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Dt 11/4/2003

To,

Shri Ashish kothari
Coordinator TPCG
BCIL N. Delhi

Subject: About submission of final report of BSAP
Vidharbha substate

Dear

Ashish

I am very sorry for late for preparation of final Report of vidharbha substate.

Here with I am sending final report of vidharbha substate in two volumes

1st volume is report & IInd volume is annexures

Thanking you for active cooperation in above process.

Youres sincerely

Gogulwar

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Amhi Amchya Arogya
Sathi
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LAC Vidharbha 15.3.2) Them Doc) Draft Action Plan/ver 2, 2003
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Bio-diversity strategy and action Plan - Vidarbha sub-state site



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Ministry of Environment and Forest
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Nodal Agency
Amhi Amachya Arogya Sathi, Kurkheda

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ii) Forest Department
iii) Forest Development Corporation of Maharashtra
iv) Pollution Control Board
v) Ballarpur Industries Limited
vi) Western Coal fields Limited
vii) District Industries Centre
viii) Statistical Department

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I must acknowledge the initiative and participation of the villagers from Markagodi and Hingare, Dist. Gadchiroli.

Special thanks to Mrs. Sandhya Edlabadkar who has done the painstaking work of compilation of the report. I must thank Mr. Narendra Bais for conceiving and conducting the workshop of 'Green Power' and Mr. Vivek Wagh for helping to organize 'Children Sciecne Congress'. I am grateful to unfailing help and co-operation of Mr. Mohan Hirabai Hiralal, Mr. Salim Kazi, Mr. Sunil Hastak, Mr. Tejraj Bhasarkar and other members of core group. I must also thank Mr. Arun Shevade for his labourious work of proof reading of the report.

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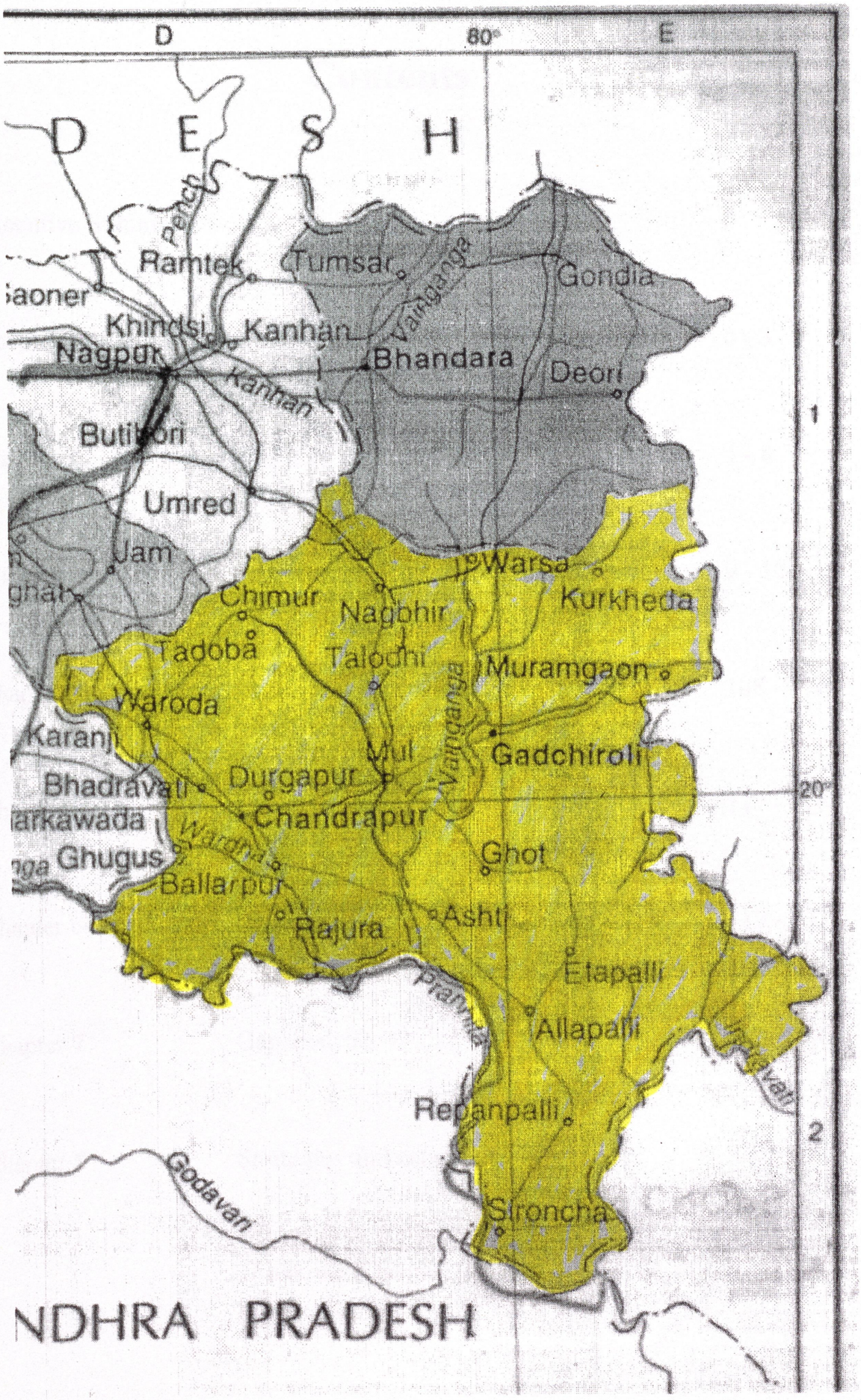
(Dr. Satish Gogulwar)
Coordinator, Chandrapur
Gadchiroli Substate.

People who commented? Suggested format

Map of Vidarbha

Shift to after other 2 maps

District boundary?



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Annexure is bound separately

Most of BSAP is profile - only 10 pp's of SAP!

Executive Summary

Executive summary

SAP for Vidarbha sub-state site (Chandrapur and Gadchiroli)

Location of site

Vidarbha sub-state site (Chandrapur and Gadchiroli) is located in the eastern Maharashtra the location map is as attached.

Objectives

1. Creating awareness about bio-diversity conservation and promotion as well as natural resource management and sustainable development among all sections of society.
2. Organization education and training of eco-clubs, self help groups and village planning groups for scientific management of natural resources and sustainable development.
3. Undertaking participatory studies and researches about status of bio-diversity, threats to bio-diversity, natural resource assessment, bio mass needs of the community etc. at the micro (village) level and creating databases.
4. Ensuring participation of disadvantaged sections of society like women, tribal in decision making process related to bio-diversity conservation and sustainable development.
5. To provide livelihood opportunities to poorest section of the society by ensuring their access to resources (Natural and financial) and promoting equity in resource use.
6. To promote self-governance at the grass root level among the groups and communities who have primary stake in bio-diversity.

Project Duration

The duration of the project was: From August 2000 to October 2001

Process highlights

A food bio-diversity mela for women was organized in Korchi and Dhanora blocks of Gadchiroli districts

Children's science congress with focus on bio-diversity was organized at Korchi

Public hearing and consultative meetings were arranged with farmers, fishermen, women and tribal etc. to know about the various problems related to bio-diversity conservation.

Discussions were held with government functionaries at the different level

Working plans, other relevant literature, reports used by govt. departments and universities and researchers were referred

Questionnaires and training modules were developed for training villagers on natural resource management and they were tested on small scale

Major achievements

Development of awareness about the need for actions related to bi-diversity within a cross section of the society initiated in a sustainable manner

Process for creating bio-diversity registers at village levels initiated and sustained.

Better understanding of the issues confronting conservation, sustainment and development of bio-diversity achieved amongst all major players

Important Outcomes

30 Areas for action identified and actions formulated in 25 areas action formulation in remaining 5 areas to be taken up after additional study with a time frame of eight to ten months

Long term perspective and SAP for conservation, sustainment and development of bio-diversity developed

Local action is taking place wherever it can be taken up without the help of external resources.

Closer co-operation is seen between various active groups and Govt. departments and joint activity (e.g. Development of medicinal plant nurseries and training in preparation of herbal medicines) is taking place.

Strategies and Actions

Strategies

Dialogue

Networking

Micro-planning

Capacity Building

Action research

Advocacy and lobbying

Actions

1. Continuation of dialogue with different actors initiated during the SAP formulation process towards closer cooperation and converging action.
2. Strengthening and expanding the present networks in the area of Farming, Education, Health, JFM, Gramsabha and SHG
3. Expanding the use of herbal medicines and village health worker system
4. Strengthening livelihood opportunities through development, deployment and dissemination of eco-friendly technologies as well as relevant schemes of government and other welfare agencies

5. Expansion in micro level actions for conservation and sustainable use of land, water, bio-mass and live stock resources to promote equity and productivity.
6. Micro level data collection about status of land, water, biomass, forest, livestock, energy resources and people's livelihoods needs, collectively by villagers, citizens, NGO and government officials
7. Creating village bio-diversity registers
8. Establishment of bio-diversity and Environmental information centre for NGO, village planning groups, research workers, students etc.
9. Continuous monitoring of environment protection activities by involving citizen groups and lobbying for strict implementation of Environment Protection Act
10. Workshops for education and training of all actors to build capacities for successful implementation of actions.
11. Action researches in the areas of:

    NTFP processing, storage and marketing of products,

    Use of bio-pesticides and live fencing,

    Better implementation of schemes of government and other welfare agencies,

    Herbal medicines,

    Maintenance of existing irrigation facilities,

    Water conservation,

    Updating village land records,

    Conservation and development of habitat of herons at village Markabody of Gadchiroli district,

    Waste land development,

    Community conserved areas

Village & other institutions for implementation?

Chapter 1

CHAPTER 1

INTRODUCTION

The 'Ministry Environment and Forest' is presently preparing National Bio Diversity Strategy and Action Plan (NBSAP) with funding from 'Global Environmental Facility'. NBSAP is proposed to be developed through a participatory process reaching out to a large number village level organizations and movements, NGO, academics, scientists, government officers from line agencies, the private sector, politicians and others who have a stake in bio diversity.

Institutional network for NBSAP process is at three levels i) National ii) State iii) Sub-state local.

At the National level the following groups and committees are formed.

1. Steering Committee
2. National Project Director (NPD)
3. Technical and Policy Core Group (TPCG)
4. Administrative Co-ordination Agency
5. Thematic Working Groups
6. Inter-state, Eco-regional, Working Groups.

NGO Kalpavariksha heads TPCG group and administrative co-ordination agency is 'Bio-tech Consortium India Limited'. Representatives from relevant ministries, NGO and experts are members of the above groups.

At the state level the following committees are formed.

1. State steering Committee
2. State nodal Agencies
3. Thematic Working Groups

Representatives from Government, NGO, Community/grass root representatives are members of these committees and groups.

At the local sub-state level the following committees are formed.

1. District/local level agencies
2. District/local advisory committee

Chandrapur and Gadchiroli district is a sub-state site in NBSAP process. 'Amhi Amchaya Arogya Sathi' Gadchiroli, is the nodal agency coordinating the activities for the Vidarbha sub-state site (Chandrapur and Gadchiroli districts).

Scope of SAP for Vidarbha sub-state site (Chandrapur and Gadchiroli district): SAP is prepared for Chandrapur and Gadchiroli districts of Maharashtra state. These districts are situated in the easternmost part of the state. Both of districts have high percentage of forest area and tribal population. These are relatively under populated district of Maharashtra states.

Nearly 85% of the population in these districts depends on agriculture, forestry, and fisheries for their livelihoods. In agriculture, forestry and fisheries external market driven extraction and production has resulted in reduction of bio-diversity related livelihoods in this area. There is urgent need to revive natural resource base and livelihoods dependent on this. SAP for this area was prepared after consultative meetings with self help groups of women, farmers, forest protection committees, government officials, NGO, social workers and teachers etc.

Objectives of SAP: The main objectives of the SAP are as follows.

1. Creating awareness about bio-diversity conservation and promotion as well as natural resource management and sustainable development among all sections of society.
2. Organization education and training of eco-clubs, self help groups and village planning groups for scientific management of natural resources and sustainable development.
3. Undertaking participatory studies and researches about status of bio-diversity, threats to bio-diversity, natural resource assessment, bio mass needs of the community etc. at the micro (village) level and creating databases.
4. Ensuring participation of disadvantaged sections of society like women, tribal in decision making process related to bio-diversity conservation and sustainable development.
5. To provide livelihood opportunities to poorest section of the society by ensuring their access to resources (Natural and financial) and promoting equity in resource use.
6. To promote self-governance at the grass root level among the groups and communities who have primary stake in bio-diversity.

Structure of SAP

SAP for this region consists of two parts.

Part A consists of

1) Profile of the area.
    i) Geographical and ecological profile
    ii) Socio-economic profile
    iii) Political profile
2) Current range and status of bio-diversity.
    i) Agriculture
    ii) Forest
    iii) Wetlands and Pastures
    iv) Industry and mines
3) Statement of problems relating to bio-diversity.
    i) Agriculture
    ii) Forest
    iii) Wetlands and pastures

4) Major Actors and their roles relevant to bio-diversity.
    i) Agriculture
    ii) Forest
    iii) Wetlands and pastures
    iv) Industry and mines
5) Ongoing bio-diversity initiatives.
    i. Government initiatives
    ii. Industries and Mines initiatives
    iii. Non-government organization initiatives
6) Gap Analysis.
    i) Agriculture
    ii) Forest
    iii) Industry and mines
    iv) Wetlands and Pastures
7) Strategy to fill the gap and action plan to implement the strategies.
8) References and Bibliography

Part B consists of Annexure

Brief Description of Methodology used in preparation of SAP

To introduce NBSAP process, first meeting was held on 13th August 2000 at Chandrapur. An ad-hoc steering committee was formed during this meeting. NGO representatives forest officials, villagers, representatives from Agriculture College and Forest College participated. It was decided to involve more people in the process. Coordinator of Gondawana eco-region was also member of the steering committee.

In the second meeting Mr. Ashish Kothari, National Coordinator of TPCG, NBSAP was present. A regular steering committee and advisory committee was constituted during this meeting.

It was decided to form committees on different subjects: agriculture, forest, wild life and fisheries etc. Hundred forms were sent to different people inviting their participation. Nearly 30 people responded.

After this a core group was constituted. NGO, government officials and agriculture college teachers and Forest College principal were members of core group.

It was decided that different NGO would prepare document for agriculture bio-diversity, forest bio-diversity, medicinal plant bio-diversity, wild life bio-diversity and Nistar rights.

A food bio-diversity mela for women was organized in Korchi and Dhanora block of Gadchiroli districts for participation of women. Women brought about 20 different varieties of vegetables, 22 varieties of fruits, 15 varieties of tubers, 4 varieties of Mushrooms. They regularly collect these varieties from the forest for consumption.

Another bio-diversity mela, for students, was organized at Kurkheda in which students from 8 villages participated. The students collected the following information.

i) Traditional agriculture equipment, agriculture produce storage methods and rice pounding.

ii) Types of grasses and their use in rope making.

iii) Teeth cleaners & herbal medicines.

Public hearing and consultative meetings were arranged with farmers, fishermen, women and tribal etc. to know about the various problems related to bio-diversity conservation.

Consultative meetings among variety of line agencies of government at the district and region level were held. Forest department, Agriculture department, Animal husbandry department, Statistical department, Pollution Control board and Social forestry department were contacted. Discussions were held with government functionaries at the different level e.g. in forest department, conservators of forest, district forest officers, rangers, forest guard, statisticians and Surveyors were contacted.

Working plans, other relevant literature, reports were referred.

Discussions were held with various researchers, experts in the field of medicinal plants, agriculture and watershed management.

Questionnaires and training modules were developed for training villagers on natural resource management and they were tested on small scale.

The details of the process and full list of participants is given in Annexure I and II respectively.

Chapter 2

CHAPTER 2
PROFILE OF THE AREA*

Chandrapur and Gadchiroli district of Maharashtra State lies between 18^0 41' and 20^0 50' north latitude and 78^0 48' and 80^0 55' east longitude. (See Location maps at the end of chapter).

Geography and Topography : Geographically speaking the district lies in the eastern part of the Godavari basin. Three large and important tributaries of Godavari viz. the Wardha the Wainganga (both of which together constitute Pranhita and the Indravati drain the western Central and eastern parts of the districts respectively. Geologically both districts possess considerable complexities with rock formation belonging to periods ranging from the Archaean basement complex to the recent tertiary alluvium. A part of Chandrapur district lies in Painganga, Wardha rift which perhaps the latest period of earth disturbances affecting the topographical and geological history of the districts.

The topography of the districts consists of alternation of low lying river plains, at elevation of less than 300 m and a series of hill ranges about 300-600 meters high in elevation. Fairly high elevations of more than 600 to 700 m are recorded only in southern and eastern parts of Sironcha tahsil which even today remains a backward tribal area. The Indravati valley in the southeast forms the westernmost extreme part of Dandakaranya basin.

The hills of Chandrapur district can be broadly considered as belonging to four groups (1) Chimur, Parasgarh, Nagbhid, Rajoli, Mul, Wamanpalli hills that form a broken series of hills together constituting the water parting between Wardha and Wainganga ranges. (2) The hills of southern and western parts of Rajura Tahsil i.e. Manikgarh hills. (3) The southern hill complex in Sironcha Tahsil such as Sirikonda hills, the Bhamaragad, Surajgad, Aheri and Dandakaranya hills. (4) The isolated hill masses of the eastern parts of Gadchiroli district such as Tipagad, Palasgarh, Boregaon hills. The highest elevations within the limits of the district are all recorded along eastern margins of Sironcha and Gadchiroli Tahsil.

Different distinctive geographical zones in the two districts are as follows -

1) The Wardha low lands with deep black regur are agriculturally the most productive, constituting the core of the most populous tract of the district, it covers a sixth of the total area.

2) The Western upland region forms a feeble water divide between Wardha and Wainganga drainage.

3) The Wainganga river basin is a heavy rice tract with clusters of prosperous agricultural villages. It is the most densely populated tract of the district.

4) The Pranhita Godavari low lands are extremely narrow and account for the only agricultural villages of Sironcha tahsil.

5) The Rajura upland is a trap country with usual monotony of flat tops, barren desolate appearance, poor dry farming and livestock rearing.

6) Eastern hills that cover nearly a third of total area are a forested tract.

* Ref. : B.G. Kunte (ed) 1973, Gazetter of India (M.S.) Chandrapur District, Chapter 1.

Soils and Forest types

Wardha low land : The soils of Wardha, Penganga valleys are rich and varied. Deep rich redeposit black regur, loams and clay loams all along the Wardha and Penganga valley floor. These are very productive soils. Eastward are the relatively higher ground these soils are replaced by shallow, yellow loam that tend to be thirsty.

The Wardha low lands have perhaps the least area under forest cover within the district. Tracts underlain by limestone and sandstone in feeble watershed between Wardha and Erai river are open dry deciduous forests with *teak, ain* and *bijasal* as the dominant species. Along Wardha and Painganga Valleys in Chandrapur and Rajura Tahsil even extensive parts of low grounds underlain shale and liable to seasonable water logging, are covered by dense thorn and scrub jungles that provide fuel and firewood.

Westerns Upland region : Shallow, brown and yellow loam soils generally predominate over the region, these soils are thirsty. Over the steeper sloping area useless, sandy, *retari* and *bardi* and at times *pandhari* soils are observed. These areas are generally well wooded. These forest are dense and of mixed type with *teak bijasal, shisum* as quality timber yielding species and *saj, dhawara, timru, kalam, haldu, anjan and babhul* as the less important species. Bamboo abounds in Moharali hill ranges.

The region is full of shallow tank depressions that collect vicissitudes of vagarious monsoon rains. One of the best known among them is Tadoba Lake. Set in depression in the well-forested Chimur hills, many wild animals and bird life abound in this region.

Wainganga low land :- Along the bank of Wainganga are generally found productive black loams. Light coloured Wardi soils cover extensively lower grounds. Higher ground is covered by morand and Khardi soils. The poorer stony and gravelly soils of the higher ground are covered by fairly dense mixed deciduous forest in many respects similar to those found further west. Teak and bamboo are most useful species. Quality teak and bijasal is obtained from Dhaba range of Gondpipri tahsil. Collection of variety of forest products and tussar worms provide subsidiary occupations.

Sironcha low land : The soils are fairly drained Kanhar soils. Kachar soils are young and immature, are frequently met within area, liable to flood inundation.

Rajura Uplands : Soils are poor stony reddish and lateritic. Almost entire plateau surface was covered by extensive Manikgarh state forest that mostly comprised high grass and bamboo as dominant vegetation.

Eastern Upland region : The whole area is a tangle of hill country. Gushing torrents and a gloomy shady forest environment, characterize entire area. The entire area is forest clad, dense wet deciduous mixed forest with high grass characterizes whole area. In the Vairagarh division *teak, bijasal, shisum, saj haldu and anjan* are the main varieties. Allapalli and Aheri forest are much denser forests. *Suria* or Indian iron wood trees, *sal, rohan tendu salai, mahua, char*, and *semal* are main species. Along the Pranhita, Godavari and Bandkia river valleys almost pure stand of teak forest occur. *Anjan* forests are widespread all over Sironcha in sandy and gravelly soils, though locally better soils are covered by *teak*. Thorny Bamboo is most common in east Sironcha area. But the best-developed forests are found in Aheri. There are mostly bamboo forests with teak along the streams.

Scientifically these forests belong to southern tropical dry deciduous forests as per Champion's classification.

Climate and Rainfall *

The climate of these districts is characterized by a hot summer, well-distributed rainfall during the southwestern monsoon and general dryness except in rainy season. The cold season is from December to February. This followed by the hot season from March to May. Southwest monsoon season is from June to September. On an average there are 63 rainy days (i.e. days with rainfall of 2.5 mm or more) in the district.

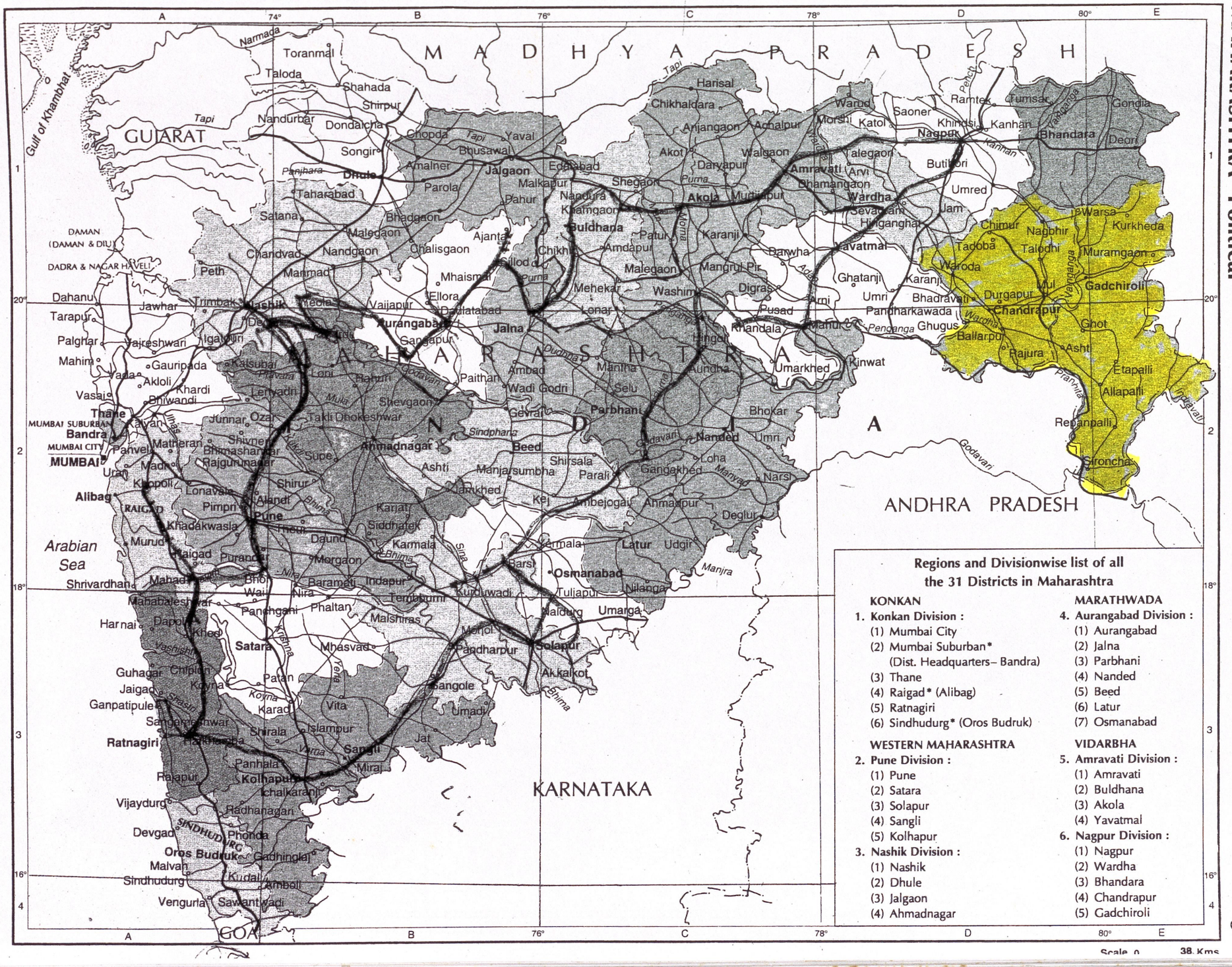
The average annual rainfall in these districts 1402 mm in the period (1901-1950). The rainfall in the districts generally increases from west towards east and varies from 1184.8 at Warora to 1820.5 mm at Murumgaon.

The detailed data tables related to climate and rainfall are given in the Annexure.



Projection : Lambert Conical Orthomorphic

Scale : 1 : 15,000,000 (1 cm to 150 km)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GUJARAT
KARNATAKA
ANDHRA PRADESH
GOA
MAHARASHTRA
Arabian Sea
Gulf of Khambhat
DAMAN (DAMAN & DIU)
DADRA & NAGAR HAVELI
Narmada
Tapi
Godavari
Wardha
Wainganga
Penganga
Purna
Manjra
Bhima
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Koyna
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Sina
Vashishti
Vaitarna
Ulhas
Amba
Kundalika
Savitri
Vena
Dudhna
Manyad
Nira
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Shastri
Terekhol
Toranmal
Taloda
Shahada
Shirpur
Nandurbar
Dondaicha
Songir
Dhule
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Bhusawal
Jalgaon
Edlabad
Harisal
Chikhaldara
Anjangaon
Achalpur
Warud
Morshi
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Saoner
Nagpur
Khindsi
Kanhan
Ramtek
Tumsar
Gondia
Bhandara
Deori
Akot
Daryapur
Walgaon
Amravati
Talegaon
Arvi
Dhamangaon
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Jam
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Kurkheda
Tadoba
Talodhi
Muramgaon
Waroda
Bhadravati
Durgapur
Chandrapur
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Gadchiroli
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Ghugus
Ballarpur
Rajura
Ghot
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Etapalli
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Jawhar
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Gauripada
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Vijaydurg
Devgad
Malvan
Sindhudurg
Oros Budruk
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Gadhinglaj
Kudal
Amboli
Sawantwadi
Vengurla
Alibag
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Murud
Roha
Mahad
Shrivardhan
Harnai
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Khed
Guhagar
Chiplun
Jaigad
Ganpatipule
Sangameshwar
Ratnagiri
Rajapur
Ambajogai
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Deglur
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Khed
Guhagar
Chiplun
Jaigad
Ganpatipule
Sangameshwar
Ratnagiri
Rajapur
Vijaydurg
Devgad
Malvan
Sindhudurg
Oros Budruk
Phonda
Gadhinglaj
Kudal
Amboli
Sawantwadi
Vengurla
Regions and Divisionwise list of all the 31 Districts in Maharashtra
KONKAN
1. Konkan Division :
(1) Mumbai City
(2) Mumbai Suburban* (Dist. Headquarters– Bandra)
(3) Thane
(4) Raigad* (Alibag)
(5) Ratnagiri
(6) Sindhudurg* (Oros Budruk)
WESTERN MAHARASHTRA
2. Pune Division :
(1) Pune
(2) Satara
(3) Solapur
(4) Sangli
(5) Kolhapur
3. Nashik Division :
(1) Nashik
(2) Dhule
(3) Jalgaon
(4) Ahmadnagar
MARATHWADA
4. Aurangabad Division :
(1) Aurangabad
(2) Jalna
(3) Parbhani
(4) Nanded
(5) Beed
(6) Latur
(7) Osmanabad
VIDARBHA
5. Amravati Division :
(1) Amravati
(2) Buldhana
(3) Akola
(4) Yavatmal
6. Nagpur Division :
(1) Nagpur
(2) Wardha
(3) Bhandara
(4) Chandrapur
(5) Gadchiroli
Scale 0 38 Kms
74°
76°
78°
80°
A
B
C
D
E
1
2
3
4
16°
18°
20°

Chapter 3

CHAPTER 3
CURRENT RANGE AND STATUS OF BIO-DIVERSITY

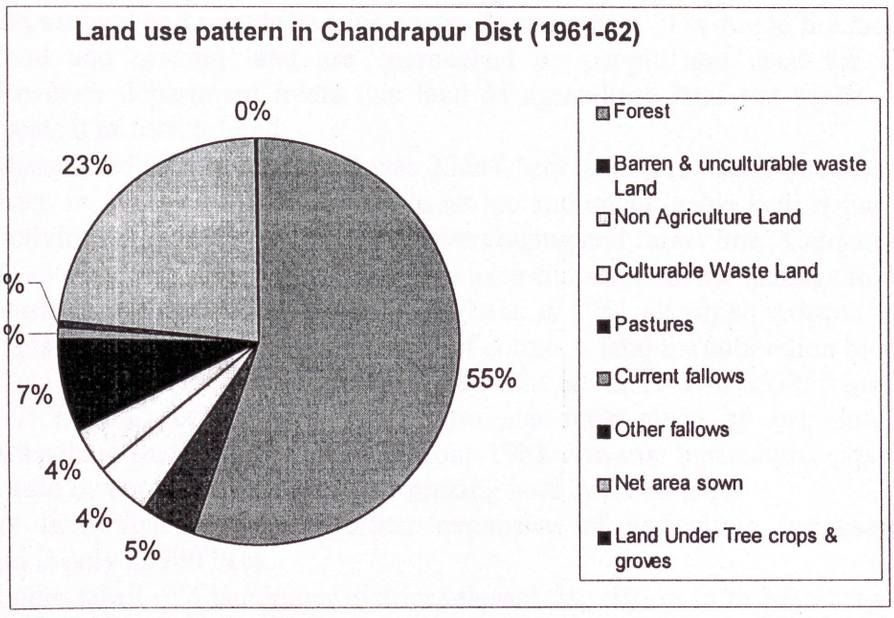
In this chapter we will briefly review the historical changes, present status of bio-diversity and problems related to bio-diversity. This chapter is divided in four parts

I. Land utilization pattern
II. Agriculture,
III. Forest
IV. Industry and Mines

I – Land Utilization Pattern

For the period between 1909 to 1961 it is very difficult to determine whether there was any shift in the patterns of land utilization as various changes in administrative boundaries and in classification of land utilization took place in the district. Based on the available data (See table no ----in Annexure) some conclusions can be drawn. They are as follows

i. The 1909 government forest area was about 30.5 percent of the total area of the district. In 1961, 56.48 percent of the total area was under forest. As unsurveyed area was transferred government forest so there was increase in area under government forest.
ii. Net cropped area was only 12 percent of total area, which increased to 22.35 percent in 1961-62.
iii. Cultivable Waste was 26.1 percent of the total area, which decreased to 3.6 percent in 1961-62.



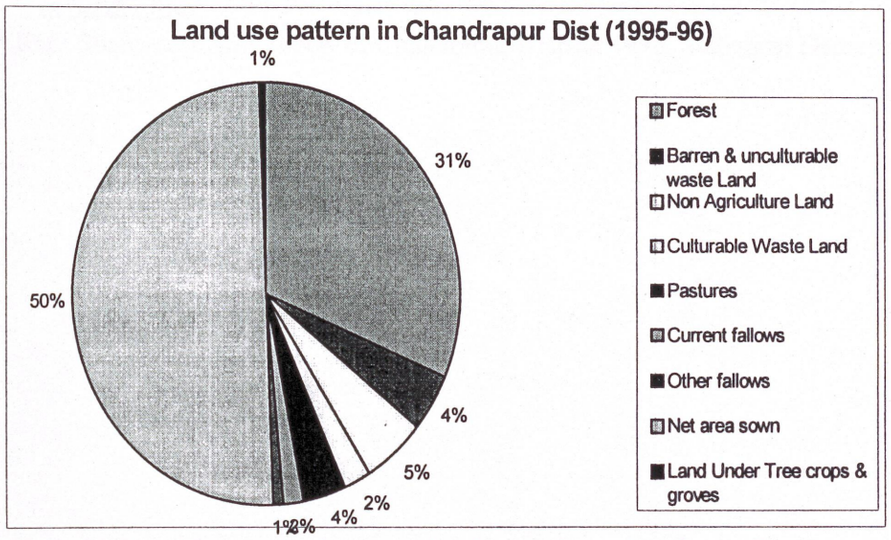
There were 6 tahsils in the district in 1961. Sironcha had highest percentage of forest area viz. 84.25 percent and Rajura tahsil had the lowest of all viz. 5.03 percent. The proportion of net area sown to total geographical area varied between 5.66 percent in Sironcha tahsil to 50.77 percent in Warora tahsil in 1961.

In 1981 Chandrapur district was divided into two districts i.e. Chandrapur and Gadchiroli.

Chandrapur District :- Chandrapur, Warora, Bramhapuri and Rajura tahsil were included in Chandrapur district.

The land use pattern in the district given by forest department, agriculture department and remote sensing centre in 1996-97 was different. This is because of different methods of land classification and determination of administrative boundaries.

For tables giving details of land utilization pattern in Chandrapur district see Annexure.



Following conclusions can be drawn from the above figures.

i. The figures of area under forest given by agriculture department forest department and remote sensing centre do not match. It is due to the fact the forest land and grazing land are encroached by people and used for cultivation. Revenue department treats this land as agriculture land but forest department treats it as forest. Land

ii. Barren and uncultivable land was 32247 hect. in 1961, which increased to 54800 hect. in 1996-97. This increase in barren and uncultivable land is due to mining activities and deforestation due to overgrazing and forest fires. Cement Industries, Coal mines and thermal power plants have caused immense damage to crop land.

iii. Pastures and grazing land was 78044 hect. in 1961-62 which reduced 43200 hect. This change is due to encroachment of common land for cultivation by people.

iv. Total cropped area increased from 484772 hect in 1961 to 663855 hect. in 1996-97. During1906-61 agriculture expansion took place by bringing cultivable wasteland under cultivation but from 1961 onwards agriculture expansion took place by encroachment on either grazing land or forest land.

There is limited scope for further expansion of agriculture because cultivable wasteland is only 28900 hect.

In Rajura tahsil of Chandrapur district migrant population from Marathawada region of Maharashtra had encroached thousands of hect. of forest land and grazing land for cultivation in the hilly region.

Migrants employed two types of strategies:

i. Clear felling of forest area was done and the land was used for cultivation. On record this land belongs to forest department but forest department is not able to undertake any forestry activities on this land.

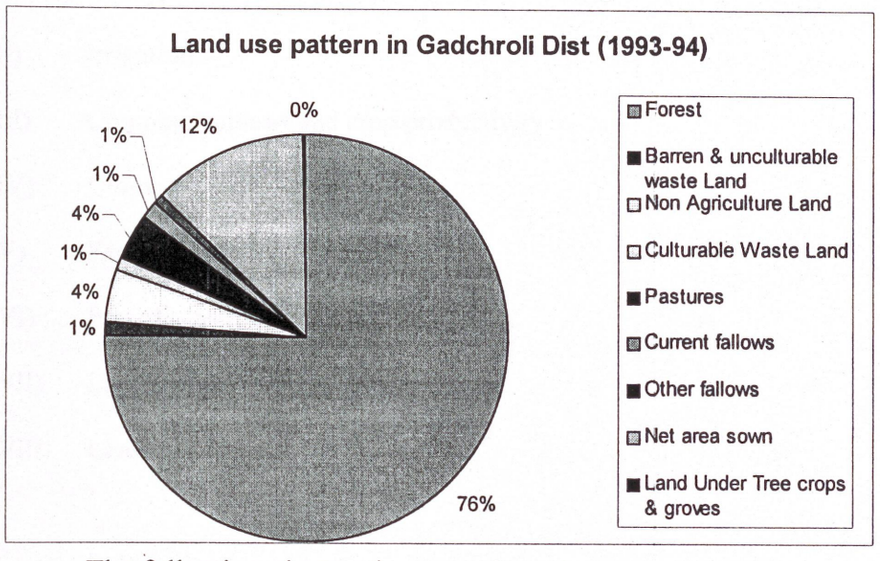
ii. In summer forest fires are induced by people who go to the forest to collect *tendu*, leaves, *Mahua* Flowers etc. Burnt part of the forest is brought under cultivation.

Political leaders in the area had supported encroachment of land in the past. With 1980 forest conservation act and its implementation by forest department this practice is on decline.

* Ref.: Socio-economic report of Chandrapur District 1998, Statistical Department, Chandrapur.

Gadchiroli : Sironcha and Gadchiroli tahasil of Chandrapur district were combined to form new Gadchiroli district (when?)

The land use pattern of Gadchiroli district in 1993-94 was as in the following table. Here also there is difference between land use pattern given by agriculture department, forest department and remote sensing centre.



The following observation are relevant.

i. The area under forest has increased from 1094890 to 1120300 Hect.

ii. There is difference between the figures in the period 1961-92 of forest area given by different agencies.

iii. The barren and uncluturable land has increased from 13102 hect. to 14900 hect. in the period 1961-62 to 1993-94.

iv. Culturable Waste land decreased from 42142 hect. to 17400 hect. in the period 1961-62 to 1993-94.

v. Grazing land decreased from 115069 hect. to 55300 hect. in the period 1961-62 to 1993-94.

vi. Total cropped area increased form 179080 hect. to 205400 hect. in the period 1961-62 to 1993-94.

vii. In Chamorshi and Bhamaragad tahasil of Gadchiroli district migrants from Bengal have encroached forest land for agriculture purpose Zoom cultivation practices in which some part of forest is burnt and cultivated is still practiced in Lahiri hills of Bhamaragad region.

viii. Thus Gadchiroli district have highest percentage of forest area (75 percent) in the state. It has lowest percentage of total cropped area (13.8) percent in the state.

* Ref. : Socio economic report of Gadchiroli District 1996, Statistical Department, Gadchiroli.

Agriculture

In this part we will review the changes that have taken place in agriculture of both districts during last 50 years and present status of agricultural ecosystems.
The topics covered will be

I) Soil type and fertility status

II) Irrigation

III) Cropping patterns and crop productivity

IV) Crops varieties

V) Farming practices

VI) Pest, diseases and control

VII) Livelihoods

VIII) Livestock

II – Soil Type and Fertility Status *

There were nine types of soils, which were distinguished at settlement and recorded, in old gazetteer of district. Their local designation varied according to language prevailing in different tracts. These local names were *Kali, Kanhar, bersi Kanhar, morand, kharadi, wardi, retari, bardi, pandhari, kacchar* of the total cultivated area of the district in 1906, *kali* covered 1%, *Kanhar* 9%, bersi *kanhar* 32%, *morand* 40%, *Kharadi* 4% and *Wardi* 13%. Of *Kali* is found in the valley of Wardha and Wainganga. It is formed from trap deep retentive and fertile. *Kanhar* is less fertile than *Kali*. It is observed in river valley as well as in tank bed. It contains small amount of grit in the form of lime. Inferior type of *Kanhar* is called as *bersi Kanhar* and is coarser in texture. It is mainly noticed in Wainganga Valley.

