being considered in this regard.

The Wildlife Department, Gujarat State Forest had convened a meeting at Gandhinagar in February 1992 to discuss measures for mitigating Problems of nilgai and blackbuck in Gujarat. A research scholar was deputed to attend this meeting. Another meeting was held in Mehsana in August 1992 and was attended by a Scientist-SD (Management) looking after animal damage problems. It was recommended that if culling was not legally permissible, it



To control the snails problem at Bokaro Steel Plant WII faculty suggest biological control of snails

would be best to capture and translocate the animals to suitable areas and also use fertility depression methods.

□ Presence of nilgai in the forest patches around the air force station and civil airport, Chandigarh was posing serious threat to the safety of taking off and landing of aircrafts. These animals would remain under cover during the day but would come out into crop fields and marginal areas along runway in the evening and night.

The Chandigarh Administration approached WII for technical advice on solving this Menace by nilgai. The Scientist-SD (Management) specialising in animal damage problems and control, looked into the problem and suggested several openings, about 20 mts each, in the peripheral barbed wire fence which could be left so for 20 days or more and would act as passages to escape out of the air-base. Animals could then be lured and habituated to use these passages by placing baits inside and outside these



The HBJ gas pipeline: WII is evaluating the impact on forest and Wildlife

openings for a few days. Water-points near runways could be closed and new ones created near the baiting sites. Once the animals start feeding on the bait outside, the inner baits could be stopped and the animals could then be driven out through the openings. At the same time, to divert the animals from the fenced runway, it was suggested to construct fence gates at entry points of loop roads. The vegetation along the fence was also suggested to be cut periodically.

A report to this effect was sent to the Chandigarh Administration in 1992.

* In March 1993, WII was assigned the consultancy by Ms. Engineers India Ltd for an Environment impact assessment of the HBJ gas pipeline upgradation project. This would include assessing

the status of forests, and evaluating and quantifying the impact on wildlife (particularly endangered species such as great Indian bustard, gharial and otter) and wildlife habitats, with special reference to any existing and proposed protected areas and existing or potential wildlife corridors in the areas between Bijapur and Dadri which are likely to be affected by this pipeline's upgradation. The various construction and post-construction operations which are going to have such impact would also be identified, and control techniques for the mitigation of adverse impact suggested.

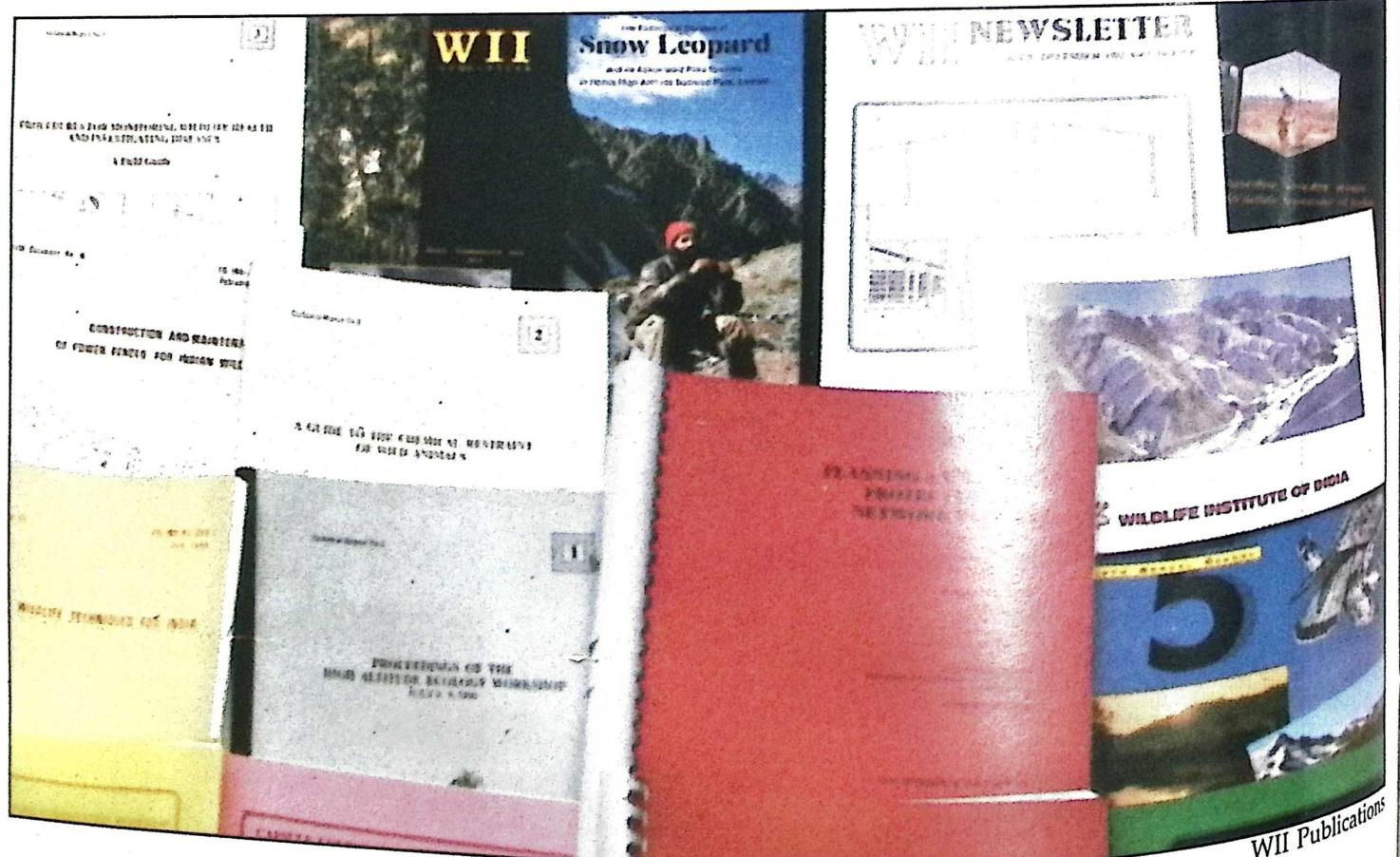
The study has been launched and one Scientist-SD in the Biology faculty along with three researchers have initiated the field work. The report will be submitted within three months.

