

A PRELIMINARY SURVEY ON FOREST FIRES IN PAKISTAN

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Introduction

The climate of Pakistan is mostly arid to semi-arid with extremely hot, dry and long summers. However, due to geographic variations, climate may be modified locally, but generally high heat and dryness prevail throughout the plains. The forest area in Pakistan is 4.224 million ha (Ashfaq *et al.*, 2000) forming only 4.8% of the total land area of 87.98 million ha. This forest area is recognized into nine major forest types/biomes, depending upon distribution and species composition. However, this much forest is far less in consideration to national economic and ecological needs.

Forests suffer from various injuries. These injuries in Pakistan are mostly due to biological and physical reasons. Biological injuries are the outbreak of forest pests and pathogens, which some times may attain the status of an epidemic, mainly under the influences of climatic conditions. Such catastrophes are controlled partially by human efforts and partially due to normalization of climatic regimes. The losses remain mostly limited to a tree species or an area and do not spread to other parts due to physical, climatic and species barriers.

Besides others, the main physical cause of forest injuries in Pakistan is the forest fire, affecting almost all forest types and occurring mostly in dry and hot summer months. Forest fires cause damage to the ground cover, young regeneration and standing trees, as well as, tremendous damage to the biodiversity and habitat. The frequency and intensity of these fires may be different in forest areas due to nature of terrain, climate, presence of dry undergrowth and nature of forest vegetation.

However, no quantitative data on the occurrence and extent of forest fires in the country are available. As a result, no nation-wise strategy could be formulated to minimize and control this forest catastrophe as well as to provide primary data for national and international interest.

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Material and Methods

Under the above constraint, a preliminary survey on the occurrence and extent of forest fires in different forest areas of Pakistan was carried out in the year 2001. The questionnaires were circulated to 75 forest divisions in different provinces/territories of Pakistan, asking various information on forest fires in their respective divisions, over the last 20 years (1979-80 to 1998-99). The detail of these forest divisions is given as under:

Province/territory	No. of forest divisions
NWFP/FATA*	18
AJK*	7
Punjab	30
Sindh	12
Balochistan	3
Northern Areas	5
Total	75

NWFP (North West Frontier province), FATA (Federally Administered Tribal Areas), AJ&K (Azad State of Jammu & Kashmir).

Response was not that as expected and only 14 forest divisions responded to the questionnaire. Out of these, 8 provided the data on forest fires and 6 gave a blank reply. The forest divisions that responded to the questionnaire are given below in Table 1.

Although the response was not that high as expected, yet the data represented almost all forest types in Pakistan and was enough to make a sample study on forest fires in various major forest types. Based upon this response, the data on forest fires were compiled, average forest area burnt annually for each forest type was calculated and projected for forest types and total forest area.

Table 1. Forest divisions responding to the questionnaire

Province/ Territory	Name of the Forest Divisions	
	Provided Data	Blank Reply
Punjab	Jhang	Range Management, Cholistan
	D.G.Khan	-
	Attock	-
	Rawalpindi South	-
	Chichawatni	-
Sindh	-	Social Forestry, Sanghar
	-	Range Management, Karachi
	-	Range Management, Mirpur Khas
NWFP	Gallis	FATA-II
	Haripur	-
Northern Areas	Khizar	

Table 2. The forest types represented by the positively responding forest divisions

S.No.	Name of the Forest Division	Forest Type
1.	Jhang Forest Division	Plantation, Bela/Riverain
2.	D.G. Khan Forest Division	Bela/Riverain
3.	Attock Forest Division	Sub-tropical broad leaved forest/Scrub (Kao, Phulai, Sanatha)
4.	Rawalpindi South Forest Division	Sub-tropical Chirpine/Scrub (Kao, Phulai, Sanatha)
5.	Chichawatni Forest Division	(Eucalyptus/ Shisham Plantation
6.	Gallis Forest Division	Temperate Conifers
7.	Haripur Forest Division	Sub-tropical chirpine/Scrub
8.	Khizar Forest Division	Temperate conifers

Results and Discussion

Forest Types and the Area Burnt each Year

The results given in Table 3, revealed that an area of 49,986 hectares (1.27% of total forest area of 3.950 million ha, surveyed) is burnt annually by different intensities of forest fires, causing damage to forest trees, regeneration, under growth, biodiversity and habitat. The extent of forest fires is different in

different forest areas. The scrub because of their location, topography and climate, are most prone to forest fires and about 2.10% of the scrub area is burnt, annually. The next higher forest fire intensity is in the plantations with 1.86% area burnt, annually. The coniferous forests stand at third position with respect to the occurrence of forest fires with 0.74% of the area burnt each year. The riverain forests are comparatively safe from the injury of forest fires and only a small area of about 0.10% is burnt.

Table 3. Forest types and area burnt each year

Forest Type	Total Area Surveyed (000 ha)	Area Burnt (ha)	%age of Area Burnt
Coniferous	1,911	14,141	0.74
Plantations (all types)	431	8,017	1.86
Riverain	297	297	0.10
Scrub	1,311	27,531	2.10
Total	3,950	49,986	1.27

In 1998, an extensive forest fire broke out in the coniferous forest of Azad Jamu & Kashmir (AJ&K) and could not be controlled by human efforts, until the onset of rains. In this fire a total of 51,639 ha of forest were burnt which is about 9.1% of total forest area of 566,802 ha in AJ&K (Anonymous, 1998). The reason for this fire, as told, was the cross-border firing by Indian Army deployed along the Line of Control (LoC).