Morand is the most common soil in the district. It is light coloured loam containing more sand than in found in bersi and larger particles of stone. It responds well to irrigation due to its loamy structure. *Kharadi* is very poor soil of light colour and full of stone its outturn in very low. It requires plenty of manure or frequent resting.

Wardi : It is principal rice soil of heavy rice tracks. It is light coloured as good as sand with just sufficient clay to keep it from crumbling in dry season. If unirrigated it would be poor soil but with the irrigation it can be the most popular soil. When dry wardi is almost as hard as stone and can't as rule ploughed before the rains well set in. It never gets water logged and with full irrigation and some manure. It gives good crop of rice and sugarcane.

Retari and *Bardi* soils are useless without irrigation. Neither soil is brought under cultivation.

Soil type: In the district there are five types soils as per agriculture university.

1) Medium black soil - Rajura, Bhadravati
2) Deep black soil - Bramhapuri
3) Yellowish brown soil - Chimur, Nagbhid
4) Red lateritic soil - Chandrapur
5) Yellowish brown red soil - Gondpipri

Medium black soil : These soils are medium black B type and more or less drained. The texture ranges from clay to clay loam and may become temporarily waterlogged especially in July, August if heavy precipitation occurs in short time. Excellent crops of *jowar* and Cotton in kharif are grown, wheat in rabi can be grown in this type of soil.

Yellowish brown soil : These soils are yellowish brown varying depth poor in organic content. These soils developed from mixed parent material under influence of warm, humid, humid and are in process of laterisation. Intense leaching has removed bases from the soil giving slightly acidic reaction to soil. Although not very fertile these soils support raising of crops of paddy with management. The soils are responsive for fertilizer use.

Red Lateritic Soils : These soils are result of intense leaching of base. There is complete absence of calcium carbonate. Soils are poor in fertility especially phosphate. With judicious use of manure and fertilization, this can be managed to support excellent crop of paddy under protective irrigation.

Deep black soils : These soils are deep black locally known as Kali Kanhar. The texture is clayey to clayey loam. Rabi, *jowar* linseed gram and wheat besides transplanted or broadcast paddy. Paddy support utera method of taking pulses. E.g. *udid* and *mung* are grown as relay crop.

Yellowish Brown : These soils are typically yellowish brown to reddish yellow brown fine textured, well drained, have pH around neutral or slightly acidic loam to silty, loam, upper horizon moderately rich in humus. Sub soil horizon is blocky in structure and may exhibit shrinkage on drying. Mottling pigmentation due to soft nodular iron may be found in subsoils.

The following conclusions can be drawn from the data on physical and chemical properties of soils and soil fertility.

i. 98% of the soils in the Chandrapur district are in pH range 6-9 and only 2% of the soils have pH less than 6 i.e. acidic soils. Alkaline soils with pH more than 9 are not existing in the district.

ii. In 99% of the soils total soluble solid percentage is at the critical level. Only 1% of the soils has total soluble solid percentage, which is injurious to the crop.

iii. The soils in Chandrapur district are low in organic carbon and phosphorous and high in potassium.

iv. The analysis of erosion data shows that out of 737209 hect. of land surveyed 342860 hect. i.e. 46.80% of the land requires immediate soil conservation measures.

* Ref.1: B.G. Kunte (Ed.) 1973, Gazetter of India (M.S.), Chandrapur District Chapter 4.
* Ref.2:Agriculture department Chandrapur

III - Irrigation Facilities

According to the agriculture returns for 1906-1907 the total area under irrigation in the district amounted to 50109.34 hect out of which 47914 were irrigated from tanks. Prior to famine in 1900 the area under irrigation varied from 60702.9 to 64141 hect.

In 1906-1907 there were about 1500 large tanks and some 4000 boris in the district. Most of the tanks were built during reign of Gond kings. Most of the tanks were constructed by Kohlis a caste apparently of Dravidian Origin and perhaps akin to Madia Gond. The Kohli also exhibited a wonderful skill in arranging distributive channels and taking out level. Though they succeeded in irrigating land from those tanks, they could not make provisions for waste weir.

Wells formed next important source of irrigation. In 1906-1907 the area irrigated from wells amounted 732.40 hect. Gata cultivation and perennial springs irrigated remaining 1456.870 hect in the district.

The gata system of cultivation was mostly prevalent in Bramhapuri area. The gata system of cultivation particular to Zamindari can be described as follows. "The essential condition of this is a small valley with gently sloping sides and watered by a stream. Substantial timber dams are built across the stream at intervals in hot weather and are continued on either wing by embankments of earth until they almost but not quite merge into the rising sides of the valley. A series of perhaps twenty such gattas may be constructed one below other. When the rains come a shallow basin of water is dammed above each gattas, superfluous water being passed onto those below it by the escape passages or also casting over the top of the dam. Rice is planted in the shallow water thus held up, the irrigated area thus being above not below the dam.

The perennial springs were eagerly seized upon by the Madia and guided into small reservoirs for the purpose of his favorite Jhilan cultivation. The Sironcha tahsil including Aheri, Zamindari and the vicinity of the Mul hills were the chief localities in which perennial springs occurred.

The active history of Government enterprise commenced in respect of district with inquiries made in 1901-1902 by the irrigation commission.

In the beginning the irrigation was confined to tank work. The major projects, which were under preparation in 1908-1909 numbered 10.

Minor tank works were undertaken also either at the entire cost of government or else on what is known as grant-in-aid system. Under grant-in-aid system half the cost of tank in malguzari village was to born by Government and half by malguzar or malguzar and tenants jointly. The part of the cost not born by government was to be advanced as loan recoverable in small installments.

The irrigation works which were in operation in 1960-61 numbered 22 of these 15 works were the same (either with some modification or repairs) which were completed during the period 1902 to 1909. As per irrigation administration report for the year 1960-61, three works were under construction. In 1963-64 the total area irrigated was 101612 hect.

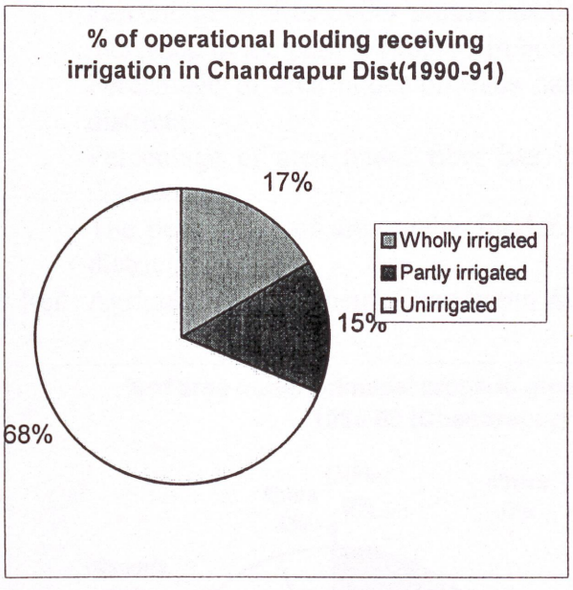
In 1996-97 the area irrigated in Chandrapur district was 97491 hect and in Gadchiroli district it was 53017 hect. (Chandrapur district was bifurcated in two districts in 1981)

Percentage of operational holding receiving irrigation: Percentage of net irrigated area based on net area sown, and percentage of area irrigated by different sources in the district is given in tables in Annexure.

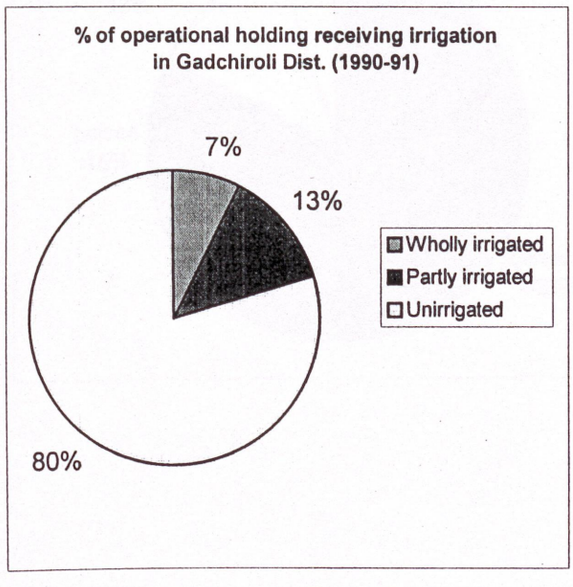
The following conclusions can be drawn from these tables.

i) The Chandrapur and Gadchiroli district irrigation facilities are better as compared with facilities in the state.

ii) In Chandrapur and Gadchiroli district surface irrigation by tanks, *bodies* and *canals* is done. The percentage of irrigation by wells is very small as compared with the corresponding figures in the state.



A picture of the districts during year 1990 - 1991



Reference: Agriculture Department, Chandrapur and Gadchiroli

IV - Cropping Patterns and Crop Productivity *

The proportion of area under important food and non-food crops has changed during last 100 years. It is worthwhile to study changes in cropping pattern in these years. Rice and *Jowar* are still major crops produced in the district. Each of them occupied more than 30 percent of the area. *Tuar, Lakh, Horsegram, gram, mung, udid* are the pulses grown in area. Linseed, seasamum, are main oil seeds grown in this area.

Percentage of area under principle crops to gross cropped is Given in Annexure.

Following conclusions can be drawn from analysis of above tables.

Percentage of area under cereals has increased in the period 1961-1985 but it has decreased after 1985 in both districts.

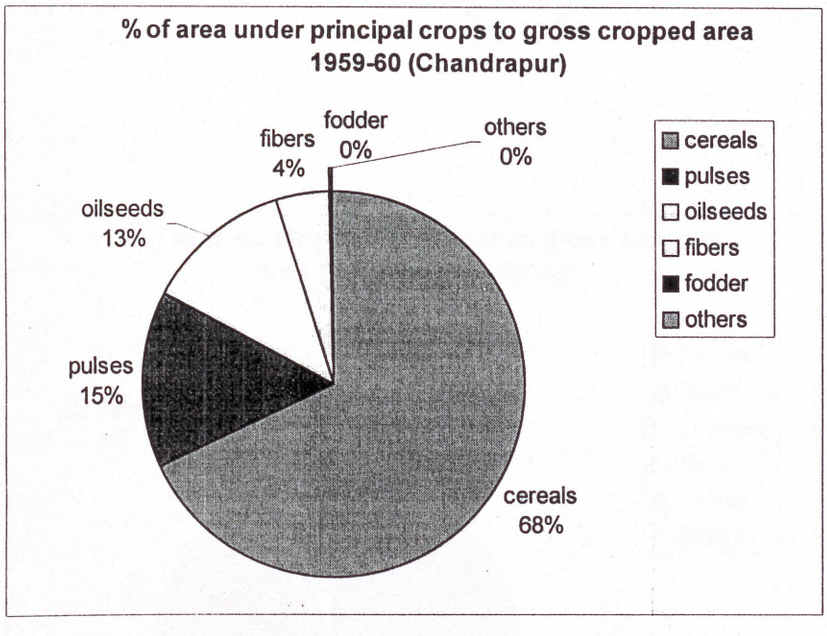
Percentage of area under pulses has decreased in the period 1961-85. But it has increased in the period 1985-91 in both districts.

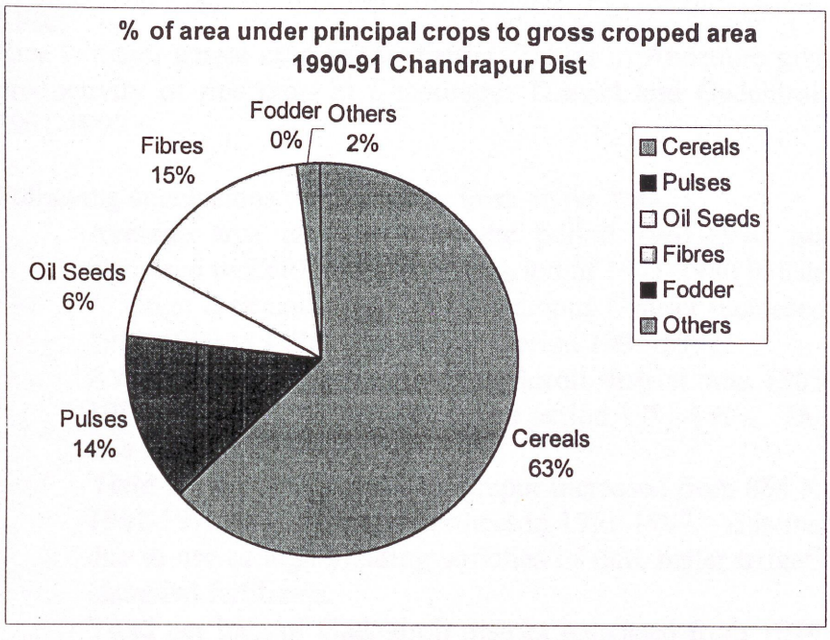
Percentage of area under oilseeds has decreased in the period 1961-91 in both districts.

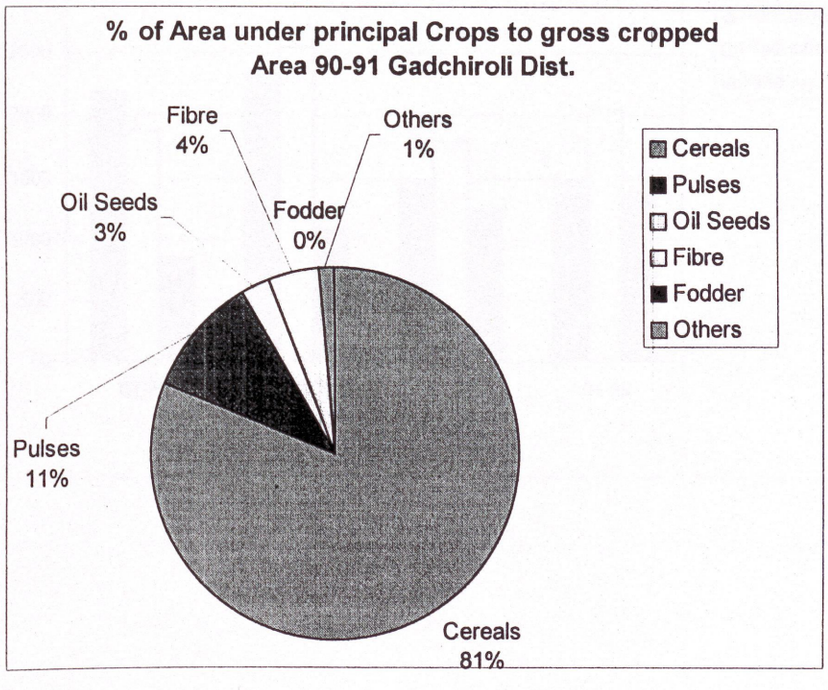
Percentage of area under fiber has increased in the period 1961-2000 in both districts.

The percentage of area under fodder crops and fruit crops is negligible in both districts.

* Ref : Agriculture department, Chandrapur & Gadchiroli




% of area under principal crops to gross cropped area
1990-91 Chandrapur Dist
Fodder 0%
Others 2%
Fibres 15%
Oil Seeds 6%
Pulses 14%
Cereals 63%
Cereals
Pulses
Oil Seeds
Fibres
Fodder
Others


% of Area under principal Crops to gross cropped
Area 90-91 Gadchiroli Dist.
Fibre 4%
Others 1%
Oil Seeds 3%
Fodder 0%
Pulses 11%
Cereals 81%
Cereals
Pulses
Oil Seeds
Fibre
Fodder
Others

RICE :

Rice is major cereal crop in the district. Tables in Annexure gives area, production and productivity of rice crop in Chandrapur District and Gadchiroli district in the period 1961-1997.

Following conclusions can be drawn from above data.

Average area under rice in the period 1961-1970 was 219400 hect which increased to 234000 hect in the period of 1971-1980 in Chandrapur district.

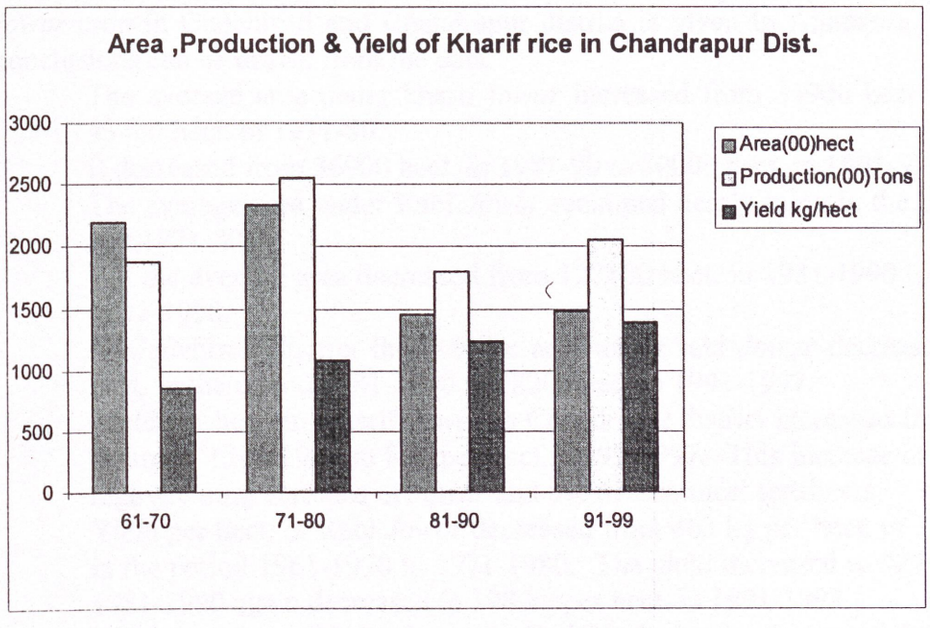
Average area under rice in Chandrapur District increased from 145100 hect. in 1981-1990 to 147400 hect in the period 1991-1997.

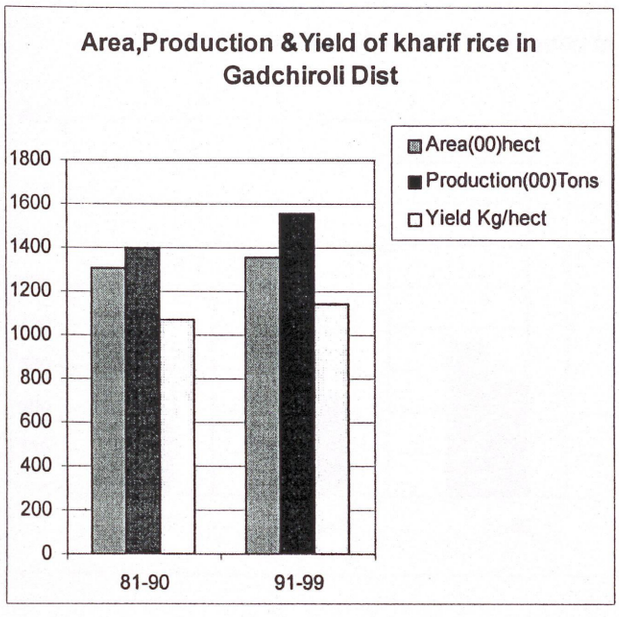
Average area under rice in Gadchiroli district was 130500 hect. in the period 1981-1990 and 135900 hect in the period 1991-1997. The increase in area under rice was marginal.

Yield per hect of rice in Chandrapur increased from 854 Kg per hect in the period 1961-1970 to 1391.2 Kg. per hect in 1991-1997. This increase in yield of rice is due to use ot high yielding varieties of rice, better irrigation facilities and use of chemical fertilizers.

Yield per hect of Gadchiroli district increased from 1074 Kg. per hect in 1981-1990, 1144 Kg per hect in 1991-1998.

In Gadchiroli district the use of chemical fertilizers is less than in Chandrapur district. At the same time tribals do not grow high yielding varieties. They prefer local varieties of rice.





JOWAR : *Jowar* is another major cereal crop grown in Chandrapur and Gadchiroli district. *Jowar* is grown both in kharif and rabi season in Chandrapur district. In Gadchiroli district it is grown only in rabi season. Area production and productivity of *jowar* crop in Gadchiroli and Chandrapur district is given in Annexure. The following conclusions can be drawn from the data.

The average area under kharif *jowar* increased from 33900 hect. in 1961-70 to 43400 hect. in 1971-80.

It decreased from 36900 hect. in 1981-90 to 30000 hect. in 1991-98.

The average area under Rabi *Jowar* remained nearly same in the period 1961-70 and 1971-80.

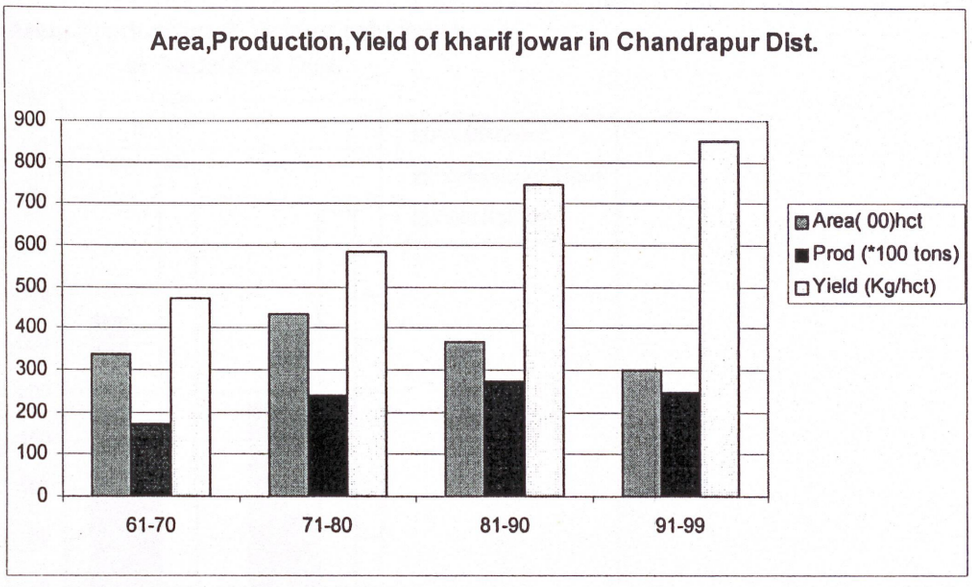
But the average area decreased from 127100 hect. in 1981-1990 to 98700 hect in 1991-1998.

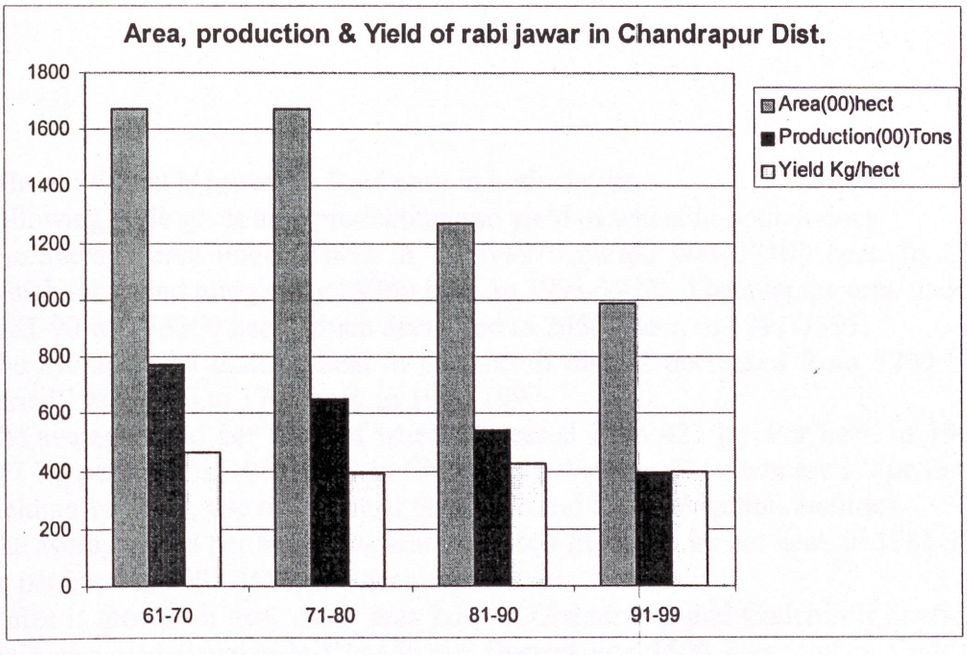
In Gadchiroli district the average area under rabi *Jowar* decreased from 27900 hect. in the period 1981-1990 to 18200 hect in 1991-1997.

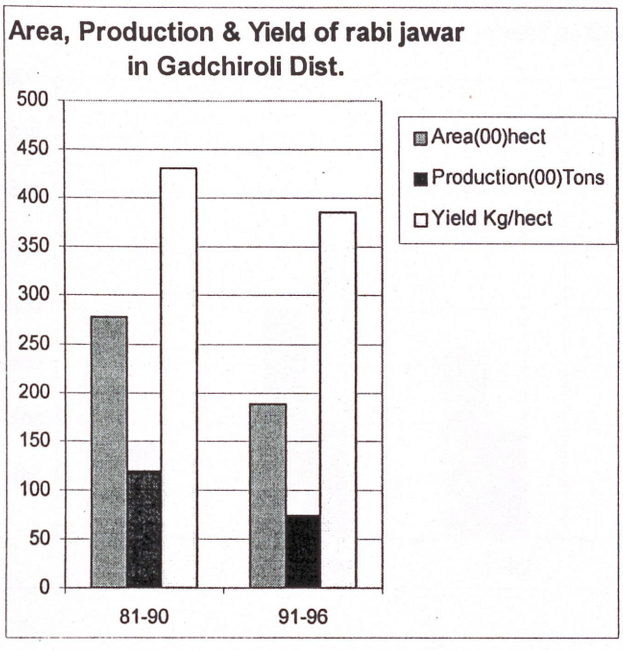
Yield per hect. in Kharif *Jowar* in Chandrapur district increased from 471 kg. Per hectre in 1961-1970 to 850 per hect., 1991-1997. This increase in yield is due to high yielding varieties of *Jowar* and use of Chemical fertilizers.

Yield per hect. of Rabi *Jowar* decreased from 463 kg per hect. to 390 kg per hect. in the period 1961-1970 to 1971-1980. The yield increased to 427 kg per hect. in 1981-1990 again decreased to 398 kg per hect. in 1991-1997.

Yield per hect. of Rabi *Jowar* in Gadchiroli district decreased from 431 kg. per hect. to 386 kg. per hect. in the period 1981-1990 to 1991-1997. Rabi *Jowar* is mainly grown for fodder. Local varieties are used. No chemical fertilizers are used and irrigation is not given. So yields are very low, nearly half of the Kharif *Jowar*.

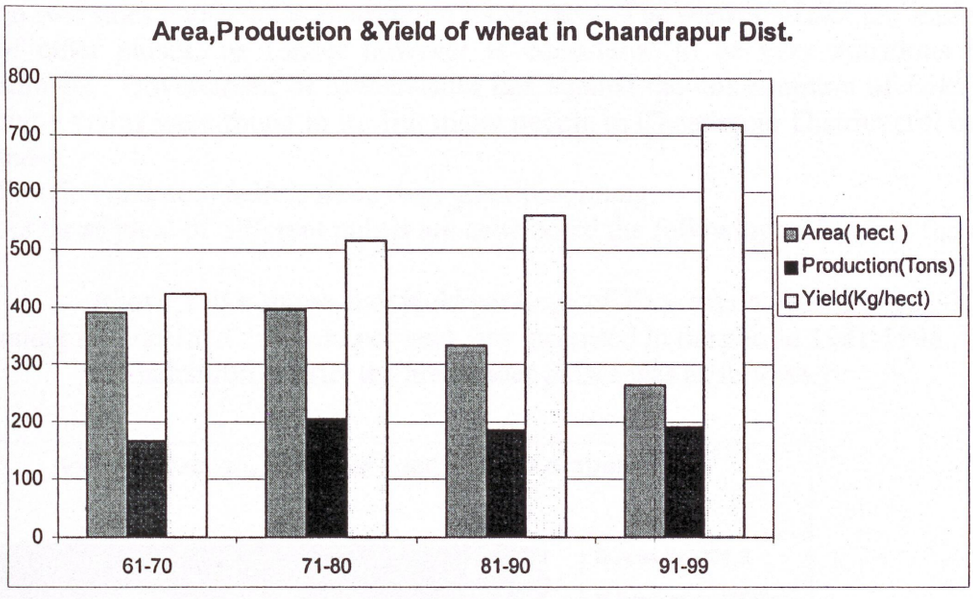

Area,Production,Yield of kharif jowar in Chandrapur Dist.
900
800
700
600
500
400
300
200
100
0
61-70
71-80
81-90
91-99
Area(00)hct
Prod (*100 tons)
Yield (Kg/hct)


Area, production & Yield of rabi jawar in Chandrapur Dist.
1800
1600
1400
1200
1000
800
600
400
200
0
61-70
71-80
81-90
91-99
Area(00)hect
Production(00)Tons
Yield Kg/hect



Wheat : Wheat is grown as Rabi crop in both district.
Following table gives area production and yield of wheat in both district.
The average area under wheat in 1961-1970 period was 39100 hect. In Chandrapur. Which increased marginally 39700 hect. in 1991-1997. The average area under wheat in 1981-90 was 33300 hect. which decreased to 26600 hect. in 1991-1997.
The average area under wheat in Gadchiroli district decreased from 3200 hect. in the period 1981-1990 to 1700 hect. in 1991-1997.
The average yield per hect. of wheat increased from 423 kg. Per hect. in 1961-1970 to 717 Kg per hect. in 1991-1997 in Chandrapur district. This increase is due to use of high yielding varieties, use of chemical fertilizers and better irrigation facilities.
The average yield per hect. of wheat increased from 627 kg per hect. in 1981-1990 to 705 kg per hect. in 1991-1997 in Gadchiroli district.
Maize is grown on very small area both in Chandrapur and Gadchiroli district. In 1997-1998 area under maize in Chandrapur District was 1500 hect. and in Gadchiroli 2600 hects.

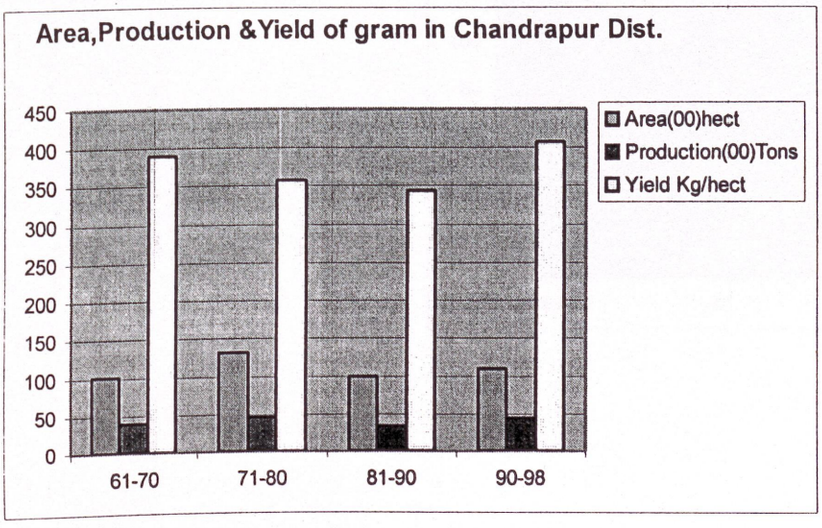
The area under *Kodra* was 1458 hect. in 1956. Grain is said to be powerfully nacrotic and consumed mostly by hill tribals. *Ragi* was grown in Chandrapur district before 1970 on very small area of 400 hect.



Pulses :- In the period 1961-2000 different pulses were grown in both district. Table 16 gives area under different pulses in Chandrapur district.

Following conclusion are drawn from the analysis of above table.
The area under Tuar has continuously increased from 1961-2000.
Area under many has continuously decreased in the period 1961-1998
Area under Udid decreased continuously up to 1981-1990 but again showed upward trend after 1990.
Area under gram fluctuated in the period 1961-1998. Area under gram increased in the period 1961-1970 to 1971-1980. But again decreased in the period of 1981-1990 to 1991-1997.

Other pulses which are grown in the district are *lakh, wal,* moth, horsegram. The data about area under cultivation of each of these pulses is not exactly known. In Gadchiroli district the pulses grown are Lakh, horsegram, *Mung, Tuar,* Gram, *Udid*, Area under *Mung, tuar, udid* is very small. *Lakh* is produced in both Chandrapur and Gadchiroli district. It is a coarse kind of pea. Its grain is distinguised from that pea by its being flat



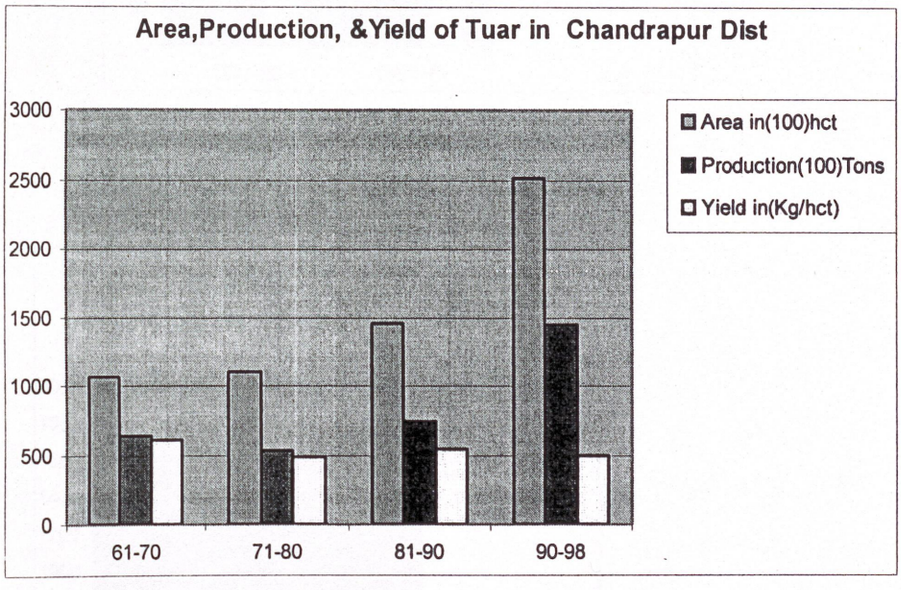
on two sides and reddish matting on its surface. The seeds of *Lakh* are inferior to those of other pulses. Its fodder however is considered to be very nutritious for draught animals. Government of Maharashtra has banned the consumption of *Lakh* because of some toxins were found in it. But many people in Chandrapur District still consume this pulse.

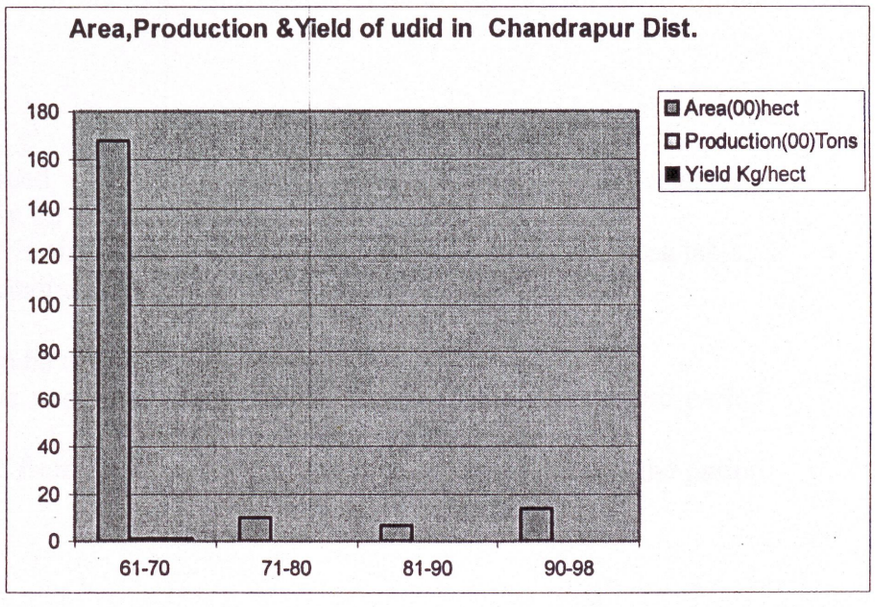
Protein content of *lakh* is more than gram pea, *mung*.

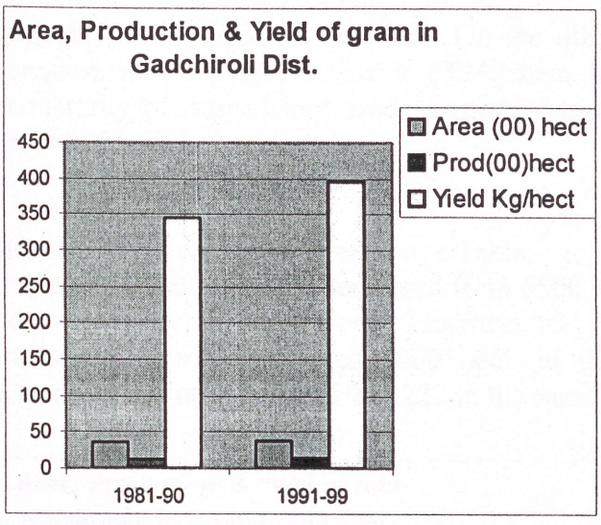
As far as yield of different pulses are considered the following table gives the details.

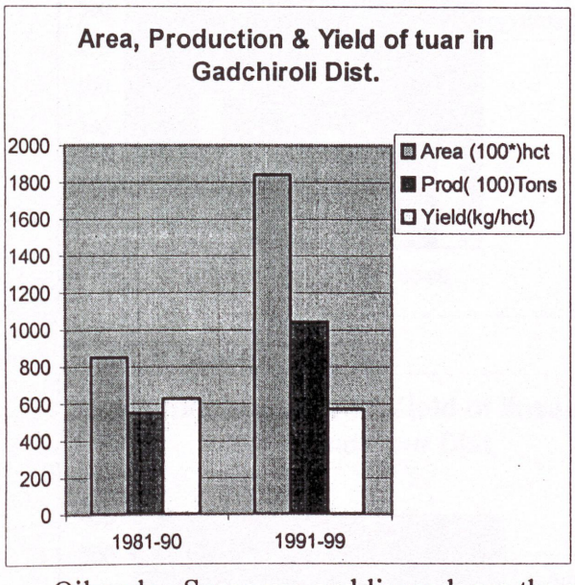
Above Table shows that yield per hect. of *Tuar* was highest in 1961-70. As far as mung is concerned the yield per hect. has increased in the period 1981-1998.

In Gadchiroli district the area under pulses was as follows.