PUBLICATIONS

The institute has developed a limited in-house designing and publishing capability. From time to time, publications addressing topical conservation and management issues as well as ecological/biological topics are brought out.

The quarterly WII Newsletter is becoming ever popular and important. Its circulation list covers chief wildlife wardens, managers of national parks, sanctuaries and zoos, and WII alumni besides a good many NGOs and individuals in the country and abroad.

In 1992-93, a special issue of the WII Newsletter was published to commemorate the institute's completion of its first decade. During the year, two books were published - "Aviculture of Pheasants", and "A Guide to Chemical Restraint of Wild Animals". Also, two technical reports - "Procedures for



Monitoring Wildlife Health and Investigating Diseases", and "Proceedings of High Altitude Ecology Workshop" were brought out.

A set of posters on four rare and highly endangered animals and birds - giant squirrel, forest cane turtle, lesser florican and western tragopan - was issued under the WII-USFWS collaborative project. These posters, a reproduction of the originals in water-colour, were in acceptance of the significance of the so-called 'minor actors' in a habitat and their recognition as major signposts of the health of the fragile ecosystems they live in. These posters are to be duly released at the time of the formal inauguration of the new campus.

WII faculty members and researchers contribute scientific papers, notes and popular articles to various journals. A list of such publications during 1992-93, along with reports and papers presented at conferences and seminars is given at the end.

ORGANISATION

Faculty and other recruitments

In the scientist category, 23 posts (including that of the Director) have been filled up against the sanctioned strength of 28, and there are 19 researchers. Of the 25 technical posts, 16 have been occupied. In the administrative category, 41 out of 51 posts and in the maintenance category all of sanctioned 43 posts have been filled up.

During 1992-93, one Scientist-SE and one Scientist-SD were appointed through direct recruitment. The Governing Body approved the recommendations for assessment promotions made in October 1992. Accordingly, three in the category Scientist-SE were promoted to Scientist-SF category, four in the category Scientist-SD to Scientist-SE, and three in the Scientist-SC category to Scientist-SD. In the case of one Scientist-SC, the recommendation was placed in a sealed cover for administrative reasons.

The contract for an incumbent on the Registrar's post expired in December 1992. This post has since not been filled up, and its functions are being looked after by the Scientist-SF, incharge of the Zoo project.

The WII Society has 35 members and is presided over by the Minister for Environment and Forests. The members comprise forest ministers of some states, members of parliament, members of the UP legislative assembly, officials from concerned ministries, and non-officials including NGO representatives concerned with wildlife conservation. No meeting of the Society could, however, be held in 1992-93.

The institute's functioning is orchestrated by a 15-member Governing Body chaired by the Secretary, Ministry of Environment and Forests. The Governing Body meets about every three-four months. However, some of its functions regarding research and building construction matters have been delegated to sub-committees, e.g. the Research Advisory Committee (RAC).

Upon the expiry of term of eminent scientists/naturalists/ conservationists, the Governing Body was reconstituted in October 1992. Under these categories, the following have been appointed as new members — Dr Ishwar Dass, S Deb Roy, Shivbhadra Sinhji and Ashish Chandola. In the faculty member category, BC Choudhury replaces SK Mukherjee. The membership list of the new Governing Body and RAC is given at the end.

DEVELOPMENT

COLLABORATION

Specialized faculty development project through US-FWS

The five-year WII-USFWS project on specialized faculty development entered its final year in January 1993 (the new termination dates being January 1994). The project seeks to enhance professional competence of WII faculty in diverse fields of frontier technology. This is done through an exchange of scientific personnel and acquisition of hi-tech equipment so as to upgrade the quality of various training and resource activities at the institute.

