Session II *Time:* 2-15 to 3-15 P.M. *Venue:* Department of Zoology, Lecture Hall No. I.

Chairmen: Dr. V.B. Saharia & Mr. T.V. Subba Rao.

Rapporter Dr. J.V. Ramna Rao.

Mr. A.L. Rao, I.F.S., General Manager, F.D.C. .. "University education and Forestry Social Forestry Teaching".

Mr. C.V. Konda Reddy, I.F.S., .. Addl. Director, D.P.A.P.

Mr. T.V. Subba Rao. .. Chairmen, F.D.C. Andhra Pradesh.

Tea Break

Panel Discussion on Curriculam Development—Fisheries and wild life from 4-00 to 5-30 P.M.

Participants: Prof. V.S. Thakre, Nagpur University; Prof. K.S. Swamy, S.V. University; Prof. K. Hanumanth Rao, Andhra University; Prof. R. Nagabhushnam, Marathwada University; Prof. Y. Radha Krishna, Nagarjuna University; Prof. Rama Murthy, Central University Hyderabad; Dr. Dwivedi, C.I.F.E. Bombay Dr. Saharia, W.R. and E., Dehra Dun; Mr. Hingorani, C.F.T.I., Hyderabad; Prof. P. Ramchander Rao, Moderator.

Popular Lecture at 6-30 P.M. *Venue:*

President: Prof. S.S. Qadri.

Speaker: Dr. Salim Ali, President, Bombay Natural History Society.

Topic "BIRD MIGRATION"

OSMANIA UNIVERSITY

DIAMOND JUBILEE CELEBRATIONS

a Seminar

on

EXPLOITABLE BIOLOGICAL RESOURCES (FISHERIES & WILDLIFE) OF ANDHRA PRADESH

is being held at

THE DEPARTMENT OF ZOOLOGY

Osmania University

on 25th and 26th November, 1978

Sponsored by

Osmania University

and

Co-sponsored by Departments of

Fisheries and Forestry, Government of Andhra Pradesh.

PROGRAMME ON 25-11-1978

FISHERIES

Session I *Time:* 10-30 A.M. to 1-30 P.M. *Venue:* Department of Zoology Lecture Hall No. I.

Chairmen: Dr. V.G. Jhingran & Mr. P.P. Williams.
Rapporteur: Mr. K.R. Saxena.

Mr. P.P. Williams, Director of Fisheries, Andhra Pradesh. .. "Fisheries of Andhra Pradesh—An overall view"

Mr. M.S. Sanjeeva Rao, M.P., Chairman, A.P. Fisheries Corporation. .. "Deep Sea Fishing and its implications".

Dr. V.G. Jhingran, Director, CIFRI, Barrackpore. .. "Scope and progress of Aqua-Culture in Andhra Pradesh

Tea Break

Dr. P.S.B.R. James, Joint Director Regional Centre of C.M.F.R.I., Mandapam. .. "Trends in Marine Fish Production".

Shri D.V. Reddy, Project Manager, A.P. Fisheries Corporation, Kakinada. .. "Brackish Water Fisheries in Andhra Pradesh".

Session II *Time:* 2-30 P.M. to 5-15 P.M. *Venue:* Department of Zoology, Lecture Hall No. I.

Chairmen: Prof. P.N. Ganpati & Mr. M.S. Sanjeeva Rao.
Rapporteur: Mr K.R. Saxena.

Dr. A.V. Natarajan, Project Co-ordinator, I.C.A.R., Allahabad. .. "Riverine and Lacustrine Fishery of Andhra Pradesh"

Prof. S. Dutt, Department of Marine Sciences, Visakhapatnam. .. "Kolleru as a Habitat".

Dr. K.V. Devaraj, Chief Scientific Officer, Inland Fisheries, Bangalore. .. "Induced breeding of Fishes".

Tea Break

Dr. S.N. Dwivedi, Director, Central Institute of Fisheries, Education, Bombay. .. "Fisheries Education and Extension".

Dr. P.N. Ganapati, Emeritus Professor, Andhra University, Waltair. .. "Pollution of Aquatic Ecosystems in relation to Fisheries".

Film Show At 5-30 P.M.

1. Induced Breeding.
2. Composite Fish Culture.

PROGRAMME FOR 26-11-1978

WILD LIFE

Session I *Time:* 10-00 to 1-15 P.M. *Venue:* Department of Zoology, Lecture Hall No. I.

Chairmen: Mr. P.S. Rao & Prof. S.N. Singh.
Rapporteur Dr. J.V. Ramna Rao.

Mr. P.S. Rao, IFS, Chief Conservator of Forests, Government of Andhra Pradesh. .. "Forestry and Wildlife of Andhra Pradesh—Over view".

Dr. V.B. Saharia, Director F.R.I., Dehra Dun. .. "Wildlife Research and Education".

Mr. Pushp Kumar, I.F.S., Conservator Forest wild life, Hyderabad. .. Dynamics of wild life Population".

Tea Break

Mr. S.R. Chowdhary, I.F.S., Field Director, Similipal Tiger Reserve, Orissa. .. "Tiger—Current Status in India".

Dr. H.R. Bustard, F.A.O. Consultant. .. "Crocodile Farming".

OSMANIA UNIVERSITY DIAMOND JUBILEE, DEPARTMENT OF ZOOLOGY, TWO DAY SEMINAR
EXPLOITABLE BIOLOGICAL RESOURCES (FISHERIES & WILDLIFE) OF ANDHRA PRADESH -
THEIR BIOLOGY~~GAL~~ & UTILISATION Nov 24th 25th (Tentative) 26th Excursions

FISHERIES	WILDLIFE
1. Inland and marine fishery resources of Andhra Pradesh - an overall view.	1. Dynamics of Wildlife populations. } Dr Gadgil
2. Trends in marine fish production in Andhra Pradesh-their exploitation and utilisation.	2. Predator - Prey relationships. } Dr Gadgil
3. Riverine and estuarine fisheries of Andhra Pradesh - their exploitation, conservation, and management.	×3. The forest wealth of Andhra Pradesh. } P.S.Rao
4. Man-made lakes in Andhra Pradesh and development of their fishery resources.	×4. Forest produce utilisation. } P.S.Rao
5. Scope and progress of equaculture in Andhra Pradesh.	5. Wildlife conservation and National Parks Management. P.K. P. Kumar
6. Induced breeding of fish and shell-fish.	6. Project Tiger.
7. Pollution of aquatic ecosystems in relation to fisheries in Andhra Pradesh.	7. Crocodile ~~farming~~ Biology Dr Bonstead
8. Fish diseases encountered in diverse ecosystems in Andhra Pradesh.	×8. The impact in human activity on forests and wildlife: Deforestation, Pollution, Pesticides. Zafar Fatehally
9. Fishery products and byproducts - processing, preservation, marketing and trade.	~~9. Diseases of Wildlife.~~
10. Ornamental fish in Andhra Pradesh.	10. Socio-biology & Animal Behaviour Studies in the field. Partharathy
11. Fishing craft and gear, and boat building facilities in Andhra Pradesh.	11. Home range, dispersal and movement of endangered species in relation to seasonal change in forest eco-systems.
12. Stategy for development of the fisheries in the inland and marine waters of Andhra Pradesh in the coming decade.	×12. Strategy for development of forests and forest produce in Andhra Pradesh. T.V.S.R & A.L.Rao

