

## FORESTS AND FORESTRY IN NORTHERN AREAS

### (PART II)

by

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### THE FOREST

Out of 7,023,562 hectares land area only 4.56% i.e., 284,900 hectares is under coniferous forests. Private forests cover 233,100 hectares whereas Government owned forests are spread over 51,800 hectares which is only 18.2% of the total forest cover. Scrub forests cover 552,100 ha. making the total vegetation cover (natural) to 11.92%. But the areas reported are quite bare of vegetation and very little percentage is actually covered with vegetation.

#### Functions of the Forest

The protective functions of the forests in the Northern Areas and especially their influence on the prevention of floods, the maintenance of water supply and soil conservation far outweigh their importance as productive forests. Fortunately, the management necessary to fulfill these protective functions is not incompatible with the production of timber. The practice in the past has been to harvest upto the extent of devastation without any replacement. This has as well hampered the protective function of the forest. However, much of forest wealth still remains intact especially in remote and inaccessible area and this area can be saved by correct forest management at no direct expense.

#### Growing stock per hectare

No inventory has been made to assess the stocking of the forest. Recently a working scheme prepared for some of the private forests in Chilas Forest Division mentions the growing stock to be 96.77 m<sup>3</sup>. per hectare. The sample measurements taken during

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the tour show different figures from 110 to 140 m<sup>3</sup>/- per hectare. Trees of 39 metre height and 107 cm. diameter were recorded. But Generally trees do not attain the height more than 30 metres though they have a good diameter growth.

### **Demands on the Forest**

The demands on the forests are much the same as in most of the other parts of the country: Small timber for housing and agricultural implements, wood for fuel and agricultural implements, shrubry and grass for cattle and goats.

What seriously affects the forest and forest land is the excessive demand for fuel, the lopping of pine branches, the extraction of torch wood and the continual cutting and lopping of broad leaved trees, the raking up of fallen leaves and the cutting and raking of leaves for compost. The raking not only removes all humus but also loosens the surface soil. The use of heated floor system in the houses demands large quantities of fuel and litter for quick and easy kindling.

Private forests face the most serious devastation by the practice of 'Nautor'. The forests after clear felling are destroyed for ever and the land is prepared for cultivation. This not only reduces the forest cover but also enhances the intensity of erosion which is already taking place in Northern Areas at a highly accelerated pace.

Grazing is allowed free of cost in every type of forest and is the main reason for the failure of regeneration and the absence of ground cover in the forests. Grazing pattern peculiar to mountainous areas of Pakistan is also harmful. However, summer grazing may be termed as beneficial in the interest of protein production and it is not harmful to the forests as the livestock visit Alpine meadows in summer pace.

### **Drain on the Forest**

No reliable statistics are available for fuel consumption in the area. Timber cut, however, is recorded regularly. Marking lists on the forests (Private) show that during a period of 10 years (1957-67), 384,130 m<sup>3</sup> timber was extracted. The consumption of marked trees is as follows:

Species	Volume/m <sup>3</sup>	Percentage
Deodar	337,315	88
Kail	39,278	10
Fir/Spruce	7,537	2
	<hr/> 384,130	

The annual out turn on the average, comes to 38,413 m<sup>3</sup>.

It is possible to find out the quantities of cut by the contractors whereas timber removed by the owners of forests is not recorded and this no doubt is also very high.

An estimate of number of trees issued during 1955-56 and 1966-67 for local consumption at standard rates, concessional rates and through free grants was 517 and 520 respectively from the Government owned forests ranging from 6-8 m<sup>3</sup> each.

With commercial exploitation, however, it should be noted that 93% of the trees marked were either completely dead or dying-being half dead, top dry or base burnt. Only 7% of the marking related to green trees. If this is the fact and apparently this seems to be the case, it may be concluded that the forests are heading towards slow but sure death. Under such circumstances, silvicultural considerations aimed at inducing regeneration are reduced to minimum. High mortality rate is obviously due to misuse to which the forests are being continuously put.

### Minor Forest Produce

*Artemisia martitima* is the most important minor forest produce being the source of Centonin. Other important minor forest produce are *Carum* sp. (Zeera), Chilgoza seed, *Achonitum* sp., *Podophyllum emodi*, *Saxifraga* sp. and *Peziza rumarina* (Commercial mushroom).

### Injuries to the Crop

The natural causes of damage are the snow, winds, lightning, hail storms, frost, flying squirrels, wild animals, birds, insects and fungi.

Apart from these, the forests are damaged by human agency in the form of fires, fellings, lopping, grazing, browsing, extraction of torchwood and extraction of deodar oil.

### Erosion Control

No attempt has been made in the past to check erosion and train the hill torrents. This has been mainly due to shortage of trained personnel and more so because of the fact that erosion has been branded to be glacial and not the accelerated. A typical example of potential erosion area is the village of Jalalabad near Gilgit. Mountain tops are partially covered with forests. There are pasture lands amidst the forest. Areas below 2,400 metres are completely devoid of tree growth. *Haloxylon* sp., *Enneopogon* sp. and *Aristida* sp. are the important range plants occurring in the area. The mountains below 200 metres do not have vegetation cover except a few small herbs of *Salsola*.