During 1992-93, seven members of the WII faculty were sponsored under the project for studies in research and management aspects under different specializations to the USA, Canada and Switzerland. (See section under Study Tours.)

From the USA, two scientists visited WII during the year - one to discuss the field research methods and the other to plan for the forthcoming workshop on animal damage control. A workshop of field research methods was conducted in February-March 1993 in which both scientists also participated (see section under Workshops, Meetings, Seminars).

UNDP collaboration

In May 1992, the Government of India and UNDP signed a three-year collaborative project titled "Strengthening Wildlife Management Planning

WILDLIFE INSTITUTE OF INDIA
& Ecodevelopment Planning Capabilities". WII has been designated the executing agency for this.

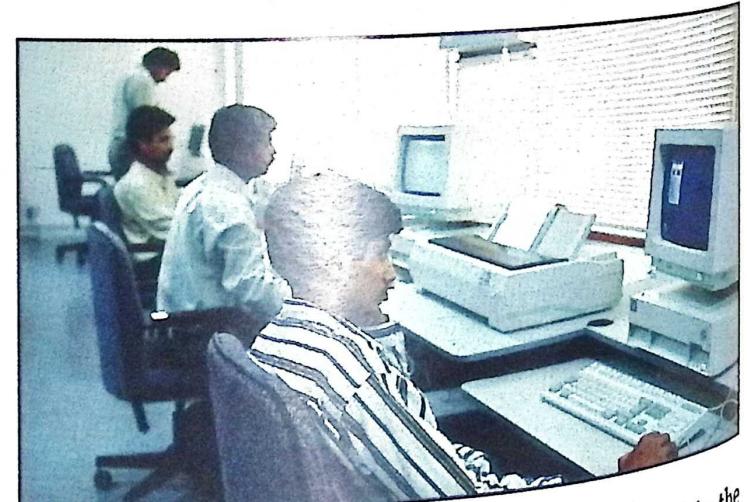
The project is aimed at starting two medium term training courses on Ecodevelopment Planning, and Protected Area Management Planning. The project also provides for preparation of ten ecodevelopment plans and ten management plans in selected areas which would be model plans for replication in other protected areas in the respective regions. With the pre-launch preparations being completed, the first training course in Ecodevelopment Planning is expected to begin in April 1993.

Environment impact assessment

A memorandum of understanding between WII and M/s. Engineers India Ltd was signed on 10 March 1993 for environment impact assessment and other projects in the field of biodiversity and wildlife.

COMPUTER FACILITY

WII's computer section is among the best in the country to serve wildlife conservation, and it continues to be strengthened. During the year, the



local area network (LAN) was commissioned in the new campus by M/s Zenith Computers Ltd.

The institute has a heterogenous hardware set up connected to LAN. The LAN is based on Novell Netware 3.11 on thin cable ethernet consisting of a 486-EISA file server having two 668 MB duplexed hard disk with 35 nodes having their own local hard disk. There is also a UNIX based SUN Sparcstation-2 for GIS and a XENIX based 386 for digital image analysis of remotely sensed data. These are also connected on to LAN through TCP/IP thus allowing remote logging and data transfer between all systems.

The LAN based software such as WordPerfect 5.1, FoxPro 2.0, SPSS/PC 4.0 and APPLAUSE II which were procured along with the hardware have also been installed on the file server.

A two-week training course on the use of computers and various software has also been started for beginners including MSc students, research scholars, diploma, certificate and other course trainees, faculty members and the institute staff.

LABORATORY

The wildlife biology laboratory at WII has been established to support research with analyses of materials collected in the field, and use the specimens during various training courses. The laboratory facility is also extended to wildlife managers for identification of species while dealing with wildlife offence cases.

Techniques for estimating forage quality and diet from faecal matter, standardized by the laboratory, were used by various researchers in their studies. Such analyses have proved useful in determining the seasonal changes in habitat quality and food habits. Food habits of leopard and tiger were determined by analysing scats collected from the Sariska

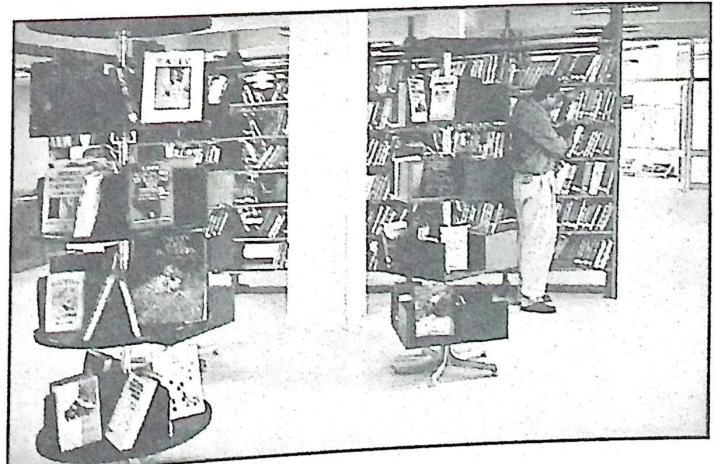
tiger reserve and Rajaji national park using techniques developed in the laboratory. The results of carnivore food habits were presented at the International Symposium on Tiger in New Delhi in February 1993 (see section under Workshops, Meeting, Seminars).