OSMANIA UNIVERSITY DIAMOND JUBILEE, DEPARTMENT OF ZOOLOGY, TWO DAY SEMINAR

EXPLOITABLE BIOLOGICAL RESOURCES (FISHERIES & WILDLIFE) OF ANDHRA PRADESH —

THEIR BIOLOGY & UTILISATION

FISHERIES	WILDLIFE
1. Dynamics of exploited fish population.	1. Dynamics of Wildlife populations.
2. Non-fish component of fisheries.	2. Predator - Prey relationships.
3. Induced Breeding of fish.	3. The forest wealth of Andhra Pradesh.
4. Aquaculture.	4. Forest produce utilisation.
5. Fishery Management.	5. Wildlife conservation and National Parks Management.
6. Conservation and Productivity of Natural waters.	6. Project Tiger.
7. Reservoir fisheries.	7. Crododile farming.
8. Pollution and fisheries.	8. The impact of human activity on forests and wildlife: Deforestation, Pollution, Pesticides.
9. Diseases of Fish.	9. Diseases of Wildlife.
10. Fish - Products & byproducts: Processing & Preservation. Marketing & Trade.	10. Socio-biology & Animal Behaviour Studies in the field.

BRACKISH WATER FISHERIES IN ANDHRA PRADESH

By

D.V. REDDI
PROJECT MANAGER
BRACKISH WATER FISHERIES
ANDHRA PRADESH FISHERIES CORPN.,
KAKINADA.

Synopsis : Brackish Water Fisheries is one of the most important exploitable biological resources which is going to occupy its due position soon particularly in view of its export potential, protein rich, rural and backward area uplift orientation and employment potential, qualities.

India has about 2 million hectares of Brackish Water areas of which Andhra Pradesh is in possession of over 0.2 million hectares. Andhra Pradesh Coastal Zone with its rich river systems is blessed with almost all varieties of stocking materials of prawn and fish in nature. Another boon for us, is its tidal amplitude of 0.5 to 1.8 meters which is considered ideal for formation of impoundments or construction of farms as also for better Water management.

The technology for construction, management of fish farms devised and culture techniques adopted at the Brackish Water Fish Farm, Central Institute of Fisheries Education, Kakinada which was originally constructed by Fisheries Department, Govt. of Andhra Pradesh has given the economical viability and technical feasibility. The fish and prawn culture taken up at salt pan reservoirs which are readily available has given good results.

The Brackish water culture under good management, effective control and efficient supervision gives an yield of about Rs.18,000/- to Rs.20,000/- per hectare per annum on our coast. The results obtained elsewhere in the country support this result.

This recent innovation of Brackish water exploitable biological resource has a bright future.

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DVS/VK/Zool.

SYNOPSIS

LAKE KOLLERU AS A HABITAT

PROF. S. DUTT
Head of the Dept. of Marine Sciences
Andhra University
VISAKHAPATNAM-530 003

Lake Kolleru which straddles across the districts of Krishna and West Godavari in the coastal plain of Andhra Pradesh is essentially a freshwater lake, although it opens into the Bay of Bengal through the Upputeru, because the tidal waters never enter the lake proper. Hence, it may be considered as the largest freshwater lake in India, having an area of about 250 sq. km., with a number of natural streams and irrigation canals opening into it. It is a shallow water lake which is flooded during the south-west monsoon season from June to August. Considerable areas of the lake are covered over by the water hyacinth; next in importance is Ipomea sp.

Lake Kolleru has been supporting an important fishery based on the natural stocks of fishes and prawns. There are more than 50 species of fishes which are commercially exploited in varying quantities; 40 of them are primarily freshwater species. In recent years, the State Government has been paying particular attention to developing the area around the lake for fish farming on a large scale.

The paper presents data with regard to the important commercially exploited species and the fishery of the lake.

VK/DVS/Zool.

MARINE POLLUTION AND FISHERIES

by P.N. Ganapati.

S Y N O P S I S.

1. The marine environment as a balanced ecosystem - abiotic and biotic factors of the marine environment - naturally occuring marine biotoxins - mass mortalities of fish due to changes in salinity, temparature extremes, oxygen deficiency, poisonous gases and noxious blooms - the red tide.

2. Pollution generated by human activities :

(a) Domestic Wastes

categories of domestic wastes - biodegradation and mineralisation of organic wastes - oxygen depletion and mass mortality - excess of nutrients and eutrophication - water blooms and red tide.

(b) Industrial Wastes

(i) Inorganic

Thermal pollution and its biological consequences in the ecosystem.

Heavy metals and other inorganics :

The entrance into the marine environment of heavy metals like mercury, copper, lead, cadmium, zinc, chromium etc. through industrial effluents and aerial transport from the atmosphere - concentration of heavy metals in organisms of the food chain, thousands of times higher than in natural sea water - cumulative toxicity of heavy metals.

Radioactive wastes :

Source of radionuclides and their concentration in organisms forming the food chain.

(ii) Organic Wastes :

Oil and Petrochemicals :

Polynuclear aromatics like benzopyrene as carcinogens - protein bound toxic carcinogenic hydrocarbons in Food Protein Concentrate (FPC) - phenoles and tainted fish.

Halogenated hydrocarbons :

Insecticides, pesticides, herbicides, fungicides etc. Polychlorbiphenyls (PCB) - toxicology of DDT, endrin, PCB etc. - persistence and accumulation in food chain - halogenated hydrocarbon accumulation in sediments.

Effects of pollutants on the biology and life-cycle of marine organisms with particular reference to fisheries.

DVS/VK/Zool.

"TIGER : CURRENT STATUS IN INDIA"

By

Saroj Raj Choudhury
(Conservator of Forests)
Field Director
Similipal Tiger Reserve
Baripada.

SYNOPSIS :-

1. Past history, a short introduction.
2. Adaptability to various habitats and range of niche with illustration.
3. Population decline.
4. Methods of measurement.
5. Estimate of decline.
6. Reasons of decline conscious

A short talk interposed with a few slides.

7. Concern for the future of the tiger.
8. Strengthening of law and its enforcement.
9. Genesis of Project Tiger; efforts and results.
10. Wisening in ant-ecology through in vivo study of a single individual from early cub-hood through more than four years to-date. This will be sequentially illustrated.

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VK/DVS/Zool.

ORGANISING WILDLIFE RESEARCH AND EDUCATION

SYNOPSIS

by

V.B. Saharia*

No serious attempts have been made in the country to organise wildlife research, education and administration on a broad based level, even though some empirical attempts have been made during the past few decades. Research and education on wildlife involve the application of several disciplines like Forestry, Wildlife Biology, Ecology, Instrumentation, Animal Health, Environmental Sciences, Economics, Extension and Interpretation, Administration etc. With such a multi-disciplinary requirement, active involvement of management agencies, research organisations and Universities has an important bearing on the organisation of wildlife research in the country.

Wildlife occupies higher trophic levels and therefore its proper management whether it be for conservation or for exploitation cannot be achieved without giving due attention to all the different parameters in the different ecosystems, wherever they occur. It is therefore inevitable to have an ecosystems approach for proper management of wildlife, and any broad-based research and education programme in wildlife has to develope within the conceptual frame of total environmental conservation and environmental management in areas of wildlife significance.

Research in wildlife is also linked with the assessment of the survival values for the rare and threatened species of wild-fauna and flora in relation to creation of biosphere reserves and gene-pool resources.

