APPENDIX 3.2

FOREST FIRE (2008-12)

Hot Spots of Forest Fires in HP (MODIS Satellite Picture)

Hot Spots of Forest Fires in India (MODIS Satellite Picture)

Hot Spots of Forest Fires in District Solan (MODIS Satellite Picture)

LOCATION MAP OF STUDY AREA
APPENDIX 3.3

Forest Types in Different Aspects Showing Unburnt and Burnt Forest Areas
APPENDIX -3.4

Burnt Forest Areas showing Surface Fire Incidents and Fire Behaviour
### APPENDIX-3.5

**Beaufort Scale for estimating 10 m open wind speeds**

<table>
<thead>
<tr>
<th>Force of number</th>
<th>Wind Speed (km h$^{-1}$) Range</th>
<th>Mean</th>
<th>Description</th>
<th>Observed wind effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&lt;1</td>
<td>0</td>
<td>Calm</td>
<td>Smoke rises vertically</td>
</tr>
<tr>
<td>1</td>
<td>1-5</td>
<td>3</td>
<td>Light air</td>
<td>Direction or drift shown by smoke drift but not by wind vanes</td>
</tr>
<tr>
<td>2</td>
<td>6-11</td>
<td>9</td>
<td>Light breeze</td>
<td>Wind felt on face; leaves rustle; vanes moved by wind</td>
</tr>
<tr>
<td>3</td>
<td>12-19</td>
<td>16</td>
<td>Gentle breeze</td>
<td>Leaves and twigs in constant motion; wind extends light flag</td>
</tr>
<tr>
<td>4</td>
<td>20-28</td>
<td>24</td>
<td>Moderate breeze</td>
<td>Raises dust and loose paper; small branches are moved</td>
</tr>
<tr>
<td>5</td>
<td>29-38</td>
<td>34</td>
<td>Fresh breeze</td>
<td>Small trees in leaf begin to sway; crested wavelets on inland waters</td>
</tr>
<tr>
<td>6</td>
<td>39-49</td>
<td>44</td>
<td>Strong breeze</td>
<td>Large branches in motion, whistling in telephone wires, umbrellas used with difficulty</td>
</tr>
<tr>
<td>7</td>
<td>50-61</td>
<td>55</td>
<td>Moderate gale</td>
<td>Whole trees in motion; resistance felt when walking against wind</td>
</tr>
<tr>
<td>8</td>
<td>62-74</td>
<td>68</td>
<td>Fresh gale</td>
<td>Breaks twigs off trees, generally impedes progress</td>
</tr>
<tr>
<td>9</td>
<td>75-88</td>
<td>82</td>
<td>Strong gale</td>
<td>Slight structural damage occurs</td>
</tr>
<tr>
<td>10</td>
<td>89-102</td>
<td>96</td>
<td>Whole gale</td>
<td>Seldom experienced inland; trees uprooted; considerable structural damage</td>
</tr>
<tr>
<td>11</td>
<td>103-117</td>
<td>110</td>
<td>Storm</td>
<td>Very rarely experienced; widespread damage</td>
</tr>
<tr>
<td>12 or above</td>
<td>118+</td>
<td>&gt;125</td>
<td>Hurricane</td>
<td>widespread damage</td>
</tr>
</tbody>
</table>

(Source: Taylor et al., 1997)
QUESTIONNAIRE

A. General Information

1. Name of Respondent ..............................................................

2. Sex (M/F) .................................................................

3. Address ...........................................................................

4. Age:
   a) < 18   b) 18-45   c) > 45                         (Please tick)

5. Education:
   a) Illiterate   b) Primary
   c) Middle   d) High
   e) Graduate/Any other                                   (Please tick)

6. Size of Family:
   a) Up to 5   b) Above 5                                  (Please tick)

7. Land holding (ha):
   a) No Land   b) < 1.0   c) 1-2                         (Please tick)

8. Living standards:
   a) Kutch Hut + Facilities
   b) Pacca House + Facilities + LPG                        (Please tick)