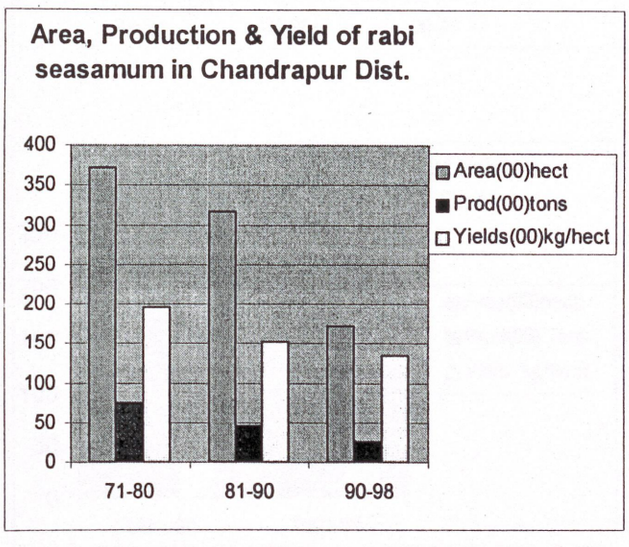
Oilseeds : Sesamum and linseed are the main oilseeds grown in the district. Groundnut, Safflower, sunflower is grown on very small area.

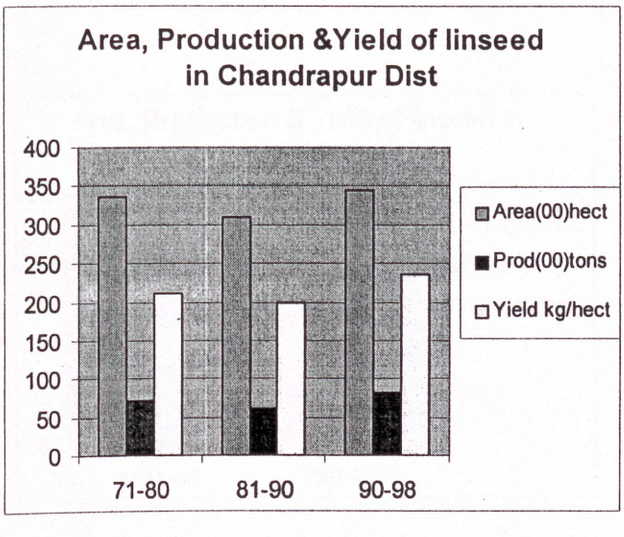
Average area under this oilseeds and yields per hect. are given in following table.
Linseed and Sesamum in Chandrapur District.

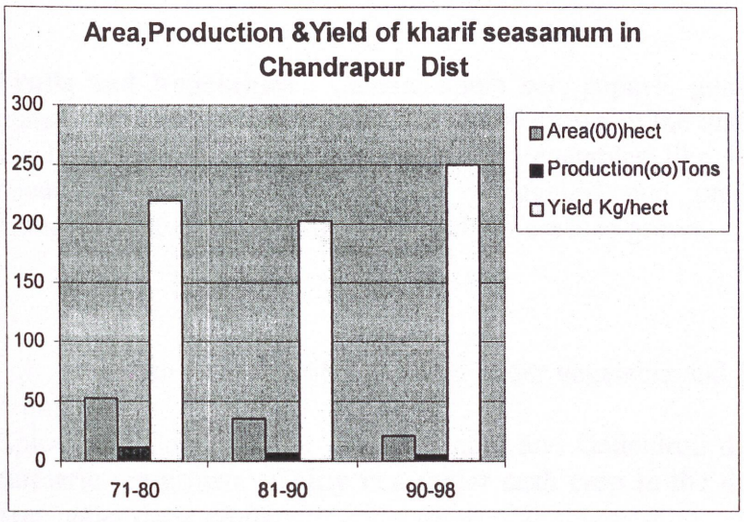
The following conclusion can be drawn from the above table.
Area under Sesamum Kharif decreased from 44500 hect. to 2100 hect. in the period 1961-98.
Area under linseed increased from 4900 hect. to 24900 hect. to 34500 hect. in the period 1961-98.

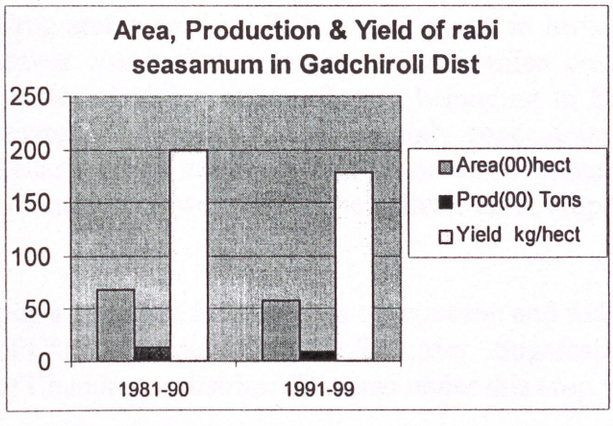
Productivity of Kharif Sesamum increased in the period from 181 kg./hect. to 250 kg./hect. in the period of 1961-98. On the other hand productivity of Rabi sesamum decreased from 197 kg./per hect. to 132 kg/hect. in the period 1971-98.
Productivity of linseed increased marginally from 215 kg./hect. to 236 kg./hect. in the period 1961-98.

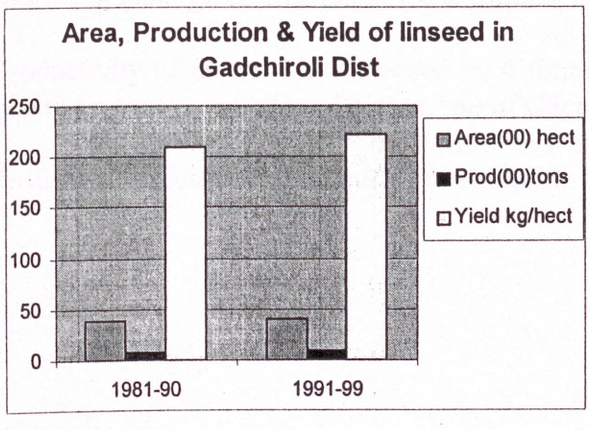
The following conclusion from above Table.
Area under Sesamum Rabi decreased from 6800 hect. to 5800 hect. in the period 1983-90 and productivity increased from 99 kg./hect. to 170 kg./hect. in the same period.
Area under linseed remained 4000 hect. in the period of 1983-97 and productivty increased marginally from 210 to 222 in the same period.






Area,Production &Yield of kharif seasamum in Chandrapur Dist
300
250
200
150
100
50
0
71-80
81-90
90-98
Area(00)hect
Production(oo)Tons
Yield Kg/hect


Area, Production & Yield of rabi seasamum in Gadchiroli Dist
250
200
150
100
50
0
1981-90
1991-99
Area(00)hect
Prod(00) Tons
Yield kg/hect


Area, Production & Yield of linseed in Gadchiroli Dist
250
200
150
100
50
0
1981-90
1991-99
Area(00) hect
Prod(00)tons
Yield kg/hect

Fruits and Vegetables : Custard apple *ber*, papaya, guava, orange, lime, sweet lime, mango, banana, *karvand*, water melon are grown in the district on small area and mainly for household or local consumption. Vegetables like ladies finger, brinjal, tomato, cucumber, pumpkin, bittergourd, bottlegourd and green vegetables like spinach, fenugreek leaves, amarnath, *ghol*, *ambadi* are also grown.

Within period 1961-1962 area under vegetable and fruits has increased more than 5 times.

Spices and Condiments : In Chandrapur and Gadchiroli district condiments like Chilly, turmeric are grown. Chilly is a major cash crop in the district. Following table gives area under these crops.

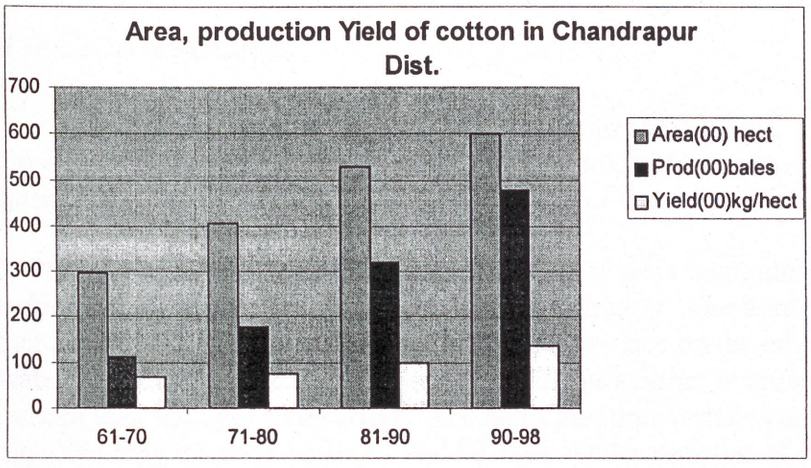
Drug and nacrotics : Tobacco is grown in Sironcha block of Gadchiroli district. Betel leaves was included amongst chief garden crops cultivated in the district in the last quarter of 19th century. People belonging to Barai community used to cultivate betel leaves. The cultivation was mainly concentrated at Bhandak and Chichorli of Warora Tahasil. This variety of pan did not have reputation as that of Ramtek pan variety hence commanded lower price. The cultivation of crop has stopped after 1962-63.

Sugar cane and fodder crops : Sugarcane and fodder crops were grown in very small area of Chandrapur and Gadchiroli district. Sugarcane is mainly grown in Bramhapuri Block of Chandrapur district. The area under this crop was as follows.

Fiber crops : Cotton is major fiber crop in district. It is grown in Rajura, Bhadravati, Warora Block of the Chandrapur District. Other fibers include *ambadi* sunhemp. The following table gives area under fiber crops in Chandrapur.

Productivity of cotton has increased by 4 times in the period 1961-90. This increase is due to improved varieties of cotton, use of Chemical Fertilizers and pest control methods.

Though productivity of cotton has increased, with rising cost of chemical fertilizers pesticides and labour cotton crop has become less remunerative.


Area, production Yield of cotton in Chandrapur Dist.
700
600
500
400
300
200
100
0
61-70
71-80
81-90
90-98
Area(00) hect
Prod(00)bales
Yield(00)kg/hect

V – Crop Varieties *

In Chandrapur district rice, *jowar* are main cereal crops. Many types of pulses are grown in the district. *Tuar*, Gram and *lakh* are main pulses grown. Sesamum and Linseed are major oilseeds grown. Cultivation of soyabean is increasing from 1985-86.

RICE : Two prominent varieties of the rice crops were commonly grown in the district before 1909 viz. The light (*halaka)* and heavy *(bhari)*. The light being an early variety matures quickly with a little supply water. Heavy rice on the other hand needs more water and take longer to mature, ripens when the weather is settled and also gives a larger outturn than the light rice variety. The short duration varieties mature within 100 – 120 days and long duration variety 130-150 days. Older varieties of rice were taller with hight 4 ft. – 4.5ft. and ratio of grain to hay was 20:80.
There were many varieties of rice grown in Chandrapur and Gadchiroli district. Farmers in Sindewahi and Nagbhid region have also developed new 8-10 varieties of rice. There are about 25 varieties of rice in the region. Most important among them were *Luchai, Lal Luchai, piwali Luchai, Ludaca, Kalikamod, Dehur*. One farmer Mr. Khobragade from Nagbhid block of Chandrapur district has developed a variety named HMT which is very popular in the area at present. Panjabrao Krishi Vidyapeeth of Akola has approved this variety. In Gadchiroli district different varieties of rice are grown. Some varieties are Halka and some are Bhari. The names of different varieties as *karhani, chapati gurmulya, kolyari, Jatashankar, Sapri, Gandrale Lalat* etc.
JOWAR : Next to Rice, *Jowar* has been the most widely sown open field crop in the district. Till 1909 there were two general class the kharif *jowar* and Rabi *jowar* recognised in the district. The kharif *jowar* was the more widely sown and was found in numerous varieties differing from each other in colour shape and hardness of grain and outturn. The most popular were *Gaddi* and *Tekhedari* in Kharif Season and Rigini in Rabi Season. The grain of *rigani* was rather hard and cource. This variety used to sustain draught. Both kharif and Rabi varieties of *jowar* were liable to smut which turns grain into fine black powder. The yield of *rigani* was 500 kg per acre.

In Sironcha block of Gadchiroli district Sironcha *jowar* distinguished itself in avrious respects from the varieties found in rest of district. The Sironcha, *jowar* appeared in nine varieties the bhuttas varying considerably in colour and shape. Some being red

* Ref.: Discussions with farmers and agriculture department employees.

and other black but all alike were profilic in the extreme. The outturn then ranged from 2000 lbs. per acre on the best soils to 700 lbs per acre on worst soil.

Now hybrid varieties of *jowar* were introduced in 1965. Out of new hybrid varieties hybrid No. 5 and hybrid No.9 became popular. Local varieties of pulses are grown on the large area. For *tuar* the seeds of companies like *Mahico, Nath* are used. In earlier time cotton varietis like Khamgaon, bhuri were grown. Hybrid varieties of cotton like H-4 were introduced. But they were not acceptable to most of farmers because of repeated pest attacks. At present Nanded 44 is the most popular variety in the Chandrapur district. The seed companies like Mahico, Nath, Nijuvadu, Mahagujrat, Ankur are also marketing their seeds.

Chilly : *Jambhulghati* variety was mostly used in the past. But now Guntur 1 and Guntur 2 varieties are popular.

Vegetables : Vegetables like brinjal, tomato, ridgegouard, ladies finger, bitter gouard, cucumber, green vegetables like amaranath, (Chawali) fenugreek leaves, *chiwal, ghol, Chandanbatwa* are widely grown. Local varieties of brinjal, cucumber, tomato are more popular than Hybrid varieties due to their better taste.

VI – Farming Practices

It will be worthwhile to take review of farming practices in the area.

RICE : There are three distinct methods of rice cultivation *Rohna* by transplantation, *autia* by sowing and broadcasting and *mullka or kaorak* by previous germination. In all three systems embanked land employed.

Rohana Method :- Transplantation is done where irrigation is available. The steps involved in rice cultivation are as follows :-

Manuring --- Seed broadcasting in 2nd week time. --- Transplantation in July upto *pola* --- worked up in to a thick pasty mud by repeated ploughing --- seedling of 1 foot are transplanted.

Autia Method :- Seed was broadcast by hand and covered by drawing harrow over it. Seed was sown before rains in dry method, in second preliminary showers were awaited.

Mulaka Method :- Land was prepared by 3-4 ploughing with plough but sowing and subsequent operation by broadcast method. The seeds were made to germinate previous to sowing by soaking them in water for 12 hours and letting them stand for another 24 hours.

KHARIF *JOWAR* AND RABI *JOWAR* :

Numerous varieties different from each other in colour, shape, hardness of grain and outturn. Rigani was the variety of the spring crop.

KHARIF *JOWAR* – In July, middle August : 4 *pallayali* of seeds per acre were sown either by *Sarata* or *tiffan.* One weeding was given. It was harvested towards the end of December or early Jan. The standard outturn was 600 lbs per acre. *Rigni Jowar* was commonly grown as spring crop in rice tracks. October sowing was done. It was cut in January-Feb., Average yield 500 lbs per acre. The grain was rather hard and often coarse. This variety used to sustain drought. Kharif and Rabi varieties of jowar were liable to smut which turns grain into a fine black powder.

Sironcha *Jowar* distinguished itself in various respects from the varieties found in rest of district. The sironcha jowar appeared in 9 varieties, the bhuttas varying considerable in colour and shape some being red and other black. But all alike were profilic in the extreme. Crop was sown in September after in floods had subsided and harvest in Feb.-March. Sometimes *Mung* and Cotton was mixed with it. The yield was 2000 lbs per acre in best soil. 700 lbs per acre in poor soils.

For growing *jowar*, in rabi Feb the land is kept ready by ploughing and 2-3 harrowing. The rabi seed is drilled during Sept., October. Hand weeding and inter culturing are given when the crop is 6-10" high. To harvest the crop, plants are cut close to the ground. The earheads are then cut & threshed in threshing ground.

WHEAT : Wheat was grown in 1909 in Warora and Bramhapuri tahsils.

In Warora and tenants used to grew wheat on that portion of field which lay about the site of previous years *mandwa*, so secured fertilizing effect of manure of the cattle, which were pickated there during the open season.

In Brahmapuri the crop was produced in embanked land. The seed sown in October on early Nov. the crop cut in Feb. or March.
The method of cultivation of wheat include such operation as ploughing, sowing harvesting and threshing. The seed is sown in October after land is brought to fine tilth by harrowing and ploughing. The crop gets ready for harvesting by the end of February.
The standard outurn was 580 lbs per acre.
The average acreage 5.62% net cropped area as against 4.68% for the state.

MAIZE : Maize cultivation is concentrated in the sironcha tahasil. It is also produced in Gadchiroli and Chandrapur tahasil.
Maize is grown in Kharif season. The land is well ploughed and harrowed prior to monsoon and farmyard manures added to the soil. Seed is sown after first shower of monsoon. The crop when sown alone grows quickly and gets ready for harvest after about 4 months. The cobs are cut off the standing stalks. The heads are eaten parched or boiled. The ripe grain is parched and made into lahi and sometimes after grinding is used as flour.
Sometimes the crop is grown as hot weather crop but then it is mainly produced for its green head. Thus crop sown in February is ready for harvest in May.
The concentration of cultivation of kodra crop is one of the special feature which distinguish the cultivation of Gadchiroli district from other types prevailing in the district.

KODRA : Kodra crop can be grown on poorest soils so cultivated in Murmadi soil. The newly harvested grain is said to be powerfully nacrotic and consumed mostly by hill tribals.

PULSES : 14.67 of gross cropped area was occupi by pulses in 1957-60. The production of *Lakh* is very command in Bramhapuri. The crop is always grown alone and in rabi season only. Sown in deep alluvial and retentive black soils, it gives best outturn. After rainy season the land which develops cracks is suitable for this crop. That is why *lakh* is often cultivated in rice fields. The land is well ploughed and repeatedly harrowed. The seed are sown in September, October. The plants are uprooted and taken to the threshing yard. They are sufficiently dried for a week are beaten with sticks or trumpled under oxen's feet. The seeds are removed after winnowing husk. Horse gram or *Kulthi* is taken as a mixed crop with other cereals and needs same method of cultivation as given to the crop with which it is sown. The crop is sown thick and also in fourth row. It gets ready in November. Drying and winnowing is done. Husk is very nutritious to both drought animal as well as milch cattle. *Udid* is usually drilled and mixed with cereals like Jowar. It is cultivation is same way as the main crop with which it is produced.

Tuar is grown as mixed crop with jowar or on paddy bunds.

Gram is grown in Rabi season. The field is made ready by September by ploughing and harrowing. The crop becomes ready for harvesting in Jan-Feb. Sometimes irrigation is given to the crop –2-3 times very often tender shoots are plucked off before Harvesting time. This renders plant bushy and strong. Tender leaves are used as vegetable.

SOYABEAN : Soyabean as oilseed crop was introduced in 1986 in Chandrapur district. This crop became very popular in the 14 years. It is grown in Kharif season land is prepared by ploughing and harrowing Crop is ready in October-November.
Green gram is grown as Kharif crop along with cereals. The seeds are drilled mixed with cereals other operations are similar to other pulses.

OILSEEDS : Linseed or *Jawas* is produced in Rabi Season. The sowing is done in October and harvesting in Feb.–March. The seeds have a tendency to shed easily. The plants are uprooted when capsules are just ripe and begin to open.

Til or seasamum is grown both in the kharif and Rabi season. The seeds are either drilled or broadcast after ploughing and harrowing. Crop is ready in 4 month.
Both linseed and seasamum is supposed to exhaust the soil. Kharif seasamum is followed by rabi gram or *jowar*.

Castor is grown in both kharif as well as rabi season. Two types of castor plants are grown in the district annual and perennial. The annual crop is smaller than perennial one and is generally grown along the irrigation channels on the border of sugarcane fields and chilli fields. The Kharif castor is sown in June-July and gets ready for harvesting in December, January. The fruits are gathered till February. The fruits are then heaped up and dried.

COTTON : Cotton was grown in Warora, Rajura and Chandrapur block of the district. Cotton grows best in deep black and medium lighter type of soils which are well drained. Its tillage consist of a ploughing and two or three heavy harrowing prior to monsoon. Farmyard manure and other fertilizers are applied. The sowing is done between June-July when there is sufficient moisture due to monsoon. The spacing between the two rows varies from 1 ft. – 3 ft. and between two plant about a foot. One or two hand weeding are done. Tuar is grown as mixed crop with cotton. After 5-6 rows of cotton 1 row of Tuar is sown.

Generally early varieties are grown in the district their flowering starts mostly by the end of August or in the beginning of September. The balls are open towards end of October and picked up in Nov.-December continues up to January.

Org. cotton also, no?

At present major portion of chemical fertilizers and pesticides are used for cotton. With rising cost of chemical fertilizers and pesticides and labour cost, cultivation of cotton has become less remunerative to farmer.

CHILLI – The cultivation of chilli is concentrated in Warora and Rajura tahasils of Chandrapur district. It can be grown in variety of soils. The chilli crop is grown usually in kharif season as single crop. The seedlings are first raised in nursery and when they about 8-10" high they are transplanted in the field which is kept throughly cultivated and well manured. This transplantation is done after monsoon sets in the distance between two plants and that two rows is about 2 feet. When the plants are well established the soil is gently unearthed. A little quantity of manure, ash is applied to the plant. Now Chemical fertilizer are applied. Under normal conditions after about three months from planting the first fruits are formed. The fruits are picked up for 3-4 months. With interval of ten of fifteen days. It is important cash crop in this area.

TOBACCO : Tobacco is important crop in Sironcha block of Gadchiroli district. It was also grown in Chandrapur, Gadchiroli block. During last quarter of 19th Century tobacco was grown in upper part of Sironcha tahasils mostly by *marars* on land situated on edge of nalla and irrigated from Kachha unlined well. Sometimes a big tobacco garden was cultivated by large community jointly about tobacco growers the old gazetteer of the district says "In lower talukas a good many expert tobacco growers have immigrated from Madras. They water the tobbacco by hand and after 1-2 watering pick off the head of plant thus inducing it to spread and ripen early very high rents are paid for these tobacco gardens.

First tobacco seed is sown in seed beds during first week of July after about 1 months the seeding are transplanted in the field. Two months after the tops of the crop are nipped leaving about ten well developed leaves on the plant. These leaves when they become slightly hard a yellow, are usually harvested in the months of December-January.

The leaves are then exposed to sun and tied into small bundles and after a sprinkling of decoction of some hot spices the bundles are covered with soil for some time. The leaves are taken out after a week and are ready for consumption.

Consumption of tobacco is very common in rural area.

SUGARCANE : Sugarcane was grown mainly in Gadbori Pargana of Bramhapuri and Warora. The cultivation of sugarcane in the last quarter of 19th Century had its pecularities. The crop ever grown in two ways viz. *Motashthal* and *Patasthal* former being the way of irrigating the crop by leathern mot employed to draw water from the well and latter by a channel or *pat* coming from a tank. The cultivation of sugarcane is extremely expensive and requires heavy manuring as well as watering. Lengthy fences have to be erected to prevent encroachment by pigs and jackals. The best soil for the cane in medium deep and well drained. It is brought to fine tilth prior to planting and subsequent repeated harrowing. Manures are applied. The land is put into ridges and furrows and necessary channels are prepared for irrigation before planting. These furrows are irrigated before planting. The planting is done in Jan-Feb selected canes are cut into small sets of pieces having three eyebuds. These sets generally pressed in the furrows already watered with eyebuds facing sideways.

Irrigation is repeated with an interval of 10 days and continued till harvesting of the crop except rainy season. Canes become ripe after 1 year and then cut close to the ground.

AGRICULTURE TOOLS AND MACHINERY : Majority of population in the both district depends on agriculture. Different types of tools, equipments, machinery, storage methods are used by farmers. Wood, bamboo, steel and leather is used to make these tools. The list of tools used by farmers and material of construction is given in Annexure

Steel, wood, bamboo needed for all types of tools. Farmers need this material. In the past material was freely available from the forests but with stricter forest laws, farmers are facing difficulties. Some farmers have started using tools manufactured from steel instead of wood. Natural fibers are replaced by synthetic fibers. *Mot, bagadi* are replaced by oil engine and pumps.

Tractors are mostly used for transportation of building materials, farm yard manure hay, agriculture products. Very few tractors are used for agriculture operations like ploughiong, leveling etc. Thus mechanisation of agriculture has taken place to limited extent. Oil engine, pumps, threshers are used by farmers.

FERTILIZERS USE :- Farm yard manure and green manure like sunhemp was used before 1965. The use of chemical fertilizers started in 1966. Initially its consumption was limited which began to increase after 1971.

The fertilizers like urea, mixed fertilizer 18:18:10, diammonium phosphate are used mainly for rice, wheat, cotton and chilli crop. The use of chemical fertilizer for soyabean, other pulses, jowar is limited. Recommended dose of fertilizers are not given because rising cost of chemical fertilizers.

Farmyard manure is not prepared scientifically. As cattles go for grazing in forest most of dung – urine is lost in forest and is not used in farms. Cow dung and household wastes are dumped in open heaps. It is not properly covered so most of nitrogen is lost in air. The farmyard manure prepared in this way is of poor quality.

Use of bio-fertilizers like rizobium culture azetobacter, blue green algae is increasing but they are not very popular. Composts and vermicomposts are not prepared.

Agrowastes are not available in large quantities because they are used either as fodder, fuel and housing material. Only cotton stalks and chilli stalks are either burnt or left on the field bunds which get degraded in rainy season. Use of green manure like sun hemp is not very common. High temperature in summer months, soil erosion in rainy season, depletes organic carbon from the soil so the soils are poor in organic matter. There is urgent need to manage animal, human, forest and agro-wastes scientifically so as to improve organic carbon in the soil.

(is all this detail needed? asked earlier also)

VII - Pest and Diseases and Control *

Pest and diseases on Rice

THE SWARMING CATER PILLAR (SPODOPTERA, MAURITIA, BOISD): The full grown Caterpillars measure 1" to 1" long dark greenish with slight yellow tinge. They can readily be distinguished from other caterpillars by presence of white longitudinal dorsal strips along the length of the body. Their heads are dark. Immediately of hatching the caterpillars feed on grass or young paddy seedling. They are active only at night and during day they hide in leaf sheath of leaf whorls or in soil if it is not flooded.
Preventive measures include protection of seed beds by deep trenching with steep sides and hand collection of egg masses and their distruction. The Caterpillar during daytime hide under clods so trapping them under planks or small bunches of dry grass may be tried. Dragging a rope across the field is resorted to after flooding. The affected fields so that caterpillars in the leaf sheaths and whorls drop into water. After the harvest of crop the affected field should be ploughed so as to expose the pupae.

PADDY BLAST (KARAPA) : This disease first manifested on leaves as small spinolle shaped brown spots with white centres. These spots grow in size and coalesce with each other. If the attack is at the time of emergence of ear heads, the necks are rotten and turned black. Such heads may not develop grains the necks do not support the weight of panicles. The disease is prevalent on seedling during July, August or on grown crops during September, November.

ARMY WORM (CIRPHIS ANIPUNCTA): Fully grown caterpillars are 1" -1" long smooth stout bodied dull greenish coloured with broad light coloured strips running along its length on either side of the body. They are found in the Central whorls of plants or may remain under stubbles around the plants under soil. These caterpillar feeds on leaves mostly at night while during the day they remain hidden in whorl or in the clods underground. They migrate from one field to another when their food is exhausted hence they are called army worms. The pest is active from June - November. Kharif crops suffer more from it than rabi crops. It is observed that when a long dry spell follows a good start of monsoon, the pest assumes epidemic form.

The pest can be controlled by the following measures.

i. Collection of egg masses and their destruction.
ii. If attack is localised caterpillars may be collected and destroyed.
iii. After the harvest the infested fields should be ploughed to expose pupae.

* Ref.: B.G. Kunte (ed) 1973, Gazetter of India (M.S.), Chandrapur district. Chapter 4.

Pest and Diseases on Jowar

JOWAR STEM BORER (CHILLO ZONELLUS SWINH) : There caterpillars are dirty white with many spots on the body and with brown head. The full grown caterpiller measures about 1 to 1 in lengths. The moths are straw coloured with forewing pale yellowish gray having minute dots on apical margin and white hind wings.

The caterpillars bore inside the stems causing thereby the drying of central shoots called dead hearts. Due to this stem and leaves turn red. The extent of damage is 4 to 5 percent.

Being internal feeder only preventive measures are found to be practicable and economic.

i. The affected plant should be pulled out along with caterpillars inside and destroyed promptly.
ii. After harvest of the crop stubble, should be collected and burnt to destroy hibernating larvae.
iii. The fodder to be fed to cattle should cut into small pieces.

Hoppers and Aphids (Pereqrinus Maidis, Ashm and Rhopalosiphum Maidis) : Delphacids and Aphids are responsible for causing sugary secretion on jowar locally known as chikata. It is quite severe especially on rabi jowar. Delphacids are wedge shaped greenish brown in colour with blackish spots on wings.

Aphids are ablong, dark brown in colour having two projection called cornicles on dorsal side of abdomen. It is mostly found in the wingless stage.

Sugary secretion is seen on the leaves of the plant and also in the whorl. Ultimately the growing shoot of the plants is damaged and further growth is checked pest and disease of wheat.

WHEAT STEM BORER : The full fed caterpillar is about 1" long flesh coloured smooth with a black head and dark spots with a black heads and dark spots on the body. Each dark spot bears a hair. They are found in stem of the affected plant. The moths are small are straw coloured. Their forewing have marginal dark line and hind wings are white.

The caterpillar bores inside the stem thus causing the drying of central shoots then called dead hearts. While entering the shoot the initial feeding of caterpillar on the whorl give rise to numerous holes on the leaves which develop later on. Drying of the plant of ten leads to reddening of stems and leaves.

Pulling out affected plant and burning it completely is done.

BLACK STEM RUST (TAMBERA)

The disease appears as reddish brown elongated linear eruptive spots known as pustules mostly on stem and also on leaves, leaf sheath and owns in early part of season. When pustules are rubbed by thumb a brownish powder smears on the surface of the thumb. The disease occurs from November to February.

Pest and diseases on Pulses

TUAR PLUM MOTH (EXCLUSTES ATOMOSA) : The fully grown caterpillars are about 1" long greenish brown in colour and tringed with short hairs and spines. They bore into green pods and feed on developing seed. Preventive measures are the collection of caterpillars by shaking pods in small trays containing kerosenised water and avoiding to take leguminous crops in the same field in successive years.

GRAM POD BORER (HELIOTHIS ARMIGERA ABSOLATA) : The caterpillar are greenish with darker broken gray lines along the sides of the body. They are 1" to 2" in length when

full grown. The feed on tender foliage and going pods. They make holes in pods and eat developing seeds by inserting the anterior half portion of their body inside the pods.

Pest and diseases on Cotton

SPOTTED BOLL WORM : (Earias Fabia, S.E. insulana B) :
The adults of former have pale white upper wings with greenish band in the middle while the adult of latter have the upper wings completely greenish. The caterpillars of both species however are brownish and have a dark head and prothoratic shield. They have a number of blank and brown spots on the body. The full fed larvae measure about 1" in length. The other boll worms are pink in colour and with brown heads.

In case of spotted boll worms caterpillars bore into growing shoots of the plants in the intial stage of crop. Later on when flower buds appear, larvae bore into them and then enter the bolls by making holes, which are plugged with excreta. The infested buds and bolls open prematurely. The caterpillars of pink boll worm on the other hand never attack the shoots. They feed inside bolls and make them drop down. The pest is more harmful to American cotton varieties than Indian ones. As the Caterpillars bore the bolls the entry holes gets closed and it becomes difficult to spot out the affected bolls until such boll drop down. The pest is active from July to December while the winter season is passed in the larval stage.

RED COTTON BUG : (DYSDERCUS SINGULATAS FABR) : The adults and nymphs suck plant sap and greatly impair the vitality of the plant. They also feed on seeds and lower their oil content. The excreta of these insects soil the lint.
The pest can be controlled by collecting adults and nymphs in large numbers by shaking them in tray containing little Kerosene added to ordinary water.

JASSIDS (EMPACASCA DEVASTANS, DIST.): The adults is wedge shaped about 2 mm long and pale green colour. The front wings have a black spot on their posterior pasts. The nymphs are wingless are found in large numbers on the lower surface of the leaves. They walk diagonally in relation to their body.

Both nymphs and adults suck the cell sap from the leaves as a result of which the leaf margin turns yellowish and in case of excessive infestation etiolation and drying up of leaves followed by stunted growth.

APHIDS (APHIS GOSSYPII GLOVER) : The adult is ablong about 1 mm long dark and yellowish green in colour. It is mostly found in the wingless stage. The nymphs and adults suck the cell sap from the leaves due to which the leaves turn yellowish dry.
MEALY BUGS : FERRISIANA VIGRATA CKLV : The adult female is pale yellow in colour and her body is covered with white meal and glossy threads. Her average length is 2.6-3 mm. Newly hatched nymphs are light yellow in colour. The male adult is rarely winged. Adults and nymph are seen congregrating on the lower surface of the leaves and shoots of cotton plant. Both adult and nymphs suck the juice of leaves and tender shoots with result that the plant gives a stunted and whitish appearance. The feedling also cause curling and chlorosis.

MITES : (ERIOPHES GOSSYPII BANK) : The adults are minute with an oval body and four pairs of legs. They are usually found on the lower surface of leaves.

The nymphs and adults usually feed on lower surface of the leaves. In case of severe infestation complete defoliation of plant is caused.

Pest and diseases of Chilly

THRIPS AND MITES : These pest suck the cell sap due to which the leaves get badly curled. It is locally known as *churada, murada* disease.

Chemical pesticides are used for controlling pest and diseases. When there is attack of any disease or pest on particular crop, the agriculture department advise farmers about the proper use of pesticides. But the information do not reach majority of farmers. Usually they use pesticides as per advice of Krishi Kendra.

Different pesticide companies market their products under different trade names. The following pesticides are used in the region.

For Blast of rice – Carbon digene, Copper Oxychloride.

Army worm on Jowar or rice-methyl parathion, monocrotophos.

For Brown plant hopper on rice-Monocrotophos methyl parathion.

VIII – Livelihoods *

Agriculture is still the mainstay of livelihood for the people in Chandrapur and Gadchiroli district.

POPULATION PRESSURE ON LAND : In 1901 the population of the district was 5,74,323 which increased to 12,38,070 in 1961. This increase in population had its effect on the economy of district which is mainly agriculture oriented. Consequently the pressure on land had increased. In 1961, 82.08 percent of working population in the district was dependent on agriculture as against 69-91 percent in Maharashtra and 69.92 percent in India. The Table gives land to man ration for Chandrapur and Gadchiroli district.

Land to human ratio (Chandrapur)

Year	Rural Population	Cultivated area (hect.) (Net area sown + Current fallow)	Pressure on land Person/hect
1961	1142000	631000	0.55
1971	1473000	672000	0.46
1981	1172000	704000	0.60
1991	1275000	522000	0.41

Land to human ratio (Gadchiroli)

Year	Rural Population	Cultivated area (hect.) (Net area sown + Current fallow)	Pressure on land person/hect
1981	622000	-	
1991	718000	230000	0.32

Following conclusion can be drawn from above figures.

i. In Chandrapur district the pressure on land has increased in the period 1961-1971. But after division of Chandrapur District into two districts the pressure on land decreased in 1981. But later on it has increased again.

* Ref : Agriculture department, Chandrapur.

ii. As far as Gadchiroli District is concerned the pressure on land is more than in Chandrapur District.

Livelihood opportunities in agriculture will increase only if area under double crop is increased. It is possible only with expansion of irrigation facilities for two crops in the year. Expansion of agrobased industries can also create livelihood opportunities for rural population.

Table gives number of cultivators and agriculture labourers in Chandrapur and Gadchiroli district.

Number of Cultivator & agriculture labourers in Chandrapur District 1951 & 1961

	Male		Female	
1951	Rural	Urban	Rural	Urban
Owner Cultivator	8117	112	28889	130
Cultivation of unowned land	4211	55	1453	2
Cultivating labourers	43539	725	135190	2351
Agriculture Rent Receiver	3100	118	2351	26

	Male		Female	
1961	Rural	Urban	Rural	Urban
Owner Cultivator	20669	1659	198214	287
Agriculture Labourers	73598	595	103894	1057

Following conclusion are drawn the analysis of above table.

i. In the period 1951-61 land reforms had taken place so the number of cultivators had increased by more than 15 time.

ii. In the same period number of agriculture labourers decreased.

Number of Cultivators & agriculture labourers in

Chandrapur and Gadchiroli district in 1991

		Gadchiroli 1991
	Cultivators	Agriculture Labourers
Rural	198100	97400
Urban	3100	5700
		Chandrapur 1991
	Cultivators	Agriculture Labourers
Rural	237200	254100
Urban	5300	10700

Following conclusion can be drawn by comparing above tables.

1) The number cultivators nearly doubled in the period 1961-1991.
2) The number of agriculture labourers also doubled in the period 1961-1991.
3) The number of cultivators and agriculture labourer in urban area has also increased in the same period.

Size of holding

Following table gives data about operational holding percentage according to size class in the period 1985-86 and 1991-92 in Chandrapur and Gadchiroli District.

Operational holding percentage according to size class (In %)
In hect.

Size Class	Year	Chandrapur	Gadchiroli
	1985-86	27	29.2
Up to 1 hect.	1991-92	28.7	33.5
Small 1-2 hect.	1985-86	23.9	28.7
	1991-92	27	30.4
Semi Medium 2-4 hect.	1985-86	26.3	26.5
	1991-92	25.8	23.8
Medium 4-10 hect.	1985-86	19.9	13.4
	1991-92	16.2	10.8
Large More than 10 hect.	1985-86	2.9	2.2
	1991-92	2.2	1.4

Following conclusion can be drawn from the above table.

1) The percentage of small and marginal farmers has increased in the period 1985-1990 both in Chandrapur and Gadchiroli District.
2) The percentage of Medium Large Farmers have decreased.
3) In Chandrapur district the percentage of small and marginal farmers was 55.7 percent and in Gadchiroli it was 63.9 percent in 1991-92.

The net income from agriculture depends on crop type, crop variety, cost of agriculture inputs and wage rate and price of agriculture product. As rice is main crop in this area the net income per hect. of rice can calculated as follows.

The average yield in the period 1991-98 of rice was about 14 quintals per hect. Assuming price of rice (whole sale) as Rs. 800 quintals the cost of rice produced will be 14 x 800 = 11200. Assuming cost of inputs and wage as Rs. 5000 per hect. net income for 1 hect. of land is (11200-5000)=6200.

Thus Farmers whose land is below 2 hect.s have incomes less than Rs. 24000 per years. It means that of small farmers are below poverty line.

AGRICULTURE LABOURERS : In the last 100 years wages of different categories of workers underwent fluctuation. However the rise and fall in the wage level have not kept pace with changes that have taken place in the price level.

The wages of agriculture labourer as well as craftsman showed a rising trend during last few decades. In 1963 skilled jobs in agriculture like carpenter, blacksmith were paid a daily rate ranging from Rs. 3.50 in sowing and harvesting season, field workers were paid at rates varying from Rs. 2 to Rs. 3. Women engaged in agricultural operations such as weeding, winnowing, cutting and harvesting were paid Rs. 1.25 to Rs. 2 per day. Certain types of operations are paid on the basis of turnover of work.

At present the average wage rate for causal agriculture labourers is Rs. 50-60 per day and for women it is Rs. 20-30 per day. The wages of women are higher in transplanting season Rs. 40-60 depending upon availability of labour.

It will be interesting to compare 1963 prices of essential items and corresponding wage rates and present prices of essential items and present wage rate.

Too much detail!

In 1963 the prices of essential items were as follows.

Rice	Rs. 0.6 per Kg.
Jowar	Rs. 0.4 per Kg.
Gram	Rs. 0.5 per Kg.
Tuar	Rs. 1 per Kg.
Groundnut Oil	Rs. 2 per Kg.
Sugar	Rs. 1.3 per Kg.
Kerosene	Rs. 0.4 per Ltr.