Socio-economic aspects of wildlife as a landuse need investigation and research particularly in relation to related and overlapping uses of land under agriculture and forestry.

There is also a need of a coordinating agency to identify problems of the managers of various wildlife areas, including Parks, Sanctuaries, Zoos and general Forest areas and feed them for research agencies and Universities, as also to transfer the research findings to the field into packages of well-defined management practices. In this context, development of a proper data base and documentation is also a great need for research.

Wildlife education has to be geared to provide :-

1. The managers of wildlife areas and areas where wildlife overlaps other uses with knowledge for evaluating various parameters in connection with wildlife habitats as well as the requirements of animals and impart capacities to integrate wildlife management techniques with overlapping land-use practices.

2. A trained cadre of research workers who may be familiar with techniques of conducting wildlife research in various inter-disciplinary fields.

The talk will highlight the role of the Directorate of Wildlife Research and Education in the above context of Research and Education and various programmes envisaged in the VI Plan.

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* Director, Wildlife Research & Education, Forest Research Institute & Colleges, P.O. New Forest, DEHRA DUN.

VK/DVS/Zool.

Dr. H.R. BUSTARD
FAO Consultant (Crocodile Breeding)
CENTRAL CROCODILE BREEDING AND MANAGEMENT TRAINING INSTITUTE, 19-4-319.,
LAKE DALE,RAJENDRA NAGAR ROAD, H Y D E R A B A D - 500 264.

* * * *

Paper : Crocodile Farming.

S Y N O P S I S

Demand for crocodile hides by the luxury leather market has brought most species of crocodilians to the verge of extinction. Crocodile populations are geared to a high level of egg and juvenile mortality but to an extremely low level of adult mortality. Hence any sustained level of hunting rapidly wipes out the population.

High fecundity, sluggish habits and ectothermy resulting in reduced food consumption, and the ease with which crocodiles adapt themselves to captivity, where they readily breed, makes them ideal subjects for farming.

A Government of India/F.A.O./U.N.D.P. Project on Crocodile Breeding and Management has been in operation since 1975. This project, initiated to save the gharial from extinction, has gained valuable expertise on husbandry of all three species of Indian crocodilians, information which could now form the basis of commercial crocodile farming.

DVS/VK/Zool.

Binay
Nov 1978

"FORESTRY AND WILD LIFE OF ANDHRA PRADESH" - OVER VIEW *

By

P. S. Rao, I.F.S., **

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SUMMARY.

The history and evolution of the Forest Management in Andhra Pradesh are outlined. The evolutionary management of forests through Panchayats, National Forest Policy, Post-independence development plans are outlined. The progress made by Forest Department in the fields of Man-made forestry, soil and water conservation, Water-shed-management of river-valley projects like Machkund are high-lighted. In view of the promotion of gigantic forest based industries, industrial catchments have been identified and for planning their raw-material supplies, potentiality studies were undertaken through Pre-investment Surveys. Trade in Beedi (Abnus) leaf has been nationalised and extraction of timber and fire-wood through Departmental Agency has been implemented in the State to give a fair deal to the wage-earners and ensure continuous gainful employment to the tribals and other weaker sections of the society. The Andhra Pradesh Forest Development Corporation has been promoted for more effective utilisation and development of forests and their resources utilizing institutional finance. Drought prone area programmes are being implemented on a large scale to alleviate the suffering of people. Social Forestry and Farm Forestry programmes to generate additional wood and energy resources have been taken up. Integrated saw mill units have been established. Coastal areas have been surveyed with a view to raise shelter belts to mitigate the evil effects of cyclonic storms. As per recommendations of N.C.A. selected research schemes have been taken up for the first time in India in collaboration with Andhra Pradesh Agricultural University. So far thirteen wild life sanctuaries have been established in the State besides two Zoological Parks viz. Nehru Zoological Park at Hyderabad and Indira Gandhi Zoo Park at Visakhapatnam, to educate people and serve as living text books of nature and repositories of our vanishing resources.

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* Paper presented at the Seminar on Exploitable Biological Resources (Fisheries, Forests and wild life) of Andhra Pradesh held in connection with the Osmania University Diamond Jubilee Celebrations on 26.11.78 zt Zoology Department, Osmania University.

** Chief Conservator of Forests, Andhra Pradesh, Hyderabad-500 004.

"FORESTRY AND WILD-LIFE OF ANDHRA PRADESH: OVER VIEW" *

By

P. S. RAO, I.F.S. **

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Forests play a very important role in the economy of our country and particularly so in a State like Andhra Pradesh which is predominently agricultural. Forest conservation in Andhra Pradesh, in the real sense started in the second half of the 19th century with the appointment of Dr. Kleghorn as the first Conservator of Forests in the then Madras Presidency. The initial effort of the foresters was consolidation and demarcation of the forest blocks and enactment of rules and acts for the protection of forests, developing communications into the inacessible forests and fire protection. These served as a good foundation for the practice of scientific forestry to commence subsequently.

The year 1914 was a major turning point in the history of forests conservation in the State. It was in this year a folly was committed which was rectified 35 years later. Certain reserved forests near villages which were mainly intended to meet the requirements of villages for grazing, fuel and small timber were transferred to the management of Forest Panchayats in the Andhra region. The forests were classified into major and minor and the major forests alone were to remain with the Forest Department, and the minor forests which were considered primarily of use for meeting the every-day needs of villages were passed on to the management of forest Panchayats. Over 5,000 Sq.Kms. of reserved forests were controlled by non-professional managers on the principle of expediency for nearly 35 years. Forest Panchayats were then abolished and the forests retransferred to the control of Forest Department, as a result of the recommendations of the forest-sub-committee of the postwar Reconstruction Committee. These forests which were taken over by the Forest Department from the Panchayat management had by this time deteriorated beyond recovery.

The year 1952 is another important land mark in the history of forestry in India for it was in this year that the Revised Forest Policy was adopted by the Government of India and the Central Board of Forestry was established. This august board has been entrusted with the task of co-ordinating forestry and allied activities all over the country and ensure uniform and proper development of forests and forest resources.

With the commencement of the Five Year Development Plans, forestry in India has taken another big leap forward and man-made forestry

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* Paper presented at the Seminar on Exploitable Biological Resources (Fisheries, Forests and Wild Life) of Andhra Pradesh, held in connection with Osmania University Diamond Jubilee Celebrations on 26.11.1978 at Zoological Department, Osmania University.

** Chief Conservator of Forests, Andhra Pradesh, Hyderabad-500 004.

on a really large-scale commenced from that time. Postwar Forestry revealed a very grave position in respect of the adequacy of the forests and forest produce to meet the increasing demands from industry and local population. Large tracts of forests have been woefully wasted, soil conditions have deteriorated on extensive tracts and floods have taken heavy toll of men, homesteads, cattle and soil. Large scale clearance of forests for extension of agriculture, forests lost in submergency in river valley projects and clearance for rehabilitation of displaced persons etc., have further worsened the situation. Gone are the days of large forest blocks of untapped virgin forests and days of complacency that there was timber and fuel enough and to spare. Properly maintained reserve forests form only a small fraction of the land. The needs of the large growing population clamouring for higher standards of living and the requirements of fast developing wood based industries, have thrown a challenge to the forestry profession.