9. Livestock Holding:
   a) Up to 5   b) > 5                                      (Please tick)

10. Occupation:
    a) Household   b) Service/Shop/Other
    c) Any other                                           (Please tick)
B. Awareness About Forest Fires

causes of forest fires

1. According to you which of the following is the cause of Forest Fire
   a) Negligence/Accidental  
   b) Intentional 
   c) Natural  

2. Are you aware about the following Fire Hazard Reduction Strategies
   a) Prescribed Fire  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 
   b) Mechanical Removal  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 
   c) Fire Breaks/Fire Lines  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 

3. According to you how much impact do the following Fire Hazard Reduction Options have:
   a) Firebreaks should be built around Forest areas.  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 
   b) Prescribed fire should be used in combination with mechanical removal of brush and trees  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 
   c) Prescribed fire should be used to improve wildlife habitat and manage forest vegetation  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal 
   d) It is alright to use prescribed fire close to homes if safety measures are taken care of  
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal
e) Local by-laws that require homeowners to remove vegetation should be implemented (Please tick)
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

f) Traditional Belief about positive effects of fire should be used (Please tick)
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

g) Only mechanical removal of inflammable materials should be used to reduce fire hazard (Please tick)
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

h) Prescribed fire is too dangerous and should not be used at all (Please tick)
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

i) Fire Hazard Reduction Strategies

1. According to you how much impact does the following Support Prescribed Fire Reduction Strategies have

   a) It is alright to use prescribed fire close to homes if safety precautions are taken
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

   b) Fire should be broken out due to Traditional belief Devta’s Will
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

   c) Prescribed fire should be used to improve wildlife habitat and manage forest vegetation
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

   d) Prescribed fire should be used in combination with mechanical removal of brush and trees
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

2. According to you how much impact does the following Support Non-Prescribed Fire Reduction Strategies have

   a) Prescribed fire is too dangerous and should not be used at all
      i) None at all ii) a little iii) somewhat iv) a lot v) a great deal
b) Only mechanical removal inflammable material should be used to reduce fire hazard
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

c) More firebreaks should be built around Forest areas
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

d) Local by-laws that require homeowners to remove vegetation should be implemented
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

3. According to you how much impact does the following have on Forest Fire Prevention

a) Educational Programme should be a part of fire hazard reduction planning
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

b) Local Forest officials should involve locals living nearby for developing fire hazard reduction plans
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

c) Residents should be a member of committee to help fire reduction management plans.
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

d) Residents should be involved as active fire watcher and informer to help the forest officials by providing some incentives.
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal

e) Local Officials should have sole responsibility for developing the fire hazard reduction plans.
   i) None at all ii) a little iii) somewhat iv) a lot v) a great deal
APPENDIX-4.1

OPERATIONAL GUIDELINES FOR
INTEGRATED FOREST PROTECTION SCHEME (IFPS)

1. BACKGROUND:

Forests of India are endowed with rich fauna and flora. India is one of the 12 mega bio diversity countries of the world. National forest policy 1988 emphasizes environmental stability and maintenance of ecological balance. The productivity of forests is to be increased to meet essential national needs like fuel wood, fodder, minor forest produces and small timber for the rural and tribal populations. Special precautions should be taken during the fire season to prevent the incidence of forest fires and improved modern management practices should be adopted to deal with them.

The Coimbatore charter on Environment & Forests has resolved to protect and improve the forests of the country through creation of infrastructure such as forest roads, buildings, wireless equipments, vehicles, arms etc. Working plans for scientific management of forests, boundary demarcation for prevention of encroachments, control of pests and diseases, promotion of natural regeneration etc. will be undertaken on priority.

However, protection of forest resources, requires a strong infrastructure at the disposal of the state forest departments. The existing infrastructure is grossly inadequate due to paucity of funds to deal with the task of forest protection. In various states notified forest areas are not clearly demarcated on the field and surveys have not been carried out. Due to the existence of habitations in and around forest areas, it becomes difficult to enforce law without proper demarcations. For the purpose of scientific and systematic management of sustainable forest resources and eco management, a prescription in the form of working plan becomes necessary.

It has been estimated that annual loss from forest fire varies from Rs. 300 crores to Rs. 570 crores. Besides there are many intangible losses such as loss of biodiversity, ozone layer depletion, loss of habitat for wildlife, soil erosion etc. For effective control of forest fire and its management through modern devices and tools has become imperative.