Agriculture Labourer with wage rate of Rs. 2 per day could buy following quantities of essential item.

Rice	3.3 Kg.
Jowar	5 Kg.
Gram	4 Kg.
Tuar	2 Kg.
Groundnut oil	1 Kg.
Sugar	1.5 Kg.
Kerosene	5 liters.

At present the rates of essential items are as follows.

Rice	Rs. 10 per Kg.
Jowar	Rs. 8 per Kg.
Gram	Rs. 22 per Kg.
Tuar	Rs. 25 per Kg.
Groundnut Oil	Rs. 40 per Kg.
Sugar	Rs. 15 per Kg.
Kerosene	Rs. 10 Ltr.

Agriculture labourer with wage rate of Rs. 50 can buy following quantities of essential items.

Rice	5 Kg.
Jowar	6.2 Kg.
Gram	2.2 Kg.
Tuar	2 Kg.
Groundnut Oil	1.25 Kg.
Sugar	3 Kg.
Kerosene	5 liters.

Thus present agriculture labourer can buy more quantity of essential items with present wage rate than agriculture labourer in 1963. Thus the wage rate hike is more than price hike of essential items in the last 40 years.

AVAILABILITY OF CEREALS, PULSES AND OIL SEEDS : Agriculture production should be sufficient to satisfy the food needs of growing population. It will be interesting to compare per capita availability of cereals pulses oilseeds in 1961 and 1991 in Chandrapur District.

Production of cereals pulses and oil seeds and population in Chandrapur and Gadchiroli district.

Production in Tons	Chandrapur 1961-62	Chandrapur 1990-91	Gadchiroli 1990-91
Total Cereals Production tons	315600	286400	157600
Total Pulses Production tons	25800	31500	12500
Total Oilseed Production	12400	21500	2000
Population	1238070	1772000	787010

Availability per capita of cereals pulses and oil seeds in Chandrapur and Gadchiroli districts.

	Chandrapur 1961-62	Chandrapur 1990-91	Gadchiroli 1990-91
Availability per Capita	Kg.	Kg.	Kg.
Cereals	254	161.6	192.6
Pulses	20.8	17.7	15.8
Oil Seeds	10	12.1	2.5

The following conclusion can be drawn from above table.

i. Availability of cereals per capita has decreased in both district in the period 1961-1991.

i. Availability of Oilseed per Capita has increased in Chandrapur District but it is very low in Gadchiroli district in the 1991.

i. Availability of pulses per capita has decreased in both Chandrapur and Gadchiroli District.

IX - Livestock

In the first quarter of the twentieth century the cattle-wealth of the district was far from satisfactory. During that period the breed of cattle found in the district was small and poor. In the forests where plenty of grazing facilities were available breeding for sale in the neighbouring districts was carried on extensively. However, there was no selection and immature bulls were allowed to stay with the herds. The castration which was usually effected very late by Mangs and Gonds, was carried out with curel methods such as by pounding with a stone. The fee generally charged by the Gonds and Mangs was an anna or two or a free meal. In 1902, an annual grant of Rs. 300 was sanctioned by the Government to be disbursed in prizes to cattle breeders at the Mahakali fair which is still held annually at Chanda. The intention was to encourage the people to adopt more systematic selection and early castration. But all such efforts then met with little success. Subsequently the grant was also withdrawn.

The plough cattle of the district were then broadly classified into two groups viz., (1) The mahurpatti group and (2) the Telangpati group. The former were good sized and strongly built and were suitable for work in the open fields of the jowar growing country. They were found in great numbers in Warora tehsil. A pair of good plough bullocks of this breed used to cost from Rs. 100 to Rs. 200 and a good cow from Rs. 40 to Rs. 50. (In 1961-62) the Telangpatti breed, on the other hand, was of much smaller build and was usually reserved for rice cultivation. The cost of a pair of good bullocks of this breed ranged from Rs. 60 to Rs. 125, while the cost of a cow varied between Rs. 10 and Rs. 30. The life of an ordinary pair of plough bullocks was about 10 to 12 years in the open-field country, but in the rice fields the usual duration of life was only about five years.

The grazing facilities in the areas covered by forests were satisfactory. "Plough cattle", writes Mr. Hemingway "are as a rule well fed and tended ; in the rice tracts there is excellent grazing, and cattle are well fed the whole year round ; in the open tracts also with one exception, there seems no lack of good fodder ; all the period that the cattle are working they are fed with bhusa and the husks from the threshing floor. During the hot weather, the cattle are kept out in the fields at the mandwas that tenants construct on their own. Cattle finds a ready sale in the local bazar. The one exception above referred to is the open tract at the bend of the Wainganga north of Bramhapuri, where the cropping is very close indeed ; there is practically no waste land in the village, and cattle appear to be muzzled when loose until the month of April, when there is little for them to find in the fields. In this tract, tenants are content with the very thinnest and oldest cattle that they can procure, they seem perfectly happy if they get a full season's work out of their pair, before the latter expire, and new cattle of equally little value take their place.

In Warora and Brahmapuri well-to-do *malguzars* and tenants used to feed salt to their cattle five time a year; the amount given was one or one and a half chittacks at a time to plough cattle, and half a chittack to other cattle, The practice of feeding salt to cattle was more or less common in the district.

Cows were kept for the sake of milk, ghee and also for manure. In the eastern half of the district, almost every village had large herds of cows and other cattle. They were also kept for breeding purposes. In the zamindari and wild tracts, the Sao Teli and Gonds were in the habit of ploughing the field with cows.

In the interior parts buffaloes were freely used in cultivation. Generally they were used in rice cultivation to drag the Khirli or sledge and defund or harro. In Vainganga valley and zamindaris and the villages around the Chandrapur town buffaloes were extensively kept for the sake of ghee. Many of the buffaloes were brought from Wardha. In Sironcha tehsil a fine breed of buffaloes was produced and exported to Nellore in Madras. The price of a male buffalo varied between Rs. 15 and Rs. 16 and that of a she-buffalo Rs. 30 and Rs. 50.

Horses and ponies were very few in number and poor in quality. The malguzars and other persons of note used to travel in rengis drawn by bullocks.

Large flocks of goats and sheep were reared in the district. The sheep were generally kept by Dhangars and Kuramwars for the sake of wool, while goats were reared chiefly for food. Both goats and sheep were then valued for the sake of their manure. The price of a goat was Rs. 4 or Rs. 5 and of sheep Rs. 2. In Sironcha there was a special breed of sheep known as dhor mundi or the Godavary sheep.

In 1906-07 the most important cattle markets of the district were held at Warora, Madheri, Chimur Jambulghata, Bhandak, Nawargaon, Gangalwadi, Chandrapur, Rajgarh, Dabha, Kunghada-Talodhi and Nandgaon. The cattle were brought from the big Wun fair to the annual Mahakali fair at Chandrapur. In Sironcha tehsil also some cattle were brought to the weekly bazar at Asaralli.

The total number of agricultural stock during 1906-07 was returned as shown below :-

	Chandrapur 1906-07	Chandrapur 1961	Chandrapur 1992	Gadchiroli 1992
Bull and Bullocks	204,712	399224	285215	238002
Cows	261,936	261775	198457	174778
He-buffaloes	22,654	45430	3866	43002
She-buffaloes	77,692	39899	58839	18636
Young Stock	172,534	294297	221396	167495
Sheep	43,111	37866	41774	14802
Goats	96,220	215313	253283	181044
Horses and ponies	988	485	244	176
Mules	1	-	-	-
Donkeys	169	-	-	-
Others	-		9448	26670
Poultry and other birds		818544	861433	714772
Improved Varieties				
Cows	.....		2310	401
Young Stock	.....		3341	484
Bulls	.....		855	267

Poultry farming which provides a subsidiary occupation the cultivators and others is carried on a small scale in the districts. Most of the poultry birds kept in the district are of deshi and non- descript variety. However, the zilla parishad, the panchayat samitis and the animal husbandry department had taken a joint move to upgrade deshi hens by supplying improved pure-breeds like White leghorn and Rhode Island Red at concessional rates and also by giving financial assistance in the form of loans and

subsidies. There were neither a poultry experimental farm nor a poultry research station in the district in 1961-62.

There is no special breed of cattle in the district. The cows are nondescript, dwarf, with average daily milk yielf of two litres. Buffaloes belong to typical Nagpur breed characterised average milk yield of these animals comes to about four litres a day. In most of the cases, cows are not milked. Farmers in Chandrapur and Warora tahsils utilize a portion of cow milk for practice of allowing the calves to suck their mothers is common. The tribals do not milk their cows. Even though the cattle wealth is immense in the tribal areas, no adequate use is made of milch cattle by the tribals.

Strategy and Action Plan (SAP) for Agriculture

Based on historical changes that have taken place in the last 50 years in Chandrapur and Gadchiroli districts and agricultural practices in the area the objectives of SAP of Agriculture can be listed as follows.

i. Vegetative soil-water conservation measures on sloping, erodable agriculture land, gullies and water ways.
ii. Encouraging crop rotation, double cropping, inter cropping.
iii. Expansion of area under fiber oilseeds, pulses, fruits and vegetables in Gadchiroli district.
iv. Expansion of area under oilseeds fruits and vegetables in Chandrapur district.
v. Agroforestery, and live fences on agriculture land in Chandrapur district.
vi. Integrated nutrient management on for crop production.
vii. Integrated pest management for crop protection.
viii. Better irrigation water management practices and expansion in irrigated area.
ix. Establishment of seed bank for local varieties of crops.
x. Development of improved seeds from local varieties of crop and promotion of controlled grazing, pasture development and better livestock management.

Vegetative soil-water conservation measures :

Vegetative barriers to control is soil erosion on agriculture land, gullies, waterways is cheaper method than earthwork or masonry construction.

Live hedges on crop land is most acceptable soil conservation measure Raising and widening field bunds occupies much crop area. Live hedges are comparatively less costly. Species selected should soil binders, easy to establish and should form as dense a thicket near the ground level, when sufficiently closely planted on bunds. They also prove excellent bund stabilizers. Species mix which can give supplementary income are to be preferred for example perennial tuar alternating with vetiver is possible combination.

Planting local species of grasses or shrubs to control gully erosion is cheaper method in the area where stones are not easily available for gully plugs. *Besharum,* Latena Varieties are suitable in Chandrapur district. (neither are local!)

Encouraging crop rotation and double cropping intercropping :-

Crop rotation system like soyabean wheat, rice-gram ~~are common~~ in Chandrapur district. It should be extended to Gadchiroli.

Intercropping system like cotton-tuar, jowar, mung, jowar-udid, wheat-gram should be encouraged.

This area is suitable for double cropping because rainfall is more than 1000 mm. If long duration cultivars grown presently by farmers are replaced by high yielding, short duration cultivators, a considerable part of rain fed area can be converted into double cropping such a change over besides increasing cropping intensity may increase total productivity per unit area of water use as well.

Expansion of area under fibers, oilseeds, pulses fruits and vegetables in Gadchiroli district :

The production fibers, oilseeds pulses fruits and vegetables is very low in Gadchiroli district. By increasing double cropped area, better irrigation facilities and proper nutrient management the production of these crops can be increased. It will help to improve

nutritional status of the tribals in the district. Tribals are mainly food gatherers and hunters, not farmers. It will not be easy to change their attitudes.

Expansion of area under oilseeds, fruits and vegetables in Chandrapur district : Oilseeds like sesamum were grown on large area in Chandrapur district but now it is grown on small area. It is necessary to increase area under oilseeds like soyabean. Growing vegetables requires regular day to day supervision and irrigation for which farmers are not ready. Vegetable are short duration crops and they can't be stored so farmers prefer crops like rice, cotton, chilli. In summer it is very difficult to protect fruit trees due to uncontrolled grazing so it difficult for farmers to protect it.

More production of fruits and vegetables is possible only with better irrigation facilities and controlled grazing.

Promotion of agroforestery, live fences, social forestry practices in Chandrapur and Gadchiroli districts: In Chandrapur district more than 60% of area is under agriculture. Live fences on field borders are useful for protection of field crops from wild animals, stray cattles and goats. They are useful for soil water conservation also. While selecting plant species for live fencing the criteria to be considered are as follows :-

i. Thorny to prevent entry of livestock and wild animals.
ii. Nonbrowsable Foilage.
iii. Adapatibility to local agro-climatic condition.
iiii. Fast growth.
ivi. Ability to grow and coppice.
vi. Higher economic returns through biomass, seeds, fibers and fruits, medicine etc.
vii. There are number of species in the forest and villages which are suitable for live fencing. At present very few farmers are using live fences.

AGROFORESTRY SYSTEMS : It refers to system in which woody perennial (trees and shrubs) both are deliberately combined on some land along with the crops in some form of spatial arrangement. There are several versions of agroforestry systems.

(a) ALLEY CROPPPING : It is a system in which food crops are grown in alleys formed by hedge rows of trees and shurbs. The essential feature of system is that hedge rows are cut back at planting and kept pruned during cropping season to prevent shading and reduce competition with food crops. The main objective of the system is to get good quality green fodder from hedge rows and produce reasonable amount of food crops in alleys.

(b) AGRO-HORTICULTURE : It is also a form agroforestry where tree component is fruit tree. The important dry land fruit trees are guava, *amla*, custard apple, *ber*, *Karvand*, pomengrate.

The success of fruit tree depends on in-situ moisture conservation practices. Protection from stray cattles goats and small quantities of irrigation water after rainy season will help to grow fruit trees.

(c) Intercropping of Nitrogen fixing tree species(NFTS). It is yet another promising system for dryland agriculture. Dry land being deficient in nitrogen and nitrogeneous fertilizers being costly, intercropping cereals with NFTS will stabilize production in dry land, economizing N use and building soil fertility.

(d) Social forestry on marginal and wasteland : Different tree species can be grown on roadside, homestead gardens, nalla, tank boundaries and villages. The choice of the species can be as follows. Fast growing species. *Babul, Maharukh*, Ucalyptus, *Subhabul*, cassia, *neem*, white siris.

Slow growing timber species : Teak, shivan, bamboo-*garari, khair* etc.

Other species : *Mahua, Karanj*, *Tendu* are some of important species.

In Gadchiroli more than 75% of the total geographical area is under forest. Better management of forest will help to provide bio-mass needed for agriculture purpose.

Integrated Nutrient Management :

It is now globally suggested that we should not depend on any single source of nutrients for meeting nutritional demands of crops. It is necessary to adopt an integrated nutrient supply system by means of judicious combination of chemical fertilizers, organic manures and bio fertilizers (Why chemical fertilizers at all?).

In Chandrapur and Gadchiroli district organic wastes are available from forest area and from livestock. Presently there is no proper management of these wastes. As cattles and goats go to forest for grazing or wonder in search of fodder most of urine and dung is scattered. Whatever dung is available it is dumped in a pit or open heap. Most of nitrogen is lost from it. So the quality of such manure is very poor.

There is urgent need to manage organic wastes scientifically and produce good quality composts and vermi composts in sufficient quantities.

Green manures crops like sunhemp, *gavar*, cowpea can be grown on agriculture land because rainfall is higher 1000 mm.

Biofertilizer like blue green algae, azetobacter, rizobium culture and PSB culture will improve nitrogen content of soil, better utilization of the phosporus. In the soil, thus reduce need of nitrogenous and phosphatic fertilizers.

Integrated Pest Management : Modern agriculture practices, in which chemical fertilizers, chemical pesticides and homogenous narrow genetically based varieties are used, has disturbed agriculture ecosystems.

Hence a combination of practices namely the use of resistent varieties, use of herbal pesticides, mechanical methods, trap crops and biological control of pests is necessary for effective pest control.

In Chandrapur pesticides are mainly used for cotton and chilli and to some extent for rice. In Gadchiroli district use of chemical pesticides is very small. Both districts have large forest area. There exists a scope to develop herbal pesticides for effective control of pest from the different plant species in the forest. Research in this direction will help to develop such pesticides.

Better irrigation water management, and expansion of irrigation facilities :

In both the districts annual rainfall is above 1000 mm. Rivers, tanks and wells provide water for irrigation. Expansion of irrigation facilities is possible.

Both district have higher percentage of irrigated area as compared with that of the state. It is observed that there is no adequate control over the quantum and delivery of water from wells, tanks, Canals. Proper scheduling of irrigation water is essential for

efficient use of irrigation water. Proper scheduling of irrigation leads to saving in water and energy, higher crop yield, efficient use of inputs and lower production costs. Farmers are following irrigation practices which are resulting in either under irrigation or over irrigation of the crops. Production per unit of water is therefore low.

Flooding method of surface irrigation mostly used by the farmers in this area. Uneven distribution and low water application efficiency are the common drawbacks of the method.

It is necessary to manage irrigation more efficiently by involving farmers.

With better irrigation facilities and proper management of irrigation water it is possible to grow variety of crops like tubers, medicinal plants, essential oils and tree crops.

Establishment of seed banks :

Of all the agriculture input seed holds the key position. Seed a living embryo is vital and basic input for attaining sustainable growth in agriculture production.

There are number of varieties of seeds different crops in this area. It is necessary to preserve these seeds and to improve develop improved seeds from it which will be more suitable for this region than seeds imported from outside.

Innovative farmers, agriculture colleges or science college can maintain seed banks. They can be linked with agriculture universities research laboratories to develop improved varieties.

Promotion of controlled grazing, pasture development and better livestock management:

There is ungent need to manage grazing lands in Chandrapur district properly. Soil water conservation measures on grazing lands growing fodder trees and fodder grasses of the land can yield more fodder per unit area. Removal of nonfodder varieties of grasses, herbs and use of chemical fertilizers will also improve productivity of fodder grasses.

Incentives for indigenous seed use and conservation, consumer networks, PDS?)

Biodiversity and Government Schemes

Review of working plans and schemes of agriculture department, social forestery and irrigation department, at the district level shows that these schemes are useful to implement SAP for agriculture.

These schemes and programmes can be summarized as follows.

i) Supply of improved seeds (improved usually means HYVs and hybrids-implication for agricultural biodiversity)of rice, pulses, oilseeds, cotton and vegetables.
ii) Demonstration cum seed plots for growing spices, medicinal plants and essential oil plants.
iii) Expansion of area under oilseeds and pulses.
iv) Popularization and supply of biofertilizers like rizobium, PSB culture, blue green algae and gypsum.
v) Land development and soil water conservation measures.
vi) Digging wells, borewells and ponds for irrigation.
vii) Supply of improved agriculture tools, machinery pumps, pipes drip and sprinkler irrigation systems.

viii) Establishment of nurseries for growing fruit trees, fodder and fuel, timber trees and supply of these trees at subsidised rates.

For successful implementation of the schemes following steps are necessary.

i) People's participation (more details-how to involve, what mechanisms)
ii) Technical guidance
iii) Financial support.

Existing government net work to provide financial and technical assistance to large number of farmers is inadequate. Inefficiency and corruption in government machinery and ignorance and inertia among farmers are main hurdles in implementation of bio diversity strategy and action plan.

Almost nothing on wild App. diversity?
** Non-forest natural ecosystems, esp. wetlands?

Forest *

In this part we will cover the following topics.

1. Description of the forest.
2. Flora and Fauna of the forest.
3. Statistics of growth and yield.
4. Past systems of Management.
5. Present systems of Management
6. Outturn of forest produce and markets and revenue.
7. Livelihood and Forest.

I – Description of the Forest

The Gadchiroli and Chandrapur are rich districts of Maharashtra state in respect of forest wealth. The forest ranges from well known teak of Allapalli to low quality miscelleneous one of Warora. Area under forest given by Forest Survey of India, Regional Remote Sensing Centre and Forest Department is given below.

* Ref. : Report of Forest statistical cell of forest department (M.S.) 1997 and 2000.

FOREST AREA

(Area in Sq.Km.)

	Total Geographical area	Forest Area			% forest Area
		Dense	Open	Total	
Forest Survery of India	25923	10632	3254	13886	53.7
Regional Remote Sensing centre	26128	15226.6		15226.6	58
Forest Department	25855	-	-	18025.29	70

LEGAL STATUS OF FOREST:

Forests have been divided into Reserved, protected and village forests. This division is mainly based on the control of government over the forest and the enjoyment of rights of people in such forests. The Government has very rigid control over reserved forests and the rights of people are strictly examined and can be commuted or even extinguished. Comparatively the government has less control over the protected forests and very little control over village forests. Thus this is basically a division defined by law. In the last 100 years legal status of the forest have changed considerably and it has direct impact on forest cover, forest bio-diversity and forest productivity. Management practices, like silvicultural operations, extraction methods, marketing of timber and non-timber forest products, encroachments and population pressure of human and domestic animals have caused degradation of the forest flora and fauna.

FOREST AREA BY LEGAL STATUS

(Area in Sq. Km.)

Administrative Agency	Reserved Forest	Protected Forest	Unclassed Forest	Total
South Chandrapur Circle				
Forest Department	7392.48	2247.30	134.92	9744.70
Revenue Department	-		99.26	99.26
Forest Development Corporation of Maharashtra	-	-	-	770.90
North Chandrapur circle				
Forest Department	5152.991	1372.64	51.6	6577.23
Revenue Department	-	-	145.85	145.85
Forest Development Corporation - Corporation of Maharashtra		-	-	687.35
Total	12545.471	3619.94	43163.00	18025.29

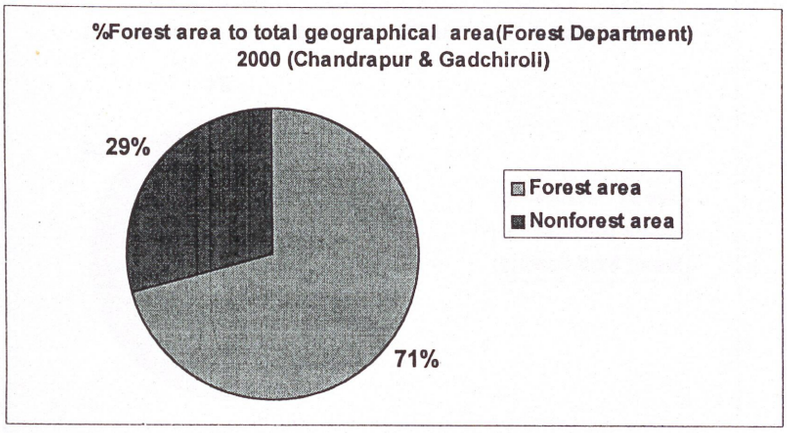
Boundaries

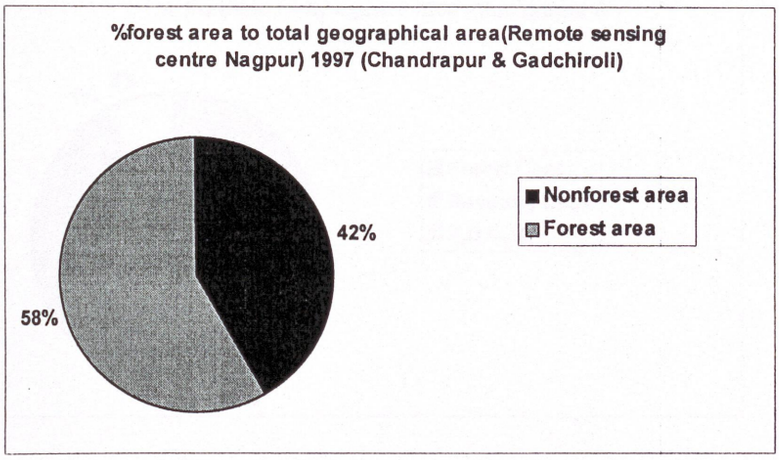
The compartment boundaries, protected forest area boundaries and interstate boundaries are not maintained properly. Reserved forest boundaries are properly demarcated as far as possible.

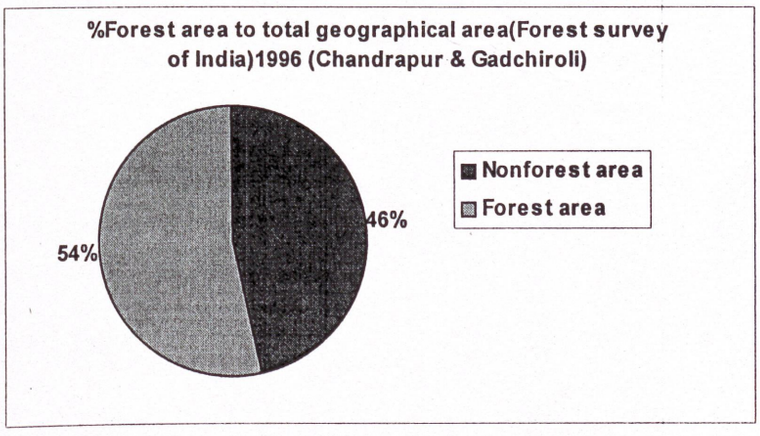
The forest in this region can be classified based on its function as follows.

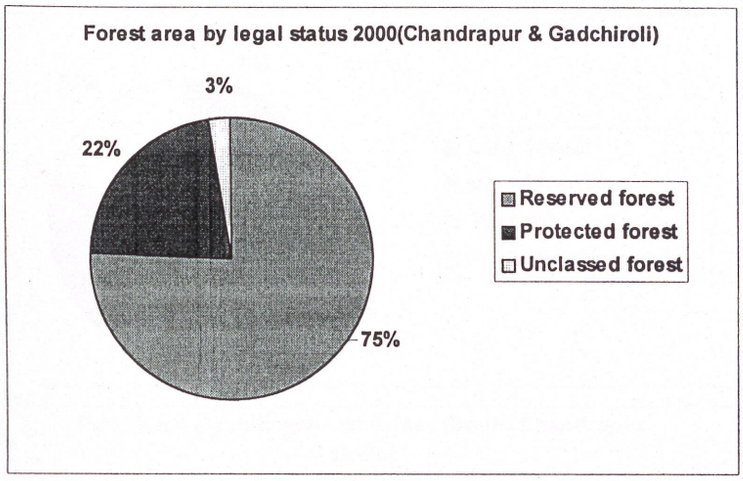
FUNCTIONAL CLASSIFICATION OF FOREST

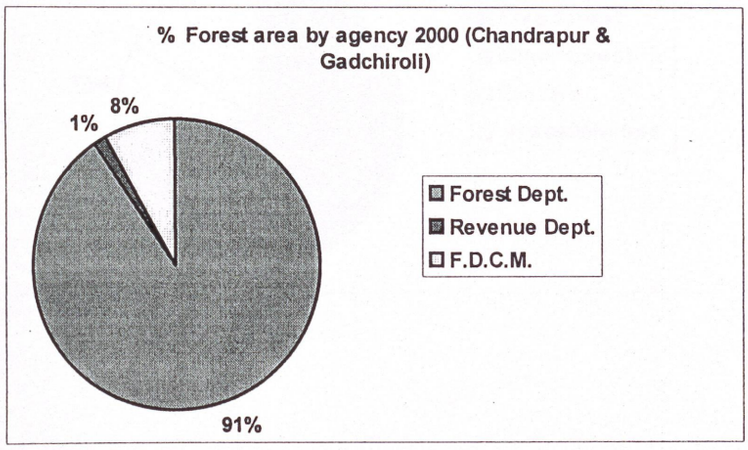
Forest type	Function	Percentage of total Forest area.	
		North Chandrapur %	South Chandrapur %
Tree Forest timber useful for commercial and industrial purpose.	Production of Valuable	8.46	36
Minor Forest	Supply of fuel and timber for local consumption	70.68	37
Pasture	Provision of Pasturage and grazing facilities.	0.54	10
Protection	Protection of Physical forest condition.	20.32	
Miscellaneous			17

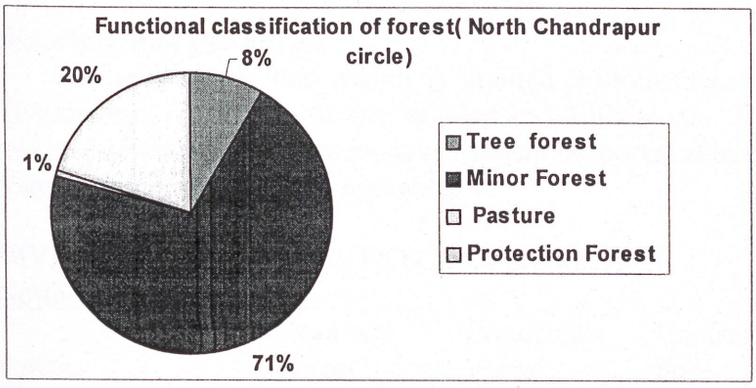

%Forest area to total geographical area(Forest Department) 2000 (Chandrapur & Gadchiroli)
29%
71%
Forest area
Nonforest area

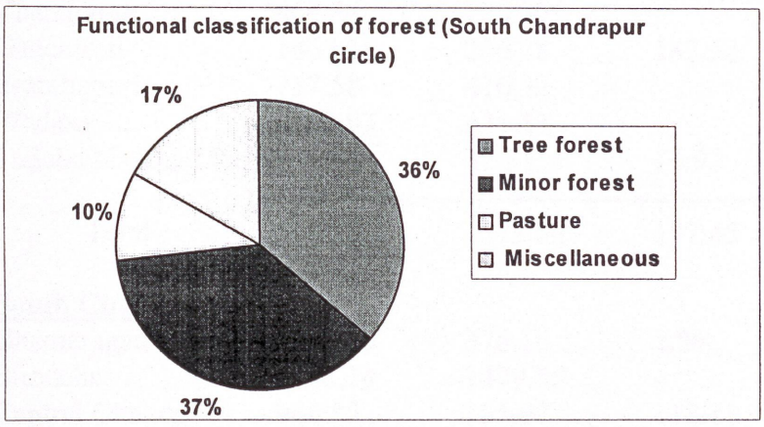

%forest area to total geographical area(Remote sensing centre Nagpur) 1997 (Chandrapur & Gadchiroli)
42%
58%
Nonforest area
Forest area


%Forest area to total geographical area(Forest survey of India)1996 (Chandrapur & Gadchiroli)
46%
54%
Nonforest area
Forest area


Forest area by legal status 2000(Chandrapur & Gadchiroli)
3%
22%
75%
Reserved forest
Protected forest
Unclassed forest


% Forest area by agency 2000 (Chandrapur & Gadchiroli)
1%
8%
91%
Forest Dept.
Revenue Dept.
F.D.C.M.


Functional classification of forest(North Chandrapur circle)
8%
20%
1%
71%
Tree forest
Minor Forest
Pasture
Protection Forest


Functional classification of forest (South Chandrapur circle)
17%
36%
10%
37%
Tree forest
Minor forest
Pasture
Miscellaneous

Description of the Forest

The forest in this region is divided 2 circles i.e. North Chandrapur and South Chandrapur. These are further divided in 10 divisions. Forest area in charge of forest revenue department and forest development corporation in each division along with legal status is given in the following table.

DIVISION WISE LEGAL STATUS OF FOREST

North Chandrapur Circle (Area in Sq. Km.)

Forest	Reserved Forest	Protected Forest	Unclassed Forest	Total to F.D.C.M.	Area assigned
Chandrapur	864.34	226.20		1090.54	292.63
Gadchiroli	1869.18	266.28	182.52	2317.98	
Bramhapuri	717.58	416.32		1133.90	394.72
Wadasa	1123.93	431.33		1555.26	
Tadoba National Park	577.96	32.51	14.93	625.4	
Total :	5152.99	1372.54	197.45	6723.08	687.32

South Chandrapur Circle

Bhamaragad	3295.76	376.16	1.89	3643.81	
Sironcha	1068.14	1479.58	-	2547.72	222.04
Central Chanda	940.89	155.07	118.11	1214.07	251.98
Allapalli	1864.47	231.20	105.08	2200.75	298.88
Wild life Allapalli	223.22	5.29	9.10	237.61	
Total	7392.48	2247.30	234.18	9843.96	770.9

SIRONCHA DIVISION

i)Configuration : Hilly terrain to Northeast, Southwest and low land in between and mostly in North – South.

ii) Geology : Archean to recent and metamorphic rock are predominant.

iii) Climate : Average Rainfall 1405.7 mm.
Average daily maximum temperature May 42.5^0 C
Average daily minimum temperature December 12.4^0 C

iv) Water : Acute shortage of water in summer.

Forest Type : The forest in the region is of two types :

South Indian moist deciduous forest : It is found in Asaralli, Sironcha ranges. Teak is main species with about 15-18% proportion. Pure patches that are mixed with Ain, Bija, Surya, Dhavara, Tendu, Lendia Mowai, Bhirra and Anjan.

Southern Tropical dry deciduous type 5 A : The second subtype is found in other area. Teak is in small proportion mixed with other species. On drier areas Salai and Anjan overtake. Bamboo is distributed in Southern localities.

Soil Erosion : Owing to soft and friable nature of rocks resulting in sandy soils in upper and lower Gondawana forms, instances of soil erosion both sheet and gully erosion has been noticed in various places in these forest where large gaps have been caused in forest canopy due to past indiscriminate and injudicious felling.
DENSITY OF FOREST : The density of crop for teak is 0.4 to 0.6 and for mixed forest 0.5 to 0.6.

Bhamaragad division
Configuration : i) The major portion of the tract is hill and undulating. The hilly portion is part of Abujmad mountain and Surjagad hills have highest point above 663.5 meters above mean sea level. The tract is drained mainly by Bandia, Indravati, Zuri and Pranhita rivers.

Geology : The rocks here essentially archean unclassified gneisses. Schists and quartzlites and granite.

Climate : Average rainfall 1350 mm.
Average daily maximum in May 43.3^0C
Average daily minimum in December 13.1^0C

Minerals : Iron deposits are found in Bhamaragad and Surjagad hill ranges.

Forest type : iv) The forest in this tract belong to the group ' Tropical dry deciduous and southern moist deciduous type. Forest local subtypes are *Ain-Bija, Dhawara, Ain-Tendu, Dhawara, Surya-Ain-Garari, Salai-Bhirra, Khair, Rohan-Bhirra, Semal* teak account for only 2% of total forest area. The low percentage of teak is due to silvicultural characterstics of being strong light demanding species. Other species are *Ain, Bija, Harra, Behada, Semal, Haldu, Dhawara, Salai, Movai, Lendia, Khair* Bamboo are found almost everywhere. Katang bamboo is found along water courses.

Soil erosion : Soils is friable granular loam and terrain is hilly interpersed with numerous water courses. Gully erosion is observed in open areas.

Central Chanda Division :
Configuration: Nearly 25 percent of area is situated in plains with slight undulations. The lowest altitude is 169.2 meters and the highest altitude at 588.6 mt. above sea level in Manikgarh hills. Area is drained by Wardha river.

Geology: The whole area is underlain by a succession of lava flows interbedded with thin beds of limestone, shale, sandstone and cherts. Manikgarh hill is the only significant basaltic trap region of the district.

Minerals : Coal, limestone and dolomite limestone are found in this area.

Forest Type: The forest of this region belong to the type 'Southern tropical Dry deciduous forest. These forest are distinguished into the following types as per

Champion & Seth's revised classification of forest types. These forest belongs to $5A/C_1b$. Dry Teak bearing southern tropical dry deciduous forest, $5A/C_3$, southern dry mixed deciduous forest, $5/E_2$ – Boswellia forest, DS_1 Dry deciduous Scrub forest.

Dry teak forest: This is found in major portion of Chincholi block, southern portion central portion of Siddheshwar block, western portion of Gariapeth block. In this forest the proportion of teak varies from 10-25 percent and economically important miscellaneous species varies from 15-25 percent of growing stock. All age classes are represented. Garari and bamboo are main species met within understorey. The occurrence of Kukutranji in open areas is common. Regeneration of Dhawada and Ain is scanty.

Southern dry mixed deciduous forest. This type of forest is in major part of Rajura block Siddheswar, Paradi, Manikgarh, Chanai Barasa, Sumthana and Murthi block. The growing stock is characterized by fair proportion of economically important miscellaneous species along with occasional teak. In some patches Bhirra, Dhawada, Tendu predominates the top story. The crop is middle aged to mature. The underwood consist of Garari Bamboo are found along nalla banks. The incidence of undergrowth is comparatively less. Regeneration is inadequate.

ii(1) Boswellia forest : Major portion of Manikgarh and Gariapeth blocks come under this type. In this forests Salai is associated with Moyen and Garari. Proportion of Salai is more than 40% of the growing stock in overwood. At places its proportion exceeds even 80 percent ever extensive patches tending to form pure Salai crop. Next to Salai, Moyen occurs frequently in overwoods and in patches attains the proportion of 10-30 percent of growing stock in overwood. Garari is the main species occuring the underwood, Bamboos are found mainly along nala banks.

ii(2) Dry deciduous scrub: It is found in all isolated blocks namely Kanargaon, Talodhi etc. which are surrounded on all sides by villages. Stunted growth trees of dry deciduous forest characterize the vegetation. A thin grass growth is present during the short moist season. Otherwise soil is bare. Climbers are few and mostly zerophytic.

Density of Forest:- Density of teak forest varies from 0.4 to 0.7 and mixed deciduous forest 0.4 to 0.6.

Soil erosion:- The plain forests of Rajura Chincholi and Murthi blocks are surrounded by large number of villages on all sides and hence subjected to heavy grazing all year round. In addition forests are frequently invaded by ground fires in summer. The soil being loose and friable sandy soil, top soil is washed away during rains. In these block 1700 hect. of undulating areas around nallas are severally affected by erosion. In these area top layer is washed away in rills as well as crossable gullies are formed which are progressing fast. The forest crop in such areas has degenerated into understocked open scrub. Unless attended to further degradation of such area into valueless blanks is only a matter of time. The severe erosion in the form of ramification of ravines 2 to 8 mt. deep is also not uncommon in these area.

In hill forests of Gariapeth, Siddheswar and Manikgarh block also unrestricted heavy grazing during rainy season followed by repeated ground fires during summer and

unabated clearing by encroachers for cultivation in Marnikgarh block are mainly responsible for erosion.

Allapalli Division:
Pirimili and Aheri (part) Ranges.
Configuration: It is plain area with elevation varying from 213 mt. to 487mt. Bandia is main river. Dumme nalla Primili nala & Tadguda nalla are tributaries of the river.

Geological formation : Geological formation in this region is of two types Archean to recent.

Climate :	Average rainfall	1265.5 mm.
	Average daily maximum temperature May	43.4^0 C
	Average daily minimum temperature December	11.54^0 C

Forest type : The forest is southern tropical dry deciduous forest type 5A. The variation in composition distribution and stocking of forest is not very significant. Ghot, Pirimili range. It is further divided in two types.

Dry teak forest $5A/C_1B$
Southern dry mixed deciduous forest $5A/C_3$
In Allapalli range the forest belong to south Indian moist deciduous forest sub group 3B.

Climate type : 1) $3B/C_1$ – Moist teak bearing forest.
2) $3B/C_1B$ Moist teak forest.
3) $3B/C_2$ Southern Moist mixed deciduous forest.

Ain Dhawara type : Ain Garari type, Rohan-Bhirra-Khair type High quality teak occurs in plains of Allapalli range. The percentage of teak varies from 50-80% and in small pockets pure crop of teak is observed. The deep alluvial soils and comparatively higher water table in these areas afford optimum condition for luxuriant growth of teak and other species in natural condition. These soils are prone to waterlogging on clear felling and are difficult for artificial regeneration.

Soil erosion: Soil erosion is negligible in plain area of Allapalli. It mostly occurs along nala banks and nearly opened up lands for regeneration operations. Severe soil erosion is noticed in Bhimaram hill. Gully erosion has been noticed in several villages in pirimili and Aheri range. Sheet erosion has been noticed in clear felled area.