Grass samples collected from the wild ass sanctuary were analysed for the forage quality by estimating crude protein, ash and energy. This enabled elucidation of the seasonal changes in the forage quality in relation to preferred grass species by wild asses. Calorific value was determined for various fish species found in the diet of smooth Indian otter.

LIBRARY AND DOCUMENTATION CENTRE

Libraries are now performing an increasingly vital role in the functioning of any educational and research institution. So is it at WII too. Though meant primarily for the use of the faculty, researchers, students and trainees of the institute, the centre is open to users from other institutions as well.

After shifting from the FRI campus to the Chandrabani campus, for about ten months, the library and documentation centre was located in the hostel block. It moved to its permanent location in an air conditioned building in October 1992.



PERSPECTIVE FOR 1993-94

The indications for 1993-94 point to a busy year packed with yet more activities with some inevitable carry overs from the preceding year, notably, the launching of the all important maiden 14-week course on ecodevelopment planning around protected areas. Another course of the same duration on management planning for protected areas shall also come to be launched. Both these courses are a part of the UNDP-FAO project based at the Institute on strengthening management planning and ecodevelopment planning capabilities. The scheduled second course on ecodevelopment planning will also be conducted in addition to the left over course of last year. Both these courses carry a follow-up in the field by way of Central assistance to States in the preparation of ecodevelopment/management plans for the selected PAs. WII will remain involved with these planning exercises to be carried out by the trained officers by providing field guidance to them. With greater envisaged thrust on scientific management, supported by site specific packages of ecodevelopment from theconcerting programmes for biodiversity conservation through protected areas, these initiatives of WII have not come a day too soon.

Yet another left over activity of last year is the Mobile Training Seminar to be conducted with the support from UNESCO and USNPS for training of park managers from Asian countries. This will be conducted early this year in the parks in India and Nepal.

The Institute is under advice from its Governing Body to raise some of its own resources to atleast partially support its growing activities. As a first step in this direction, the Institute plans to set up this year an EIA cell which will undertake consultancy

studies for EIA of the various industrial and multi-purpose river valley projects. No doubt, this will help conservation by rational redirection of development projects and by bringing in compensatory and mitigatory measures against loss of natural values. The WII will also bid for biodiversity research initiatives forming a component of the internationally supported forestry development projects in different states. This would also help in better integration of forestry and wildlife conservation efforts towards biodiversity conservation.

1993-94 will also be the terminal year of the WII-USFWS collaborative project for institutional capacity building under the Indo-US Sub-commission on Science & Technology. The various training inputs under it for faculty training and dissemination of techniques through field workshops will be completed. Planning for a Phase-II collaborative project under the same auspices having been completed, hopefully the Phase-II project itself will come to be started this year. The Phase-II project while further helping in capacity building, will also have important components in conservation research and modern technology applications to field situations e.g. use of GIS in management of crucial wildlife corridors.

Standing requests of the Government of Malaysia and Thailand for specialised short training of their personnel in wildlife management and research techniques respectively, will be complied with this year. There is also a plan to conduct a special six-week course in conservation biology and wildlife management with international assistance from the Smithsonian Institution of USA, for the trainees from India as well as those from south and south-east Asian countries.

During the coming year, in July 1993, the IVth course of MSc (Wildlife) will also begin. By

then, the present batch will have completed its course and passed out.

All the regular long-term and short-term courses on wildlife management, orientation for biodiversity conservation and zoo management will take place as usual. The short-term course in 'Interpretation and Conservation Education' which could not be held this year will be conducted in collaboration with the Centre for Environment Education, Ahmedabad during August 1993. For the first time, a workshop on 'GIS' will be organised for field researchers and wildlife managers in January 1994. In February 1994, a workshop on 'Wildlife Damage Problems and Control' will be held. This would be for field managers and interested workers from the universities and other research institutions. During 1993-94, the Institute will also start publication of its completed research study reports.

Several new research proposals have been prepared by the Institute and these include status survey of elephant in Arunachal Pradesh and corridor study in Central Highlands. Some of these would come to be taken up during 1993-94.

On the infrastructural side, the computerisation of the library and documentation centre will be enhanced this year. In order to make the library database readily available to the faculty, the centre will be hooked on to the Institute's LAN and will also have ten separate terminals installed in the carrels within the library.

WII's new campus at Chandrabani presents a picture of revitalisation, a manifestation of the intrinsic revival capacity of the tropical ecosystems. Our campus facilities need to be strengthened to be able to support the enlarging activity. New campus

development programmes this year will comprise starting construction of a new 40-room hostel block and 34 house units for faculty and staff. The work on developing a modest sports complex for the Institute in the recently acquired land between campus blocks I and II will also be taken at hand this year.