To meet the emergent requirements of the State Forest Departments, Integrated Forest Protection Scheme has been made operational during the 10th Five Year Plan.
2. INTRODUCTION TO THE SCHEME

Integrated Forest Protection Scheme has been formulated by the merger of the schemes of the 9th Five Year Plan 'Forest Fire Control and management' and 'Bridging of Infrastructure Gaps in the Forestry Sector in the North Eastern Region and Sikkim. The later scheme is now being extended to all the States and UTs during the 10th Five Year Plan. It is a 100% centrally sponsored scheme. The main components of the scheme are:

1. Infrastructure Development
   i. Working Plan Preparation / Survey and Demarcation
   ii. Strengthening of Infrastructure for Forest Protection Division

2. Forest Fire Control and Management
   Both the components of the Scheme will be implemented in all the States and Union Territories.

3. OBJECTIVES OF THE SCHEME

3.1 Long Term Objectives:

. To maintain environmental stability through preservation and where necessary, restoration of ecological balance that has been adversely affected by depletion of the forest cover of the country.

. To preserve the natural, heritage of the country by protecting and conserving the remaining natural forests with the vast variety of flora and fauna which represent the remarkable biological diversity and genetic resources of the country through strengthening of the infrastructures of the Forest Department.

. To improve the productivity of forests to meet essential national needs.

. To ensure Scientific management of the forests by preparing and implementing good quality working plans.

. To protect forest against forest fires by adopting improved and modern management practices and through the cooperation of the local communities on the principles of Joint Forest Management.
3.2 Short Term Objectives:

. To carry out detailed field survey, demarcate the forest boundaries and notify the forest areas.

. To carry out detailed field enumerations to assess the growing stock and biodiversity.

. To make use of the latest technology of the satellite imageries, GPS (Global Positioning System), GIS etc. in the preparation of good quality working plans.

. To prepare Working Plans aiming at sustainable management of the forests and plantations.

. To prepare fire danger rating system and devise forest fire forecasting system.

. To prevent and control forest fires with a view to protect and conserve the forests & wildlife and environment.

. To monitor the impact of forest fire prevention and control activities and use latest technology including the establishment of a network.

. To involve the local people in protection of forests from fires on the principals of Joint Forest Management.

. To develop and strengthen Forestry Infrastructure and capacity of the Forest Departments of the States and UTs for effective protection of the flora, fauna, biodiversity and the environment as a whole.

4. IMPLEMENTING AGENCIES:

The Central Sector Component of the Scheme will be implemented by the Forest Protection Division of the Ministry of Environment and Forests and Forest Survey of India Dehradun. The Ministry will also involve the Central Institutions like Indian Council of Forestry Research and Education Dehradun, Indian Institute of Forest Management Bhopal, National Centre for Medium Range Weather Forecasting and others wherever necessary.

The state Sector Component of the Scheme will be implemented by the Forest Departments of the concerned State Governments and UTs.
5. PROJECT FUNDING

5.1 Pattern of Funding:

The Scheme will be implemented as a centrally sponsored scheme with 100% central funding during the Xth five Year Plan.

5.2 Items of Funding:

Following are the broad items of expenditure which can be funded under various components of the scheme:

i. Central Sector Component

- Preparation of forest fire danger rating system and forest fire forecasting system in collaboration with 'National Centre for Medium Range Weather Forecasting' of Department of Science and Technology, Indian Institute of forest Management, Forest Survey of India, Dehradun and Indian Council for Forest Research and Education, Dehradun.
- Setting up of National Geoinformatic Centre for monitoring and evaluation studies on forest fires and imparting advanced training on the subject.
- Compilation of database and analysis of statistics on forest fire damage.
- Assistance to forest protection committees for forest fire prevention under JFM Programme, through JFM Cell and other related work of JFM Cell including expenditure related to training and workshops etc.
- Research, extension, publicity.
- Evaluation Studies on the impact of the scheme and JFM Programme sanctioned by the Ministry.
- Travelling expenditure and office expenditure, etc. of the staff associated with the Forest protection Division.
- Any other item of expenditure considered essential from time to time with the approval of competent authority.
ii. State Sector Component:

a. Strengthening of Infrastructure for forest protection

- Construction of offices and residences of front line staff, transit camps, inspection huts, research, training and computer centres.
- Construction and improvement of forest roads.
- Development of Management Information System.
- Procurement of IT related equipments.
- Procurement of effective communication systems like wireless, cell phones, satellite phones etc.
- Provision of Vehicles for movement and other equipments for effective monitoring and patrolling.
- Technological upgradation and skill development. Publicity and extension (Joint Forest Management committees can be involved).
- Any other items considered essential and as proposed in the scheme of the State or Central Government with the approval of competent authority.

(Details at Annexure - I)

b. Survey and Demarcation

- Carrying out field survey of the forest areas.
- Identification of eco-fragile and inaccessible areas.
- Recording of flora and fauna, soil condition, regeneration status etc.
- Identification of actual areas for enumeration.
- Carrying out detailed field enumeration.
- Organization and supervision of field work which includes camping arrangements for the field party.
- Contingency expenditure for supply of forms, manuals etc.
- Purchase of satellite imageries. Equipments for data collection like global Positioning Systems and all types of survey and enumeration equipments.
. Provision of equipments for maintaining database an( analysis like setting up of GIS workstations, computers scanners, printers etc.
. Procurement of vehicles for field work.
. Other expenses involved in the preparation of working plans.
. Any other items considered essential and as proposed in the scheme of the State or the Central Government with the approval of competent authority.

   (Details at Annexure - II)

**c. Forest Fire Control and Management**

. Procurement of Hand tools, Fire tenders Tractor Trolley mounted with water tanker, Back pack pump consisting of pump, fire finders, water bottles, field dress etc.
. Procurement of Communication Sets for fast communication
. Procurement of vehicles for speedier mobility.
. Construction of watch towers.
. Establishment of fire control rooms.
. Control burning and fire lines.
. Training and Demonstration
. Research, Development, Extension Publicity
. Expenditure related to fire control measures such as expenditure on fire crew and JFM Committees.
. Assistance to States and UTs for strengthening of capacity building for infrastructure of JFM.
. Any other items considered essential and as proposed in the scheme of the state or central government with the approval of competent authority.

   (Details at Annexure - III)
BROAD GUIDELINES FOR STRENGTHENING OF INFRASTRUCTURE FOR
FOREST PROTECTION

The Forest Department has country's most valuable resources at its disposal and has the responsibility of protecting them. Protection of forest resources requires a strong infrastructure at the disposal of protecting agency. To build such an infrastructure the State Forest Departments can send proposals for the following types of capital expenditure:

(A) Construction of Buildings: The following type of constructions may be proposed:

1. Offices and residences of front line forest staff, like Forest Guards, Foresters, Deputy Rangers and Range officers, depending on the requirements of individual states.
2. Protection Offices and residences at headquarter.
3. Transit Camps and Inspection Huts for the field staff and visiting officials.
4. Buildings for housing GIS, MIS and Research and Training.

The cost of construction should be based on CPWD / PWD rates in the concerned state. The estimate should also be site specific. The buildings should use local materials, be environment friendly and in line with the local architecture.

(B) Construction and Improvement of Forest Roads and Bridges

Construction, and improvement of forest roads and bridges for the purpose of patrolling and inspection of regeneration of forests can be considered under this component for the mobility of the staff. The proposal should be location specific.

(C) Aerial Communication System:

To develop / supplement the existing wireless network, the State Govts. may propose purchase of fixed wireless sets, hand held sets, vehicle mounted sets, satellite telephones, cell phones, repeater stations and other accessories for operationalizing the wireless communication. States should propose the amount based on current market rate including taxes of reliable wireless sets. A one time License fee may also be proposed under the Scheme.

(D) Patrolling equipments:

The following patrolling equipments can be proposed for consideration.
   a) Light Motor Vehicles (motor-cycles and patrolling vans)
   b) Medium Motor Vehicles.
(E) Management Information System:

For development of Management Information System, the following items may be proposed:

a) Computers and
b) laptops Accessories
c) GIS workstations
d) GIS / MIS Software
e) Local Area network
f) Wide Area network

(F) Arms and Ammunition:

Based on the requirement arms like rifle, pistol, etc and the ammunition thereof may be proposed.