Forest Development activities commenced on a really big scale in Andhra Pradesh with the commencement of the 3rd Five Year Plan only. Under the schemes for raising economic plantations and quick growing species, large areas of mixed deciduous forests of poor quality were cleared and planted with Teak, Eucalyptus and Bamboo and more recently high yielding varieties of Cashew are being planted on a large scale. The areas planted with some of the important species upto 1977 are:

Teak	..	48,145 hectares	
Bamboo	..	24,263 hectares	
Eucalyptus	..	12,091 hectares	
Cashew	..	2,345 hectares	(with seed from high-yielding varieties released by the Cashew Research Station, Bapatla)

Coffee (Coffea arabica) planting on commercial scale was also undertaken by the Forest Department in the Agency forests of Visakhapatnam and East Godavari districts at the same time and an area of about 3189 acres has since been planted with Coffee to improve the economic conditions of the tribals and to wean them from the wasteful habit of shifting cultivation. Hybrid Pepper was also introduced in these coffee plantations with very good success.

The scheme for soil conservation in River Valley Project was also **taken up from** that time in the Machkund Sileru Basin in Vizag district and upto 1977, about 40,000 hectares of agricultural land has been treated with soil conservation measures like bunding, terracing, stone terracing etc., and about 10,000 hectares of badly eroded hill slopes have been planted with Bamboo, Eucalyptus, Silver Oak etc.

Forest resources survey to ascertain the growing stock including timber, fuel wood and bamboo by industrial catchments were undertaken

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between 1965-75 and most of the important forest zones of the State have been covered under schemes sponsored either by the Government of India or State. Based on these survey, the following wood based industries are currently being set up, or have already been established in different parts of the State:

1. A pulp and paper mill with an installed capacity of 42,000 tonnes of paper in the Kurnool district at an estimated cost of Rs.36 crores.
2. A Pulp and Paper and Board Mill in Khammam district with an installed capacity of 50,000 tonnes at an estimated cost of Rs.60 crores.
3. A Rayon Grade Pulp Unit in Warangal district with an installed capacity of 25,000 tonnes of pulp, at an estimated cost of Rs.20 crores.
4. A Particle Board Factory in Medak district with an installed capacity of 20,000 Cmt., at an estimated cost of Rs.5 crores.
5. A plywood factory in the tribal area of East Godavari district with an installed capacity of 2 million Sq.metres of commercial and decorative plywood, at an estimated cost of Rs.1.50 crores.
6. In addition to the above, the two existing Paper Mills in the State, the Andhra Pradesh Paper Mills in East Godavari district and Sirpur Paper Mills in Adilabad district are also expanding their capacity. A number of mini-paper mills with 10 to 20 tonnes capacity per day are also being set up in different parts of the State, based mainly on paddy straw.

Commencing with 1971 season the Abnus leaves trade in Andhra Pradesh (Telangana Region to begin with) was nationalised eliminating the contractor's agency. Simultaneously the wages paid to the labourers for the collection of leaves was also enhanced and an amount of about Rs.1.75 crores is disbursed every year as wages for collecting leaves, mostly confined to tribals and other weaker sections of the Society living in and around the forest areas, during the non-agricultural summer months of April to June when they are otherwise unemployed.

As a sequel to cabinet decision, departmental extraction was taken on a large scale in the year 1975-76 by replacing the contractors agency in East Godavari, Khammam, Kurnool and Nizamabad. In a phased manner, the Contractor agency has been eliminated and in 1978-79, the entire State forests are brought under departmental extraction. But for the areas where the Paper Mills are given lease, the bamboo forests are also being worked departmentally.

By departmental extraction the protection of forests have improved. The tribals and other weaker sections of society depending on forestry works are assured of fair wages. They are also being trained in modern logging methods with the association of I.T.D.A. and S.I.D.A.

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The wood based industries are assured of supply of raw material. Even the small scale industries are being supplied their requirements of raw material. In other words there has been proper utilisation of the available forest resources to-day than in the yester years under Contractory agency.

Simultaneously with the above, the Andhra Pradesh Forest Development Corporation was also established to undertake large scale plantations of Industrially useful species like Bamboo, Eucalyptus etc., in order to meet the growing demand for wood of these species by the several wood based industries existing and proposed to be set up in the State. The Corporation has an ambitious programme to raise plantations over an area of about 1,80,000 hectares of pulp wood species.

Certain parts of the State which are very frequently affected by severe drought are covered by the Drought Prone Areas Programme. The scheme for the present covers the districts of Anantapur and parts of Mahabubnagar, Kurnool, Cuddapah, Chittoor, Nalgonda and Prakasam districts and the anticipated investment under the various schemes during the 5th period alone is Rs.3.27 crores. The Drought Prone Area Programme aims at integrated rural and agricultural development on a water shed basis depending on the resources available in the districts. In the forestry sector, the important schemes are pasture development for sheep, soil and moisture conservation works coupled with pasture development for cattle, afforestation and Farm Forestry. Every year, a large number of polypot seedlings of fodder, small timber, Minor Forest Produce etc. trees are distributed to the farmers for planting in their homesteads and a similar programme on a mugh bigger scale is envisaged during VIth Plan.

An Integrated Saw Mill-cum-Seasoning and treatment plant at Rajahmundry was established during 1964-65 with the main objective of popularising hitherto non-conventional non-teak species. The strides it had made in the past one and half decades, it can be said with pride that we have been able to fulfil this objective to a great extent. The furniture fabricated at Rajahmundry Saw Mill with species like Terminalia tomentosa, Gmelina arborea, Ogenia dalbergiodes, Xanthoxylum rhetsa etc. are very popular to-day. The business turnover which was hardly half a lakh in 1964-65, the year of inception is to to-day of the order of Rs.50 lakhs. During the current year 8,000 doors and 16,000 windows are fabricated for the Chief Engineer, Roads and Buildings for the Cyclone rehabilitation works in Divi Seema. The customers range from a common man who wants a chain light upto big Government establishments like Madras Port Trust, Tamilnadu Housing Board, Shen Project, Bharat Heavy Electricals Limited and State Ware Housing Corporation etc.

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Experimental Plantations of tropical pines have been taken up since 1962 to assess their suitability to our conditions. Till 1977 an area of 185 hectares has been planted up with Tropical Pines. The experience so far has been encouraging and it is proposed to take up large scale field trials.

Forests ameliorate the climate, attract rain, prevent soil erosion and run off, augment the water supplies, meet the demands for fuel and timber and provide grazing to cattle. They also feed the forest based or wood based industries in the country.

These are all social functions of the forests or forestry. What then is Social Forestry? Is the role of forests changed? These are the questions that arise in our minds when we hear of the term "Social Forestry". The phrase "Social Forestry" appears to be a contradiction in terms to a layman unaware of the trends in Silviculture and forest utilisation.

The National Commission on Agriculture has brought Social Forestry into sharp focus in 1976 and the following are the objectives of "Social Forestry" being the basic and economic needs of the community aimed at bettering the conditions of living.

1. Fuel wood supply to rural areas and replacement of cow-dung.
2. Small timber supply to rural communities.
3. Fodder supply to the milch and draught animals.
4. Protection of agricultural fields against desiccating winds and
5. Providing recreational needs of the community.