Density of crop varies for on : 0.4 to 1.0

Gadchiroli Division

Configuration : The area is undulating and hilly, the hills being low in height. Main blocks of hills are Palasgarh, Gewardha, Satinalla and Tipagarh, Wainganga is the main river and Garvi, Khobragarhi and Kathani are its tributaries. Other rivers are Tipagarh, Satti. There are many nallas passing through the area.

Geology : The geological formation throughout the division belongs to Archean series. Most of the area under soil cover have granite or gnessies as bed rock

Climate:		
	Average Rainfall	1524 mm.
	Mean daily maximum temperature in May	46.6^0 C
	Mean daily minimum temperature in December	13.7^0 C

Water supply : During summer water table recedes and wells, rivers and tanks dry up.

Forest type : The forest of this tract belongs to the group. "Tropical dry deciduous forest and subgroup 5A/C3 southern tropical dry deciduous forests.

The local subtypes are as follows.

Teak forest with dense bamboo.
Teak forest with scanty or no. bamboo.
Mixed forest with dense bamboos.

Mixed forest with scanty or no. bamboos. Teak forests account only 4.69% of the total area of division. The percentage of teak in teak bearing areas varies from 20-30%. The edaphic and biotic factors are responsible for low extent of teak in the division. In mixed miscellaneous forest commonly found important species are *Ain, Bija, Harra, Behada, Semal, Haldu, Dhaora, Bhirra, Tendu, Salai, Mowai, Lendia Khair* etc. Bamboo are found everywhere.

The main species of bamboo is Dendrocalamas strictus. Katang bamboo has also been sighted in compartment 146 of Dhanora range.

Soil erosion : As a result of ruthless felling fire and excessive grazing the forest thinned out, losing power to regenerate. Unplanted and uncoordinated developmental works across natural water channels have on one hand led to closure of many existing ones on the other new channels created due to formation of gullies and eventually nallas are becoming increasingly evident. This is perhaps one of the major changes that have seen in the landscape of western limits of Gadchiroli as an accompaniment to the thinning out of forest area.

Wadasa division.

Configuration : Most of the area is gently undulating with low hill ranges. The forest of Wadasa are situated on tringle.

The area of the division is on tringle of high land forming a table land. The left bank river is Wainganga and is drained through khobragarhi, Garhvi and Kathani rivers which runs the entire western portion of the division.

Numerous hills rise on these table lands mainly on Northern Eastern and South eastern side two blocks of hills namely Palasgarh and Gewardha. The highest portion of Sattinalla hills is called Kalapani and is 1553 mt. above mean sea level.

Geological formation: It belongs to Archean series the most predominant rock formation are granite and granite genessies which are uniform in texture and composition.

Climate :	Average Rainfall	1524 mm.
	Mean daily maximum Temperature	46.6^0 C
	Mean daily minimum Temperature	13.7^0 C

Water supply during summer especially in month of April-May most of the wells, tanks and river dry up except Wainganga.

Forest type: The forest in this division generally corresponds to the Tropical dry deciduous forest of sub group $5A/C_3$.

The following subtypes:

Teak forests with dense bamboo (0.5 to 0.7)
Teak forests with scanty or no bamboo (0.4 to 0.6)
Mixed forest with dense bamboo.
Mixed forest with scanty or no bamboo.

The % of teak varies between 20-30% in plain subtype and 20-50% in hill subtype. The quality of teak forest ranges from III to IV(a),IV,IV(b).

CHANDRAPUR DIVISION

Configuration – Mul hills lie about 5 km. West of the township of Mul. The hills are flat topped consisting of sandstones and rise barely to height of 300 mtrs. The area drains into Wardha and Human river basin through network of its tributaries.

Geology – Laterite is found in the area at many places capping over Deccan traps and gneisses at places. The gnessises and other rocks of Archean age of weathering give rise to red soils, which are less fertile than black soils.

Water supply: Water is scanty during summer season. Drinking water is available through wells and tanks in most of the villages.

Forest type: The forest belongs to tropical dry deciduous forest and sub group $5A/C_3$. Southern dry mixed deciduous forest, which occupy the whole of Chandrapur division.

Local variations are observed depending upon soil type and past treatment. Well drained, deep loamy soil and alluvial soil bear better quality forest.

Teak bearing forest with bamboos: The best quality of these forest occur around Kolsa in and between Dewada, Junona villages in Moharli ranges over deep well drained sandy loam or alluvial along Andhari nalla in small patches. Teak in overwood varies from about 15 to 20%. Bamboo in this area is full of bamboo regeneration and congested. Where bamboo is less, growth of teak and other species is better. The height ranges are 21-27 mt. in best soils and below 15 mtrs. in inferior sites.

Mixed forest without bamboo: These forests occur in Warora range of Chabada Division. These forest are composed of number of species *bija, lendia, Dhawada, Sivan, Awla, tinsa, ain, semal* etc.

Soil erosion: The process of soil erosion is proceeding at alarming pace in all the marginal areas of reserved forest. These areas are subjected to very heavy grazing and repeated fires. Where the soil is sandy in nature gully erosion has set in and is noticed in Warora, Mul, Chanda range. The quality of forest has degenerated and many understocked patches bearing scrub forest are noticed.

Bramhapuri Division:
West of Wainganga has mainly metamorphic rock (quarts schist with patches of laterite Vindhyan Sandstone also occur at some places. These forest are similar to Forest in Wadasa Division.

Tadoba Andhari Tiger Reserve: *
Configuration : The tract is mostly undulating and hilly in north interpersed with open grass land and wooded area. The other parts of tracts are mostly plain. In the basin of Chimur hills lies Tadoba take which is of 120 ha. spread. The highest elevation is 354-0.7 mtrs. and lowest point is 212.45 mt. Two major rivers Erai in Western half and Andhari river in the eastern half are draining the reserve area. Another important lake is Kolsa lake. The hilly area give rise to various streams like Andhari, Bhanushkhind, Hirdi etc. contain water throughout the year.

Geology: There are alluvial deposits in northern side Godawana Sediments in Southwestern side, precambrian Vindhyan Formation in Central & NW-SE direction and Archean metamorphic rocks along NE corner. There are several types of soil in the area, alluvial soils, moderate dark grayish brown, reddish brown and ferruginous etc.

Water: As per manual of wild life Institute of Deharadhum (1988) an animal can under normal circumstances walk upto an average distance of 2.5 km to quench. Its thirst therefore there should be a minimum of one water hole in the radius of 2.5 km. 69 percent of the protected area is effectively covered with water. There are 10 perennial lakes, and 7 seasonal lakes, 9 anicuts, 37 natural water holes and 33 artificial water holes.

Forest type: These forest belong to 5A. Southern tropical Dry deciduous forest type having teak as dominant specie the main associates of teak are *Ain,* Bamboo, *Bija,*

Dhawara, Haldu, Salai, Tendu etc. Trees of *Jamun, Mango, Arjun* are found in most area, two varieties of wild rice (oryza) exists in the wet patches of Katezari area. Whole

* *Ref. Mr. K. N. Khaware & Mohan Karnad, Management Plan for Tadoba-Andhari tribal Reserve 1997-1998 to 2006-2007.*

area consists of 11.48 percent of teak forest, 76.10 percent of mixed forest, 7.17 percent of grass land and 5.19 percent of degraded area.

Cover: The different composition of the vegetation and density along with topological features like caves, nala belts, cliffs, bargous act as cover required by wild animal for various purpose. In addition to these dead hollow and fallen trees also act as cover to many species of birds reptiles and microfauna. There are 14 caves of Tigers/Sloth bears, twenty-four burrows of Porcupine/Python, one burrow of wild dog in the tiger reserve. The space available for wild animal is adequate at present.

II - Flora and Fauna of the Forest *

Mr. Malhotra and Moorthy (1971) has given fuller accent of the flora of this district (1971-73). Their list contains 780 species spread over 463 genera, and 110 families spread over various localities. The working plans of forest department also gives list of species in the forest. Recently botanical survey of India has conducted survey of flora of Tadoba Andhari National Park.

The list given by Moorthi and Malhotra show that the following are the predominant families.

Family	Genera	Species
1) Febaceae (Papilionaceae)	82	72
2) Poaceae (Gramineae)	30	71
3) Cyperaceae	11	37
4) Asteraceae (Compositeae)	27	35
5) Acanthaceae	20	28
6) Malvaceae	9	25
7) Rubiaceae	16	25
8) Convovulaceae	8	25
9) Caesalpinaceae	9	19
10) Amarantaceae	11	17
11) Mimoceae	8	15

It is quite obvious from this that a large number of herbaceous members are found side by side with different tree species. Compared to herbaceous plants the woody species are few. These woody species form tall canopy. The tree growth the Tectona grandis (teak) and other species is so good that they hardly indicate the deciduous nature of the forest here. The second layer is formed by Adina Cordofolia, Cappris Grandis, Soyamida Febrifuga (rohan) etc. Latena camera is spread over in open and waste lands. A number of climbers and linanas of Abrus precatorius, Aristolochia, Indica etc. are observed in this area. Due to heavy rainfall and humidity the trees are loaded with ephiphytic orchids like vandna Tessellata and parasites like Cassytha filiformis

check spellings!

Dendrophothoe facalata, Viscum articulum etc. Bamboos and pricky thickets of calamus are plentiful.

The undergrowth consists of Abutilon Indicum, Acalyphy indica, Achyrantous, aspera, Yeronia cinnera, xanthium sturmomium etc.

* Ref. : Malhotra, S.K. Murthy 1971, Bulletin of Botanical Survey of India, 13: 292-311.

* Ref : Khaware K.N. and Karnal Mohan, Management plan for Tadoba-Andhari reserve 1997-1998 to 2006-2007.

The countryside in open trees and shrubs of Ailanthus excelsa, Azadircha , indica (Neem) Calotropis gigenantea, cassia ariculata Denis indica Manginfera indica are cultivated.

Both districts have large number of pends and small and large intersecting nallas and rivers. Aquatic plants like ceratophyllum demersum. Nelumbium rucifera Nymphaea nouchali etc. are quite common. Besides these one finds herbaceous plants of Ericaulen dianae, Paspalium viginatum. Rotala indica etc. in marshy areas.

The flora of here is like the flora in the valleys of Western Maharashtra. But the growth of trees much better than there due to humidity for the most part of the year and good soil.

The timber trees like teak here grow very best in whole of India. Analysis of both herbaceous and woody species however indicates the dry deciduous nature of flora and vegetation. Besides species from Orissa and Andhra Pradesh also grow here. In Bastar Teak and Shorea robutsta are found together but not here. The famous Allapalli forest has the tallest and largest timber trees of teak. It reaches here nearly 120 ft. height more than double that at other places. The Allapalli teak is much valued for its size and figured wood, good for veneering. Ordinary teak fetches very high price for furniture and building timber.

Thus flora of Chandrarpur and Gadchiroli is very rich having assemblage of dry deciduous, and semi evergreen or moist deciduous species but that alone in not special feature. The special feature is luxuriant growth of teak and other species.

Forest Reserves of Allapalli : Glory of Allapalli is kept reserved as a show piece a permanent preservation plot since 1953 shooting is not allowed here. It is situated 110 km. away from Chandrapur on Pranhita river. The climate is extremely humid as number of nallas cross it and soil being mostly alluvial or sandy. Humus depth is 2.5 cm–10 cm. The trees develop admirably good root system in loose sandy soil. The growth of teak and other species here is the best in India as good as that of teak in Burma or Malbar.

The following table gives the data about best trees in Glory of Allapalli by descending height.

Name	Height (mts.)	DBH (mts)
Teak	42.98	3.96
2.01		
2.72		
Tamarind	35.05	3.35
Haldu	35.65	3.12

The following table gives the list of best trees in glory of Allapalli by diminishing diameter.

Name	Height (mts.)	DBH (mts)
Teak	34.4	5.28
Teak	34.74	5.18
Teak	34.44	4.27
Teak	33.53	4.24
Teak	34.44	4.22

The list of flora in these forest and given in Annexure III.
Fauna of the Forest: There are about 41 varieties of Mammals , 23 varieties of fishes, 25 varieties of Reptiles,5 varieties of Amphibians, 48 varieties of Butterfiles, 26 varieties of Spider and 195 varieties of Birds in this area.
The list is given in Annexures V to IX.

III - Statistics of Growth and Yield

Number of studies have been conducted with regard to growth to either teak or miscellaneous species of this area. The mean annual increment (M.A.I.) and cumulative annual increment and other curves for different species have been plotted in working plans.
The table giving stem analysis of teak trees but different places is given in the Annexure

IV - Past Systems of Management

In this part brief review of past systems of management will be taken. It includes legal status of the forest, working plans and working circle for the divisions.

A silvicultural system may be defined as a method by which forest crops are tended harvested and replaced by new crops of distinctive forms in accordance with accepted sets of silvicultural principles.

The essence of silvicultural system is 1) the reproduction method 2) the form and character of the crops produced by such system. 3) The distribution of the age gradation or age classes over the area of forest.

Silvicultural systems can be conveniently classified according to the method of carrying out the felling which remove the mature crop with a view to regeneration and the type crop produced by the method regeneration employed. Generally two main categories of silvicultural systems are high forest system and coppice system.

High forest system are the systems, where regeneration is normally of seedling origin either natural or artificial or combination of both and where the rotation is long. Coppice systems are the systems where the crop originates mainly from stool shoots (coppice) or by other vegetative means and rotation of the coppice is short.

High forest systems are further divided into two types of systems i.e. systems of concentrated regeneration and selection system. In selection cum felling system mature trees are removed individually or in groups over whole felling series (usually in the

course of felling cycle) the crop is irregular on the whole with adequate representation of all age classes.

In coppice systems there are three main categories, clear felling, coppice with standard and coppice with reserve. In the simple coppice the whole of crop is clear felled on attaining exploitable sizes and in coppice with standard part of mature coppice is retained for one or more rotations to get poles and some timber. In coppice with reserve systems the regeneration may be natural that is from seedling or from coppice or may have been artificially by planting.

Working plans for the forest are prepared by forest department working circles are constituted after undertaking detailed survey of the area. Felling rules are mentioned for extraction of timber and non-timber forest produce. Silvi-cultural practices to be adopted are mentioned in working plans.

SIRONCHA DIVISION * :

The forest of Aserali and Sironcha ranges were declared as reserved forest in 1879. The Jimnalgatta and Korapalli blocks were merged with British rule in1903. In 1902 the ex-zamindari Estate was taken over by courts of wards for management on lease. In 1924 declared as reserved forest under Madhya Pradesh Abolition of Proprietary Rights Act 1950, forest came under management of forest department (1951) as protected forest under section 29 of Indian forest Act. 1927. Further under section 4 of Indian forest Act 1927 the Government decided to constitute this forest as Reserved forest (1959).

* Ref.: A.P. Deshmukh, Working Plan for Sironcha Forest Division 1991 to 2001. Vol. 1.

Working Plans : The following working plans were prepared for working of the area.

Reserved Forest Name		Working Circles	
1)	Mr. J. Carr.	1917-1936	Selection felling working circle.
2)	Mr. Hussain	1937-1954	Bamboo working circle miscellaneous working circle Bamboo overlapping circle conversion working circle.
3) (Jimmalgatta and Korapalli)	Mr. Anthony	1910-1956	Improvement working circle
4)	Mr. Dashputre	1954-1969	Conversion working circle selection Miscellaneous working circle. Coppice with reserve circle. Semal overlapping circle.
Mr. R.B. Joshi.		1974-84	Protection working circle. Conversion working circle

Selection cum improvement-working circle.
Coppice With reserve working circle.
Bamboo overlapping working circle.
Khair overlapping circle.
Semal overlapping circle.

Analysis of past systems of management in working plans:-

1) In Hussain's plan stock mapping was carried out. Anthony's plan in Jimmalgata Korepalli blocks was first measure of scientific management.

2)Mr. Dahsputre's plan suited for improvement of the forest. Some coups remained unworked. Semal remained untapped.

3) In Mr. Joshi plan, protection working circle was not given any treatment. In conversion working circle working was proper. In selection cum improvement working circle the results were not satisfactory. In area earthmarked to forest development corporation of Maharashtra, the crop was open to greater extent than prescribed. Regeneration was patchy. In coppice with reserve working circle the crop condition had gone down due to heavy exploitation.

4) In miscellaneous working circle the forest had been heavily exploited. Bamboo working circle was proper. Khair and Semal were not tapped.

Proprietary forest

Mr. P.P. Joshi Delichil	1961-65	Selection cum improvement working circle.
Mr. B.P. Desai	1966-76	Selection cum improvement working circle Khair plantation working circle. Teak plantation working circle. Coppice with reserve working circle. Bamboo overlapping working circle Khair overlapping working circle.
Mr. R.L. Chaudhari (Sironcha, Aserali range)	1965-75	Minor Forest Working circle. Coppice with reserve working circle.
Mr. S.C. Agrawal (Umanoor, Edanoor, Edrange)	1956-76	Selection cum improvement working circle.
Mr. Mankare (Kamalapur, Jimalgatta, Delichil block)	1970-80	Protection working circle Selection cum improvement working circle. Clear felling teak plantation working circle. Forest produce working circle. Khair overlapping working circle. Bamboo Working circle.

↓ Too much detail - give only analysis, rest can be annexed

The results of past working are as follows.

Heavy exploitation resulted into open areas in crop.
Teak plantation upto 1980 are good but those raised there after failed miserably due to human factor.
Encroachment and illicit cutting persisted in Protection working circle.

ii) Bhamragad Division *

LEGAL STATUS:- The forest of the tract dealt with form the part of ex-Aheri Zamindari. Till 1951 forest were managed by ex-ruler. The main object of management was to earn revenue therefore over and unscientific harvesting of the crop was carried out. All valuable species were harvested by selection without bothering for their regeneration. This resulted in inferior type of crop. In 1951 forest were taken by government and in 1955-1959 the forest were declared as reserved forest after submission of report by forest settlement officer.

* Ref.: B.P. Singh, Working Plan for Bhamaragad Forest Division, 1995-2005. Vol.1.

Working plans:- Different working plans prepared for this region are as follows.

Name		Working circles
1) Mr. Anthony	1916-1956	Improvement felling Working circle.
2)Mr.S.C.Agrawal (Gatta and Bandra blocks)	1957-1976	Selection cum improvement working circle Bamboo overlapping working circle.
3)Mr. J.R.Desai M.V.Khistey (Surjagad and Ghotsur) area of 4 hect.	1961-1970	Selection cum improvement working circle Bamboo overlapping working circle. Clearfelling and teak plantation on small
4)Mr.V.B.Joshi (Garewada, Tadgaon, Bhamaragad Lahiri)	1970-1980	Protection working circle. Selection cum improvement working circle Minor forest produce working circle. Teak plantation working circle(Clear felling And planting of teak in 100 acres annually was prescribed) Bamboo overlapping working circle.
5)Mr.V.R. Singh (North and South Etapalli range)	1977-1987	Conversion working circle. Selection cum improvement working circle. Miscellaneous working circle. Khair overlapping working circle. Wild life overlapping working circle.

Analysis of past systems of Management in working plans.

1. Soil water conservation measures could not be observed properly.
2. In conversion working circle the conversion of forest could be achieved to the greatest extent , except failure at certain places. But thinning and other silvicultural operations could not be done properly. There is no point to convert the miscellaneous natural forest in to teak there by sacrificing everything except enhancing revenue.
3. Grazing control and fire protection was prescribed but could not be adhered to.
4. In minor forest produce working circle and miscellaneous working circle the crop deteoriated to greater extent. Overharvesting is seen. No improvement felling was done. Silvicultural system was coppice with reserves, which should not have been adopted for miscellaneous crop.
5. In teak plantation the prescription could not be followed.
6. Khair overlapping circle could not be operated due to lack of demand..
7. The previous schemes could not throw any light upon development & tapping minor forest products. This was totally neglected.
8. The essence of felling rules was not followed to have recruitment of at least 8 bamboo's per clump was prescribed. But on an average not even a single clump was satisfying it. The retention of first year and second year clumps though prescribed could not be observed.
9. For wild life protection no efforts were made to conserve. The status of wild life is very poor .
10. Welfare and upliftment of tribals was neglected.

iii) Central Chanda Division *

LEGAL STATUS: Out of total area of 73613.78 hect. an area of 67496.2.47 hect. is the reserved forests declared under section 18 of Hydrabad forest act of 1326 F (1916) and section 19 of Hydrabad forest act II (1945). 10 blocks reserved forest and rest of blocks with an area of 6117.652 hecter are protected forests An area of 4602.4 hecter in Mangalhira and Talodhi blocks was proposed to be reserved, before the state reorganization. But reservation proceedings were not completed while in Hydrabad state and same have not been attended to since it's transfer to Maharashtra state. Later on 1982,1288 hect. Area was proposed for reservation but settlement of areas is not completed.

At the time of reservation of Manikgarh block only seven enclaves were shown as excluded though there were 77 village of long standing. Out of these 7 enclaves 4 are wholly in Maharashtra and 2 are completely in Andhra Pradesh. The total area of enclaves handed over to Bombay state is 1979.99 hect.

In Manikgarh block out of 48378.465 hect. 29546.93 is already deforested and as per recent stock mapping an area of 20385.32 hect. is under encroachment or cultivation by Marathas from Marathwada and people from Andhra Pradesh.

Prior to 1882 the forest were controlled by revenue department. They had introduced a permit system and permit holders were allowed to cut trees for their bonafides. The

control was nominal. In 1882 forest were placed under control of forest department. Up to 1921 the felling were unsystematic, resulted in removal of valuable species.

From 1921 onwards felling under improvised schemes were started. Improvement felling was done.

Working plan:

The working plans are as follows:

Name		
Mr. S.M. Razvi	1931	Coppice with reserve working circle.
Mr. S.G. Bhogale	1946-67	Coppice with reserve working circle. Anduk overlapping working circle Bamboo overlapping working circle Plantation working circle Miscellaneous working circle (Stock mapping of forest in quality classes was done)
Mr. S.B. Kulkarni	1967-1982	Conversion working circle. Miscellaneous plantation working circle Selection cum improvement working circle Coppice with reserve working circle Pasture working circle Miscellaneous working circle Bamboo overlapping working circle Khair overlapping working circle.

* Ref.:S.S.Mahajan,Working Plan for Rajura,Wansadi and Virur Ranges 1993-2003.Vol.1

Analysis of past systems of management in working plans.

In 1931 plan coppice with reserves was prescribed. In Rajura block mature and over mature trees of valuable species like, Bija, Bhirra, Dhawada etc. have failed to produce coppice shoots and reproduction of inferior mixed species was plentiful. The erosion is conspicuously seen in the worked area, which are in the vicinity of nalla as sufficient wide strips of the heads of ravines was not excluded from felling. The working of these forests was not on sound lines due to defective prescriptions. Bamboo in this area flowered in 1943-1944.

In working plan 1946-1957. Coppice with reserve circle was prescribed. Coppice reproduction of salai is not dependable as it either dies or is blown by strong winds. *Anduk (Boswella Serrata)* working circle. This circle was constituted with sole object of making demand of *Anduk, Gympana (Lannea granets)* required by Sirpur mills for manufacture of mechanical wood pulp and wood free paper. For this purpose in 1947. Nizam Government conferred upon Sirpur Paper Mill the sole and exclusive rights of harvesting salai, Borague and Tapsi in Adilabad district. 6 paise per cuft of *Anduk, tapsi*

borguee and other varieties was charged. Bamboo was given to Sirpur mill in the period 1954-65.

Khair working circle: In 1956 Government of Hyderabad leased out *sundra* trees at flat rate of Rs. 1.50 per tree to Mr.Lalajee Mulia for manufacture of *Katha* from *Khair* from 1956-1965. The contract was not renewed by Government of Maharashtra afterwards.

Gadchiroli Division *

LEGAL STATUS: The forest areas forming old reserves account for 7.92% of total forest area of division. These areas were reserved in 1897 under IFA 1878. The total area of old reserved forest is 17190 hect. Enmeasuring 199725.88 hect. of protected forests were owned by Zamindar upto 1951. This Zamindaries and proprietary areas were brought under control of state Government i.e. forest department in April 1951 to December 1951 under Madhya Pradesh Abolition of Proprietory Rights Act. 1950. These forests were declared protected under section 29 of the Indian Forest Act. 1927. In 1975 under section 20 of Indian forest act 1927, 1618000.158 hect. Forest were declared as reserved forest.

* Ref. B.P. Singh & Ashok Sharma, Working plan for Gadchiroli Forest Division

Working plans: The following working plans were prepared for working of the area.

Name		Working Circle
Mr. A.F.Lawrie (Wairagad)	1897-1900	Improvement felling working circle.
Mr. C.O. Hansoo (Gunjewahi) Mr. S.A. Vahid	1927-1935	High forest working circle. Coppice with standard working circle. Bamboo working circle. Low forest working circle.
Mr. Heweston	1936-1948	High forest working circle. Coppice with standard working circle. Miscellaneous working circle. Bamboo working circle (overlapping).
Mr. Singh & Mujumdar	1949-64	Coppice with reserve working circle. Miscellaneous working circle.
1993-94 to 2003-04 Mr. Kartar singh	1977-1992	Conversion working circle. Coppice with reserve working circle. Improvement felling working circle. Kuran working circle. Miscellaneous working circle.

Mr. V.K.Prabhu	1965-1975	Selection cum Improvement circle. For protected forest Coppice with reserve working circle. Minor forest working circle. Bamboo overlapping working circle.

Result of past working.

1. Tree forest were divided into selection cum improvement working circle and coppice with reserve working circle on the basis of presence and absence of valuable tree species.
2. The compartments formed included forest as well as non-forest areas. This gave rise to serious protection problems and large scale encroachment took place.
3. In conversion working circle numbers of species have diminished. These include *Bija, Ain, Mokha, Cheda, Harra, Bhirra, Khair, Semal* as well as host of other species which are poor or no coppicers or which coppices only upto certain age.
4. No soil conservation measures were carried out though prescribed during the plan period. Soil erosion has accelerated.
5. No light was thrown on scientific management and improvement of Minor forest products.
6. Age old Tussar cultivation practice was ignored.
7. Normalcy of forest could not be achieved.

Chandrapur Division *

LEGAL STATUS: The forest in this division were reserved in 1879. No description of the forest was available at the time of reservation but absence of large sized trees as observed by C.W. Heweston in 1936-46 plan shows that forest were subjected to maltreatment by shifting cultivation, illicit felling.

Commutation system was introduced after reservation of the forest and was in force upto 1888 the licence holders selected and cut their own material from any part of the forest till 1893.

* Ref.: S.A. Qureshi, Working Plan for Chandrapur Division, 1985-2000. Vol.1.

Working plans:

The working plans prepared for this area are as follows.

Name		Working Circles
Mr. A.F.Lawrie (Wairagarh)	1897-1900	Improvement felling working circle.
Mr. C.O. Hansoo (Gunjewahi)		

Mr. S.A. Vahid	1927-1935	High forest working circle. Coppice with standard working circle. Bamboo working circle. Low Forest working circle.
Mr. Heweston	1936-1946	Coppice with standard working circle. Miscellaneous working circle. Bamboo working circle. High forest working circle.
Mr. Singh & Mujumdar	1949-64	Coppice with reserve working circle. Miscellaneous working circle.
Mr. Kartar singh	1977-1992	Conversion working circle. Coppice with reserve working circle. Improvement felling working circle. Kuran working circle. Miscellaneous working circle.

Result of past working.

1. Area subjected to light to moderate grazing have regenerated well but in the areas subjected to heavy grazing especially in small isolated blocks the regeneration failed to establish and severe soil erosion is noticed.
2. In conversion working circle the conversion period had been kept 80 years therefore the area could not as such fully converted. Plantation failed to establish in these area.
3. Coppice with reserve working circle. In this circle clear felling the density 0.7 above was done.
4. The bio-diversity was lost in favour of coppice. It will take very long period to restore the status of site which otherwise would have improved.
5. Kuran working cirlce had objective of improving the quality and quantity of fodder grasses, which could hardly be done.
6. A large number of plantations have come up all over division during previous years.
7. During period 1975-80 the crop density in various compartment was ranging from 0.4 and 0.6 and 60% of the crop being of density above 0.6.

Allapalli Division *

Legal status: Allapalli range forest belonged to Ex. Zamindar of Ahiri from whom in 1873 mirkallu and Bhimaram block and later in 1883 the remaining areas were purchased. These area were constituted as reserved forest in 1887 and 1897 respectively. These area were famous for large size timber. The zamindari contractors were free to extract any timber of their choice and local population had a free choice to practice their shifting cultivation any where they preferred in these forest.

In 1894 these forests were grouped under three classes viz. 'A' Class areas to be retained permanently reserved, 'B-1' class areas declared available fore cultivation and B-II class areas as not finally placed under either of two classes.

In cource of time B-II areas were either alloted to 'A' class or B-I class and further evern B-I class areas have been progressively brought under A class. With the result that most of the forest consist of 'A' class. The B.I. Class areas of the total extent of 20467 acres which formed a part of Pedigundam range in the past was disforested under Government in Revenue and Forests Department resolution dated 13.3.1965. All the forest in these working are 'A' class forest.

In 1879 forest of Ghot range were declared as reserved forests from 1951 after the abolition of Zamindaries and Malgujars these private forests become property of Government. A small portion of Ghot range was acquired by Government from Aheri Zamindari and made reserved in 1913.

Pirilmi & Aheri (P) range:

Pirilmi Aheri(P) range was a part of Aheri forest zamindari. The zamindari was granted six centuries ago to Mansu Bapu by one of the Gond Rajas of Chanda on condition of reclaiming land extending cultivation and maintaining security of life and property. Particularly against the in roads of dacoits from what was known as Nizam's dominion. The authentic history of the estate and lineage of its proprietary can not be traced further back then to the day of Rani Shah (1672-1702) who bestowed the same to Koksha (1703-1769). His successor Bhim rao or Venkatrao who held zamindari from1770-1818. It was in his days that zamindari is supposed to have expanded to its present limit. Bhimrao successor. Mussumat bai survived him only by six months and was succeeded by Bhujangrao. Bhujangrao continued to hold his zamindari undisturbed until his death in 1847, in spite of British rule in Chanda. He was succeeded by Venkateshwar Rao who died in 1851. The next properitory was Laxmi Bai, widow of Bhimrao who ruled the estate firmly well until her death 21st June 1861. The successors of Laxmibai were Mangarao (1861-1866), Savitribai (1866-1871) an Dharamrao (1871-1983). On death of

Dharamrao the estate descended on Bhujangrao who proved to incapable of managing the affairs of estate. In his time the contractors played havoc on teak forests of the estate. In January 1902 the estate was taken over for management by court of wards. After the passing of M.P. abolition of proprietary rights act, these forest were handed over to state government. In 1951-54 the forest were under control of Revenue department. In 1955 portions of these forest in surveyed villages were declared as protected forest under section 29 of Forest Act 1927. And remaining portion of unsurveyed villages were declared as protected forest in 1954. The forest department did it as a formality as these areas were neither demarcated nor their maps were available. With a view to prevent the possible deterioration, indiscriminate and uncontrolled fellings and to bring all such exproprietary forest under systematic management Mr. B.L. Chaudhary was appointed as working officer.

In 9.12.1985 the forest were declared as reserved forest. Momagadu block (10521.188 ha.) was handed over the FDCM in 17.6.78.

Upto 1902 these forest were subjected to indiscriminate cutting and heavy exploitation. All the good timber trees, which were expected to bring good prices were cut and removed. There was much wastage as extraction was in excess of demand. Shifting cultivation was common. This caused considerable damage to large tracts of forest. In 1902 under the management of court of wards only Jimmalgatta block was taken up for

management and remaining areas were thrown open to contractors and purchasers, at first for extraction of green timber and later for the extraction of dead and dying trees. The later policy prove to be of some benefit to these forests.

A working scheme for Aheri zamindari (263.54 sq. miles) out of 2558 sq. miles prepared by Anthony was in operation from period 1916-17 to 1935-36.

The Ballarshah timber syndicate had a lease for extraction of hardwood species from these forest for the period 1-12-1947 to 30-9-1959.

The syndicate exploited a considerable proportion of hardwood species like Ain, Bija, Teak, Shisum, Haldu, etc. from these forests after paying a royalty of 25 paise per qu. ft. of hardwood measured at the depot. The wholesale felling of teak and other suitable species regardless of principles of forest conservation resulted into serious damage to these forests. Semal and Khair also has been exploited on similar lines in the past under a lease given by the exproprietary to the various contractors and purchases.

In 1950 in the wake of rumours regarding abolition of proprietary large scale felling were carried out all over these forest to convert as much forest produce as possible fore the monetary advantage of exproprietor. Nistar officer was appointed in 1955 who embodied all the admissible rights and privileges of the villages in Nistar Patrak of each village.

* Ref. : A.P. Deshmukh, Working Plan for Allapalli Forest Divsion, Pirimili & Aheri Ranges 1990-2000. Vol.1.

Working plans for Allapalli Range.

Name		Working circles
Mr.Peter Cluttarback plan	1895-1930	Selection felling working circle. Girdling or cutting of other trees interferring with Young teak regeneration was prescribed. Improvement felling combined with through cleaning and thinning operation were prescribed.
Mr. Gentle's Plan	1930-1946	Bhimaram Hills working circle. Plains Elchil working circle. Mixed forests working circle. Miscellaneous working circle.
Mr. McDonald and Mujumdar Plan	1947-1961	Selection cum improvement felling circle. Bamboo working circle. Miscellaneous working circle included forest village areas.
Mr. Chandras and Gujar's Plan	1965-1984	Teak working circle. Miscellaneous working circle.

Bamboo Overlapping working circle conversion to uniform system with artificial regeneration continued to be the system of working.

The removal of unsound and malformed trees and opening of canopy by removal of inferior species greatly benefited the young and middle aged crop in the plain area.

Bamboo regenerated widely when last general flowering occurred around 1900 in Bhimaram hills and Mirakalu blocks. All over these bamboo areas natural regeneration of teak was very deficient. Exploitation fellings were heavy in these hills and lack of regeneration produced a crop, which was deficient in teak. Allapalli range was already very much deficient in natural regeneration of teak then and it was difficult to predict whether methods for obtaining this regeneration of teak would be successful or otherwise.

Pirmili and Aheri Ranges:

Mr. Anthony	1916-1936	Improvement felling working circle.
Mr. R. L. Chaudhary	1965-1975	Selection cum improvement working circle. Teak plantation working circle (clear felling & plantation). Khair overlapping working circle. Minor forest working circle (0.4 – 0.6)
Mr. S.C. Agrawal		Selection cum improvement working circle.

Result of past management.

1. Marking and felling rules were not followed scrupulously. In some areas the mature trees have been exploited in excess which resulted in gross deficiency of higher age classes in growing stock. Thinning was not carried out in congested crop containing young poles. Soil conservation measuring like gully plugging etc. were not carried out.
2. In teak plantation working circle the selection of area was incorrect at many places. Post plantation work like thinning, cleaning and protection from fire and grazing were neglected. Overall picture revealed in the form of lack of natural regeneration in Selection Cum Improvement areas. Encroachment in small patches adjoining cultivation and badly shaped plantations in terms of survival and growth.
3. In minor forest working circle considerable damage was caused to the crop as villagers did not follow the felling rules. They enjoyed nistar rights without any control Subsidary silivicultural operations and protection from fire and grazing were not followed. The coups were not worked through Grampanchayat. No control was exerted to limit extent area of annual coup. There was lack of co-operation between three departments (Zilla Parishad, Forest Department and Revenue Department) No efforts were made to protect and preserve these forest from rampant, unsystematic felling by Nistari. Uncontrolled grazing and frequent forest fire also deteriorated the soil and destroyed natural regeneration. Girdling of trees, clearing of patches for encroachment and cultivation were common.

4. In *khair* overlapping working circle no working was done as there was no demand for *khair* from *kattha* industry.

Ghot Range *

LEGAL STATUS: The forest were declared as legal reserved forest in 1879.

Mr. Donald	1913-36	Improvement felling. In 1932 special semal overlapping working circle was formed.
Mr. M.J. Hussain	1937-54	Improvement felling working circle. Miscellaneous working circle.
Mr. Dashputre G.B.	1954-68	Selection cum improvement working circle. Miscellaneous working circle. Bamboo overlapping working circle. Khair overlapping working circle. Large proportion of mature stocks were exploited. This had left the growing stock deficient in higher age classes. Bamboo were not exploited at per rules.

* Ref.: K.N.Khisti, Working Plan for Allapalli Forest Division, Ghot Range, 1977-1992.

WADASA FOREST DIVISION *

The forest dealt with under plan were reserved in 1879 and 1895 vide central province gazetteer Notification No. 917 CD 14 Feb. 1879 and no. 3796 at 29 Aug. 1895 respectively. No description of the forest is available but as per the observation by Mr. C.E.Haweston the forest were subjected to maltreatment of shifting cultivation and illicit felling for meeting local demand. He also observed absence of large sized timber trees. Commutation system was introduced in these areas after reservation and same was in force upto 1888. The commuters could remove there requirement from any parts of the forest of their choice. They are also permitted to extend their kosa cultivation over the whole area. The system had continued upto 1893. Kosa cultivation has also been restricted to excise area.

The old A class (84 comp) of the division, B class reserved forest were basically in old Wairagarh range in 1901 Wairagarh range came under North Chandu division, then in Gadchiroli range of east Chanda division in 1959. Reserved forest of old Wairagarh range came under control of Wadasa Division in 1983.

The protected forests 117490.46 ha. were owned by Zamindaries upto 1951. These forests were transferred to forest department. In 1955 and 1957 the state government declared these forests as protected forests. In 1959 these forests were proposed for reservation. The forest officer was appointed in 1963. He submitted his report in 1975. Subsequently part of these forest were declared as reserved forest in

1992. These forest were burdened with rights and concession of local people. And fedual grants to influential villagers.

* Ref.: G. Krishnarao Preliminary working plan for Wadasa Division 1994.

Mr. A.P. Lawarie	1897-1910	Improvement felling working circle. Coppice with standard working circle.
Mr. S.A. Vahid	1927-1935	High forest working circle. Coppice with standard working circle. Bamboo working circle. Low Forest working circle.
Mr. Singh and Majumdar	1944-1964	Coppice with reserve and Miscellaneous working circle.
Mr. V.K.Prabhu	1965-1975	Selection Cum Improvement working circle. Coppice with Reserve Working Circle. Minor forest working circle. Bamboo overlapping working circle.
Mr. Kartar Singh	1977-1992	Conversion working circle. Coppice with reserve working circle. Improvement felling working circle. Kuran working circle. Miscellaneous working circle.

Results of past management:

1. Better quality forest with density 0.5 to 0.7 were clear felled in conversion working circle. The growth of plantation were not to the extent that it was to be attained as per the site quality.
2. In coppice with reserve system it was noticed that coppice shoot fail to come up in majority of the areas. Heavy grazing pressure further aggravated these problems. Illicit felling and frequent fires resulted in compaction of the soil. Whatever regeneration came in the area died before getting established. The forest is completely opened without much undergrowth resulted in exposure of the soils, which lead to soil erosion in certain area.
3. Improvement felling working circle, improvement operations were not followed properly. These areas were situated near human habitations were subjected to tremendous biotic pressure. As a result of heavy trampling and fire, gully erosion had taken place particularly in undulating portion of forest.
4. In bamboo working circle the exploitation of bamboo was not regular due to less demand of Nistar led to conjestion of Bamboo clumps in these areas.