(G) Technological Up gradation and Skill Development:

Funds may be sought for technological up gradation and skill development in the forestry sector. Funds required for equipments and training should be shown separately.

(H) Publicity and Extension:

Equipments like television, camera, projector, etc required for publicity of various programmes and activities of the Forest Dept. may be proposed under the head. JFM Committees may be involved in extension work.

(I) Research and Training:

Research on tissue culture, seed certification, silvicultural aspects, etc may be proposed under this head. Equipment requirements and training needs should be separately shown in the proposal.

Any other item deemed necessary for protection of forests and improving the productivity of forest land can be considered after due approval by the competent authority.
APPENDIX-4.2

GUIDELINES FOR PREVENTION AND CONTROL OF FOREST FIRES

Forest fires are a major cause of degradation of our forest resources. There are a number of tangible as well as intangible losses due to forest fires and they cause environmental threat to the affected area. Forest Survey of India data on forest fires attributes about 50% of the forest area as fire prone. It is estimated that about 3.73 million ha. of forest area is annually affected by forest fires. Very heavy, heavy and frequent forest fire damages are noticed over 0.87%, 0.14% and 5.16% of forest areas. Government of India has taken the issue of forest fires very seriously and a National master Plan has been prepared in this regard for taking preventive and control measures for the next 10 years. However, for effective control it is necessary for the state governments to take all the necessary measures to combat forest fires. State governments are requested to take action as suggested hereunder:

(A) General Measures

1. All the fire prone forest areas of the state should be clearly identified and a map of fire prone areas should be prepared.
2. Data base on forest fires should be compiled and analysis of statistics on fire damage should be done every year and reported to this ministry.
3. Fire Danger Rating System & Forest Fire Forecasting System should be prepared with the help of National Centre for Medium Range Weather Forecasting of Department of Science & Technology, Lodi Road, New Delhi.
4. The services of ex-servicemen could be utilized and they can be appointed as Fire Warden in Divisions / Ranges on payment of honorarium.
5. The item of forest protection should be treated as a plan item so that it gets more attention and more allocation of budget.
6. Forest department field staff must make a realistic assessment of damages from forest fires and a professional approach should determine the assessment of damage. It is generally observed that field staff do not report the actual fire damage due to fear of action and this practice needs to be curbed.

(B) Specific measures

Following specific measures may be undertaken for prevention and control of forest fires:

1. All the preventive measures should be taken in advance before the fire season starts. Fire lines should be cleared in time. Fire watcher should be employed and other precautionary measures as per working plan should be taken.
2. A senior officer in PCCF Office may be appointed as Nodal Officer. During fire season he will keep up to date information on forest fires of the state and will liaise with various agencies including Government of India regarding various issues on the subject.

3. During the fire season, a crisis group of about five officers may also be constituted in the Office of PCCF and territorial CCF / CCs to closely monitor the situation and coordinate various preventive measures and also arrange adequate enforcement in case of any eventuality. The crisis group should meet at least once in a month during fire season. Similarly crisis group should also be constituted at the circle level. At Division level a group under the Collector's chairmanship with DFO as Secretary with prominent local, social and political leaders and other officers of different departments be constituted for effective coordination and control. This crisis group would mobilize all the government and non government officials and other material resources for prevention and control of forest fires.

4. Communication network should also be set up for quick flow of information and movement of the men and material to fire site.

5. The forest staff available in other wings should be specifically placed under the disposal of territorial division during fire season.

6. The concerned authorities of other departments may be apprised in advance and their cooperation may be sought in dealing with any eventuality.

7. Special steps should be kept ready for use in case of any eventuality.

8. JFM Committees & Forest protection Committees should be actively involved in prevention and control of forest fires. Other people living in and around the forest areas and getting benefits from the forests should also be actively involved.

9. The communities and government staff should be regularly trained for prevention and control of forest fires.

10. Efforts should be made to create public awareness against the ill effects of forest fires. A fire week could be celebrated to create mass awareness.