(H.S. Panwar)

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Sathyakumar, S, SN Prasad, GS Rawat and AJT Johnsingh (1992) - Ecology of Kalij and Monal Pheasants in Kedarnath Wildlife Sanctuary, Western Himalayas. At: Fifth International Pheasant Symposium, Lahore, Pakistan; WPA-International, WPA-Pakistan and Punjab Wildlife Department; 28 Sept-4 Oct 1992.

Sawarkar, VB (1993) - Tiger Census: Issues in Field Application. At: International Symposium on Tiger, New Delhi; Ministry of Environment & Forests; 22-24 February 1993.

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Tata, L Raghuram and Parikshit Gautam (1992) - Habitat Utilization by Grey Junglefowl in Bori Wildlife Sanctuary, India. At: Fifth International Pheasant Symposium, Lahore, Pakistan; WPA-International, WPA-Pakistan and Punjab Wildlife Board; 28 Sept-4 Oct 1992.

1. Secretary Ministry of Environment & Forests Government of India Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110 003	Chairman	Member
2. Inspector General of Forests Ministry of Environment & Forests Government of India Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110 003	Vice-Chairman	Member
3. A Representative of Indian Board for Wildlife	Member	Member
4. Shri S. Deb Roy B-4/V24, Lodhi Road Complex, New Delhi-110 003	Member	Member
5. Shri Shivbhadra Sinhji Bhavvilas Near Gaurishankar Lake, Bhavnagar-364 003	Member	Member
6. Shri Ashish Chandola A-1, Chirag Enclave, New Delhi	Member	Member
7. Dr. Ishwar Dass E-1/154, ARERA Colony, Bhopal-462 016	Member	Member
8. Director, Wildlife Preservation, Ministry of Environment and Forests Government of India Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110 003	Member	Member
9. Joint Secretary & Financial Advisor, Ministry of Environment and Forests Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110 003	Member	Member
10. Director General, Indian Council of Forestry Research & Education, P.O. New Forest, Dehra Dun-248 006		Member
11. Joint Secretary (Education) Ministry of Human Resource Development, Shastri Bhavan, New Delhi-110 003		Member
12. Chief Wildlife Warden, Govt. of Uttar Pradesh, 17, Rana Pratap Marg, Lucknow (U.P.) (Nominee of Chief Secretary, U.P.)		Member
13. Shri B.C. Choudhury, Wildlife Institute of India Post Box-18, Chandrabani, Dehra Dun-248001		Member
14. Director, Wildlife Institute of India Post Box-18, Chandrabani, Dehra Dun-248001		Member-Secretary



RESEARCH ADVISORY COMMITTEE



AUDIT CERTIFICATE

I have examined the Receipt and Payment Accounts, Income and Expenditure Accounts for the year ended 1991-92 and 1992-93 and the Balance Sheet as on 31st March 1993 of the Wildlife Institute of India, Dehradun. I have obtained all the information and explanations that I have required, and subject to the observations in the appended Audit Report, I certify, as a result of my audit, that in my opinion these Accounts and Balance Sheet are properly drawn up so as to exhibit a true and fair view of the state of affairs of the Wildlife Institute, according to the best of information and explanations given to me and as shown by the books of the organisation.

Ex-Officio Members

1. Director, Wildlife Preservation
Government of India
2. Director, Botanical Survey of India
3. Director, Zoological Survey of India
4. Five Chief Wildlife Wardens, each to represent five regions coterminous with the jurisdiction of Regional Offices of the MEF, on one year rotational tenure
5. Director, Wildlife Institute of India

- Chairman
- Member
- Member
- Members
- Member-Secretary

Nominated Members of Eminence

6. Shri J.C. Daniel (Wildlife Scientist with the background of research organisation)
7. Prof. J.S. Singh, BHU, Varanasi
(Ecologist with University background)
8. Dr. A.H. Musavi, AMU Aligarh
(Wildlife scientist with University background)
9. Shri S. DebRoy (Experienced Wildlife manager)

- Member
- Member
- Member
- Member

WII Faculty

10. Shri S.K. Mukherjee, Additional Director, WII.
11. Dr. A.J.T. Johnsingh, Joint Director, WII.
(Faculty members nominated by the Director, WII)
12. Dr. P.K. Mathur,
Research Coordinator, WII

- Member
- Member
- Member

Sd/-

New Delhi

Pr. Director of Audit

Dated: 24/9/93



RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDING 31ST MARCH, 1993.