Tadoba, Andhari Tiger reserve *

It was part of Chandrapur division except seven compartments, which were part of Bramhapuri division. Systematic fire protection was started in 1873 and reserved forest of the area were declared in 1879. Detailed stock maps of the area were prepared in 1925-26. The area was worked as per the prescription of various working circle from time to time. The area of Tadoba national park was excluded from prescriptions of working plan in the year 1927. The protected forest of the area were declared in 1955. In 1982-83 the gregarious flowering of Bamboo occurred in the forest area Chandrapur district including Tadoba. Collection of non-timber forest produce was stopped from Tadoba National Park since 1968. In Andhari wild life sanctuary, it was stopped in 1992. Wild life conservation measures received relatively less attention in the past. Prior 1905 when Tadoba area was a shooting block and shooting was permitted liberally. Tiger was the main animal shot by hunters. In 1905 shooting was closed because the liberal shooting has causes imbalance between carnivores and Herbivores. However special permits were issued for killing carnivores which become threat to human life. In 1931 the block was closed to shooting for all kinds of animals. In 1935 an area 45 sq. km. around Tadoba lake was constituted as sanctuary for wild animals except wild pigs. Sanctuary was converted as game reserve in 1942. The shooting was done mainly in case of chital, wild boar and sambar. The number of animals that could not allowed to be hunted under a game hunting licence in a year depended on the abundance and dispersal of animal species. Special permissions were given by government to hunt tigers in Kolasa and Karwa blocks. In 1973-74 Moharli and Karwa blocks were permanently closed for hunting. The working plan of Shri Kartar singh (1971-1992) has given prescription for wild life management but those prescription were not fully translated on the ground. Tadoba National Park remained as a picnic resort more than a place of bio-diversity conservation. With creation of independent forest division in 1981 for Tadoba National Park more attention was given to conservation of wild life. Restriction were imposed on the movement of tourists. All the traffic passing through the park was kept under control. As a result of frequency and variety of wild life flourished in the park. The wild animals in the protected area are healthy and no epidemic have been noticed so far.

Forest Developments Corporation

In 1969 forest development board was formed by government in view of conversion of miscellaneous forest into timber forest which can give more revenue to government. In initial 5 years the activity on small scale proved to be very renumerative. Based on the experience forest development corporation was formed in 1974. Some of the forest area was allotted to F.D.C.M. for clear felling and plantation. This activity continued from 1974-1986. 800-1000 hect. Per year of miscellaneous forest was clear felled and converted into teak forest. This management practice lead to loss of biodiversity on large scale. Many clear felled area failed to regenerate. This policy was criticized all section of society. After 1986 clear felling is totally stopped. Presently F.D.C.M. is undertaking plantation on degraded forest land. The following working circles are part of the management plant of F.D.C.M.

Teak Working circle
Bamboo Working circle

Teak Plantation Working circle
Bamboo Plantation Working circle

In plantation working circle the number of trees planted per hectre 2500. Thinning operation were carried out after the 5 steps. I thinning after 10 years, second thinning after 15 year, third thinning after 25 year, fourth thinning after 35 years and fifth thinning 45-50 years.

The following table gives results of working of 4 division of F.D.C.M. in the year 2000.

Outturn of timber and fuel wood (Cu.mt.)

	Ist Thinning 10 Years				IInd Thinning 18 Years			
	Central Chanda	West Chanda	Pranhita	Mark anda	Central Chanda	West Chanda	Pranhita	Mark anda
Teak Timber		-			0.0083	0.201	-	-
Non-Teak Timber		-			0.0089	0.108		-
Teak Poles		78			49 No	0.182	84.1036	149
Non-Teak Poles		3			32 No	55	22.1058	32
Teak Beat		0.6			0.50 No	6	0.054	1.1
Non-Teak Beat		0.236			4.65 No	0.130	4.25	3.15

V - Present Systems of Management

The national forest policy of 1988 lays much emphasis on the following.

1. Maintenance of environmental stability.
2. Conserving national heritage.
3. Checking soil erosion in catchment area of rivers.
4. Increasing the tree cover through massive afforestation
5. Meeting the requirements of fuel, fodder, small timber and non timber forest produce of rural and tribal people.
6. Increasing the productivity of forests.
7. Efficient utilization of forest produce and people's involvement to achieve these objectives.

In 1988 it was for the first time people's role in protection and management of forest was emphasized.

Important object of management at present as follows.

To protect forest on steep slopes and open stocked area to check soil erosion.

To conserve existing natural forests.

To restock the understocked and degraded areas.

To give priority to local demand for forest products.

To increase production of non-timber forest products.

To create grass reserves in heavily populated areas.
To ensure maximum sustained yield.
To protect wild life and biodiversity.

Working circles in working plans are constituted for the fulfillment of about objectives. The working circles in different present working plans are as follows.

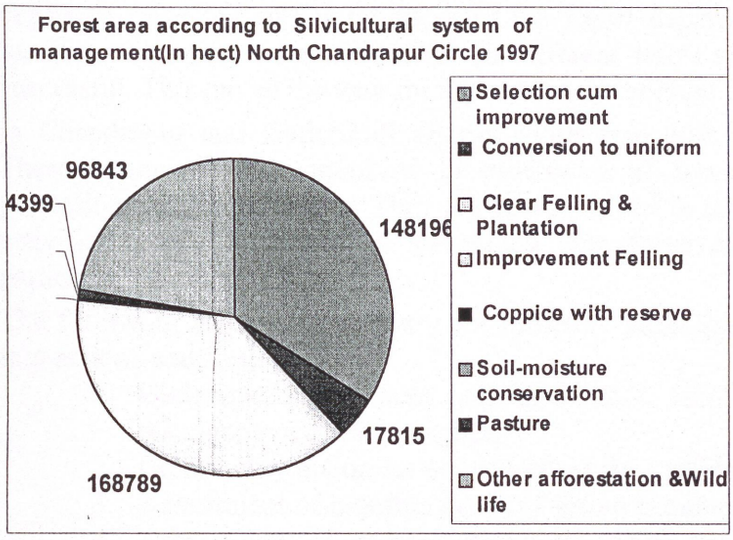
Protection working circle.
Selection cum improvement working circle.
Improvement working circle.
Miscellaneous working circle.
Wild life and nature conservation overlapping working circle.
Bamboo overlapping and under planting working circles.
Non timber forest produce overlapping circle.
Afforestation working circle.
Tussar working circle.
Kuran Working circle.

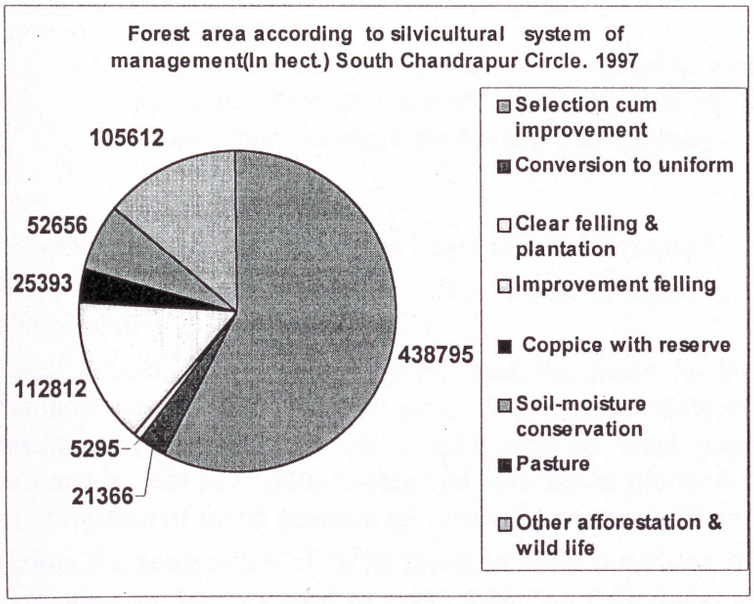
Management practices like coppice with standard, coppice with reserve, clear felling conversion to uniform are not followed on large scale due to past experience.

The following table gives the forest area according to silvicultural systems of management.

Forest area according to silvicultural systems of Management (In Ha.) 1997.

	North Chandrapur	Sourth Chandrapur
Selection cum Improvement N and similar working	148196	438795
Conversion to uniform	-	-
Clear felling and plantation	17815	21366
Improvement felling	-	5295
Coppice with Reserve	168789	112812
Protection of Soil Moisture Conservation	42050	25393
Pasture Kuran Fuel Working	-	52656
Other afforestation and wild life	4349	-
TOTAL	96843	105612
	478092	761929





The working plans for Gadchiroli, Sironcha, Bhamaragad and Tadoba-Andhari are presently in operation. The working plans for other division are not ready. Due to paucity of funds the prescriptions given in the working plans are not followed.

Joint Forest Management: An experiment to involve people in protection of forest was made in West Bengal. At several places forest protection committees were formed and member of the committee protecting forest were assured a considerable share in forest produce. The number of forest protection committees rapidly increased and ministry of environment and forest decided to follow the practice of joint management of forest. In June 1990 the secretary of Government of India, Ministry of environment and forest wrote a letter to the secretaries state forest departments asking them to follow and popularize the practices of joint forest management. In a way this was a welcome

departure from the earlier practices of the forest department. Several projects of joint forest management were undertaken in different states and many of them proved to be successful. This paved the way for the enactment of New Indian Forest Act.

In Chandrapur and Gadchiroli district more than 300 forest committees are formed. These committees are involved in protection of forest by control of grazing, fire protection and illicit felling. They are also involved in forestry operations and plantation activities. It is necessary to strengthen then these committees. So that they can participate effectively.

The following steps are necessary for effective participation of these committees. (Put into actions and flesh out)

1. Understanding of forest policies of 1927, 1952 and 1988 and the objectives of management of nistar rights.
2. Community action for control of grazing, illicit cutting, forest protection.
3. Assessment of biomass needs of the community present and future by people.
4. Assessment of present status of forest biodiversity and productivity of different forest produce by people with the help of forest department staf and experts.
5. Preparation of working plans for management of the forest and agriculture so as to improve productivity and satisfy food, fuel, fodder, timber and non timber forest produce needs of the community.

VI - Outturn of forest produce Market and Revenue *

Many types of timber and non-timber forest products are available from the forest of Chandrapur and Gadchiroli district.

Local population and tribal depend upon the forest for their food, fuel, fodder, timber, bamboo, needs collection of gum, *lak, mahua* flowers and oilseed, *tendu* leaves, medicinal plants etc. provide employment to local people. Forest department gets revenue by sale of various timber and non-timber products. In this chapter a brief review of utilization of forest produce by forest department will be taken.

Before the reservation of these forest in 1869 there was little timber trade in the region zamindari contractors used to make selection felling and market the timber. Purchasers or commuters could select their requirement anywhere in the forest. After 1893 the forest were classified into A, B reserves and felling were as localized as possible. The teak poles derived from improvement felling were readily scaleable by depots in annual auction and rivers transported timber to *Rajahmandri*. But the period 1910-1933 there was no remunerative market for timber and the cost had gone down. The cost of transport was so high it was not economical for the traders. The large timber

was carted to *Ballarshah* for sale. The monopoly for collection for various kind of minor forest produce was annually auctioned in each range until 1910, when seasonal licenses for daily head loads were introduced for *mahua*, *todi*, gums, roots and edible fruits. Horns and hides were auctioned on the monopoly system. *Pranhita* and *Wainganga* river was used to float timber from *Dhaba* range to *Balharshah* or *Rajmandri (?)* or east coast railway in the period 1910-1930. Floating upstream to *Balharshah* used to take about 3

weeks and to *Rajahmandri(?, two spellings)* from 1-2 years. *Allapalli* timber was transported to Bengal-

Nagpur railway station at *Mul* by means of traction engine. Pit pops 10 feet in length from *Dhaba* coups were given to colliery at *Balharshah* in this period. In some area it was difficult to make roads and streams were not big enough to carry timber so such areas remained unexploited. Purchasers from *Wun* district *Nagpur*, *Wardha* and eastern bearer districts used to come to *Balharshah* timber Depot.

In the period 1927-35 the timber from *North Chanda* was transported to *Yeotmal*, *Wardha*, and *Nagpur* by railway. Cotton-ginning industry used large quantities of fuel wood from these forests.

Fuel wood from this forest was supplied to the towns in *Wardha* district and in the *eastern berar* district. There was limited demand for timber from *Madras* and *Hyderabad.*

The following table gives quantity of important forest produce auctioned in the period 1916-1936 from about 30000 hect of forest area.

* Ref.: Annual Reports of Forest Department, Chandrapur

Statement of Past yield of division

Name	1916-1926 Unit	Yield
Timber	Cft	6239169
Firewood	Cft	21779128
Bamboo's	Number	8036214
Karkas	Number	5537137
Fodder Grass	Tons	129055
Minor Produce	Tons	358983
Hides and Horns	No	1066
Mineral Produce	Cft	145185
Thatching grass	Cft	519620
Harra	Tons	3324
Lac	Mound	877
Mahua and *Char*	Tons	9799

1926-1936

Timber	Cft	550800
Fuel	Cft	28246000
Bamboo	Nos	9481847
Thatching Grass	Tons	527910

After independence *Balharshah* was all India Market for teak and miscellaneous timber in round and sown sizes. Charcoal was exported from *Chandrapur.* Important consuming center of timber & Bamboo were *Hydrabad*, *Madras*, *Delhi*, *Poona*, *Calcutta*

and *Nagpur* and for Charcoal were *Bombay*, *Hydrabad* and *Poona. Semal was* in demand for match industry.

The tables giving outturn of different forest produce and revenue obtained by forest department in the period 1980-1996 are given in the Annexure.

The analysis of the above table can be done as follows.

1. The quantity and fuelwood extracted from the forest has decreased in the period 1986 to 1997.
2. The quantity of *Tendu* leaves collected from the forest has increased in the period 1983-1996.
3. The quantity of Bamboo collected from the forest has fluctuated in the period 1983-1996.
4. The quantity of *Hirada, Mahua*, Gum collected from the forest has increased in the period 1986-1993.
5. The percentage of revenue obtained from *Tendu* leaves and Bamboo has increased considerably in the period 1986 to 1996.
6. The percentage of revenue obtained from Timber and Fuelwood has decreased.

VII - Livelihood and Forest *

In these districts majority of the population depends on agriculture, forestry and fishery for livelihood. The local population consists of mainly agriculturists drawn from various castes like Mahar, Marars, Buddha (S.C.) and Gond, Maria Gond, Kolam (S.T.). The Kunabi predominates in the Wardha valley and Gond Predominates in forest area. Local population especially tribal depend on the forest for food, fuel, fodder thatching grass, timber. They also get employment in forestry work and collection of non-timber forest products like *tendu,* bamboo, *mahua,* gum, *hirada, behada, awala, harra* etc.

In the last 100 year the population of the district has increased by 4 times. The population pressure on the forest land has increased. Similarly livestock population has also increased.

The following table gives per capita forest area and per cattle forest area.

PER CAPITA FOREST AREA(In Hect.)

Year	Population (In thousands)			Forest Area		Per capita Forest	
	Chandarpur	Gadchiroli	Total	Chandarpur	Gadchiroli	Chandarpur	Gadchiroli
1901	-	-	574	1757360*	-	3.1	-
1951	728	325	1053	1757360	-	1.67	-
1981	852	637	1489	1732287	-	1.16	-
1991	1772	718	2490	441595	1294474	0.25	1.78

PER CATTLE FOREST AREA(In Hect.)

Year		Total cattle units (In thousands)	Forest Area	Per cattle forest area
1909		980	1757360	1.79
1961		1417	1757360	1.24
	Chandrapur	1176	441595	0.375
	Gadchiroli	917	1279474	1.39

* Ref.: B. G. Kunte (Ed) 1973 Gazetteer in India (M.S.) Chandrapur district and forest and agriculture department statistics.

The population pressure on forest varies for different divisions. Bhamaragad, Allapalli divisions are sparsely populated and the forest area is more. On the other hand

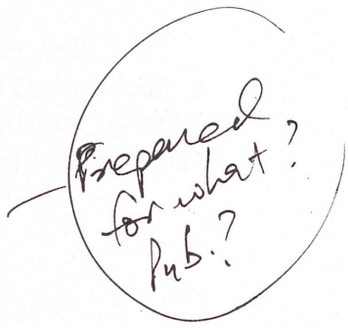
* Exact figures of forest area 1901 are not available so the value of forest area in 1951 is taken.

Central Chanda and Chandrapur divisions are thickly populated and industrialized. So there is heavy population pressure on forest area.

Food From Forest*

Month	Name
*Chaitra (March- April)	Vegetable:- *Lodya, Hemal, Kaimul, Chinchoda, Mirangad.* Tubers :- *Rengal, Dhurapa mating Gude Dhurapa mating* Food from big trees. Leaves and beans *kopa harra, Kowdel bhaji, Aradphari* tender leaves of peeple, pods of *surya, tettu, Mahor beans.* Birds - Wild hens, peacock, *titar, kokrang*, lava (a quail), *Hinkey, Hariya(green pigoon), Munjal pitte, Devla, card Sandya, Pitkoda, Huchad, Mulaudiya, Kowonkor, Dolcit, Tiral Akhahid, kider utti, kanjakakad, quild c. Delapitle, Paras pitte, Bagadi, Barada, Pandod, Gurti, Aagghoch, Kukal pitle, Dhokra (a heron). Usid, Kirkad, Ek Kakad (a water crow) Khamani pilte, nungnodiyal.* Fish – *Zinga, Vahula, Frog, Crabs, Tortoise, Oilseeds, Behada, Papadi.*
Vaishak (April-May)	Vegetable – *Koyal, Bhagi, Koste*, (Shoots of bamboo). Food from big trees : Raw fruits of *Moha, Kojaba, Shin dode, Tadphal, Deo eronya, Char, Marking nut, pods, Mitch Kaya.* Flower : *Kudaphal.* Oil Seeds : *Behada Papadi.*
Jestha (May- June)	Vegetable : *Kutkuti, Tarota, Tildek, Bhaji, Dhopa, Londgal, Hankad, Sheridire, Haddadui dire. (dire means sprouting bunn).*
Ashad (July – August)	Vegetable : *Ram ambadi, Pareer punger cereeper, varli, Satya* (Mashrooms) – *Dumber sati tumi boresela fua fendra.* Tubers – Base mating. Oil seeds – *Moha and Kojab.* Sepi Animals – Urpal
Shravana (August- Sept.)	Food from big trees – bean of kuda, Mushroom – *Rangi satya* (Mushroom on bamboo).
Bhadrapad (Sept. – Oct.)	Mushroom – *Rangi Satya* (Mushroom on bamboo) Tubers – *Kaimul mating, Murad mating, Supari mating, Karwool mating, Kopadalli mating, Kupat mating.*
Ashwin (Oct.-Nov.)	Vegetables – *lolanga (Bhaji Sherdire, Korak bhaji.* Tubers – *Maruda mating, Rengal Dhurapa mating, Gude Dhurpa mating, Varali mating.* Fruits from *Surepela (Jondhuri) Modiya Harre parcela.*
Kartika (Nov.-Dec.)	Tuber – *Kohaka mating, Morada mating, Heer mating, Jangam mating.*

Margsheersh	Tuber – not available.
(Dec.-Jan)	Fruit – not available.
Paush	Vegetable Bhotora (Kohaka Bh.)
(Jan.-Feb)	Tuber *karwoo mating, chila mating.*
	Fruits Renga (fruit of Jujube, Amla).
Magha(Feb.-Mar.)	Vegetable – *Hawalful, Hawai Bhaji*
	Fruit – Marking nut, fruit.
	Michcaya vegetable – wild variety of banana.
Phalgun	Tuber – *Powan mating (Bhishakand)*
(Mar-April)	Fruit – *Moh fruit, Charoli, Flower Moha.*



* Ref.: Mohan Hirabai Hiralal, 1993, Report on Forest and Tribal culture.
* The names are in Gondi Language, Scientific names are not available.

FUELWOOD FROM FOREST

Firewood is the main fuel used by people in the area.

The wood of following trees in useful for the purpose.

Garadi, Ain, Moha, Dhavada, Amla, Tembhurum, Ghoti, Anjan Ber, Kojab, Babhul, Ran babhul, Kakai, Hisre, Behada, Chinch.

The following variety of wood is not used for cooking purpose.

Sawari, Mohai, Dhoban, Pimpal. They do not burn properly and one doesn't get good coal out of their burning. Wood, Salai, *Umber, Mowai, Dhoban Bahava*, smell bad too much smoke is released so it is not used for burning.

For heating water wood of above mentioned trees is used. In addition the bark of *Ain, Moha,* Char is also useful.

For getting light Bamboo *Amla. Ghote, Ain, Ajnan* and *Chinch* are very good for lightening. Also dried sticks of boru, *Ambadi, Bhendi* are good for the purpose.

As a warming fire the trunks and bulky parts of all these trees are used.

For preparation of tiles and bricks wood of *Ain, Dhawada, Hirada, Behada,Garadi, Moha, Anjan Tembhurn* is good. Wood of *Salai, Mowai, Sawai, Dhoban Palas, Umbar* is not good for this purpose.

In preparation of liquor the bark of *Ain, Sag & Ghoti* is used.

For making Charcoal the wood of *khair, kojab, Moha, Garadi* is used. *Khair* and *Kojab* is supposed to best for this purpose.

Charcoal from the trees like *Sag, Tund,* and *Ber* was used to prepare gun powder in the past.

Fuel efficient Chulha are not used in the area and consumption of fuel wood is very high especially among tribal. Tribal keep fire burning for whole night for lightening and warming. Tribal family of 4-5 requires about 2 bullock carts of fuel wood per month on an average.

* Ref. : Mohan Hirabai Hiralal, Food, Fuel, Fodder and tribal. (1993) report of participatory reaserch project.

Fodder from forest

In Chandrapur and Gadchiroli district stall feeding is not practicized. Cattle and goats are sent to the forest in the morning and they return in the evening. A cowboy accompanies the cattle and goats. After returning from the forest they are fed with hay of *Jowar*, rice etc. Stray cattles and goats are seen everywhere in village after December.

The following types of fodder is available in the forest.

1) Hukada Jadi, 2) Barbis Jadi, 3) Manda Jadi, 4) Dogal but jadi, 5) Putter Jadi,
6) *Hila Katta jadi, 7) Nulka Jadi, 8) Paiya batti Jadi, 9) Hahakad Jadi, 10) Dubari Jadi.*

Varieties 1-7 are used for thatching the roofs after maturation while the varieties. 8th,9th, and 10th are used only as fodder. Ropes are made from 7th variety while hats and baskets are made from 8th variety.

The cattle also like the following foliage.

1) Foliage of Bamboo (*Hid-Aki*).
2) Foliage of Peepal (*Acel-Aki*)
3) Sprouting ends of Bija (*Venger, Koding*).
4) Sprouting ends of Ain (*Mordi, Koding*).
5) Bamboo shoots (*Vaste*).

Nistar Rights about Grazing – The area for every village where it has grazing rights has been noted in Nistar Patrak (explain what this is). It is clearly mentioned that "the farmer can graze their farming cattle free of cost on the land, which is reserved for common grazing. However if the collector feels it necessary to make rules for villagers convenience, he can do so. All the villagers of that zone can graze their cattle free of cost until the collector applies any new rule.

Nistar Patrak have been prepared without developing any specific criteria based on the scientific study of carrying capacity of grazing land (pasture) under different conditions.

No systematic efforts were undertaken either by forest department or by villagers to preserve and develop grazing land. Grazing land were encroached for the purpose of farming and have been regularized. Forest department has also carried out clear felling and raised teak plantation on grazing land of number of villages. The livestock population has nearly doubled in the last 100 years. Many of the villages are facing fodder scarcity as a result of this.

TIMBER FROM FOREST:

Timber for building both houses, cowshed is required by practically all villages. The main timbers in demand are teak, bija, shisham and saj. There is always a great demand for dhaura, which is employed universally for the axles and carts. Bhirra and lendia are used for making agricultural implements. *Anjan (Temmanalia Arjun)* and *rohan (Soymida Fobrifugal)* are in demand for well curbs and for stakes in making tank embankments. *Khair (Acacia catechu)* is in great demand for house pole stakes for fencing, ploughshares, and rice pounder etc. *Semal (Bombax malabricum)* is used for door panels and packing cases and is also hollowed out into dongas. The tough and elastic wood of Dhaman is worked up into oars, shafts and handles of instruments and into Kawars for carrying goods. *Tinsa (Ougenia dalbergioides*) is always in great

demand for various purposes owing to its toughness and durability and used for cart shafts.
Tendu for long shafts of carts. *Bija*, Timber is little used by local population.
poles below 2½ size are used for housing building and cowshed and above it are used only as fuel by local population. Poles of size 9" and 22" of girth of G*arari, Lendia Ain, Dhavara, Awla, Tendu, Achar* and *Suria* are also used.
Garari, Ghote and *Ber* and more rarely iron are used for fencing. *Garari* is one the most popular trees among inhabitants, it is straight durable and pliable used for poles and rafters.

The minimum yearly requirement of small of timber of a farmer is as follows.

Particulars	Girth	Length	No.	Vol. in M^3
a) For plough, bakhars, Daora, Tipan etc.	18"-24"	3.5'	2	0.0328
b) Dandi, Kopar	9"-18"	10'	2	0.0466
c) For repair of Cart	18"-24"	11'	2	0.1044
d) Mandav in field and cattle shed	12"-24"	6'	6	0.1314
e) For house repairs	9"-15"	7.05"	3	0.0420
f) For use during ceremonial occasion	18"	12'	4	0.0462
	24"	10'	2	0.1416
Total :				0.5450m^3

NON-TIMBER FOREST PRODUCTS:
Non-timber forest products include many articles of importance to poorer classes. The most important is the Mahua flower and fruit of Mahua, which fells in April-May. Other fruits collected are *tendu, Khirani, Jamun, Katol, Karonda Ber*. Other products are the leaves of *Bel, Palas, Mahua,* and the green *dikemali* an *Dhawada*. The other minor forest produce are *Hirda, Kamela,* (fruits of Mallutus Philipire) *tendu* fruit, *taokeer*, (*Cureuma Langa*) *hing (Bakonites Roxburgnic), Chironji (Buctouania latifolia), behada Awla, Kumbhri, Malkamni (Celastrus Panioulata)* and *Bhilwa*.
Harra is not common but in the Wairagarh range lease is sold for the collection of nuts (myrabolams). Lac is found only in very small quantities. *Katha* is extracted from *Khair*.

Tendu Leaves:
There is a large proportion of Tendu trees in the forest of the region. Their leaves which are neither too tender not too mature are used for making 'bidi'. People of this region get seasonal employment from collecting Tendu leaves. Some people get the employment in March-April but all get it in May-June every year.

Government & Contractors:
Tendu leaves have been nationalised and their ownership is with the state Government. In some parts of Gadchiroli district, the Government purchases the leaves through forest department, while in some parts, contract is given to contractors. Most of the contractors are migrated from Andhra Pradesh while some are Gujarathi from the adjacent Bhandrara district; and only a few local, especially of the gandali caste, are involved in this business. The auction of tendu leaves takes place before the month of March and contractors are appointed. Their staff managers and 'diwanji's - can be observed moving in surrounding area during the month of March.

Cutting of the saplings
During the March, old saplings of tendu are cut from the bottom so that fresh foliages is produced more vigorously and also more in number. The staff of contractors gets this task done by local labourers on wage basis. This work starts a week prior to the festival of Holi (usually in March) and lasts generally till Holi.

Fires in Forest:
The season of cutting old tendu saplings is the same in which old dry leaves are shaded off and get accumulated under trees. The cut tendu saplings also add to them. The contractor's men deliberately burn this dry foliage because it ultimately leads to vigorous growth of tendu leaves, bringing in more profit to the contractor. But in this fire, many other small saplings, seeds, dry pieces of wood and green trees with hollow trunk are also burnt to ashes. The contractors reap the profit while the forest and the people bear the losses.

For about a month after Holi, such fires can be seen in forests. It is starts in some corner of the forest and then it spreads with the speed of wind. Earlier, people used to clear, every year, the line of spread of fires from the boundary of their village because of the prevailing organic relationship between the forest and the people. If they saw or heard of fire in any part of forest, they would take initiative to extinguish with the branches. But now even if they see the fire, there is no effort to put it out. People believe that if the forest belongs to the Government, let the government put of the fire.

Because the forest is not considered to be their own, its destruction does not seem to produce any reaction in the minds of the people. On the other hand, they have a selfish interest of earning more wages from plucking more tendu leaves (an outcome of forest burning).

Plucking of Tendu Leaves:

The season for plucking of leaves lasts for two months from 1st May to 30th June. All able-bodied persons of every household – males, females, boys girls, old men and women – get up in the morning quite early with sun-rise and go to pluck the leaves till the Sun reaches the nadir. These plucked leaves are systematically arranged in a basket in such a way as to accommodate greater number and prevent them from falling out. The plucking initially is done nearby, but later on they have to wander 5 or 6 kms. to collect them.

Tying of Bundles

The collected leaves are brought to home and afternoon-meal, the whole family sits down to tie bundles, each containing 70 leaves; in two packets of 35 each. Both packets are arranged upside-down and tied with plant- rope (called 'vaak' in Gondi language). Five such bundles are called a 'phaadi' and twenty phaadies are measured as hundred bundles, having a total of 7,000 leaves. A man or woman can collect in one day minimum of ten and maximum of 30 phaddies. The amount collected depends upon the availability of trees and leaves.

Purchasing Centre for Leaves

The Centre where tendu leaves are purchased is known as 'Phaadi'. They are commonly located in river-bed or empty rice-field. These centres are run by 'diwanji's' appointed by the contractors. Bundles of leaves tied during the day are arranged in a basket or in 'kavadi' (a kind of lath for carrying load) and brought to the centre by walking a distance of 2 to 4 kms. If the diwanji at a centre is a good man or is afraid of people's united strength, the work runs smoothly. Else diwanji can reject bundles unjustifiably or exploit a man or a woman in different ways. In some centres, wages are paid daily, while in others, weekly. Daily payment is beneficial to the villagers; weekly payment is beneficial to the contractors. The bundles which are purchased at the centre are first dried in the river-bed or the rice-field and packed in gunny bags and finally transported according to convenient transport : bullock-cart, tractor or truck.

Purchasing Rate of Leaves

The rate of leaves is fixed for 100 bundles. The Government of Maharashtra fixes, every year, the minimum wage for collecting tendu leaves. The rates obtained in the area of study were as follows :-

			Rs.
1980 to 1985	Rs. 4 to 5	1990-91	35
1986	Rs.8/-	1991-92	39
1987	Rs.10/-	1992-93	43
1988	Rs.14/-	1993-94	45
1989	Rs. 25		

Increase in rate : Death of Trees:

Earlier when the rate for leaves was less, the villagers were collecting only leaves of saplings and did not think of plucking leaves from bigger trees. The proportion of Tendu

trees in the forest was sufficient and fruits of these trees were available to people which was the food for the poor. Villagers would collect and dry these fruits in summer and eat them along with flowers of Mahua during difficult rainy days. With increase in the rate for leaves, the tendency to cut branches of tendu trees increased. With further increase in rates, the villagers began to uproot the trees to collect leaves instead of taking the trouble of climbing up the trees to cut the branches. As a result the Tendu fruits have become scarce in the area. Migrant labourers from urban area of both districts, and from Madhya Pradesh, Andhra Pradesh come to forest area for collection of Tendu Leaves in summer, causing reduction in employment opportunities for local tribal.

Future Calamity

Tendu fruits are the means of sustenance not only for the poor people but for the bear and other animals during summer season as per the natural cycle. But the total disappearance of fruits, how will new saplings sprout? How will they get Tendu leaves for which there is so much struggles? What is about food for poor people and animals? Apart from these questions, what about ecological imbalance resulting from these? All these questions call for very serious consideration and right decisions at the village level.

G UM

Collection of gum oozing from trees is another -source of employment in this area. Oozing of gum from trees generally starts from Deepavali and lasts till rainy season. People have observed that gum stops draining as fresh foliage starts sprouting on trees, Gum is collected and dried during this period; part of it is used as a food ingredient and part is sold out.

Gum is obtained from following trees: *Dhawada*, *Ain, Khair, Behada, Karu, Salai, Mohai* and *Char*. Gum obtained from *Dhawada*-tree is white in colour with reddish-yellow tinge and has best adhesive property and Sweetsness of taste. This is considered superior to all for eating purpose. Mothers are served with a sweet dish prepared from gum during the post-natal period, due to its high nutritive value. Gum obtained from *Ain* tree is white in colour and of a good quality for eating, Whereas that from *Khair* and *Behada* trees is faint yellowish in colour and of medium quality' f or eating. Gum from *karu* tree is clean white in colour out of an inferior quality but it fetches the best price in the market.

In the market, the traders purchase the *Karu* gum separately, that of *Ain* and *Dhawada* together and gum of all other types together. The average rate of purchasing the above tree types of gum fixed by the Tribal 'Development Corporation in,1988-89 was as follows:

Type of Gum	Rate per kilogram (Rs.)
1. Karu	15.50
2. Ain & Dhawada.	14.50
3. Other	6.00

The gum of *Salai.Mohai* and *Char* has no market value. It is used only to serve household purpose, The gum of *Salai* is inflammable, and if a wick is inserted, it burns like a wax-candle. In case of a covert injury or pain in the ribs, the gum of *Mohai* and *Char* is used as remedy to alleviate the pain.

No tree, except *Karu*, requires to be wounded to drain the gum out; it oozes naturally. But one has to make a wound in the trunk of *Karu* tree after which gum keeps oozing throughout the year. The quantity is more during the period from Deepavali to rainy season and less during the rest of the year. A wound in a tree with a large trunk oozes out half to one kg. of gum every day; while in other trees, that much quantity is collected in four days.

Gum of karu: Higher rate & destruction of trees:

With the increase in price and demand of *Karu*-gum, the tendency to inflict more wounds to the trunk has also increased, resulting in ultimate destruction of big *karu* trees. Today, not a single *Karu* tree with a large trunk is visible anywhere. People say that it is 10 to 15 years now that large trees have been Destroyed in this area. Although the rate of *Karu*-gum fixed by the Tribal Development Corporation is RS-15.50 per kg., traders are willing to purchase it even at a higher rate of Rs.20/- per kg. But there is no *Karu*-gum available for sale at that rate.

Karu-gum has also served as food for tigers, bears, monkeys, etc. These animals were inflicting wounds with their claws or sharp teeth and eat the oozing gum. The effect of absence of this food for these animals and their suffering can be a subject for separate study.

With destruction of *Karu* trees, the employment potential has also vanished. To revive it, plantation and cultivation of *Karu* trees should be carried out. It is also necessary to have strict regulation about the number of wounds and the manner of correct opening, in the trunk so that the tree will not die but maximum gum will be acquired. There is also urgent need to give training people working on this. It is unfortunate that the people or the Government does not seriously think these aspects. Forest Research Institute Dehradun has formulated rules for extraction of gum. These rules are about selection of trees, time of harvesting, number size and shape of blazes to be made and distance between blazes etc. It is necessary to train people for scientific extraction of gum.

LAC (Sealing wax)

Lac is a forest-based industry, which has provided employment to many people in the area, formerly before advent of plastics. Lac is largely used for making bangles, earrings, ornamentally decorated bowls, small ornamental boxes, etc. But plastic is now being increasingly and popularly used for all these purposes, and the demand for lac is reduced, depriving local people of one avenue of employment. Use of lac is now mostly restricted to sealing of envelopes and parcels; and only a small fraction of this formerly widely prevalent industry is fulfilling this requirement.

Nature of the activity:

In the months of *Chaitra* and *Kartika* red insects which prepare lac are born in natural course on trees of *palas, kojab, umbari* and *jujube* trees. These insects are as small as ants, Branches infested with the insects are cut and tied to trees which do not have them. After the transfer takes place and production of lac starts, the leaves of the tree turn black but do not die. The yield is ready in six months: the yield of Chaitra is harvested in kartik and that of *Kartik* in *Chaitra*. Lac is thus harvested twice a year.

When the crop is ready, the branches are cut and lac collected by scraping the branches. In Chaitra, the lac melts due to heat and becomes gummy while in *Kartika*, Its turns compact and tough., and comes off easily by scraping alone. But in *Chaitra*, the branches have to be soaked in water and then the lac is separated, It is then dried in shed for three to four days. If dried under the Sun, it turns globular and fetches less price.

Though lac is collected from the trees of *Palas, Kojab, Umbari and Jujube*, the one collected from *Kojab* trees is considered the best. This is because the lac formed on kojab tress is both thick and heavy in weight, fetching a higher rate. Lac Collected from palas trees fetches second best rate. The quantity of lac collected from *Kojab* tree is three times to that collected from *Palas* tress.
There is no local use of lac nor did local people learnt skill o produce articles from lac. Artisans of lac from other areas did not migrate here to utilise this product. Hence when traders stopped purchasing lac, the profession and employment came to an end, though trees are there with experienced cultivators, There is thus opportunity to revive this industry and offer employment Potential to people.

BAMBOO
The people in this area; right from birth up to the end of life need bamboo at every step. A cradle in which a newly born baby is rocked; as also the bier on which the dead person is carried; both are made up of bamboo. It occupies an exclusive position in the tribal and rural life.

As a food : Bamboo' shoots, which are locally, known as vasta are used as an ingredient of food.

Articles Of household utility : Large number of artifacts of daily household utility are prepared from green or dry bamboo such as 'Ukad'; cradle for baby ; holi. huge containers for storing grain or Moha flowers; small and big baskets of different shapes; a 'soop': a sifting pan; 'Chatai'; a matting; 'Thathare': a plank of closely woven thick strips of bamboo; Baj': a locally, made cot; 'Tatte': a matting for making partition etc.

A straight bamboo is tied horizontal and used for keeping clothes and also for drying them. A bamboo is plucked out from the root and by giving a shape of deer, dog or rabbit to it's root-end, a stick for old people is made; which they use for support. A couple of bamboo sticks is always there in the corner of a house to be used for snakes, dogs or cattle etc. however if they are also brought into use in quarrel is a different matter. The hollow of a bamboo is used for storing oil and grease for cars. A small tubular bamboo is generally used as a mortar for pounding tobacco. The same bamboo, if corked can be used for storing the pounded tobacco, A lath for carrying heavy articles on foot is also made up of bamboo. In the rainy season a beautifully woven hat of bamboo and leaves (satodi) gives protection from rain. Small pins of bamboo are utilised for sewing bowls and plates of leaves.

In House construction Bamboo is used on big scale in the construction of houses. Horizontal bamboo are fitted on the vertical wooden poles or bamboo matting are spread

to form a support for thatching grass or kaveloo (clay tiles). Bamboo matting are also used to cover the open side of a verandah (open Porch or gallery). Many people use bamboo even in the construction of a wall. Closely woven planks of bamboo are used at the bathroom or at place of water storage. Some people also make the flaps of window from bamboo. In old days iron nails were not at all in vogue in the house-construction but bamboo pins were used in this area. In those days and even today the tribal in interior area make use of bamboo-strips for tying wooden poles, bamboo etc.

All the domesticated animals and birds generally stay in the courtyard or somewhere around, just adjacent to the house. Number of bamboo are required to construct pens for big cattle, *Harre Kothod* (enclosures) for goats and separate enclosures for pigs, hens and pigeons etc. In the *Harre-Kothod* a plat-form of closely woven bamboo is fixed at a distance of 5 to 6 inches above the earth. The goats stay on the plat form and their dung & urine drops down on the earth, Thus the platform is maintained clean and good manure gets collected underneath.