(c) Legal Measures

1. Provisions of Indian Forest Act, 1927 regarding Forest fires Le. Section 33 and 79 of IFA, 1927 should be strictly implemented.

2. A specific circular may be issued by the state governments regarding mobilization of human and material resources like man power, vehicles etc. in case of forest fires.

3. Other rules and regulations of the state governments in this regard should also be strictly implemented.

4. In order to make an impact at field level, the guidelines may be translated in local languages and circulated to the field staff.
APPENDIX-4.3

No. 22-8/2000-JFM (FPD)
Government of India
Ministry of Environment and Forests
(Forest Protection Division)
Paryavaran Bhawan, CGO Complex
Loch Road, New Delhi

Dated: February 21, 2000

To
The Secretaries
Forest Departments
(All States/UTs)

Subject: Guidelines for strengthening of Joint Forest Management (JFM) Programme.

Sir,

As per the provisions of National Forest Policy 1988, the Government of India, vide letter No. 6.21/89-PP dated: 1st June, 1990, outlined and conveyed to State Governments a framework for creating massive people’s movement through involvement of village committees for the protection, regeneration and development of degraded forest lands. This gave impetus to the participation of stakeholders in the management of degraded forests situated in the vicinity of villages. The joint forest management programme in the country is structured on the broad framework provided by the guidelines issued by the Ministry. So far, during the last ten years, 22 State Governments have adopted resolutions for implementing the JFM programme in their respective states. As on 1.1.2000, 10.24 million ha of forests lands are being managed under JFM programme through 36075 committee.

The JFM programme in the country was reviewed by Government of India from time to time in consultation with State Governments, NGO’s and other stakeholders in view of several emerging issues. In order to further strengthen the programme, the State Governments may take action on the following suggested lines.

(A) Legal backup to the JFM committees:

(i) At present, the JFM committees are being registered under different names in various States as per the provisions contained in the resolutions. Except in a few States where the committees are registered under the relevant acts in most of the states there is no legal back up for these committees. It is, therefore, necessary that all the State Governments register the JFM or village committees under the Societies Registration Act, 1860 to provide them with legal back up. This may be completed by 31st March, 2000. Completion of such formation of existing JFM committees may please be reported to this Ministry.

(ii) There are different nomenclatures for the JFM committees in different States. It would be better if these committees are known uniformly as JFM committees (JFMC) in all the States. Memorandum of Understanding, with clearly defined roles and responsibilities for different work or areas should be separately assigned and signed between the State Governments and the
committees. All adults of the village should be eligible to become members of JFM Committees.

(B) Participation of women in the JFM programme:

Considering the immense potential and genuine need for women’s participation in JFM programme, following guidelines are suggested for ensuring meaningful participation of women in JFM.

i. Atleast 50% members of the JFM general body should be women. For the general body meeting, the presence of atleast 50% women members should be a prerequisite for holding the general body meeting.

ii. Atleast 33% of the membership in the JFM Executive Committee/Management Committee should be filled from amongst the women members. The quorum for holding meeting of such Executive/Management Committee should be one-third of women executive members or a minimum of one whichever is more. One of the posts of office bearer i.e. President/Vice-President/Secretary should be filled by a woman member of the Committee.

(C) Extension of JFM in good forest areas

For better resource planning and collective management distance from the village and dependency on forests should be the main criteria for allowing JFM programme to operate. Therefore, JFM programme should cover both the degraded as well as good forests (except the protected area network). The microplan or treatment plan and memorandum of understanding should be different for degraded forests and good forests (crown density above 40%). In good forest areas, the JFM activities would concentrate on NTFP management and no alteration should be permitted in the basic silvicultural prescription prescribed in the Working Plan but to promote regeneration, development and sustainable harvesting of NTFP which can be given free or on concessional rates as per existing practice in degraded areas under JFM. The benefit sharing mechanism will also be different for the good forest areas. The JFM committees will be eligible for benefit sharing for timber, only if they have satisfactorily protected the good forests for a minimum period of at least 10 years and the sharing percentage should be kept limited to a maximum of 20% of the revenue from the final harvest. The felling of trees and harvesting of timber will be as per the provisions of the working plan. A certain percentage of revenue from final harvest should be ploughed back in the silviculture and management of the forests. The extent of good forest areas to be allowed will depend upon the number of village household and should be restricted to a maximum limit of 100 ha and generally limited to 2 Km from the village boundary. For degraded forests also as far as possible JFM should be first concentrated on areas upto 5 km from the village boundary. The implementation of JFM in good forest areas shall be done in a phased manner on pilot basis. The pilot areas may be monitored closely for a few years and based on the feedback and success achieved the programme can be extended further in consultation with the Central
Government. Before allowing the good forests on pilot basis, all the degraded forests of that locality should be covered simultaneously.