	RECEIPTS	PAYMENTS	NON PLAN	PLAN	TOTAL
To Opening Balance:		By salaries	41,71,001.00	19,74,873.00	61,45,874.00
Cash in Hand	39,329.25	By Leave Salary & Pension Contribution	31,720.00	-	31,720.00
Cash in Bank	1,35,82,868.19	By Bonus	1,10,399.00	-	1,10,399.00
Balance in		By Honorarium	24,585.00	-	24,585.00
Training Account	3,46,768.21	By Fellowship	2,72,604.00	3,49,968.50	6,22,572.50
To Grant-in-aid		By Wages	2,08,062.00	2,80,600.00	4,88,662.00
Department of Environment, Forests, New Delhi	2,82,60,000.00	By Travel Expenses	5,06,510.00	3,24,631.00	8,31,141.00
To Training Cost		By Newspaper & Magazines	46,006.00	-	46,006.00
9-months Diploma Course	6,29,170.00	By Publicity & Advertisement	50,000.00	1,16,646.00	1,66,646.00
3-months Certificate Course	1,60,320.00	By Operational Expenses	2,00,025.00	7,27,800.00	9,27,825.00
Other receipts	51,142.00	By Stationery	4,05,080.00	4,27,143.00	8,32,223.00
Outstanding cost	1,88,100.00	By Maintenance of Deer Park	-	1,79,321.00	1,79,321.00
Outstanding Advance for expenses	95,000.00	By Rent for hired Building	60,050.00	80,609.00	1,40,659.00
Interest of Bank A/c (Training)	20,005.20	By Postage & Telegram	75,700.00	46,529.00	1,22,229.00
To Interest credited by Bank	3,92,403.20	By Sports Goods	1,298.00	-	1,298.00
To Interest on Mobilisation Advance	6,993.00	By Uniforms	40,056.00	-	40,056.00
To Recovery of Mobilisation Advance	46,744.00	By Telephone & Trunk calls	1,81,355.00	-	1,81,355.00
To Recovery of Income Tax from Contractor	2,78,394.00	By Conveyance Charges	8,885.00	-	8,885.00
To Recovery of Sales Tax from Contractor	4,35,455.00	By Electricity & Water Charges	4,56,000.00	2,17,478.72	6,73,478.72
To Recovery of Security		By Entertainment	22,323.00	-	22,323.00
Deposits from Contractor	7,37,787.05	By Printing & Binding	4,00,937.00	3,08,000.00	7,08,937.00
To With held amount from contractor bills	79,405.00	By Repair of Office Equipment	1,50,000.00	1,02,261.00	2,52,261.00
To CGEGIS Refunded	13,656.00	C/O	4,53,63,540.10	51,35,860.22	1,25,58,456.22



B/F	4,53,63,540.10	B/F	74,22,596.00	51,35,860.22	1,25,58,456.22
	21,156.00	By Seminar & Workshop	-	3,49,341.00	3,49,341.00
	88,579.00	By Insurance of Research Fellows & Faculty Members	9,570.00	-	9,570.00
	30,33,486.60	By Stipend to M.Sc students	79,800.00	-	79,800.00
		By Legal Expenses	26,544.00	-	26,544.00
		By Training Cost	-	-	8,33,699.00
		i) Sale of Tender document	10,150.00		
		ii) Guest House Charges	1,316.00	By repair and maintenance of vehicle	1,80,563.00
		iii) Lab. Testing	3,825.00		1,47,854.00
		iv) Sales Tax Refund	61,509.00		3,28,417.00
		v) Penal Interest	873.00	By POL for Vehicle	2,56,000.00
		vi) Compensation	250.00		1,60,242.00
		vii) H.L.Fee	30,047.00	1,07,970.00	4,16,242.00
				By Purchase of Vehicle	7,13,479.00
				By Journals & Periodicals	7,77,162.00
				By Scientific Publication	25,000.00
				By Audiovisual, Computers & Training Equipment	16,36,453.00
				By Laboratory Equipment	73,550.00
				By Laboratory chemicals	2,688.00
				By Office Equipment	56,846.00
				By Photographs & Photographic materials	97,047.00
				By Educational Films	71,228.00
				By Furniture & Fixtures	19,49,034.00
				By Library Books	5,26,431.50
		C/O	4,86,14,731.70	C/O	79,75,073.00
					1,17,22,215.72
					2,05,30,987.72