When population was small and limited, what appeared to be limitless forests met the demand for fuel, timber and grazing. With the rapid increase in population and the irrational and reckless use of the resources, the forest areas as well as the forest wealth have dwindled to a dangerous limit. Fortunately, however, we have still extensive communal lands which are ill treated but can yet be revived to make them productive. The creation of tree groves or forests on such communal lands can be termed as "Extension Forestry" and growing trees for fuel or timber on field bunds and in the fields in conjunction with the agricultural crops can be termed as "Farm Forestry". Both extension Forestry as well as Farm Forestry are two facts of "Social Forestry".

Growing forests in the rural areas to provide fuel to the farmers who burn dung as fuel and to release dung as manure to the fields, growing trees on Farm lands or Road-side to supply small timber to the local population giving protection to communal grazing lands and producing fodder to the local cattle, growing shelter belts or wind belts around fields to protect them from desiccating winds and wind erosion and growing small

Contd.....

forests and woodlots to provide recreational respots to rural and urban communities, all these activities constitute "Social Forestry". Social Forestry is gaining more of importance. This is real people's forestry and with the active involvement and support of the people, much can be done.

Andhra Pradesh is one of the few States in India which has taken up selected research schemes on forestry in collaboration with the Andhra Pradesh Agricultural University. The following are some of the schemes taken up.

1. To study the effects of Wind Breaks and Shelter Belts on Dry Agricultural Crops;
2. On developing High Yielding Varieties of Bamboo;
3. To study the Growth, Reproduction and Grading of wood in Red Sanders;
4. To study the causes for low bearing of Cashew in the forest areas under dry conditions; and
5. To study Physical Chapters of Red Sanders viz., Thermal, Electrical and Radiation Absorption properties.

Now coming to Wild Life in Andhra Pradesh. The concept of setting apart forests for the preservation, protection and propogation of Wild Animals and plants is not a new one in our country. It was borne in Vedic times and flourished in the time of Asoka when "Abayaranyas" were set up, and has continued to modern times. It has taken legal shape with the enactment of the Indian Wild Life Protection Act of 1972, under which any area can be declared a sanctuary if such area is of adequate ecological, Faunal, Floral, Geomorphological natural or Zoological significance . . . . . " Conceptionally, sanctuaries may be said to be "islands of nature in an ever embrolled sea of change and turmoil". They can be described better as "Oasis of nature in a fast emerging ecological desert". They are for the people, for their enjoyment and for their benefit.

In Andhra Pradesh, the 4th largest State of India, with 479 lakhs of population at present there are 13 notified Sanctuaries, as against the national figures of nearly 200. Area wise at present sanctuaries cover less than 5% of the total forest area of the State as against the National Figure of over 18%.

The important animals and birds common found in our sanctuaries are -

1. Tiger.
2. Panther
3. Wolves
4. Gaur.
5. Nilgai
6. Chowsingha
7. Black buck,
8. Chinkara
9. Sambar,
10. Cheetal,
11. Wild Boar,
12. Hyenas

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13. Wild Dogs
14. Flamingo
15. Grey Pelicans
16. Painted Storks
17. Open billed storks
18. White necked storks
19. White ibis
20. Nuktas
21. Spot bills.
22. Red crested Pochard
23. Pied Horbills
24. Grey Hornbills
25. Snake birds
26. Herons etc.
27. Peacocks
28. Jungle fowl.

From the Wild Life Point of view the best sanctuary in our State is the Eturnagaram Sanctuary, 70 K.M. from Warangal spread over 800 hectares approximate of mixed decisuous forests along the river Godavari. This can be truely termed the home of the Guar and the only place where animals feel at home and can be seen quite frequently especially Gaur, Nilgai, Spotted Deer, Chowsingha, Sloth Bear etc., Tiger, Panthers and Wolves are also reported from the sanctuary.

It is proposed to throw open this sanctuary to visitors. Sometimes in 1979 after providing all facilities for visitors to stay and see the fauna.

Zoological Parks all over the world are assuming a changing role in the context of compulsions of the present times vis-a-vis the universl onslaught on wild life and its habitat. They are now looked upon not as necessary evils for the amusement of uninformed people but as the only possible last repositories of a fast vanishing resource. Another role they have assumed is that of educating people about our Natural Resources. "They are "living text books of Nature" and "items of our Culture".

In keeping with this concept the Zoos in Andhra Pradesh are also playing their part.

The Nehru Zoological Park now has in its collection over 1600 animals and birds. Many of them are endangered like the Indian Rhino, African White Rhino, Indian Lions, Tigers, Panthers etc. Most of the animals like the Rhinos, Giraffees, Zebras, Gaur, Lions, Tigers, Panthers, Pumas, Gnus, Gaunacos, Elands, Himalayan Bears have bred one time or the other. Besides most of the indegenous species like Manipur Deer, Black Buck, Chinkara, Cheetal, Sambar, Nilgai, Hogdeer etc., have bred for a number of years.

The Nehru Zoological Park has had the unique disctinotion of being the first Zoo in India to introduce several innovations and new concepts. These include some of the nature simulating moated enclosures designed for animals like Cheetahs, Pandas, Rakoons, Civets, some Monkeys and Baboons etc., a Natural History Museum with dioramas, Pre-historic Animals Park with life size fibre-glass models in a natural setting, and the Lions Safari Park, the first of its kind to be set up in India.

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We have a programme to set up two new ventures viz., a Tiger Safari Park and a Nocturnal Animals House, the first of their kind in India. Tiger Safari Park and a Nocturnal Animals House for which plans were drawn up three years back are now coming to fruition and it is hoped well within the next couple of years, with sufficient allocation of funds.

The Indira Gandhi Zoological Park-cum-Wilderness Park proposed to be developed near the steel town of Vizag covering an area of nearly 16,000 acres will perhaps the biggest of its kind when fully developed. We are planning to have a "Marine land complex" in this park with P.L.480 funds for which we have approached the Government of India. If and when set up, this will be the first of its kind in India.

At present there are nearly (250) animals and birds in the Zoo including Lions, Panthers, Wildboars, Giant Tortoises, Sloth Bears, Rhesus and Bonnet Monkeys, Crocodiles, Indian Squirrels, Nilgai, Salbar, Cheeral, Blackbuck, Barking Deer, Hog Deer, Chowsingha and so on. More are planned to be added.

This is in brief, is an account of forestry and wild life in Andhra Pradesh.

HISTORY OF EVOLUTION OF DROUGHT PRONE AREAS AND THEIR AMELIORATION * IN ANDHRA PRADESH.

C. V. Konda Reddy, I.F.S., **

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The dry zone of Andhra Pradesh covers the Districts of Anantapur, Cuddapah, Chittoor, Kurnool, Prakasam, Mahabubnagar and Nalgonda. In these districts, the rainfall is little and erratic and the temperatures are high. The howling desicating winds hasten the process of evaporation. The cattle population in this arid zone exceeds the human population and the rural population maintaining the huge population mostly for dung forms 80% of the total population. While most of the bornie cattle are maintained for agricultural activity, the ovine population is maintained for trade.

The Sheep account for about 40 lakhs and the destructive and ubiquitous goats numbering about 20 lakhs around the country side and destroy almost every kind of vegetation.

The forests once fairly luxuriant are to-day stretches of boulders radiating heat and increasing aridity to the vast tracts. A few glimpses of the wealth of forests in the not very distant past would highlight the man's imprudence.

Jean Bartist Tavernier, a French Traveller and a Jeweller travelling from Fort St.George (Madras) to Gandikota, a principality under Mir-Yumla's suzerainity via. Renigunta Balapalle and Kodur records on 27-8-1652 that the Chiefton of Gandikota was capturing wild elephants in the dense forests of Balapalle (now part of Chittoor District) by pit method and gives very graphic account of the camp and the captured elephants.