(D) Preparation of microplan in JFM areas:
(i). In case of new working plans a JFM overlapping working circle should be provided to incorporate broad provisions for micro plans. To achieve this flexible guidelines should be evolved for preparation of local need based micro plans. For this purpose, the working plan officer will work in tandem with the territorial DFO and CF for finalisation of the prescriptions of the JFM overlapping working circle. The micro plans should be prepared by the Forest Officers and Village Forest Protection Committees after detailed PRA exercise and should reflect the consumption and livelihood needs of the local communities as well as provisions for meeting the same sustainably. It should utilise locally available knowledge as well as aim to strengthen the local institutions. It should also take into account marketing linkages for better return of NTFPs to the gatherers and should also reflect the needs of local industries/markets. This should be done with due regards to the environmental functions and productive potential of the forests and their carrying capacity as also their conservation and biodiversity values.

(ii) In areas where the existing plans are in force (till their revision in future), for incorporation of micro plans in the working plans, a special order may be issued by the PCCTs for implementation of the micro plan. In these areas, micro plan should aim at ensuring a multi product and more NTFP oriented approach. Without changing the basic principles of silviculture, deviations may be approved in the existing working plans if necessary. To ensure this, the concerned DFO and CF should dovetail the requirements of micro plans with the working plans.

(iii) The micro plan should also take into consideration and provide suitable advice for areas planted / to be planted on community lands and other Government lands outside the notified forest areas including in the district council areas of North East.

(iv) Infrastructure / Ecodevelopment under micro plan should form a separate entity for funding it through concerned development agencies.

(E) Conflict resolution:
In order to resolve conflicts in the functioning of JFM committees and to maintain harmony among different groups participating in the JFM, State Governments may constitute divisional and state level representative forums or working groups. This forum/group should include representatives from all stakeholders including NGOs. The model prescribed by the Andhra Pradesh Government for this purpose is a case in point for consideration.

(F) Recognition of Self-initiated groups
The community groups in many places in Orissa, Bihar, Gujarat, Andhra Pradesh and Karnataka are performing the essential functions of Forest protection and regeneration. These groups need to be identified, recognized and registered as JFM Committees after
proper verification of records and enquiry. The period of their existence and duties performed for protection and regeneration should be suitably assessed and proper weightage given to them for deriving benefits under the JFM programme.

(G) Contribution for Regeneration of Resources:
For long term sustainability of resources, it is essential that a mechanism is created for ploughing back a certain percentage of the revenue earned from final harvest. For this purpose, no less than 25% of the share of village community should be deposited in the village development fund for meeting the conservation and development needs of the forests. A matching contribution may be made by the forest department from its share of such sales. There should be transparent mechanisms for computation of income for sharing the benefits between different stakeholders.

(H) Monitoring and Evaluation:
Concurrent monitoring of progress and performance of this programme should be undertaken at Division and State level. Evaluation of the programme should be planned at an interval of 3 years and 5 years at Division and State level respectively.

Yours faithfully,

(C.P. Oberai)
Inspector General of Forests & Special Secretary

******
APPENDIX-4.4

Forest (Conservation) Act, 1980 with Amendments Made in 1988

An Act to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto.

Be it enacted by Parliament in the Thirty-first Year of the Republic of India as follows:-

1. Short title, extent and commencement.

   (1) This Act may be called the Forest (Conservation) Act, 1980.

   (2) It extends to the whole of India except the State of Jammu and Kashmir.

   (3) It shall be deemed to have come into force on the 25th day of October, 1980.