In agriculture

Rice Is the main crop in this area. Most difficult and strenuous work in rice farming is of transplantation in the mud 1 and 1/2 feet deeps during the rain. Beautifully woven covers of bamboo and leaves (knowing as More) are prepared to give protection from the rain while transplanting rice plants. The handle of an axe and a hoe is also made up-of bamboo. The equipment; used for carrying paddy after the harvest and also for separating the stalk at the time of crushing are made up of bamboo,

Most of the people stay on the farm itself during the complete season of rice farming until it is harvested and threshed. Large quantity of bamboo is required to construct a small temporary farmhouse, as also for constructing a platform for keeping vigilance and a shed near paddy threshing ground. After the harvest vegetable gardening (known by name 'Mariyan') is carried out on the banks of river and nallas. Bamboo is also required to build a temporary shelter in the Mariyan. All the bamboo utilized in agriculture and vegetable gardening is again used for household requirements. It is not that new bamboo is cut every time.

For making open sheds

The open sheds required during agriculture are mentioned above. In spite of them a shed is required in front of every house during summer. This has a dual utility; as a shed in the afternoon and also for drying Moha flowers and other things under the sun. Hence a closely woven, sturdy structure is necessary for which considerable number of bamboo are required. Some people also use its roof for sleeping at night, Whole day of summer is spent under or above this shed. All activities from cooking till going to the bed are carried out there itself. Number of other, tasks are continuously carried out under this shed in their respective seasons such as tying the, bundles of Tendu leaves, breaking 'Todi' (fruits of Moha) and separating its rind from the seeds, breaking the ripened tamarind & separating it from it's seeds etc.

Summer is also a season for marriages A special open shed is must in the tribal marriage functions Green bamboo are spread in a particular style and are beautifully woven with

yellow bamboo strips. Green branches of tree Jambhul are spread over them. Besides this two more open sheds for cooking and dining are necessary in a marriage.

For fencing : Fencing is needed to the farms just adjacent to village, to the vegetable garden and to the kitchen gardens. This fencing is made from the bamboo, the branches of which are not cut, and are locally known by name '*Karkal*'.

For getting light

Dry bamboo is a torch of an adivasi. Such bamboo cracked with stones or reverse side of an axe, is lighted and thus used as a portable light while travelling to another village in a dark night, as also while searching for the lost cattle in the forest. Even inside the house whenever light is required, dry bamboo is added to the fire and the work is carried out. Tribal dance in the light of burning bamboo.

To collect the juice of palm variety of trees

Thick tubular bamboo are utilized to collect the sap of trees like Tada, Shindi or Gorga, a tall bamboo-keeping the initial portion of its branches as it is, for stepping above - is tied with the tree. This bamboo serves the purpose of a ladder while climbing the trees of palm variety.

For fetching water from a well :

For fetching well water a peculiar system known as 'Bagadal is in vogue at most of the places in this area. A hole is made at the balance point of a long and sturdy wooden pole which is then fixed at the same point, on a steady stand. A long bamboo is tied vertically to the thinner extremity of wooden Pole. While the heavy stones or other weights are attached to it's other extremity, so as to balance the weight of water, a bucket or tin barrel is attached to the other end of bamboo. Whatever energy required is only to push the bamboo and insert the empty bucket in water, but comparatively very less energy is required to pull the filled bucket out. In his system, the portion which Is to be pushed and pulled manually has to be of a good quality bamboo.

In fishery, Traps of bamboo with different-varieties and shapes are made for catching fish, which are locally known by name 'Zinka'. It has a system by which the fish once entered can not escape back but the water flows out, Their size varies according to the size of fish. Besides, largely bamboo are used to form a separate system so as to situate these traps in the flowing water,

For Hunting : A peculiar trap is formed for hunting wild pig, deer, spotted deer an elk, rabbits etc., in which at a convenient spot where animals came for drinking water; a strong and closely woven fencing of bamboo is formed, leaving a certain distance from the water place, on it Is both sides up to a long distance. At the portion were the middle extremities of fencing meet, some space is left so as to allow the animals just pass through. A deep pit is dug on the other side of it. People sit hiding themselves on both sides of watering spot and shout out as the animal approach the spot.

Employment Potential: Bamboo has got a tremendous potential for employment. If planned properly it can be a source of continuous employment and at the same time sustainable development can also be achieved through it.

MOHA: FLOWERS AND SEEDS:

Moha flower and *Moha* fruit and *moha* seeds are used as food. *Moha* tree has an important place in tribal folklore and religious beliefs.

Moha flower is eaten raw or cooked. They are dried under the sun and stored. They are cooked and eaten with rice or chapatis are made from dried flowers. The nutritive value of flower showed digestible crude protein 3.08 gram, total digestible nutrient 73.79 gram, and starch equivalent to 551 kg./100 kg.

Moha fruit – A ripe fruit has cream coloured epicarp, which is edible. *Moha* berrics are eaten raw or cooked. They have medicinal value as well. They are also eaten by cattle sheep goats, monkeys, parrots.

The *Moha* seed yield oil. A thick oil light yellow in colour extracted from seeds is used by forest tribes for cooking as hair oil and also for lighting. In many areas it is used as adulterate Ghee for which it is clarified with buttermilk to mask the disagreeable odour.

Moha liquor is prepared by ferementation of *Moha* flowers and is most important alcoholic drink in tribal area. *Moha* oil is used in manufacture of soap. *Moha* trees start bearing flowers and fruit between 10 to 15th – year of planting. The studies about the yield of *moha* flowers and fruits has been carried out by Maharashtra Van Sanshodhan Sansatha, Chandrapur in compartment 195 in Tadgaon range of Bhamaragarh forest division in 1992. The trees of different girths and shapes were selected for the purpose of this study. The results are as follows.

	Weight in Kg.	
Girth (cm)	Flower	Fruit
76-90	8	1.20
91-105	10	1.0
106-135	11.25	2.0
136-150	13.3	2.75
151-175	13	3.8
176-190	15	4.0
206-220	20	4.30
Average	12.94	2.72

Year 1992 was not a good seed year the average obtained above is on lower side.

There was monopoly purchasing in this field of *Moha* flowers and seeds, and it was expected that only Tribal Development Corporation should purchase them. But the corporation never carried out proper management of purchasing at proper time. Hence the traders in the market of this area carry out over-all illegal and open purchase of these commodities at lower rates. With new tribal self rule act, grampanchayat can collect and sell 33 Non timber forest products in the market.

CHAROLI (Chirongia sapida)

When the upper rind of char-seeds is broken, the dry pulp that we get inside is known as 'charoli'. It is reckoned as a dry fruit and rich people very much like It to be added to some sweet dishes prepared out of milk, and also to the sweet meats. Hence charoli fetches a good price in the market. Thus collecting char, separating charoli from it and it's selling is also one of the avenues of employment.

Tribal Development Corporation do not purchase charoli at all. As a result poor tribal is completely trapped by the traders, in this respect. Proper research and planning, if worked out, a kind of employment can be made available from the production, processing and sale of charoli.

HIRADA :

People collect the ripened fruits dropped down from the *Hirada*-tree. There is a demand for *Hirada* in the market. The fruit is endowed with the medicinal properties and is being used in number of Ayurvedic preparations, Besides on a large scale it is also used in making tanning extract for leather industry.

AWALA

The proportion of *Awala* trees is good in the natural forests of this area. Up till now there had been no demand for *Awala* in the market. But this year, in the adjoining districts of Bastar and Rajnandagaon of Madhya Pradesh, the traders have started it's purchase. The boiled *Awala* fruits, whose seeds are removed could get a good price. It is understood that these *Awalas* are utilized in the preparation of famous Ayurvedic tonic 'Chavanprasha'. Unfortunately Tribal Development corporation is not playing its role even in the purchase this fruit, The people from many villages of study area went to Madhya Pradesh to sale *Awala*. It seems that the production and processing of Awala bears good potential and scope for employment.

9. HONEY

The honeycombs of fiery variety of honeybees are commonly situated on big trees in the forests, high on rocks or in the clefts of mountains. These fiery honeybees are of ardent and aggressive nature and there sting is also poisonous, it has not been possible up till now to domesticate it. Therefore generally no one -tries to provoke it. But the tribal in this area have by tradition, mastered the skill of collecting honey, also from these fiery Honeycombs. By making the teams of five to ten persons and literally endangering their lives, honey is collected during the summer season from the inaccessible parts of forest. But due to the lack of proper legal information they have to carry out this activity secretly. The traders for the same reason loot them. In addition they are forced to bribe the staff of Forest Department. There is considerable demand for good quality of pure honey in the market and hence there is a good scope for the development of this business. Dharamitra, Wardha has developed technique for extraction of honey scientifically.

10 *BIBA* (marking nut) :

The nut is similar to cashewnut and used in confectionery. It fetches high price of Rs. 80-90 per kg. Black resin obtained from paricap of the fruit is used as marking ink to write on clothes. Recently it has found application in varnish paints lacquers, enamels

etc. Kernel yield semidrying oil, which is used as wood preservation against white ants and also lubricant for wooden axles of carts. Trees serves as host for lac insects. Presently biba is used only as medicine by tribal. It is not marketed.

LEAVES-PLATES AND LEAVES-BOWLS :

Most of the people make plates and bowls from tree-leaves for self-consumption and use them for taking meals. Some of them earn little money by making supply of these plates & boils according to the local demand. Now-a-days, an easy technique of making durable leaves plates and bowls of different sizes has been developed and it can further be utilized for developing this activity.

FIBRE ACTIVITY

A good quality of fibre is obtained from many trees and creepers of the forest. Ropes are made from them. Utilising these fibres for making small and big ropes and various other useful items can be a good avenue of employment.

GRASS – MATING, BASKETS AND HATS:

Matting and small sitting mats are prepared from Lava grass available from the forest. They are durable and also of good utility. There is one more variety 'Urasudi' of grass from which beautiful baskets, hats and other decorative items are made, This variety of grass possesses glitter and bright yellow colour therefore the articles made from it look nice and they are also durable. This is one possible area from the viewpoint of development of village-industry, Appropriate research, training is needed for forest-based employment.

As a result of wrong Government Policies and large, scale denudation of forests; the proportion of trees like Moha, Char, Hirada, Awala etc. is decreasing day by day. These avenues of employment just like other forest based employment, are getting perished at a high pace. Large-scale employment can be created of tree-plantation is carried out at large scale, with foresight through the schemes like-'tree-patta' on forest land, and further entrusting its ownership to the care of people. We may proceed along the path of sustainable development, if a chain of decentralized processing industry based on forest produce, is set-up.

Industry and Mines *

In Chandrapur district there are 16 large scale and medium scale industries and there are about 1450 small scale industries. The industries can be classified as follows.

* Ref. : District Industries Centre, Chandrapur.

Mineral and Chemical based Industries	3
Forest Based	4
Others	9

Small scale units can be divided in following categories.

Agrobased	372

Mineral based	234
Food processing, beverges	58
Forest based	136
Others	650

Thermal power plant: Themal power generation station producing about 2250 MW of electricity is situated at Durgapur in Chandrapur district. Coal is used as fuel in the thermal power plant. Nearly 36,000 tons of coal is used per day in these plant. The coal is supplied by western coalfield limited Padampur. The ash content of coal is very high which is in the range 35-50%. This plant is run by Maharashtra state electricity board the major pollutants from the thermal power plants.

1) Fly Ash about 10,000 to 15,000 ton per day.
2) Carbon dioxide omission of the order 50,000 to 60,000 tons per day along with sulphure dioxide carbon monoxide is emitted per day.

To control particulate matter in the air, electrostatic precipitators are installed. The fly ash is disposed through pipes in fly ash disposal yard. Avenue plantation is done to absorb carbon dioxide emissions. Due to high percentage of fly ash in air, and contamincetion of fly ash in water, the agricultural land has degraded, affecting productivity of agricultural land.

Western Coalfields Limited : In Chandrapur there are coal mines at Padmapur, Durgapur, Ballarpur, Gouri, Dhoptala, Lalpeth, Sasthi, Most of the mines are open cast mines which cause immense damage to agriculture and forest land. Mining operations like blasting, drilling and transport of coal cause air pollution. It also affects ground water level. It also causes damage to the buildings in the nearby area.
To minimize air pollution of dust, measures like spraying water at different stages is done. To reclaim the land sand filling & plantation is done. Water treatment plants are erected to control water pollution at some places. Cement Industries there are cement plant is under construction.
Cement Industries : The names and capacities of the cement industries are as follows.

Name of Industry	Production capacity
1) Ms. Associated Cement Company Ghugus	0.9 million tons of cement per annum
2) Ms. Manikgarh Cement of Gadchandur Taluka Rajura	1.5 million tons of cement
3) Ms. Larsen and Turbo Ltd., Awarpur, Taluka Rajura	2.9 million tons of cement

One more plant Maratha Cement manufacture 2 million tons per annum of cement is under construction in Rajura.
Cement industries use limestone as raw material Revenue land and forest land are given on lease to these industries for mining limestone.
These industries have set up electrostatic precipitators to control emission of particulate mater. Avenue plantations are done so as absorb carbon dioxide emissions.

Cement industries cause air pollution by increasing suspended particulate matter in the air. The cement dust settles on land, water reservoirs and crops causing pollution and loss of productivity.

Ballarpur Paper Mill *: It is situated in Ballarpur town. It production capacity is 89500 tons paper per annum.

Ballarpur Paper Mill use Bamboo as a raw material for production of paper.

To manufacture 1 ton of paper approximated 2.25 tons of bone dry bamboo is required.

The first agreement for supply of bamboo from the forest of both districts was made in 31st July 1947. It was for supply of Bamboo for production of 9000 tons of paper at the royalty rate of Rs. 5-4 annas per tons of air dry bamboos containing not more than 10% of moisture. The industry was allowed to draw water rate.

The following area were allotted to paper mill for extraction of Bamboo.

Schedule	Acres
a. Khandab, Assgam and Satara bamboo felling series of Chanda range. The whole of existing.	94951 22829
b. Adagaon bamboo felling series of the Moharali Range.	190307
c. The whole at existing pimpal khut Bamboo felling series & Mul range.	
Total	137087

Thus area of 13087 acre was allotted to paper mill for purpose of extraction of bamboo. The paper mill was allowed to cut bamboo from forest area described to cut bamboo from forest area described in schedule B & C.

The second agreement was made on 10th December 1968.

In addition to the sale-price Company had to pay development tax to concerned authorities of the forest.

The home of division allotted and estimated annual quanta were as following.

Schedule A

Name of Division	Estimated Annual yield in Metric tons
Allapalli	7300
Sironcha	7300
Bhamaragad	77100
Gadchiroli	34100
Wadasa	14000
East Meghat	4200
Total	144000

Schedule B

Name of Division	Estimated Annual yield in Metric tons
Gadchiroli	44000
Wadasa	16000
Bhamaragad	15000
Total	75000

In the best area there are about 225 clumps of bamboo in one hectare and poor area there are about 75 clumps per hect.

Quantum of bamboo to be cut and removed during the season 1962-1963 was 51000 tons and 92820 tons from 1963-1964 onwards till 1966-1967, 139000 tons from 1967-6968 onwards. Subjected to ceiling of 150,000 tons. The royalty rate was Rs. 17.70 from 1963-1963, 1966-1967 and at the rate of Rs. 28 per ton for accessible areas at the rate 28 per ton for accessible area shown in schedule B and Rs. 20 per ton for inaccessible area shown in schedule C from 1967-1968 onwards. In this agreement provisions were made to revise the royalty rate after every five years.
The third agreement was made on 22 Feb. 2000 for supply of 2.65 lakh metric tons of bamboo form government forest areas in Gadchiroli, Chandrapur and Amravati districts for the ten years. Sale price was fixed with 10% escalation over the scale price fixed for each proceeding supply year. The prices were fixed as per metric ton of air dry bamboo.

Year	Sale Price (Rs.)
1991-92	400
1992-93	440
1993-94	484
1994-95	532.4
1995-96	585.64
1996-97	644.2
1997-98	708.62
1998-99	779.48
1999-2000	857.44
2000-2001	943.18

* Ref. : Agreement of Paper mill with forest department in 1947, 1968 and 2000.

1) In the first agreement the period of agreement was for 40 years and there was no provision for revision of rates of bamboo. Water was given free. No forest development tax was charged. Thus without bothering for generation of bamboo, paper mill extracted large quantities of bamboo at nominal rates.
2) In the second agreement there was provision for revision of price of bamboo every 5 years. Thus raw material was costlier.
3) In the third agreement 10% escalation of prices per year was imposed. Now area was allotted for extraction bamboo from Sironcha, Bamboo of division. Forest development tax was imposed.
Thus paper mill was made to pay more price for bamboo. Initially 96.6 of raw material was bamboo but now paper mill is planning to restrict use of bamboo and use hardwood from agro-forestry plantation. At present paper mill is using 50% bamboo and 50% hardwood and paper mill is planning to use in future 65% wood and 35% bamboo which they are planning to increase up to 75%.
At present the cost of paper is Rs. 27000-28000 per ton and the cost of raw material is about 6500-7000 Rs. Per ton of paper, which is 25% of cost of paper with increase in rates of raw material, bamboo paper production has become less remunerative.

Chapter 4

CHAPTER 4

STATEMENT OF PROBLEMS RELATED TO BIO-DIVERSITY

In the last 100 years changes have taken place in agriculture and forest. In this chapter we will take review of causes for those changes.

Agriculture

In Chapter 3 detailed review of changes in land use pattern, irrigation, facilities soil fertility status, cropping pattern, crop productivity, crop varieties, farming practices, pest and insect control and livestock is taken.

These changes in agriculture bio diversity and related issues can be divided in two categories. Positive changes negative changes. In some cases no significant changes have taken place.

The positive changes can be summarized as follows –

Land is more equitably distributed.

Network of financial institutions and marketing federation related to agriculture has spread in this area.

Awareness among farmers and literacy level has increased.

Purchasing power of agriculture labourers has increased.

Area under agriculture and irrigation has increased.

Crop rotation like *soyabean*-wheat has developed.

Area under vegetables & fruits has increased.

Crop productivity of rice, cotton, pulses like *udid, mung* and gram, Kharif *jowar* has gone up.

Due to land reforms in the period 1951-1961 there was sudden increase in the number of farmers. Land was more equitably distributed. More land was brought under cultivation. Different development activities like road and building construction, plantations, irrigation tanks, canals, farm ponds, soil-water of check dams were undertaken by government. They increased employment opportunities for landless labourers. As a result wages of agriculture labourers increased.

A network of nationalized banks and co-operative banks increased availability of credit to farmers. Development of roads and transport facilities and marketing federations has increased marketing facility for agriculture produce.

Use of improved seeds, chemical fertilizers, insect pest control measures and improvement in irrigation facilities have increased crop productivity of the most of the crop as *rice, Kharif, jowar,* wheat, cotton, pulses like *udid, mung, chilli.*

Urbanization and industrialization of Chandrapur district have increased markets for fruit and vegetables. Due to increase in irrigation facilities and urban markets area under vegetable and fruits increased.

The negative changes can be summarized as follows.

Common grazing land has decreased and degraded.

Fodder production has decreased.

Wasteland has increased area under trees and groves decreased.

Use of organic fertilizers like farmyard, manure, oil cakes has decreased.

Area under oil seeds like *seasamum* and pulses like *udid, mung, kulatha lakh* has decreased.

Yield per hectare of *Rabi Jowar* has decreased.
Per capita availability of food, grains like cereals, pulses, oilseeds have decreased.
Human population increased by nearly 5 times and livestock population nearly doubled in last 100 years.
Soil erosion has increased.
Local varieties of rice (only?) have disappeared.
The economic condition of farmers has worsened.
Siltation of tanks, reservoirs and check dams has increased.
Pollution due to pesticides and fertilizers has increased.

Reasons for negative changes – Common grazing land were brought under cultivation. Increasing livestock population pressure on grazing land degraded them. In hilly regions sloping forestland was brought under cultivation without undertaking soil-water conservation measures so soil erosion increased.

Thermal power plant wastes like fly ash, cement industries waste like cement dust, open cast coal mines caused immense damage to agriculture land and common land. Deforestation and loss of cover in hilly region has caused increase in wasteland. Agriculture expansion in this area is not possible without encroachment in either grazing land or forest land.

Collection of organic wastes and production of organic fertilizer is labour intensive process. Organic fertilizers are bulky and not easy to handle. Chemical fertilizers are available on subsidized rates from government machinery and Krishi Kendra on loans. Chemical fertilizer are not bulky, easy to handle and improve crop yield substantially. With increasing cost of farm labour, the cost of production of organic fertilizers is also high. So farmers prefer to use chemical fertilizers.

In the past tall varieties of rice giving more fodder than grains were used but now short varieties giving more yield of rice are used. So the yield of fodder from rice field has decreased. *Udid* and *mung* were grown as relay crop in rice field on residual moisture. This practice was possible because the tall varieties of rice were of short duration and spacing between rice plant was more. With introduction of short duration varieties of rice and close spacing between rice plants this practice is on decline. This is one of the reasons for reduction of area under pulse crops.

Oil seeds crops were replaced either rice or cotton so area under oil seed crop like *seasamum* decreased drastically especially in *Kharif* season.

Due to high yielding improved varieties of rice, use of low yielding varieties has decreased. Use of chemical pesticides is mainly for cash crop like cotton and *Chilli* and to some extent for rice. But they are used on small quantities in this area as compared with other part of the country. Catchment area of tank, reservoirs check dams are not treated properly. Denudation in catchment area has caused siltation of these reservoirs and structures reducing their storage capacities. But with increasing cost of agriculture inputs like seeds, fertilizers pesticides and irrigation and low price for agriculture produce agriculture has become less remunerative.

Increase in agriculture production is slow in relation to increase in population growth; as a consequence per capita availability of food grains has decreased. Area under oilseed crops has decreased but area under fiber crop has increased. Oil seeds productivity per hectare has not increased significantly. With introduction of *soyabean* in Chandrapur district, the situation of oil seeds has improved considerably.

No significant changes have taken place on the following.

Bullocks and ploughs are still mainly used for agriculture operations tractors are used mainly for transportation of agriculture produce and building materials.

Mixed cropping practices like cotton-*tuar, Jowar-udid,, Jowar-mung* and crop rotation like rice gram are still practiced.

Local varieties of *Rabbi-jowar*, *linseed* and vegetables like *tomato fenugreek, brinjal, bittergourd, ladies finger* and others are still in use. Local varieties are still popular because of their better taste, draught resistance and higher fodder yields.

Local breeds of cattle goats and poultry birds are still used because they can withstand high temperature in summer and fodder scarcity. Improved breeds require more fodder and health care compared to local breeds. In spite large population of cows & buffaloes the milk production is still low.

No such section on Wastelands/Grasslands?

Forest*

It is well known that the last 100 years forest cover, forest density and bio-diversity in the forest has decreased. Over exploitation of the forest products, faulty management practices, population pressure, diversion of forest land for other purposes (e.g. reservoirs) and other factors are responsible for it.

Over exploitation forest products:

As far as forest in this region are concerned, no written record of early description of these forest is available before 1900. In 1869 major Lucie Smith extensively traveled in the district. He acquired intimate knowledge of forest resources and their potential value. The reservation of these forests was probably result of his recommendations.

The policy of British rule was to exploit the forest and export teak for manufacture of ships and sleepers for railways. Thus British rulers started commercial exploitation of forest.

At that time roads and communication network was not developed. Most of the area was sparsely populated and inaccessible. Extraction and transport of timber was done by bullock carts or rivers. Transport was costly. Labour for forestry work was not available. The staff appointed by Britishers was limited. Under such circumstances it was not possible to exploit forest resources on large scale. Much area remained unworked due to inaccessibility. Selection felling and improvement felling was done. Extraction and sale of forest produced increased with the construction of new roads and railway lines. Purchasers from nearby districts Nagpur, Wardha, Yeotmal and Rajmahindri used to purchase timber and fuel wood from Balharshah and Chanda.

In 1909, 7819.21 sq.km. of forest was government forest. Other forest area belonged to Zamindari area. Agriculture population living in the village was dependent upon the forest for their food, fuel, fodder, timber and minor forest product needs. British rulers and Zamindars gave rights and concessions to villagers.

After independence in 1950 in the wake of rumours regarding abolition of proprietary rights large scale felling were carried out all over the forest to convert as much forest produce as possible for monetary advantage of ex-proprietor. Under Madhya Pradesh. Abolition of proprietary rights 1950, zamindari forest came under management of forest department.

In the same period the forest were given on lease to various commercial establishment. Balharshah timber syndicate had a lease of extraction hardwood species for the period 1947-1959 in Allapalli Forest Division.

The wholesale felling of teak and other important species like *Ain, Bija, Shishum* regardless of principles of conservation resulted into serious damage to these forests. Sirpur Paper Mill and Ballarpur Paper Mill were allowed to extract bamboo from the forest area at nominal rate. Special Anduk working circle was formed to supply raw material to Sirpur mill to manufacture wood pulp. This has resulted in extinction of the *Anduk* species of from the forest.

* Ref.: Working plans of different divisions of the Forest Department

Scientific name?

Faulty Management Practices of Forest Department:

In the past the main emphasis was earning more revenue by extraction of forest products especially timber. Management practices like coppice with reserve, conversion to uniform stands were followed instead of improvement felling and selection felling. These management practices failed to produce desired results. Felling rules were not followed. As a result forest degraded and with opening of the canopy, soils erosion started, degrading the forest further. Regeneration was patchy in worked areas.

In the year 1968 area was marked for 'Forest Development Corporation' of Maharashtra. Clear felling of mixed forest and plantation of valuable species was done on large scale. But the result of such working was not to the expectation. The crop was open to greater extent than prescribed. Silvi-cultural operations were not carried properly. There is no point to convert miscellaneous natural forest into teak thereby sacrificing everything except enhancing revenue.

As commercial demand for timber, bamboo increased, forest department, commercial and industrial units over exploited the forests. Felling rules for timber and bamboo were not followed. More forests were brought under government control depriving local village people from the their rights. Tribal and poor populations in the village mainly depend on forest for bamboo, fuel, timber and fodder. As more and more forests were brought under government control, and less of forest area was allotted to satisfy people needs, these forests were overexploited, overgrazed causing degradation of the forest.

In forest management practices no attention was given to satisfy basic needs of poor rural population. On the other hand reserved forests were over exploited for the benefit of industry and commerce.

Deforestation for resettlement of east Pakistani migrants:

In 1964 a special forest division was established for clearing reserved forest area selected for resettlement of migrants. Forest departments released 37720 hects of reserved forest area land from various compartments of Ghot, Markanda, Perimilli and Chaudampalli, Pendigudam & Wairagad ranges of Gadchiroli District. The area was clearfelled and allotted to migrants.

According to departmental survey the forest land actually utilized was only 14878 hect. There was no indication in departmental record for reasons of excess deforestation of 18120 hect. After the survey it was found that about 17315 hect. of land was found to be uncultivable. As per unofficial records nearly 55000 hects of forest was clear felled.

Encroachment on Forest Land:

As majority of population depends on agriculture for livelihood in this area, after abolition of proprietary rights of zamindars, the surplus land was given to landless people in the period 1951-1961. As the population increased more and more forest land was cleared by villagers for cultivation. Common grazing lands were also encroached.

Initially Manikgarh block was the part of the Hyderabad state. This block was declared as reserved forest by Hyderabad forest state act. In 1960 the area was transformed to Maharashtra State. Owing to remoteness and hilly terrain this area was not accessible from Maharashtra side. But this area was approachable from Andhra Pradesh and Marathawada as communication facility were available from there. People from

Marathawada and Andhra Pradesh took advantage of this geographical factor and started to encroach the area.

The extent of encroachment of these people was negligible till 1958. These encroachments could not be detected because of absence of village boundary and reserve forest boundary. Similarly cultivated land was also neither shown on the map nor on the ground. As a result encroachment could not be detected and if detected they could not be evicted due to proper demarcation on the ground. Keeping the above facts in view a survey by land record department was carried out in 1963-64 to demarcate village boundary and forest boundary. Encroached land was allotted to encroachers by issuing them pattas. In addition most of land was shown as Gairan, Pampok. In this way only 15517.316 ha of total 48378.160 hec. of land was shown as reserved forest area.

Thus major part of the forest land was shown as revenue land and the encroachment area was regularised. This encouraged the encroachers and as a result it was seen that from 1964 encroachments were increasing steadily and continuously.

Gond and Kolam are original tribes in the area while others are intruders from Marathwada and Andhra Pradesh.

Keeping in view the increasing tendency of encroachment, combined action was taken by the forest, department revenue and the police department in 1969 but government of Maharashtra stayed the same.

The above played an important role in demoralising forest staff and encouraging encroachers. As a result during rainy season of 1969 encroachers started cutting of forest trees and did fresh encroachment in remote area. In this way, by 1973, 15937.11 hect. of forest land went under encroachment out of which approximately 12000 hect. of land was encroached upon by people from Marathwada and Andhra Pradesh.

In the month January Feb 1972 revenue department started demarcation of 3.25 hec. plots on revenue land for unknown purpose but it created a rumour that every family is getting 3.25 hec. plot and encroachment is going to be regularised. This again encouraged encroachers. Thus an exodus of encroachers intruded in the valuable forest and started clear felling of the forest and created new encroachment with vigour on large scale.

In 1974 approximately 15960.8hect.of land was encroached in which 5519.50 hect. was under traditional cultivation. As per record of encroachers and their caste are classified as shown.

Gond	165	Dhiwar	33
Kolam	18	Baudh	33
Laman	668	Kumbhar	5
Mang	478	Telangan	18
Marath	875	Dhanger	10
Muslim	114		

Total	2358 (Families)		
	====		

Refs ?

Forest Fires:

Natural forest fires in this region do not occur. The following activities are responsible for the fires in these forests.

i. Fires set by tendu contractors for getting good flush of tendu leaves.
ii. Fires for cleaning of ground for collection of mahua flowers.
iii. Fires for getting succulent shoots of grass after first shower of rains.
iv. Fires for trapping game animals.
v. Fires set by encroachers for clearing land.
vi. Fires due carelessness of smokers.

Due to high temperature in summer and large quantities of dried leaves on the ground due to dry deciduous character of the forest if fire sets in it spreads very fast causing damage to the forest and wild life.

The effect of forest fires on forest and forest ecosystem has been studied in depth in Western countries. But the data on incidence of forest fire and damage in the study area is not well documented.

During fires organic matter in the forest which increase humus content of the soil is destroyed. Not only the organic matter like dry leaves and wood is lost, but nitrogen in them is almost entirely lost as free nitrogen. The only apparent gain is supply of immediately available potash. Fires have other effects of significance such as direct physical effects from heat generated and often pronounced influence on relative proportions of different types of soil organisms and hence on the results of their activities. Moreover removal of the un-decomposed litter may facilitate regeneration, by permitting to seedling access to mineral soil necessary for their development. At the same time it is known that heat produces in soil soluble organic substances, inhibiting germination, which can retard weed growth. At the same time fire damage is the cause of unsoundness found in large trees. Their unsound condition and low vitality render them liable to attack by fungi and insects. Fires destroy fungi, birds, reptiles on the ground. In dry deciduous forests fire spreads very fast but it does not rise above few feet from the ground because of nature of the forest.

In a study carried out in 8000 hect. of watershed in Western countries the damage due to fire was calculated as follows.

Fire Size (Hect.)	Damage (Rs./Hect.)	Total Damage (Rs.)
4	325	1300
40	4817.50	19500
400	3250	130000
4000	4875	1960000
8000	4550	36400000

The number of fires reported are less as compared with actual fires taking place.

Diversion of forest land for mining, industry other and development activities:
Coal, Limestone, iron ore are the important minerals found in this region. Forest land having these minerals have been diverted for mining activities. In Chandrapur district there are number of industries like Paper mill, Thermal Power Plant, Cement Plants and Ordinance Factory. Forest land was given to these industries. Forest land was given for construction of irrigation projects, construction of road etc. (See Table in Annexure)

The following conclusions can be drawn from the data.

1) The % of forest area to total geographical area reduced from 67.25% to 65.86% in the period 1947-1997.

2) Forest area having density more than 0.4 has decreased by 91800 hect. in the period 1972-1996. No data is available about forest density before 1972.

3) Mixed forest and pastures have decreased by 798730 hect. and 377170 hect. in the period 1973-1996.

4) Forest area having density less than 0.4 has increased by 116800 hect. in the period 1972-96 which is result of degradation of the forest area of density more 0.4.

5) The percentage of reserved forest area has increased from 24.52% to 48.18% and the percentage of protected forest has decreased from 42.73% to 17.68%.

Surprisingly scantly given imp of wetlands here!

Wet-lands

Current status:

District	Ownership Irrigation Dept.	Ownership Z.P.	Ownership Cooperatives	No. members of Cooperative
Chandrapur	95	1614	112	Apprx. 12000
Gadchiroli	N.A.	1689	84	8880

In Chandrapur and Gadchiroli district

River belt available for fishing 698Km.
Area available for fisheries 24500 Hectare
Area under use for fishing 20600Hectare
Fish production per year from river belt 3808 Metric ton
Fish production in last three years has been as follows Chandrapur district

The local varieties that are slowly diminishing are

1. Sawada
2. Dadak
3. Marad
4. Waghul
5. Singul
6. Botare
7. Katwe
8. Kairy

Can scientific names be put?

The above species are available in tanks. While:

1. Bam
2. Zinga
3. Bodh
4. Bhogar
5. Waghul
6. Ogar

are river based species.

Species that have been introduced by different agencies are Katala, Rohu, Mrugal, Cyprus, Grasskar, Silverkar.

The major threat to the livelihood facing the fishermen cooperatives is due to tendering of the irrigation tanks to big private parties.

Source: Fisheries department

Wild Life:

The biggest problems facing the wild life are poaching and diminishing habitat.

The other details about habitat have been covered under the section on forests.

Chapter 5

CHAPTER 5
MAJOR ACTORS AND THEIR ROLES RELEVANT TO BIODIVERSITY

BSAP for this area can only be implemented by active participation of NGO, local communities, government official and industries and mines.

In order to implement BSAP, the actors are as follows.

Non-government Organizations
Village
Peoples' organizations
Peoples' representatives
Financial Institutions and funding agencies
Private sector
Government departments like agriculture irrigation, animal husbandry and social forestry, forest, revenue, etc.
Universities & Research organizations

Non-government organizations:

They are to play crucial role in implementation of BSAP. They have the responsibility of acting as catalysts, and initiators for positive changes. They also have to play the role of inhibitors if the occasion so demands. Needless to say they have the primary responsibility of coordinating various actors and resources along with positive monitoring to propel the change.

The regional NGO have the capacity to play such a role. The development of BSAP is an illustrative example.

Peoples' organizations

During the process of NGO activity or the activity undertaken by Govt. departments several peoples' organizations have evolved. Examples are SHG, JFM committees, Farmer groups, Sports Groups, Cultural groups, village (like Mendha and Saigatha), science clubs, wild life clubs.

At present some of them are playing great roles for conservation and sustainable development. However, many such organizations never had an exposure to better vision or had required inputs to develop them as positive intervention groups. They are the actual implementers of BSAP.

Peoples' representatives

In every democracy peoples' representatives have a significant role to play. Under BSAP, they are the actors who have to take up the fight for legal and constitutional reforms. It is they who have to provide logistic support to implementation of BSAP right from village level to the regional and national level through appropriate legislative and legal reforms.

Financial Institutions and funding agencies

Currently banks and other financial institutions play the role of reaching resources allocated by the different govt. schemes for tribal and rural sectors. They have a similar role to play vis-a-vis BSAP.

Several funding agencies are financially supporting efforts of govt. as well as NGO in bringing about development as per their mutual vision. They have the same role to play in the context of BSAP.

Private sector

Although normally blamed for profiteering attitude and callousness to pollution. Private sector including industries and mines add considerably to the economic scene at the local level. It is also looked upon as giving stability of income to small but not negligible number of people.

As an economic actor Private sector has a crucial role to play in BSAP more so in the urban sector of the region.

Government departments (like agriculture irrigation, animal husbandry and social forestry, forest, revenue, etc.)

They are major actors now and in future also they will play a critical role. Govt. departments are often blamed to be insensitive, corrupt and inefficient. A part of it is true but that is definitely not true about everyone and everything concerning govt. departments.

BSAP for the region has received co-operation from different govt. functionaries and departments. In fact large portion of the data presented in the present BSAP is collected by the govt. departments.

They are the policy implementing arms and also policy reviewing eyes of the govt. and have a crucial role in the implementation of the sub-state BSAP.

The role of govt. departments in BSAP is of facilitation and of providing field support.

Universities & Research organizations

They are presently playing the role of capacity building organizations. Although a lot of improvement is needed in the actual delivery, they do play a role of value and significance in development effort and related research. They have a similar role in the BSAP.

Chapter 6

Chapter 6

ONGOING BIO-DIVERSITY RELATED INITIATIVES

We find initiatives related to bio-diversity by all actors in the region. NGO, Peoples groups, Govt. departments, Peoples' representatives, Village all have undertaken some or the other initiative related to bio-diversity of the region. The volume of the total work done is large enough to justify a series of books. We will, however, take a brief look at the initiatives.

To start with let us have a look at the different areas in which the initiative exists.

Forest and livelihood

- Participatory Forest Management (PFM) (Ongoing)
- Scientific Honey Harvesting (Ongoing)
- NTFP collection, processing and marketing (Ongoing)
- Medicinal plant conservation (Ongoing)
- Scientific Tussar Silk rearing (Ongoing)
- Wild life conservation (Ongoing)

Peoples' Empowerment

- Tribal Self Rule: Gram Sabha Empowerment (Ongoing)
- Women empowerment through Self Help Group (Ongoing)
- Anti liquor movement (Ongoing)
- Employment Guaranty Scheme (EGS) movement (Ongoing)
- Farmers' Clubs through NABARD (Ongoing)
- 'Save the Forest Save the Human' movement (Past activity that led to many current initiatives)

Education

- Village science clubs (Ongoing)
- Joyful Learning through District Primary Education Program (DPEP) (Ongoing)
- Quality improvement of primary education and pre-primary education (Ongoing)
- Bharat Jan Vidyan Jatha (Past activity with intermittent current phases)
- Workshops (Art, Theater, and science activity) (Ongoing)

Health

- Empowering good local health traditions (Ongoing)
- Women health program (Ongoing)
- Child Health Program (Ongoing)
- Adolescent health program (Ongoing)

Community based rehabilitation of disabled (Ongoing)

Leprosy Management (Ongoing)

Old age care (Ongoing)

Agriculture

Organic farming (Ongoing)

Sustainable agriculture (Ongoing)

Vriksha Farming (Mix of forestry and agriculture) (Ongoing)

Granary (Ongoing)

Grain Bank and food security (Ongoing)

Technology initiatives for Value addition

Processing of agricultural products (Ongoing)

Revival and Up-gradation of local technology (Ongoing)

Watershed management

Bunding in agricultural Land (Ongoing)

Farm tanks (Ongoing)

Village tanks (Ongoing)

Nalla Bunding (Ongoing)

Wet-lands

Tank fishing and river fishing:

Up-gradation of technology: (Ongoing)

Prawn rearing in tank: (Ongoing)

Fish nursery (Ongoing)

Environment Conservation

Pollution watch (Ongoing)

Eco-clubs (Ongoing)

We now present for completeness the present status in each of the areas in a brief way.

Forest and livelihood

Participatory Forest Management (PFM)

With the cooperation of the forest dept. formation of PFM committees got initiated by NGO Vrikshmitra, Amhi Amachya Arogyasathi, Jagut Mahila Samaj, Gao Niyojan Vikas Parishad (Mendha-Lekha), PFM committee Saigatha.