B/F	4,86,14,731.70	B/F	79,75,073.00	1,17,22,215.72	2,05,30,987.72
By Avenue Plantation	-	4,08,623.00			
By Advance for Expenses	-		4,08,623.00		
By Advance for Expenses (Training)	-		32,11,034.50		
By Awards	2,495.00	-		3,17,550.00	
By Loans and Advances	-	-		1,02,557.00	
By Festival Advance	-	-		4,400.00	
By Remittance of Income Tax (Contractors)	-	-		2,39,523.00	
By Remittance of Sales Tax (Contractors)	-	-		3,91,754.00	
By Procurement of Cement, Steel & Wood	-	(-)6,86,863.00	(-) 6,86,863.00		
By Construction of Building	-	86,07,673.03	86,07,673.03		
By Air Conditioner	-	8,06,915.00	8,06,915.00		
By Campus Development	-	6,44,547.00	6,44,547.00		
By Construction & Architectural Management Fee	-	9,12,542.00	9,12,542.00		
By E.P.A.B.X.	-	4,13,005.00	4,13,005.00		
By camp Equipment	-	1,01,699.00	1,01,699.00		
By Exhibihtion	-	44,528.00	44,528.00		
By Audit Fee	24,585.00	-	24,585.00		
By Estate Maintainance	-	4,25,850.00	4,25,850.00		
By Security Deposit released	-	-	3,29,515.00		
By Construction of Staff Quarters	-	28,23,363.00	28,23,363.00		
By Material and Supplies	-	18,28,737.00	18,28,737.00		
By Office Expenses	-	17,36,262.75	17,36,262.75		
CLOSING BALANCE				89,738.55	
By Cash-in-hand	-	-	49,64,453.74		
By Bank Balance with UBI	-	-	3,39,256.41		
By Cash with UBI (Trainees Account)	-	-			
Total	4,86,14,731.70				
		Total	80,02,153.00	2,97,89,097.50	4,86,14,731.70



**WILDLIFE INSTITUTE OF INDIA, DEHRA DUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31ST MARCH, 1993.**

EXPENDITURE	INCOME
To salaries and allowances	61,45,874.00
To Leave Salary & Pension Contribution	31,720.00
To Bonus	1,10,399.00
To Honorarium	24,585.00
To Fellowship	6,22,572.50
To Wages	4,88,662.00
To Travel Expenses	8,31,141.00
To Newspapers & Magazines	46,006.00
To Publicity & Advertisement	1,66,646.00
To Operational Expenses	9,27,825.00
To Stationery	8,32,223.00
To Maintenance of animals (Deer Park)	1,79,321.00
To Rent for Hired Buildings	1,40,659.00
To Postage & Telegram	1,22,229.00
To Sports Goods	1,298.00
To Uniforms	40,056.00
To Telephone & Trunk calls	1,81,355.00
To Conveyance	8,885.00
To Electricity & Water charges	6,73,478.72
To Entertainment	22,323.00
To Printing & Binding	7,08,937.00
To Repair & Maintenance of Office equipment	2,52,261.00
	C/O 1,25,58,456.22
	C/O 1,68,63,477.97



B/F 1,25,58,456.22

To Seminar & Workshops	3,49,341.00
To Insurance (Research Fellow and Faculty Members)	9,570.00
To Stipend	79,800.00
To Legal Expenses	26,544.00
To Training Cost	8,33,699.00
To Repair & Maintenance of vehicles	3,28,417.00
To POL for vehicles	4,16,242.00
To Awards	2,495.00
To Lab chemicals	2,688.00
To Exhibition	44,528.00
To Audit fee	24,585.00
To Office expenses	17,36,262.75
To Estate Maintainance	4,25,850.00
To Scientific Publications	25,000.00
Total	1,68,63,477.97

B/F 1,68,63,477.97



WILDLIFE INSTITUTE OF INDIA : DEHRA DUN

BALANCE SHEET AS ON 31ST MARCH 1993

FUND & LIABILITIES	ASSETS				As on 31.3.93	Addition during 1992-93	As on 31.3.92	Addition during 1992-93	As on 31.3.93
	As on 31.3.92	Addition during 1992-93	Amount	Amount					
		Rs. Ps.	Rs. Ps.	Rs. Ps.	Rs. Ps.	Rs. Ps.	Rs. Ps.	Rs. Ps.	Rs. Ps.
Excess of income over expenditure 1990-91	2,10,21,691.77	(-)86,83,809.10	1,23,37,882.67						
Sales Tax Liability		43,701.00	43,701.00						
Amount capitalised	7,48,39,315.17	2,24,48,334.53	9,72,87,649.70						
CGEGIS Refund									
Income Tax Liability		38,871.00	38,871.00						
C/O	10,97,21,760.37								
Office Eqpt	11,22,308.07	73,550.00	11,95,858.07						
Furniture & Fixture	22,88,928.89	19,49,034.00	42,37,962.89						
Vehicles	27,74,677.47	7,13,479.00	34,88,156.47						
Library books	23,13,961.78	5,26,431.50	28,40,393.28						
Camp Eqpt	2,49,298.34	1,01,699.00	3,50,997.34						
Photographs and Photos									
Material	4,25,711.20	97,047.00	5,22,758.20						
Educational films	9,10,841.35	71,228.00	9,82,069.35						
Journals & Periodicals	19,11,171.50	7,77,162.00	26,88,333.50						
C/O	3,02,78,697.96								