2. Restriction on the dereservation of forests or use of forest land for non-forest purpose.

Notwithstanding anything contained in any other law for the time being in force in a State, no State Government or other authority shall make, except with the prior approval of the Central Government, any order directing-

(i) that any reserved forest (within the meaning of the expression "reserved forest" in any law for the time being in force in that State) or any portion thereof, shall cease to be reserved;

(ii) that any forest land or any portion thereof may be used for any non-forest purpose;

(iii) that any forest land or any portion thereof may be assigned by way of lease or otherwise to any private person or to any authority, corporation, agency or any other organisation not owned, managed or controlled by Government;

(iv) that any forest land or any portion thereof may be cleared of trees which have grown naturally in that land or portion, for the purpose of using it for reafforestation.

Explanation - For the purpose of this section, "non-forest purpose" means the breaking up or clearing of any forest land or portion thereof for-

(a) the cultivation of tea, coffee, spices, rubber, palms, oil-bearing plants, horticultural crops or medicinal plants;

(b) any purpose other than reafforestation;
but does not include any work relating or ancillary to conservation, development and management of forests and wildlife, namely, the establishment of check-posts, fire lines, wireless communications and construction of fencing, bridges and culverts, dams, waterholes, trench marks, boundary marks, pipelines or other like purposes.


The Central Government may constitute a Committee consisting of such number of persons as it may deem fit to advise the Government with regard to-

(i) the grant of approval under Section 2; and

(ii) any other matter connected with the conservation of forests which may be referred to it by the Central Government.

3A. Penalty for contravention of the provisions of the Act.

Whoever contravenes or abets the contravention of any of the provisions of Section 2, shall be punishable with simple imprisonment for a period which may extend to fifteen days.

3B. Offences by the Authorities and Government Departments.

(1) Where any offence under this Act has been committed-

(a) by any department of Government, the head of the department; or

(b) by any authority, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the authority for the conduct of the business of the authority as well as the authority;

shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render the head of the department or any person referred to in clause (b), liable to any punishment if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence punishable under the Act has been committed by a department of Government or any authority referred to in clause (b) of sub-section (1) and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of any officer, other than the head of the department, or in the case of an authority, any person other than the persons referred to in clause (b) of sub-section (1), such officer or person shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.
4. Power to make rules.

(1) The Central Government may, by notification in the Official Gazette, make rules for carrying out the provisions of this Act.

(2) Every rule made under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or both Houses agree that the rule should not be made, the rule shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

5. Repeal and saving.

(1) The Forest (Conservation) Ordinance, 1980 is hereby replaced.

(2) Notwithstanding such repeal, anything done or any action taken under the provisions of the said Ordinance shall be deemed to have been done or taken under the corresponding provisions of this Act.
# APPENDIX-4.5

Table 4.2.1: ANOVA of Av. air temperature during fire season 2011

<table>
<thead>
<tr>
<th>Source</th>
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Table 4.2.2: ANOVA of Av. air temperature during fire season 2012

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Table 4.2.3: ANOVA of Av. relative during fire season 2011

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Table 4.2.4: ANOVA of Av. relative humidity during fire season 2012

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Table 4.2.5: ANOVA of Av. wind speed during fire season 2011

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Table 4.2.6: ANOVA of Av. wind speed during fire season 2012

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Table 4.2.7: ANOVA of Av. wind direction during fire season 2011

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Table 4.2.8: ANOVA of Av. wind direction during fire season 2012

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Table 4.2.9: Analysis of Variance (ANOVA) of Slope %

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<td>2875.667</td>
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<td>32</td>
<td>456.000</td>
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### Table 4.10: Analysis of Variance (ANOVA) of Elevation (m)

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### Table 4.11: Analysis of Variance (ANOVA) of Tree Stand (%)

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### Table 4.12: Analysis of Variance (ANOVA) of Tree Density (TS/ha)

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### Table 4.13: ANOVA of Trees Circumference (cm)

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### Table 4.14: Analysis of Variance (ANOVA) of Shrubs (%)

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Table 4.2.15: ANOVA of Shrub Density (Shrubs/ha)

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Table 4.2.16: Analysis of Variance (ANOVA) of Herbs (%)

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Table 4.2.17: ANOVA of Herbs Density (Herbs/ha)

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