Presently the scenario in this area is as under

Division	District	PFM com. Formed	PFM com Registered and active
Chandrapur	Chandrapur	40	15
Bramhpuri	Chandrapur	41	11
Central Chandrapur	Chandrapur	53	29
Gadchiroli	Gadchiroli	30	11
Wadsa	Gadchiroli	34	21
Bhamragad	Gadchiroli	95	31
Sironcha	Gadchiroli	76	29
Alapalli	Gadchiroli	62	38
		431	185

Source: Booklet of forest department

The story of Saigatha

Saigatha is a very small village of 65 families in the Bramhapuri tahsil of Chandrapur Dist. Just 2 km away from Bramhpuri on Nagbhid road. The forest department statistics put the forest at 271 hect. The main trees were Bija, Moha, Teak, Ain, Awala, Rohan and Dhavada. Slowly this forest was completely destroyed due to cutting of trees for livelihood needs pertaining to sell of firewood.

In 1975 a farmers club was formed in the village and the villagers regularly discussed the matter of destruction of the forest, slowly the whole village understood the effects of destruction of the forest. They decided to start the conservation.

Now, this village is covered under PFM and a rich forest surrounds the village. Today Saigatha is recognized as a leader and trend setting example and Govt. of Maharashtra has honored this village.

An important feature of this village is that it has six different communities with Dalit majority. The village got organized under the leadership of a dalit leader Mr. Suryabhan Khobragade. This is to be viewed against the backdrop of the fact a large number of surrounding villages have a strong caste divide.

Scientific Honey Harvesting

Traditionally honey was harvested from the forest by burning beehive area and thus honey could be harvested from a beehive only once. Dr. Gopal Paliwal and Dharamitra an NGO from Wardha trained about 100 honey collectors in Gadchiroli, Yeotmal and Wardha district of Vidarbha region of Maharashtra. The new training allowed the harvesting without disturbing natural surroundings of the

beehive entailing multiple harvesting from the same hive. In short a highly eco-friendly and sustainable method was handed over to the traditional honey harvester.

The last year's volume of harvest is given in the table below. It is growing every year as new groups are being trained.

District	Promoting Agency	No. of persons trained	Average collection and volume of honey marketed
Gadchiroli	AAA	40 (Tribal)	20,000Kg/year
Wardha	Dharamitra	20	30,000Kg/year
Yeotmal	Srujan and Gramin Samasya Mukti Trust	30	40,000Kg/year



A trained honey harvester at work.

NTFP collection, processing and marketing

Adivasi Vikaas Mahamandal entrusted with purchase of NTFP buys only a few items namely Hirda, Moha. After the initiation of the tribal self-rule the Mandal did not buy NTFP saying that it is now the responsibility of the Gram Panchyat. The Gram Panchyat had no financial assistance to do such a thing. The NTFP had to be sold to traders at exceptionally low rates.

It is important here to note that two of the most valued forest produce classified as NTFP by central government namely Tendu leaves and Bamboo have been put in the category of major produce by the state government and the rights over these have been retained by the state government.

AAA started a small initiative in Korchi, Dhanora and Kurkheda block of Gadchiroli by giving training to 150 women of SHG in scientific collection of the medicinal plants their use and value addition. DST financially supported this effort from 2000 to 20002. This is slowly growing. The turnover in this area is now to the tune of Rs. 100,000/- per annum.



Group of women trainees

Medicinal plant conservation Area

With the assistance of MOE and UNDP through FRILH (Banglore) and Rural Communes (Mumbai) developing a medicinal plant conservation area in 200 hect of forest surrounding village has been undertaken. Pitezari in Bhandara district and Mizgao in Gadchiroli district are the project villages. AAA is giving part of training related to value addition and while Forest department is implementing the project.

Scientific Tussar Silk rearing

Tussar rearing has been a traditional occupation amongst the Dhivar community (NT) of Chandrapur, Gadchiroli and Bhandara districts of Vidarbha. The rearing is done using the leaves of Asan and *Arjuna Terminelia* trees. About 1500 families depend on this occupation for their livelihood. During 1985-1992 period scientific preparation of DFL along with plantation of *Arjuna Terminelia in about* 350 hect of forest land was initiated. This project was a result of cooperation between Central Silk Board and Swiss Government. Vidarbha Development Corporation implemented this project. Although the plantation was envisioned to be handed over to the communities by forming their cooperatives the same has

not actually happened till now as the procedures have not been completed and the project has been closed. Maharashtra Government is trying to proceed further.

Wild life conservation

There are 3 protected areas and wildlife sanctuaries within the site at Tadoba, Chaparala and Bhamragadh. Forest department receives cooperation from peoples' group in census and other activities including the development of awareness about wild life conservation in city and villages. Prominent amongst these groups are TEAK club Chandrapur, and Bird Watchers group Chandrapur.

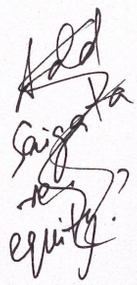
At Saigatha the village looks after the wild life that has started staying in the regenerated forest.

Similarly, at Mendha-Lekha people look after the wild life.

Peoples' Empowerment

Tribal Self Rule: Gram Sabha Empowerment

90% of the villages in Gadchiroli and about 20% villages in Chandrapur district come under the purview of the Tribal self-rule act. Before this act was enacted the village Mendha-Lekha in Gadchiroli district demonstrated the concept of self-rule. A brief account about Mendha Lekha is given below.



Mendha-Lekha

Mendha-Lekha is a beautiful village covered by dense green forest. It is probably the first village in India, which fought the forest department and the forest act to establish its traditional right over the forest.

It gave the slogan: 'We are the government in our village and government at Mumbai and Delhi is our government.'

Long back the village sabha decided to build a Ghotul -a traditional school. The village brought teakwood from the forest. Forest department soon swooped on the village tore apart the Ghotul and took away the teakwood. Mendha then organised a struggle and got 22 villages to join it each village built its own Ghotul and finally the forest department relented and joined hands with people for joint management of the forest.

Where as, in general, the forest department offers degraded forest for joint management Mendha-Lekha got its right established over the dense forest. Every household in Mendha has to contribute a part of their earnings for community use this fund is called Gram Kosh (village fund). Every community work draws upon every family. Mendha is a living lesson of an ideal democracy.

It is mandatory to take the permission of the village Gram Sabha for undertaking any work within its jurisdiction. This rule applies to Govt. departments, NGO, or individuals. It is interesting to quote here that the Governor of Maharashtra Dr. P. C. Alexander visited the Mendha-village in 2001 to have a first hand experience of the working of Mendha-Lekha. The concept is now spreading to the surrounding villages

Women empowerment through Self Help Group

The concept of SHG emerged in Vidarbha around 1991. AAA initiated formation of SHG in Gadchiroli and Chandrapur Districts. Later on other organizations like MAVIM under the finance of EFARD also started the activity. Today over 20 organizations NGO, ICDS and DRDA, NABARD, MAVIM and Banks are engaged in the women empowerment through SHG. Extent of its impact can be realised from the following statistics.

	No. of SHG
Chandrapur Dist.	2064
Gadchiroli Dist.	1578

Glimpse of activity of SHG initiated by Amhi Amachya Arogya Sathi

Chandrapur and Gadchiroli districts

Number of SHG: 508

Women SHG 466

Male 42

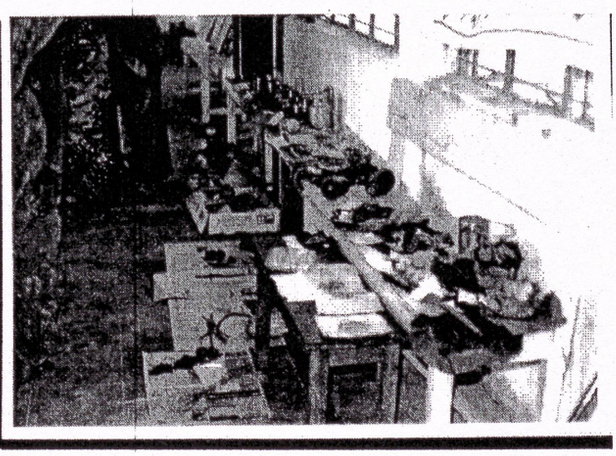
Total Members: 6404

Women 5861

Male 543

Total saving:	Rs 44,11,339/-
Bank loan drawn from 95-96 to 2002-2003:	Rs 71,52,101
Repayment upto 31st December 2002:	Rs 58,30,156 (82%)
Number of Cluster level federations of SHG:	26
Total member SHG	321





Women and agriculture bio-diversity

Anti liquor movement

The anti liquor movement began in 1990 to address issues arising out of increasing addiction. Due to this movement the Maharashtra had to ban sale of liquor in Gadchiroli district.

This movement had drawn groups and people from every walk of life. It included women groups, politicians, NGO and individuals.

The struggle to control the illegal production and sale of liquor at village is continuing and is spearheaded by women SHG. Youth and villagers lend support.

Employment Guaranty Scheme (EGS) movement

Agitation for implementation of the employment guarantee scheme was started in 1983 in Wadsa and Armori blocks of Gadchiroli district through Building and woo-workers union under the leadership of Sri. Sukhdeobabu Uike (Ex. MLA) and Sri Mohan Hirabai Hiralal. The agitation continues even today through women SHG under the leadership of Ms. Shubhada Deshmukh.

Farmers' Clubs through NABARD

The first Women farmers club was formed at the initiative of AAA by the help of NABARD in 1990 at village Awalgao in district Chandrapur. Now NABARD has initiated number of farmers clubs with the help of banks in both districts.

The purpose of forming the farmers clubs was to develop collective action for betterment of farm sector.

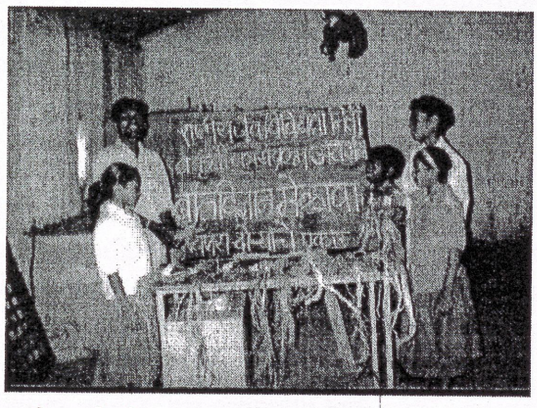
The activity continues today also.

Education

Village science clubs

During 2001 AAA established village science clubs in 14 villages of Korchi block of Gadchiroli district. Above 300 children above the age of 7years are regularly participating in the science club activity that is held every weekend.

In BSAP project the different science clubs studied bio-diversity related aspects related to use of varieties of plants, grasses, storage techniques etc. covering 9 topics. They presented their findings at science congress held at Korchi. The information gathered by them is of high value.



Children presenting their research on traditional ropes at science congress

Joyful Learning through District Primary Education Program (DPEP)

Gadchiroli became a DPEP district in the year 1999. The World Bank funded project is directed at achieving qualitative and quantitative improvement of primary education in the district.

Through the implementation of DPEP there is improvement in the infrastructure of primary education facilities within the whole district.

Quality improvement of primary education and pre-primary education

PEEP: The Primary Education Enrichment Program PEEP was started in Chandrapur district with the help of UNICEF. The program runs through the department of education.

This program has helped in retaining students by reducing dropouts. It has also provided training inputs and data on performance was gathered.

AAA and Bhartiya Adim Jati Sevak Sangh started a quality improvement program in 20 villages.

Bharat Jan Vidyan Jatha (Past activity with intermittent current phases)

BJVJ was peoples' science activity aimed at developing scientific temper. There is a BJVJ unit at Gadchiroli and Chandrapur. It conducts activities related to various aspects related to beliefs amongst the society. Presently they are held once in a while.

Workshops (Art, Theater, and science activity)

Workshops are regularly held for children and teachers in the region. So far workshops on origami, science experiments child art, mathematics teaching, development of local stories, case studies and play-way educational activities have been held.

Health

Empowering good local health traditions

The activity began in 1988 at Kurkheda in Gadchiroli district through AAA and Paramparagat Van-Aushadhi Sanshodhan Wa Vikas Kendra under the guidance of Lok Swasthya Parampara Samwardhan Samiti (LSPSS). LPSSS is a national network of NGO and individuals involved with local health systems

The activities under this program are

Organizing meetings of Vaidus - traditional healers who use herbal medicines

Exposure visits of Vaidus within the state and outside the state

Workshops of Vaidus, botanists and ayurved experts together

AAA regularly runs a training center for NGO persons, persons from forest departments and individuals. This center is in existence from 1995. The training concerns scientific collection of medicinal plants, their uses and preparation of simple herbal medicines.

Women health program

A study of reproductive tract infections in rural women in Gadchiroli district was conducted by SEARCH under the guidance of Dr. Rani Bang. They trained local TBA for the management of simple RT infection. The activity continues to grow.

Child Health Program

A study to decrease the child mortality by 60% through trained village women as a barefoot neonatologist along with local TBA was taken up in 100 villages of Gadchiroli district by SEARCH under the guidance of Dr. Abhay Bang.

This study was accepted by WHO and also by the Ministry of Health Govt. of India.

This exercise is now being replicated in seven sites of Maharashtra through seven NGO under a project titled ANKUR and at central level through ICMR in six states.

Adolescent health program

A govt. run program on Adolescent health is going on through district health department.

A similar project is also being run by SEARCH, AAA, Lokmangal.

Community based rehabilitation of disabled (Ongoing)

Govt. health department started identifying handicapped from this year and organizing diagnostic camps at block at block level for handicapped.

AAA is working in community based rehabilitation of handicapped in 26 villages of Korchi and Kurkheda blocks of Gadchiroli district

Leprosy Management

Maharogi Seva Samiti Warora is world renowned for its effort in rehabilitation and treatment of leprosy afflicted individuals. It has created several work opportunities for the cured patients. It is important here to note that these individuals have developed de-generated forest and are efficiently managing it at three places namely, Ashokvan, Somnath and Anandvan.

Agriculture

Organic farming

Agriculture department, through their various offices, is promoting the concept of organic farming and also helping the farmers by providing organic manure and organic pesticides. NGO initiave of promoting ideas of organic farming through the formation of study groups of interested farmers is going on. Vrikshmitra in Dhanoraa block and AAA in Kurkheda block of Gadchiroli district. Agriculture College of Anandvan is also active in this area. Some individuals are doing the experiment of Vriksha Farming.

Vriksha Farming

Sri. Shende at Talodhi Balapur, Dist Chandrapur, a retired forest servant is continuing an experiment 'Vriksha Farming' at his farm. He ahas planted a number of Awala trees and medicinal plants along with paddy farming.

Sri. Borkar at Nilaj Dist. Bhandara is a small farmer carrying out a similar experiment.

Mr. Dushyant Deshpande an agriculture post graduate is doing medicinal plant farming and marketing the same.

Sri. Girish Padmawar of Bhadravati Dist. Chandrapur is doing Vriksha farming since last ten years.

Granary

AAA organised a camp for 30 artisans and youth to familiarize them with technology of building good quality and low-cost granary. They were also exposed to the construction of a low-cost hot air dryer for drying farm and forest produce. Its trial is going on.

Grain Bank and food security

State government initiated the scheme of grain bank for tribal community through ITDP. However, the scheme was not properly propagated in tribal villages. AAA and Gao Niyojan Vikas Parishad Mendha-Lekha propagated this idea in number of villages in Gadchiroli district. The status of NGO initiated Grain banks is as follows.

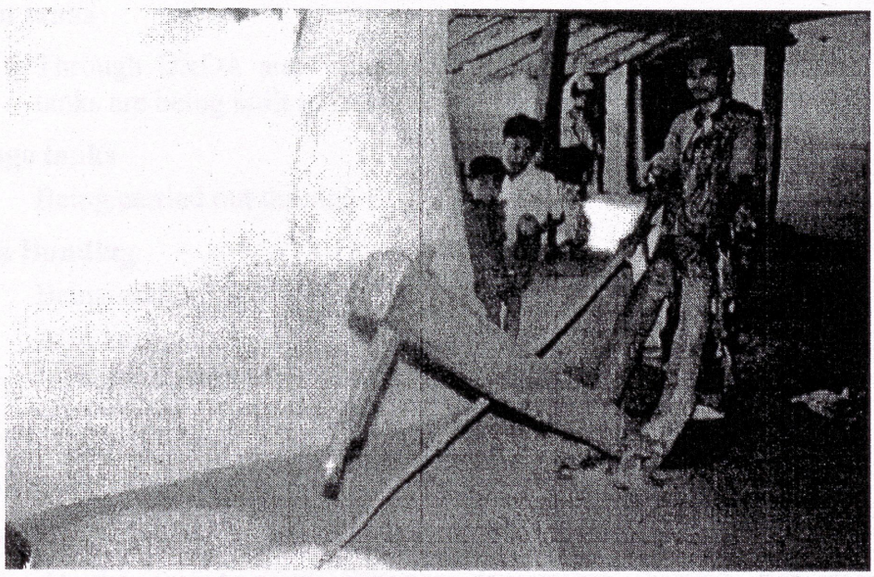
GB through Govt. Schemes	26
Self contributing GB	8

Technology initiatives for Value addition

Processing of agricultural products

Manually pounded rice using traditional pounding unit called Dheki

AAA revived use of Dheki with dual purpose of providing part time employment and for enriching their diet.



Rice pounding using a Dheki

Last year 2000Kg rice was pounded and sold. The nutritional value of the manually pounded rice is far superior to the machine polished rice. This was established through laboratory tests. The detailed lab results are given in the Annexure. We mention here briefly that the manually pounded rice is much richer in iron, phosphorus, fiber and vitamins.

A jam from flowers of Ambadi a local plant that is seasonal and harvested on the bunds of the paddy field in small quantities is developed. A sharbat is also developed. AAA has promoted the marketing of Powdered Ambadi, Jam and sharbat.

Revival and Up-gradation of local technology

The traditional rice-pounding unit Dheki is undergoing technological up-gradation to reduce required efforts. The new Dheki is expected to become available in two years time.

Watershed management

Bunding in agricultural Land

Under EGS the program is being implemented through agriculture department through out the area.

Vitte: Peoples' initiative

Vitte was a tradition in which community went to help an individuals personal work. The individual had to spend on food. Salhe, Kale, Surwahi and Bhuryaldand villages of Korchi block of Gadchiroli district modified this tradition and adapted it to develop the farm bunds.

Farm tanks

Through DRDA and Village community in Mendha-Lekha farm tanks are being built to enhance irrigation.

Village tanks

Being carried out through EGS

Nalla Bunding

Being carried out under EGS by Forest department

Also being done through NGO initiative in village Katang tola and Mendha-Lekha

Wet-lands

Tank fishing and river fishing:

Prawn rearing in tank:

At the initiative of fisheries department through fishermen cooperative societies

Fish nursery

At the initiative of fisheries department through fishermen cooperative societies

Environment Conservation

Pollution watch

Continuing through individuals and through small groups, Largely around Ballarpur paper mill, around mines in Chandrapur district and near Jairam Phosphate and Kasturchand Fertilizer Ltd at Wadsa in Gadchiroli district.

Eco-clubs

At the initiative of forest department Eco-clubs are being promoted in schools.

Chapter 7

CHAPTER 7
GAP ANALYSIS

It is worthwhile to analyze gaps in policy, laws, administration, information, human capacities and vision before formulating SAP for this region.

Agriculture

Gaps in policy, Laws -

Top-down bureaucratic planning for agriculture development (Lack of empowerment of farmers, specially women)

Subsidies to hybrid varieties of seeds, chemical fertilizers, and pesticides have created environmental problems. (Gap is not a problem. An e.g. of gap would be No financial incentives for organic, diverse, agriculture.)

Subsidized irrigation water for cash crops without social arrangements for equitable distribution of water has created pockets of prosperity.

Under pricing of agriculture produce compared to industrial products.

Gaps in Administration

Land records at the village level are not up-to-date. Demarcation is not done properly. This creates problems in regularization of encroachments and developmental activities on common land.

Land records, information about various government schemes, an allocation of funds for developments is not available to villagers. It is at the mercy of village level government functionaries like *Patwari / Gramsevak.*

Patwari / Gramsevak have powers to select beneficiaries for different schemes and issue certificates about caste, land holding etc. Thus wide powers given to them have lead to corruption. Laws to empower people are not formulated.

Gaps in Information

At the village level following information is necessary for micro planning of agriculture development by villagers.

Maps of land capability, tree cover, drainage pattern, water harvesting structures, geo-morphology, soil fertility, ground water potential etc. not available

Data on depth and yield of water from wells and tube-wells, tanks, farm-ponds in different seasons and irrigation potential.

Data on depth, breadth, length of *nalla*, bank height and flow-rate of water in *nalla* in different seasons.

Meteorological data on rainfall pattern, temperature, humidity and pan evaporation rate etc.

Data on organic wastes available in the village and its present utilization

Data on consumption of chemical fertilizers and chemical pesticides

Data on crop productivity in different types of soils

Data on employment opportunities in the village, wage rates for different types of work in different season.

Documentation of local varieties of seeds (livestock), farming practices and skills

In absence of this information agriculture micro-level planning at the village level can not be done.

Gaps in human capabilities

Villagers at present are not able for collecting and organizing micro level data due to lack of training.

Very few villagers have skills & knowledge to undertake different conservation related activities. Very few NGO have capability of training the villagers for collecting data and organizing it and impart skills and knowledge for conservation activities.

Lack of initiative and collective decision making, traditions and inertia of majority, economic and social inequities are main hurdles in participatory planning.

Gaps in vision

Very few NGO, government officials and villagers have vision of sustainability and equity in resource use and its relation with productivity.

Women' skills are undervalued and under utilized

Forest

Gaps in policy and Laws

In 1988 forest policy the role of people in protection conservation and management of forest was emphasized for the first time. Priority was given to satisfy basic needs of fuel, fodder, small timber of rural and tribal population. In spite of changes in policy, no efforts were made to change existing laws.

There were no changes in the following legal provisions.

Arbitrary powers given to forest settlement officer to determine nature and extend of rights of people remained unchanged.

Restrictions on cutting, felling and selling of trees on private land were not removed. It increases administrative control over the trees in private land and leads to corruption. This policy discourages farmers to undertake plantation on private land.

Wide powers given to forest officers to check forest offences did not change. It clearly shows that government wishes to have participation of people without empowering them.

Policy of empowering central and state government to monopolise purchase, transport and sale of forest produce remained unchanged.

Thus on one hand the forest policy stressed participatory management, on the other hand laws empowering people were not formulated. These contradictions still continue.

Gaps in Administration

In spite of all types of bureaucratic powers, forest department was unable to protect and conserve the forest. They are unable to deal with the problems of illicit cutting, encroachments on forest even today due to inappropriate management systems and lack of peoples' particiapation.

Wide powers given to forest officers leads to corrupt practices

There are no efforts on the part of the government to implement provisions of village forest, mentioned in Indian Forest Act. 1927 (Act. No.16).

Instead of that government is implementing Joint Forest Management (JFM). In JFM though participation of people in protection and conservation is expected, but there is no clarity about role of people in planning, management and benefit sharing arrangement between people and forest department.

In this area more 300 JFM committees are formed but a few are for the names sake and their role in planning and management is marginal except for few.

Gaps in Information

For micro-level planning of forest the following information is important. Even after 50 years of scientific management this information is not available at the village level.

Types of fuel wood species and their productivity.

Type of fodder species and their productivity.

Flora and Fauna of the village and their relative abundance

Religions beliefs, customs, values of tribal culture and its relationship with bio diversity

Types of NTFP available in the forest, their use to tribal & local people, season-wise availability and productivity.

Livelihood needs of the community and tribal.

Industry and Mines -

Gaps in policy and law

Promotion of large-scale industries which use fossil energy and energy intensive technologies.

Subsidized fossil energy & electricity to industries.

Supply of irrigation water from reservoirs at nominal rates to the industries.

No separate legislation about environment protection for medium and large-scale industries, which cause more harms to environment.

There are no provisions in law, which will make it mandatory to industries for utilization of wastes generated by them and renewable energy.

Gaps in Administration -

Powers to monitor pollution control activities solely lies with pollution control board, which it is not able to do effectively.

Recently *Parayavaran Vahini* was formed at the district level. But its structure and mode of working is such that it can't work effectively. It is not mandatory to district collector to constitute it and hold regular meetings of *Parayavaran Vahini.*

Pollution control equipment installed in the industries is merely showpiece. Many times these equipment is outdated and not in operation. They are not properly maintained and operated. People feel that management bothers about more production & market to earn more profit but give lowest priority for maintaining pollution control equipment and environmental protection and promotion activities. They are not willing to spend on pollution control activities as far as possible.

In mining activities safety rules are not followed strictly by the management. Accidents in mines have occurred in the past due to negligence of management.

Gaps in Information

The information about raw materials used in industry, the pollutants in air, water and land, their quantity and concentration is not available to citizens.

Information about ill effects of pollution on human health, plant and animal life, citizens do not know properly.

Gaps in human capacities -

Awareness about control of pollution, renewable sources of energy, bio-diversity conservation is lacking at all levels, educational institutions, administrative agencies, political organizations and trade unions.

Vested interests, economic gains and inertia among citizens prevent different agencies to come together for control of pollution.

Gaps in Vision:

Biodiversity is still not a central concern in forestry, except PAs

Forest based livelihoods considered a pressure-no attempt to encourage positive links

Chapter 8

CHAPTER 8
STRATEGIES AND ACTION PLAN

This chapter deals with the strategies and actions to fulfill the objectives of the conserving bio-diversity in the region. To begin the chapter we will outline the strategies and actions in brief and follow it up by details of implementation strategies as well as specific projects.

Strategies

Dialogue
Networking
Micro-planning
Capacity Building
Action research
Advocacy and lobbying

Actions

1. Continuation of dialogue with different actors initiated during the BSAP formulation process towards closer cooperation and converging action.
2. Strengthening and expanding the present networks in the area of Farming, Education, Health, JFM, Gramsabha and SHG. Advocacy and lobbying will be strengthened to bring about changes in
   Laws and policies framed by various govt. agencies
   Planning process of all actors
   Implementation process of all actors
3. Expanding the use of herbal medicines and village health worker system
4. Strengthening livelihood opportunities through development, deployment and dissemination of eco-friendly technologies as well as relevant schemes of government and other welfare agencies
5. Expansion in micro level actions for conservation and sustainable use of land, water, bio-mass and live stock resources to promote equity and productivity.
6. Micro level data collection about status of land, water, biomass, forest, livestock, energy resources and people's livelihoods needs, collectively by villagers, citizens, NGO and government officials.
7. Creating village bio-diversity registers
8. Establishment of bio-diversity and Environmental information centre for NGO, village planning groups, research workers, students etc.
9. Continuous monitoring of environment protection activities by involving citizen groups and lobbying for strict implementation of Environment Protection Act
10. Workshops for education and training of all actors to build capacities for successful implementation of actions.

11. Action researches in the areas of:

NTFP processing, storage and marketing of products,

Use of bio-pesticides and live fencing,

Better implementation of schemes of government and other welfare agencies,

Herbal medicines,

Maintenance of existing irrigation facilities,

Water conservation,

Updating village land records,

Conservation and development of habitat of herons at village Markabody of Gadchiroli district,

Waste land development,

Community conserved areas

Specific Strategies for Agriculture

Promotion of micro-level planning of agriculture and related bio-diversity issues by people instead of centralized planning.

Gradual withdrawal of subsidies on hybrid seeds, chemical fertilizers, chemical pesticides and fossil energy and providing incentives for eco-friendly farming.

Developing system to regulate and prioritize use of irrigation water for more equitable, more productive and fair use

Specific Strategies for forest

Changes in law in accordance with Forest Policy 1988 to empower people.

Constitution of village forests wherever possible and hand it over to Gramsabha as per provision of Indian forest Act 1927.

Micro level planning of Forest and related bio-diversity issues by people instead of centralized planning.

Speeding up micro level actions for conservation and sustainable use of forest resources to promote equity and productivity.

Specific Strategy for Industry and Mines Nothing for Mines?

Lobbying for gradual withdrawal of subsidies given to industries for raw material supply, fossil energy, electricity and water.

Lobbying for uniform laws for medium and large-scale industries as separate laws cause more harm to environment.

Lobbying for initiating incentives to industries to use renewable energy.

Strategies for development of human capacities and vision

Awareness, organization, education and training of students, teachers, villagers, citizens, NGO working at the grass root level.

Action on reviewing state laws & policies, dropped (used to be Action 10)

Details of action plan

Action 1:

Continuation of dialogue with different actors initiated during the BSAP formulation process towards closer cooperation and converging action.

Status:

Ongoing

Brief History:

Major NGO of the region have been working, since their inception, with an objective of achieving convergence of services of all actors for the welfare of the people and for sustainable development of the region. There were networks in different areas of action e.g. JFM, SHG, Health before the beginning BSAP project. The process was strengthened through implementation of BSAP project.

Manpower requirement

Existing manpower with network is sufficient for the action

Funds Needed

Over and above the funds invested by networks Rs. 24,000/- per annum are needed for bettering efficiency and documentation.

Action 2:

Strengthening and expanding the present networks in the area of Farming, Education, Health, JFM, Gramsabha and SHG. Advocacy and lobbying will be strengthened to bring about changes in

Laws and policies framed by various govt. agencies
Planning process of all actors
Implementation process of all actors

Status:

Ongoing

Brief History:

Major NGO of the region have been working, since their inception, with an objective of achieving convergence of services of all actors for the welfare of the people and for sustainable development of the region. There were networks in different areas of action e.g. JFM, SHG, Health before the beginning BSAP project. The process was strengthened through implementation of BSAP project.

Continuing work of different agencies is enlarging the scope of networking through formation of new Gramsabha, JFM committees, SHG, Farmer groups. It is also increasing the need of organising and lobbying.

Manpower requirement:

Existing manpower will have to be augmented by setting up a small 2-person unit at one of the partner NGO

Fund requirement

Rs.300,000/- for first two years. Includes cost of materials, documentation, travel, communication and manpower. Rs.100,000/- per year in subsequent years.

Action 3:

Expanding the use of herbal medicines and village health worker system (15 Villages)

Status:

Ongoing

Brief History:

Amhi Amachya Arogya Sathi is involved with the use of herbal medicines and developing village health worker system. It is offering courses in preparation and use of herbal medicine. It has recently successfully completed a 3-year project of training tribal women in identification, preservation and processing of medicinal plants along with their medicinal uses.

It has held 3 workshops in collaboration with the forest department.

Manpower requirement:

Manpower already exists

Fund requirement:

Rs. 400,000/- for 2 years

Action 4:

Strengthening livelihood opportunities through development, deployment and dissemination of eco-friendly technologies as well as relevant schemes of government and other welfare agencies (50 villages)

Status:

Ongoing

Brief History:

NGO, Forest department and other agencies are involved with the use eco-friendly technologies for strengthening livelihood opportunities. Examples are Technology for harvesting honey, Use of herbal medicines. Forest dept has held 3 workshops in collaboration with AAA on herbal medicine and honey harvesting. AAA was involved with the Govt. institute at Jabalpur, working under ministry of food in organising demonstration cum training workshop for low cost dryers and granaries.

Manpower requirement:

Manpower already exists

Fund requirement:

Long term support for a period of 10 years - Rs.250,000/- per annum

Action 5:

Expansion in micro level actions for conservation and sustainable use of land, water, bio-mass and live stock resources to promote equity and productivity. (50 villages)

Status:

Ongoing

Brief History:

NGO, Forest department and other agencies are involved since significant time with the micro-planning and micro-level actions. For example: Watershed development, Bunding, organic farming, biomass utilization, vermi-composting etc. Models and field-tested activity modules are available with different actors.

Manpower requirement:

Manpower already exists some more will have to be deployed (5-6)

Fund requirement:

Long term support for a period of 10 years - Rs.500,000/- per annum

Action 6:

Micro level data collection about status of land, water, biomass, forest, livestock, energy resources and people's livelihoods needs, collectively by villagers, citizens, NGO and government officials (50 villages)

Status:

Proposed

Brief History:

NGO, Forest department and other agencies are involved since significant time with the micro-planning and micro-level actions. For example Watershed development, Bunding, organic farming, bio-mass utilization, vermi-composting etc. Models and field-tested activity modules are available with different actors.

Some voluntary organizations in the region (e.g., AAA, SEARCH, Vrikshmitra, Jagrut Mahila Samaj, Indian Institute of Youth Welfare, Bharatiya Adim Jati Sevak Sangh, Lokmangal, Lok Biradari Prakalp,) have an experience of such type. Semi-government organizations MITCON, MCED, MAVIM, NABARD to name a few have also done significant work in the region and have an active presence.

Manpower requirement:

Manpower already exists some more will have to be deployed (5-6)

Fund requirement:

Rs.600,000/-

Action 7:

Creating village bio-diversity registers (30 villages)

Status:

Ongoing

Brief History:

As a component of the BSAP process the process of writing Bio-diversity registers was undertaken by the BSAP steering committee under the guidance of Prof. M. Gadgil from IISC Banglore. Presently 4 villages Mendha, Ranwahi, Mahagaon and Wadal are currently participating in this exercise

Manpower requirement:

Manpower (2-persons) to be enhanced for more efficient work and for expansion

Fund requirement:

Rs.200,000/- per annum for two years

Action 8:

Establishment of bio-diversity and Environmental information centre for NGO, village planning groups, research workers, students etc

Status:

Proposed

Brief History:

During the BSAP process a need was felt to set up a Bio-diversity and information center for the region. This need arose from the volume of data and methods that got generated during pre-BSAP and BSAP process. The proposed center will be able to provide support in terms of data, data collection instruments, references, resource information and many more things. Such a center is an essential element of the strategy and action related to conservation and growth of bio-diversity of the region.

Manpower requirement:

Manpower to be enhanced (2-persons) for more efficient work and for expansion

Fund requirement:

Rs.400,000/- for first year and Rs.100,000/- for next ten years

Action 9:

Continuous monitoring of environment protection activities by involving citizen groups and lobbying for strict implementation of Environment Protection Act

Status:

Proposed

Brief History:

During the BSAP process a need was felt to set up a 'Continuous monitoring of environment protection activities by involving citizen

groups and lobbying for strict implementation of Environment Protection Act.' This need arose from the issues raised during pre-BSAP and BSAP process.

The proposed monitoring will be able to receive support in terms of data, data collection instruments, references, resource information and many more things from information centre. This will help in solving multitude of issues related to conservation of bio-diversity.

Manpower requirement:

Manpower to be enhanced (4-persons) for more efficient work and for expansion

Fund requirement:

Rs. 400,000/- for first year and Rs.100,000/- for next ten years

Action 10:

Workshops for education and training of all actors to build capacities for successful implementation of actions

Status:

Proposed

Brief History:

One of the principal strategies of BSAP is to effect convergence of efforts for conservation and documentation of bio-diversity. The BSAP process also threw up a need for training of all actors in varied areas. These include data collection, authentication of data, data analysis, training, managing change, managing multiple projects, effective management of resources, mapping and many more.

The proposed continuing workshops will be able to deliver support in training in the areas of data collection, data collection instruments, references, resource information and other relevant things. This will help in solving multitude of issues related to conservation of bio-diversity.

It is expected that as a consequence of this action eco-forum activity will emerge at village level, at school and college level, as well as cluster, tahsil, district and regional level in a sustainable way.

Manpower requirement:

Manpower exists but for coordination 2-persons will be needed for efficient work

Fund requirement:

Rs.300,000/- for first year and Rs.100,000/- for next ten years

Action 11:

Action research projects

(a) NTFP processing, storage and marketing of products,

Sustainable methods of harvesting NTFP and its storage, packaging and marketing for income generation.

Status:

Proposed

Need:

NTFP like Moha flowers and seeds, *awala, tamarind, behada, hirada, Jamun, Satyya (Mushroom), Tembhur, char,* gum etc. are collected and marketed.

While collecting *awala, jamun, tembhr* the trees are cut. Due lack of proper drying – storage and marketing facilities, there is wastage. To avoid this provision of suitable kits, drying processing preservation and packing of the NTFP is necessary. Sustainable methods of harvesting of this produce need to be developed and popularized. It is a highly challenging task. AAA has started exploring the possibilities of such a technology.

Methodology:

In the first phase a lightweight and compact but long reach harvesting gear will have to be developed to efficiently harvest the easily perishable and soft fruits. This gear should preferably be made out of local material and its maintenance should be possible locally.

A phase that can be taken up simultaneously relates to packaging from place of harvest to the city market, which is overnight transportation over rough roads. Low cost reusable packaging methods need to be developed urgently.

Time frame:

3 years

Funds needed:

Rs.250,000/- for development and trial of technology

(b) Use of bio-pesticides and live fencing,

Preparation and popularization of bio-pesticides

Status: Proposed

Category – High priority medium term (3 years)

Details –

Botanical pesticides can be prepared from *Neem, besharam, garlic chilli, custard apple* leaves etc. They should be prepared and popularized.

At present these pesticides are not very popular and easily available. There is need to have demonstrations and establish village level unit to produce and market these pesticides locally.

Responsibility – NGO, self help groups of women, farmers groups and agriculture dept.

Resources – Rs. 50000 for establishing one unit, which includes fixed capital and working capital.

Live fencing for agriculture land.

Category – High priority medium term (3 years)

Details – Live fences like *agave, mehandi, bamboo, Besharam* can be grown on the borders of agriculture land which will protect agriculture land from stray cattle, wild animals etc.

Responsibility – NGO and farmers group.

Resources – Rs.1000 per hect of land

(c) Better implementation of schemes of government and other welfare agencies,

Action research will be undertaken to study difficulties in implementation of schemes of govt. and other welfare agencies by case studies of 3-4 villages. Strategies will be evolved to get optimal results. These strategies will be tried out for effectiveness. Useful strategies will be tested for scaling up over 20 villages.

Status: Proposed

Time frame: 3 years

Fund requirement: Rs.400,000/-

(d) Herbal medicines

Action research will be undertaken to study the development of herbal medicinal gardens and propagation of medicinal plants in easily accessible forests, its sustainability and market for its harvests. 20 villages will be covered

Status: Proposed

Time frame: 5 years

Fund requirement: Rs.300,000/-

(e) Maintenance of existing irrigation facilities

A detailed study will be made in 5 villages about issues related to maintenance of existing facilities and the costs involved. Based on the findings a long-term action will be undertaken. Efforts will be made to find and design scalable actions.

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.150,000/-

f) Water conservation

A detailed study will be made in 5 villages about issues related to water conservation. Based on the findings a long-term action will be undertaken. Efforts will be made to find and design scalable actions.

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.50,000/-

g) Updating village land records

A detailed study will be made in 2 villages about issues related to updating village land records. Based on the findings a long-term action will be undertaken. Efforts will be made to find and design scalable actions.

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.50,000/-

h) Conservation and development of habitat of herons at village Markabody of Gadchiroli district

During the BSAP process it was found that herons have a habitat at village Markabody in Gadchiroli district. People have been persuaded to conserve the habitat of the herons. The project proposes to establish the site as a heronary. Starting from documentation, publicity and development of infrastructure will be undertaken. As the excreta of heron serves as manure, awareness development about it will be undertaken.

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.100,000/-

i) Waste land development for growing fruits, fuelwood, fodder, tubers (2 villages)

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.100,000/-

j) Community conserved areas

A detailed study will be made in 5 villages about issues related to community conserved areas. Study will include existing areas if any, opinion about the need for community conserved area, willingness to contribute to developing such area, difficulties and costs involved with possible way outs. Based on the findings a long-term action will be undertaken. Efforts will be made to find and design scalable actions.

Status: Proposed

Time frame: 2 years

Fund requirement: Rs.100,000/-

Additional action points given in AK comments — esp.
- Tribal self-rule / PESA
- Inst. str. for "
- Role of DPC, etc.
- Conserv. of threatened spp
- Hunting issues
- Reorienting dept / inter-sectoral —