	B/F	10,97,21,760.37	C/F	3,02,78,697.96
Security deposit	4,40,530.90	4,08,272.05	8,52,802.95	
				Material & Supplies 16,57,651.95 18,28,737.00 34,86,388.95
				Training Equpt 67,09,966.24 16,36,453.00 83,46,419.24
				Boundary Wall 14,46,200.59 14,46,200.59
				Block I & Gate Boundary 8,17,934.93 8,17,934.93
				Fencing
				Building complex 3,37,38,076.1586,07,673.03 4,23,45,749.18
				Archi 25,78,768.85 9,12,542.00 34,91,310.85 tectural &
				Supervision fee
Withheld amount	25,000.00	79,405.00	1,04,405.00	D.G. Set 6,62,391.00 - 6,62,391.00
				EPBX 3,07,737.00 6,84,005.00 9,91,742.00
				A.C. 17,90,537.00 8,06,915.00 25,97,452.00 Plant
				Advance for 95,000.00 2,22,550.00 3,17,550.00 expenses for training
				Advance to 3,18,793.10 1,77,547.90 4,96,341.00 staff (for expenses)
				Loan & 12,04,868.20 85,801.00 12,90,669.20 Advances to staff
				To 23,68,032.82 (-) 1,35,323.00 22,32,709.82 Sundry Debtors
				Staff Quarters - 28,23,363.00 28,23,363.00
	C/O	11,06,78,968.32	C/O	10,16,24,919.72



B/F	11,06,78,968.32	B/F	10,16,24,919.72
To closing stock of Steel, cement and wood	33,47,462.90 (-) 6,86,863.00 26,60,599.90		
Closing Bank Balance (Training Account)	3,39,256.41		
Grant-in Aid Acrued but not received	10,00,000.00		
Closing Bank Balance	49,64,453.74		
Closing Cash Balanace	89,738.55		
Grand Total -	11,06,78,968.32	Grand Total -	11,06,78,968.32

The above balance sheet to the best of our belief contains a true account of the Funds, Liabilites, Property, and Assets of the Institute.

Sd/-
(S.S. Oberoi)
Finance Officer

Sd/-
(Dr.J.H.Desai)
Registrar

Sd/-
(H.S. Panwar)
Director



PERMANENT ASSETS AS ON 31.3.1993

S.No.	Particulars	Opening stock	Addition during the year	Total
1.	Land	80,32,795.00	-	80,32,795.00
2.	Trees	24,32,709.00	-	24,32,709.00
3.	Avenue Plantation	6,66,183.65	4,08,623.00	10,74,806.65
4.	Furniture & Fixture	22,88,928.89	19,49,034.00	42,37,962.89
5.	Lab Equipment & Chem	11,22,308.07	73,550.00	11,95,858.07
6.	Office Equipment	11,72,136.90	(-)2,14,154.00	9,57,982.90
7.	Training Equipment	67,09,966.24	16,36,453.00	83,46,419.24
8.	Camp Equipment	2,49,298.34	1,01,699.00	3,50,997.34
9.	Photographs & photographic material	4,25,711.20	97,047.00	5,22,758.20
10.	Educational films	9,10,841.35	71,228.00	9,82,069.35
11.	Library Books	23,13,961.78	5,26,431.50	28,40,393.28
12.	Journals & periodicals	19,11,171.50	7,77,162.00	26,88,333.50
13.	Materials & supply	16,57,651.95	18,28,737.00	34,86,388.95
14.	Vehicles	27,74,677.47	7,13,479.00	34,88,156.47
15.	Campus development	8,29,328.31	6,44,547.00	14,73,875.31
16.	Boundary Wall Block I	14,46,200.59	-	14,46,200.59
17.	Boundary fencing II & III	8,17,934.93	-	8,17,934.93
18.	Construction of Building	3,37,38,076.15	86,07,673.03	4,23,45,749.18
19.	Architectural fee & Supervision	24,28,768.85	9,12,542.00	33,41,310.85
20.	Architectural Completion	1,50,000.00	-	1,50,000.00
21.	D.G. Set	6,62,391.00	-	6,62,391.00
22.	E.P.A.B.X.	3,07,737.00	6,84,005.00	9,91,742.00
23.	Air Conditioner	17,90,537.00	8,06,915.00	25,97,452.00
24.	Staff Quarters	7,48,39,315.17	28,23,363.00	28,23,363.00
			2,24,48,334.53	9,72,87,649.70

CONSERVATION CLOSER HOME

The earmarking of WII's new location was not greatly welcomed by the residents of the neighbouring Chandrabani village. This was primarily due to their immediate loss of access to the forest resources and the thoroughfare to the main road, which as part of the campus were now bounded off. In fact, for quite long, the locals were downright hostile.

Here was the typical situation of a "protected area" coming up and the people resenting it!

WII realised that howsoever legally correct its own stand may be, in its long-term interests as also that of the locals, it would be better to not bring matters to a head but instead attempt being friends.

The sustained efforts eventually paid off. And today, at the behest of WII, the villagers have already taken the first steps towards environmental awareness. Children eagerly participate in painting and quiz competitions and awareness excursions organised by the Institute, and also undertake socio-economic surveys of their village and surrounds. Women have formed a Mahila Mandal and are seeking, with the Institute's assistance, information and know-how on developmental efforts and prospects for their village.

The story about WII and its partners in conservation does not end here. In fact, it is only just begun!