Season of forest fires

The peak season of forest fires differs in different forest areas due to variation in climatic conditions. In sub-tropical chirpine and sub-tropical broad leaved forests (scrub), the prime fire season is the hot and dry summer months of May and June. However, in this zone and elsewhere, fire may break out, at any time, when the conditions are dry and the combustible are available in sufficient quantity.

In temperate forests the forest fires are less common, but may occur in the month of October, when the conditions are dry and seasonal grazers are leaving the forest, who set the dry and dying grasses and forest under growth on fire to have a good grass cover next year. Contrary to the conditions in sub-tropical chirpine zone, forest fire are less common in the months of May and June in temperate areas. This is due to comparatively cooler and moist conditions and freshly sprouting grasses and herbs, in sufficient quantity.

Causes of Forest Fires

Climatic conditions, presence of combustibles and human activity are the causes of forest fires. However, the main cause of forest fires is deliberate by the local villagers, just for mischief or to burn the ground vegetation to have a rich growth of grasses and herbs next year to provide grazing for livestock. An other cause of forest fires could be accidental due to smoking, camping in the forests or firing of tracer bullets at the eve of celebrations. The cross border firing by the Indian Army along the Line of Control (LoC) in Kashmir (Anonymous, 1998) is the main reason of forest fires in the Azad State of Jammu and Kashmir (AJ&K).

Conclusions

The forest fires occur in Pakistan every year and are considered very severe and extensive in view of small size of the forest. There is no organized and integrated infrastructures and fire control strategies with the forest departments in the country. In very rare instances, the forest staff with the assistance of local villagers (legal obligations of Forest Act, 1927), may try to put-off the fire, but the efforts are very meagre and often too late, by the time the damage has already occurred. Mostly, the forest fires stop by itself either due to exhaustion of combustibles, natural barriers, change of wind direction or onset of rains.

All the forest departments in the country could not come up with the present challenges of forest fire prevention and control. This failure of the forest departments could be due to the following reasons/constraints:

i. Forest distribution

The small forest area of 4.227 million ha (4.8%) is spread over the entire country of Pakistan in the form of small pockets, physically separated by vast tracts of different land forms and uses. This distribution of forest area is not ideally suited for any effective fire prevention and control.

ii. Financial

The Forest Departments, all over the country, are facing serious budgetary constraints due to overall national economic situation. There is lack of adequate and sustainable funds to meet the requirements of early warning, monitoring, equipment, transportation and development of trained personnel facilities to under-take the effective forest fire prevention and control in the country.

iii. Facilities and Infrastructures

These days, the prediction, early warning and control of forest fires have become a specialized field. Unfortunately, none of the forest departments, in the country, have trained personnel and equipment for early warning, monitoring and forest fire control. It is a part of general duties of all forestry field staff and obligation of local villagers under the forest law (Forest Act, 1927) to fight back the forest fires with the use of available resources. These efforts are always very late, crude, meagre and mostly not effective to overcome the catastrophe.

iv. Hostile Conditions along the LoC

Mine fields and firing by Indian Army deployed along the LoC in Azad Jammu & Kashmir (AJ&K) are also major obstacles in forest fire prevention and control in AJ&K.

v. Poor Accessibility

Coniferous and Scrubs are the major chunks of forests in Pakistan, constituting 73% of the total forest area. Topography of these forests is generally rugged with steep slopes and very poor accessibility and are therefore, not easily approachable for fire prevention and control activities. The present forest road density, in these areas, is hardly 3.1 m/ha (Siddiqui, 1987). This much road network is not enough for effective forest fire prevention and control.

Recommendations

Forest fire control measures adopted could both be anticipatory and reactive. The following anticipatory and reactive fire control measures must be adopted by the forest departments throughout the country:

- i. Adequate, timely and sustained funds remained the biggest constraints in all development activities in different public service organizations, including Forest Departments. Provision of adequate funds must be assured to the forest departments, on sustainable basis, to undertake the anticipatory and reactive forest fire control measures.
- ii. Due to very limited response to the circulated questionnaire, the results reported in this survey provide a very basic data on forest

fires in Pakistan. It is recommended that each provincial/territorial forest departments should collect complete information on forest fires in their area, for compilation of a national document on forest fires and formulation of a national strategy for forest fire prevention and control.

- iii. Monitoring of climatic conditions and forecasting. All anticipatory and reactive fire control measures depend upon climatic conditions in the coming seasons and years. Therefore, continuous monitoring and forecasting of climatic conditions is very essential for pre-planning of anticipatory and reactive fire control measures.
- iv. Facilities for the development of forest fire information and warning are essentially needed. For this the adequate infrastructures like watch towers, electronic warning, aerial transportation, equipment, trained personnel, water and other fire extinguishing compositions must be provided.
- v. The present forest road density of 3.1 m/ha must be increased to 10 m/ha (considered optimum for the forests of Pakistan), to provide efficient communication and improve forest accessibility for effective forest fire control.
- vi. Development of manpower and training of personnel in anticipatory and reactive forest fire control measures.

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