Ferista, the Moghul historian is reported to have mentioned in his chronicles that in the early 17th century, the Moghul armies passing through Kurnool had encountered elephant herds.

Dr. A.V.Raman Rao in his book entitled "The Economic Development of Andhra Pradesh" lists wild elephants along with tobacco and cloth as the chief exports from Cuddapah in 1812. The Wild skins of tiger and Cheetah were being sold Rs.5/- and Rs.2/- each respectively in Cuddapah district in 1886.

While the present Ghat road from Nandyal to Giddalur was being laid between 1867 and 1875 through Nallamalais in Kurnool District, the tiger menace to the road labour was so great that annually about 163 human deaths were reported by the District Collector and one Major Christy with his batallion was ordered to camp on the road under making, kill the tigers and afford protection to the road-making labour.

When systematic Forest Management was for the first time considered necessary in the early 19th century when Dr. H. Cleghorn was the Conservator of Forests, Madras (Conservator was then the Head of the Department working under the Board of Revenue), Nilgiris and Cuddapah were selected for scientific Forest Management and Kodur where Yarde successfully practised "Plantation Forestry" of Red sanders for the first time became the Mecca of Foresters and the training ground for all the foreign recruits.

In the sixties of the 19th Century, the Railway lines were laid for the first time through Cuddapah, Chittoor, Anantapur and Kurnool, special tram line was laid from Balapalle into the Valleys to extract and supply sleepers for the Railways.

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* Paper presented at the Seminar on Exploitable Biological Resources (Fisheries, Forests & Wild Life) of A.P. held in connection with Osmania University Diamond Jubilee celebrations on 26.11.78 at Zoological Dept. Osmania University,

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The plains around Nallamalais were so full of Bamboo that the District Collector of Kurnool ordered the destruction of this 'dangerous material weed' in the 19th Century. Anantapur district in the [illegible] blocks of Nyalakota, Mallappakonda, Janneavulapalle, Kothukota, Yerlampalle, Narsampalle, and Amagondapalem, there was good bamboo growth and a "Gallows" working circle was constituted to extract bamboos.

The Reserved forests were classified according to their functions in 1915 in Madras Presidency on the recommendation of the Committee of Officials and Non-officials constituted in 1912, headed by Horne, the Forest Commissioner. The forests were divided into six classes:-

Class-I : Reserves which must be preserved for climatic purposes and for the protection of water sources and these which are far from the villages (climatic forests).

Class-II : Reserves as producers of timber and fuel and in which grazing is a secondary product.

Class-III : Fuel Plantations.

Class-IV : Reserves adjoining Villages which, while useful for grazing certain trees growth which it is necessary to preserve for future (grazing and fuel production).

Class-V : Reserves more useful for grazing than for any other object.

Class-VI : Reserves entirely useless (These were dis-reserved)

In Anantapur there were no Class-I forests, but out of the total areas of 4,75,320 acres then reserved, Class-II forests accounted for 1,95,427 acres ie. 41% of the total area. There were no Class-I forests. In Chittoor, the Class-I forests covered an area of 87,521 acres and Class-II, 2,05,738 acres ie., 38% of the total area. In Cuddapah, out of the total area of 11,62,738 acres Class-I accounted for 8,22,079 acres i.e., 60% and Class-II forests accounted for 11%.

In Anantapur now we have about 7% of Class-II forests, the rest having degenerated either into Class-IV or Class-V. In Chittoor, we have still about 5% of Class-I forest in Seshachalam plateau, and about 90% of class-II forests have slid down into Class-IV forests. In Cuddapah, all Class-I forests have been degraded into Class-II or Class-IV, and several Class-IV forests have degenerated into Class-V. and the then Class-V has almost gone out of existence.

This general trend of degeneration is due to rapid increase in both human and cattle population and the tremendous biotic interference with the growth and existence of the tree growth. No less responsible for the degradation are the faulty management techniques and the anxiety of the then Governments to meet the commercial and industrial demands of fuel while cheap alternatives were available.

The permit-cum-licence system practised by the Government in meeting the local requirement for fuel removed control over unsystematic felling and transport in the nineteenth century.

When some seigniorage on Bamboo was suggested, Minchin, the Collector of Kurnool in 1864 stated, "In my opinion the clearing of Bamboo from the jungles at the foot hills should be encouraged in everyway. The sooner these un-healthy jungles are replaced by cultivation, the better for the District and the Government . . . . . the Forest Conservancy should work in subordination to the Revenue authorities of a District.

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When the Railways were laid through Cuddapah, Chittoor, Anantapur and Kurnool, it was the policy of the Government to supply forest fuel to the Railways at Rs.5-14-6 per ton or Rs.17-11-6 per three tons equivalent to a ton of coal which cost the Railways at Jalarpet Rs.25/- only. The fire-wood demand of the railways was about 40,000 tonnes per annum and nearly 30,000 tons of fuel were annually supplied from accessible forests of Chittoor, Cuddapah and Anantapur.

To Napier Foundry Company, according to proceedings of Madras Government (Revenue) dated 27-3-1876 was leased a forest of 42 Sq.miles in the present Mamandur Forest (North Arcot District at that time) of Chittoor district. The seigniorage charged for the company was only Rs.2-4-0 per ton of charcoal manufactured. The Company resisted the proposed increase of the rate to Rs.3-8-0 and the Government yielded to the wishes of the Company.

In Sirvel Taluk (present Arlagadda) of Kurnool district, according to the proceedings of the Board of Revenue dated 13-9-1865, there were 83 forges manufacturing iron, using Bamboo and other wood charcoal in making bars out of iron bails. Each forge produced iron worth Rs.2,400/- annually and exported the metal to Cuddapah and Hyderabad.

Inspite of R.H.Beddome's (Conservator of Forests, Madras Presidency) plea made in his letters dated 12-9-1865 and 17.10.1865 that Bamboo should not be allowed to be removed free from the forests, that this valuable product would, in a few years disappear in the forests (Bamboo was stated to occur extensively and densely in Cuddapah), that due to considerable tax levied on Bamboo in Mysore country, Bamboo was being cut from Madras forests indiscriminately and transported to Mysore by Rail and that due to large scale clearance water supply would be seriously affected, the Government of Madras refused to levy any seigniorage on this "giant grass" for the following reasons:

> "The Bamboo is wide-spread, very abundant, self renewed and constant universal demand more especially by the poorer classes. The Forest Department do nothing in the way of conserving it or of improving the supply".

For the manufacture of sugar and Indigo, large quantities of forest fuel was used free of cost. The acreage under these two crops in the southern circle of Madras was as follows:-

(Board's proceedings No.3411, dated 21.3.1883)

Name of the district.		Sugar (acres)	Indigo (acres)
Cuddapah	..	3,034	1,00,772
Anantapur	..	1,841	5,382
Bellary	..	8,444	323
North Arcot.	..	4,254	33,928
South Arcot.	..	3,285	45,935
Salem	..	2,131	1,510
Total:		22,989	1,87,860

The fuelWood annually removed free of cost from the forests was 1,53,260 tons for sugar making and 41,746 tons for indigo manufacture. This unregulated drain on the resources of forest must have caused gradual denudation.

In all the Districts of Rayalaseema, more especially in Anantapur melting of block glass and bangle making industry were prosperous. The smelting furnaces were set up in-side the forests and as the forest disappeared, the furnaces were shifted into the interior.

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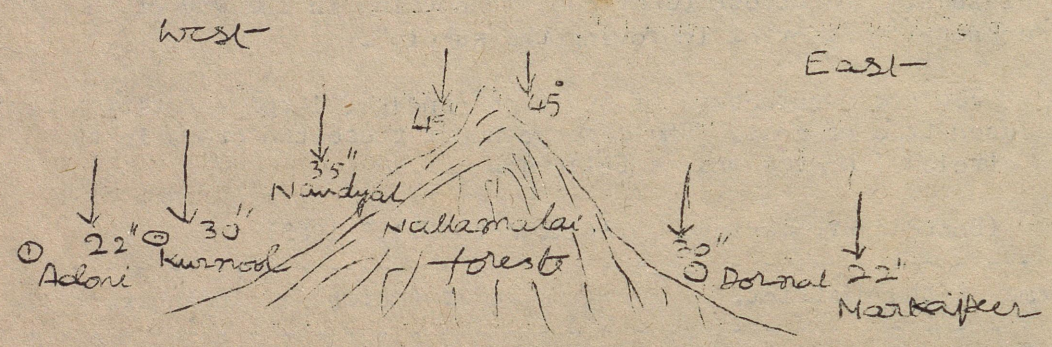
This industry existed in Anantapur till thirties of the present century and continues on a small scale in Kalahasti taluk of Chittoor district.

In Madras Government Order No.1884 (Revenue), dated 26-12-1905 it was ordered that wherever grazing forests were being burnt by graziers the Forest Department itself should burn the forests to encourage good regrowth of grass, inspite of the protestations of the Forest Officers and even Collectors. The Conservators of Forests, C.E.Brasier bemoaned, "Almost the alpha and omega of successful silviculture in India may be summed up in the two words, "natural reproduction" and it is impossible to have this on a brick like surface soil for the simple reason that moisture cannot be retained for sufficient time for seed to germinate".

The extensive and luxuriant forest of Cuddapah and Kurnool sheltering elephants and tigers have gradually become the scrub jungles due to man's avarice and administration's failure to appreciate the advantages of forest protection and conservation. The rainfall atleast in the forest zones must have considerably decreased over decades of denudation and the unrestricted grazing, burning and the unwise decision to permit free removal of manure leaf and fencing material from forests have further aggravated the situation.

The presence of the forest over an extensive area has a definite bearing on the rainfall. The tracts clad with tree growth cause higher precipitation. In Nallamalais of Kurnool district, away from the sea, the rainfall increases as one goes from the periphery to the centre of the forest area which is nearly 130 K.Ms. long and 60 K.M. wide running from North to South. The rainfall at Nandyal on the western fringe of Nallamalais is 35" and at Dornal or Giddalur, 30". In the Central Nallamalais it is as much as 45".



The precipitation increases as the rain bearing clouds float over the forested hills. The process of Transpiration through the myraids of green leaves cools the atmosphere and causes increased precipitation. It is common knowledge that those who travel by an automobile suddenly feel cool and nice as they enter the forest. The increased humidity and coolness are due to transpiration and shade. The loss of moisture in a piece of wood after five months' exposure at Atmakur just outside the forest was 25% while it was only 18% at Bairluty just inside the forest. This proves that the humidity inside a forest is much more than outside the forest.

In the Government of India's Circular No.38-F-236-2, dated 30th October 1907, an enquiry was instituted which had reference to two main points, namely (1) the effect of forest preservation on the rainfall or the

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under ground water supply and (2) the effect of forests in the catchment areas of streams on the regularity and amount of the supplies which had their origin in these catchment areas.

From an examination of the replies received from the local (State) Governments and after consultation with Dr. G.T.Walker, F.R.S., Director General of Observations, the conclusions arrived at were briefly

> that the influence of forests on rainfall was probably small, and that sufficient information could not be furnished by the local governments to arrive at definite conclusions.

Scattered forests may not have any effect on the general rainfall pattern of a region, but large contiguous forest blocks most definitely influence the rainfall as in the case of Nallamalais of Kurnool. If such extensive forests exist on high hills, the effect is more spectacular.

Dr. Voelkar in his report entitled, Improvement of Indian Agriculture, gives data relating to Ootacamand and the neighbourhood of the Nilgiri hills, which before 1870 were nearly bare of trees so much so that a photograph taken about that time has no resemblance whatever to the now thickly wooded station, the result of a large amount of planting by Government and by private individuals. Taking all the months of the year except June, July and August (which are excluded because the rains of this period are not local in origin but are those of South-west Monsoon and come from a distance), it was found that during the treeless period 1870-74, there was a total of 374 rainy days only whilst during the wooded period 1886-90, there were 416 rainy days. According to information brought up-to-date by the Inspector General of Forests, the figures upto 1922 are as follows:-

Period.	Rainy days excluding June, July and August months.
1870-1874	374
1886-90	416
1902-06	467
1918-22	481

Not only has the number of rainy days increased but also the rainfall has increased from 165 inches in 1902-1906 to 177 inches in 1918-1922.

The foregoing account indicates that forests in the dry zone of Andhra Pradesh were quite extensive and luxuriant indicating better rainfall and cooler climate. The injudicious attitudes of the administration and the belief that the God-given jungles would perpetuate themselves inspite of the perpetration of destructive practices led to the gradual disappearance of forests. The unprecedented harvesting of the natural forest wealth for industries and railways, the purposeful eradication of bamboo which was treated as a weed, the burning of forest to promote forage, the unregulated grazing and the permission to remove green leaf manure and fencing material free from all over the forests, removed the green mantle of the tract and exposed the land to merciless sun, the beating rain and soil erosion resulting ultimately in the aridity of the region now treated under Drought Prone Area Programme.

This degradation has been, no doubt, gradual in the beginning and rapid in the twentieth century due, perhaps, to unprecedented explosion of human and animal population and the frequent incendiary fires.

The forests which were worked for timber in the early twentieth century passed on to 'fuel forests' and the forests worked for fuel passed to 'faggotwood forests' in the forties of the present century as is gathered

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from the successive Forest Working or Management Plans prepared for the forests of Anantapur and Chittoor. Even the faggot wood series had to be closed and allotted to mere grazing forest, or pasture, in the fifties of this century.

The jungles of the majestic elephant and tiger have become the home of only jackals and rabbits. The forest fires every summer raze through all the forests, killing the flora and fauna and baking the soil. The pitiful rain mostly runs off the barren ground eroding the top soil and causes sudden floods in all the silted and shallow rivers. The numerous cattle and sheep roam the forests and the Countryside nibbling every shrub herb and grass. When the evaporation is more than the percolation the salts in the soil come to the surface through capillary action and create sterile, saline and alkaline soils which are generally unfit for any vegetation.

The reversal of this trend and the revival of the green glory of the dry tracts are immense tasks set before the Governmental agencies in the Drought Prone Areas.

The forest fires destroy the humus, the leaf litter on the floor, the seed and the seedling regeneration of all tree or herbaceous species. The soil building micro organisms are killed and the hardy woody species get charred and burnt causing immense damage to timber. The eggs and the young ones of birds and most of the wild animals perish in the conflagration. Annually, about two lakh cubic metres of timber (Teak alone accounting for about 50,000 cubic metres valued at Rs.1000 lakhs) are produced from the forests of Andhra Pradesh. But according to the experience in various divisions where the Departmental Working is introduced, nearly 50% of timber harvested is unsound or hallow due to charring and occlusion in young age. The unsound timber gets only 50% of the prices the sound timber gets and the direct loss annually in timber alone would run into crores of rupees. However, taking the teak timber alone into consideration, the loss due to annual fires annually is Rs.2.5 crores.

The sound teak sells at Rs.2000/m3 while the unsound Teak (become unsound due to fires) sells at Rs.1000/m3. On the annual production of 50,000 m3 of teak, 50% of which is unsound, the loss due to unsoundness caused is Rs.2.5 crores as indicated below:

25,000 m3 sound teak at Rs.2000/m3	..	Rs.500,00,000
25,000 m3 unsound teak at Rs.1000/m3	..	Rs.250,00,000
		Rs.750,00,000
If all the 50,000 m3 is sound Teak, the monetary return would be at Rs.2,000/m3		Rs.1000,00,000
The loss due to unsoundness, the direct result of annual fires	..	Rs. 250,00,000

The forest soils are self fertilised in nature. The leaves and twigs that fall to the ground replenish the nutrients to the soil. According to the work done in U.S.A. by Chandler in 1941, the hardwood leaf litter that reaches the ground in a forest annually by forest tree leaves (Hardwoods or broad leafed trees) alone are indicated below:

(Values represent lbs. per acre)

Ca.	Mg.	K.	P.	N.	Total.
65.6	9.2	13.5	3.3	16.6	108

The area of forest under the control of the Forest Department is 64,372 Sq.Kms. If it is estimated that only about one tenth of the forest or 6000 Sq.KMs. gets burnt annually, the indirect loss of fertility would run into about ten crores of rupees. The indirect losses would be staggering.

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As the ground flora and fauna are destroyed and the soil is baked hard in forest fires, the rain water does not seep into the soil but gushes down the slopes carrying the top soil into rivulets and rivers and ultimately silting up the reservoirs, and shortening the life of the costly multipurpose projects. The silting up of Nizamsagar and the costly temporary rectification carried out should be the pointers of the future.

As the interception and percolation of rain water into the soil are meagre, there would be no recharging of sub-soil water and consequently the water level in the wells goes down and the forest streams dry up.

In a normal catchment not subject to all these destructive biotic factors, according to National Council of Educational Research and Training, Government of India, half the rainfall evaporates, one sixth gets absorbed by vegetation, one sixth sinks into sub-soil and another one sixth flows as rivers.

The effect of denudation on loss of precipitation, and loss of soil as studied at the State Soil Conservation Centre, Lucknow by O.P.Malik (Indian Forester, November, 1973) is indicated below.

Catchment.	Loss of precipitation.	Loss of soil.
1. Forest with normal cover	1	1
2. Forest with Poor ground cover	3	20
3. Well-managed pasture	3	14
4. Agricultural crop.	25	3250
5. Grass lands	10	130

The short sighted policies, the destruction of tree growth over vast stretches of land, the forest fires, and the persistent biotic factors in operation over a century have been responsible in the dry zone of Andhra Pradesh for the loss of precipitation, soil erosion, decreased percolation of rain water into soil, loss of recharging capacity of catchment and ultimately for the conversion of vast stretches of fertile soils into alkaline or saline tracts.

This degradation has taken place in Rayalaseema, Prakasam, Mahaboobnagar and Nalgonda and is now taking place, may be imperceptibly, even in Adilabad, Warangal, Karimnagar and other densely forested districts of Telangana.

To slow down the process of desertification and to re-establish the forest cover, Drought Prone Area Programme is launched in the drought prone districts. In 1970-71, the Rural Works Programme, the precurser of the D.P.A.P., was initiated in this dry zone with cent percent assistance from the Government of India. The basic concept of the programme was the optimum utilization of land, water and human labour as resources. The concept from works orientation to area development approach was evolved and accepted at the time of the mid-time appraisal of the fourth plan. In recognition of this re-orientation, the programme was redesignated as D.P.A.P. and is being implemented on a water shed basis during the Fifth Plan.

Stone wall fencing or barbed wire fencing of the forests in the hill slopes to give some respite and protection to the ground flora and shrubs and to revive the vegetation, contour trenching and bunding to arrest the run off and recharge the ground water and sowing or planting of grass and tree species to hasten reforestation and enrich the pasturage and leaf fodder, are the main operations in the degraded forests which should also service as cattle pastures. Rotational or deferred grazing may have to be introduced to maintain these pastures in a state of sustained production. So far, about 10,000 hectares of forests are thus treated and improved.

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In the lower slopes of forests in the vicinity of villages fencing, ploughing and sowing of superious pasture grasses are done and a sprinkling of top feed tree species (Fodder leaf species) are planted to provide leaf fodder to the sheep in summer. The sheep pastures raised are also more than 10,000 hectares.

To meet the local demands for small timber and fuel, all pocket of degraded forests where the soil is still available for sufficient depth concentrated plantations are being raised after providing a fence to the areas. So far, about 8000 hectares of such plantations are created.

The Kings of Vijayanagar and the local Chieftains had constructed in the past several tanks big and small in the sloping terrain across streams and river all over the dry districts. The foreshores of these tanks are vast and are now being planted with Babul (Acacia arabica). So far, about 1500 hectares of such plantations are created and the local village panchayats will share 50% of the produce free of cost. This incentive ensures protection.

From the dry river beds in summer, the sands are blown on the adjoining agricultural lands causing dune formation and rendering them useless for agriculture. To prevent this sand drift, plantations of Sissu, Acacia, Eucalyptus and Palmyrah are raised all along the banks as wind belts and so far about 200 KMs. of the banks are planted.

Similarly, canal banks and Road Avenues are also planted with suitable trees to act as wind breaks and to ameliorate the dessicating climate. About 700 Kms. of road and canal belts are so far planted.

The gullies and ravines in the hill slopes are being plugged to reduce the velocity, prevent soil wash and to recharge the ground water.

Seedlings of trees useful to agriculturists and other rural population are raised in polypots are distributed free of cost to the people who plant them in the farm and home-steads. So far, 53 lakh seedlings have been distributed and it is estimated that atleast 10 lakhs seedlings must have been successfully raised in the country side.

These efforts in the Drought Prone tract of Andhra Pradesh have cost the Government about Rs.2 crores and more has to be done under 'Social Forestry' in the coming years to atone for the past mistakes.

Whatever is done to create resources and ameliorate the dry conditions, if fires are not eliminated to the extent possible and if the cattle population is not reduced considerably the ecological progression now set in motion will receive a jolting set back. Clearance of wide fire lines and fire petrols will have to be organised on an unprecedented scale.

What has happened to this Drought Prone tract is now happening even in the more fortunate districts of higher rainfall. The retrogression is clearly visible in the forested districts of Adilabad, Warangal, Khammam, Karimnagar, East Godavari and Visakhapatnam districts. The luxuriant mixed deciduous forest is giving way to the fire hardy teak in some districts and to scrub in some other districts. We have to learn the ~~xxxxxx~~ lessons of the dry districts where the process of desertification has advanced and take early steps to protect the forests against incendiarism, vandalism and unrestricted grazing. Once these are achieved the trend can be reversed and progress can be set in motion to restore the past glory and to reclothe the despoiled mother earth with green mantle.

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