The area becomes rugged with a number of interspersed torrents. Gullies have been carved and chocking has taken place with the rock debris. It is normally a low rainfall area but in August-September, heavy showers are experienced on the hill tops.

Rain water, not infiltrated, starts flowing down. On its way it gathers speed, taking the loose rock debris along with to create flood hazard for this village located in the foot of the mountains. The flood destroys the crops and houses by severe force. It also deposits silt in the agricultural fields and rocks in the nullah bed. The lands are ruined and irrigation channels choked thus destroying the economy of the village.

A scheme has been prepared to control the flood hazard as well as to train the stream beds to save the village. It envisages the raising of nurseries of fruit plants and fast growing tree species. Extension service will be provided to local population to plant these in the catchment areas. Engineering structures like check dams, retaining walls etc. will also be constructed. Local graziers also need a training in proper land use.

Such projects are a great necessity in Northern Areas in the interest of ground water recharge.

### **Forest Industries**

There are no forest based industries in the whole of Northern Areas except a few saw mills. Even the sawing machines and skilled labour force to run these for the contractors has to be imported from the Punjab or Azad Kashmir.

## **FOREST ORGANIZATION**

### **Forest Policy**

Ideally, Forest Policy being in vogue in Pakistan should also form the basis of Forest Management. However, social and political conditions of the area demand some special considerations.

Till this time no clear cut policy has been framed and the forests are being governed by Thumb rules of the private owners of the principles thought to be fit by the Resident/Commissioner.

### **Staff**

Forest Department is headed by a Conservator of Forests who is helped by three Divisional Forest Officers, one each in the civil districts.

### **Commercial Forestry**

Deodar (*Cedrus deodara*) and blue pine (*Pinus wallichiana*) are the only species exploited commercially. Fir (*Abies pindrow*) and Spruce (*Picea morinda*) though extensively used as timber are normally not extracted from the forests. Deodar exists only in Darel and Tangir sub-divisions of Diamar district where all the forests are privately owned.

Blue pine is found all over Northern Areas, but felled only from Darel-Tangir Forests, as a ban has been imposed by the Conservator of Forests, Northern Areas to conserve the fast dwindling species from Government owned forests.

Government have devised certain means to control ruthless exploitation going on in the private forests but these have proved to be insufficient due to lack of control on the sale procedures.

Government owned forests are not tapped. The only extraction allowed is by the lawful right holders of the population inhabiting the forest areas.

## HISTORY OF MANAGEMENT

### Private Forests of Chilas

Before partition of the Indo-Pak sub-continent the forests of Chilas, under Dogra and British rule were not commercially exploited. These forests have, however, remained subject to misuse by the locals in the form of grazing, browsing, lopping, girdling, setting of fires, clearing of land for cultivation, cutting of valuable deodar for terracing, fencing and construction of their dwellings. Use of wood has been extravagant. First step towards conservancy of forests was taken in 1943 by Assistant Political Agent Chilas, Captain Murphy. This envisaged submission of application for requirement of trees, removal of only dead and dying trees in the first instance and no tree to be cut below one metre girth at B. H. These rules were meant mostly for contractors. No other record is available to throw any light on the conservancy of forest wealth in the Northern Areas.

After independence, commercial exploitation was started in 1949 when Assistant Political Agent gave contracts at the rate of Rs. 5 per tree getting the trees marked by un-trained Levy police. Half the price was to go to the owners and half to the Government.

In Darel and Tangir agencies which acceded to Pakistan as late as 1952, destruction by timber traders was ruthless and all accessible patches were cleared.

Bases of the future management of these forests were decided in 1953 by the political authorities. Forest Department was duly organised and Conservator of Forests made head of the department and controlling officer. In respect of the political districts and tribal areas powers were vested in the concerned political office for sponsoring exploitation works, Forest Department taking up the job subsequently. It also implied that no proposal or any commitment in respect of sale of trees and timber will be implemented unless approved by Political Agent, Gilgit. Only marking of trees was to be made by the Forest Officers. All agreements were to be done between the political resident and with the contractors. Duty of the checking of timber and grant of permission for its floating was assigned to the Divisional Forest Officer. Sale rates were also to be fixed

by Assistant Political Agent after consultation with the Divisional Forest Officer. These decisions brought the Forest Department in picture to a certain extent.

In 1957, silvicultural marking of trees sold by owners to the contractors was started. Marking rules were framed in 1958 fixing the exploitable diameter as 27" (69 cm.) and above. All dead, dying, badly damaged and the trees standing over well established advance growth were to be removed. Intensity of marking was to be light. It was also provided to maintain 90 metres broad protection belt below the upper limits of conifers to safeguard against snow slides and slips.

Forest Department had, however, no control over the sale negotiations between the owners and purchasers. The markings also remained subject to the desire, demand and finding of the purchasers according to their convenience.

In 1967 all leases were suspended by the orders of the Federal Government on account of alleged indiscriminate fellings. As there was tremendous loss of revenue to Northern Areas which was collected in the form of royalty and supervisory charges, subsequent deliberation on the situation resulted in the recommendations for preparation of working scheme and promulgation of a Regulation for working of forests on correct lines as far as possible.

To decide the issue of further working of the forests, a high level meeting was held in 1970. The Gilgit Private Forest Regulations of 1970 were promulgated by the Resident of Gilgit. It envisaged that each forest will be managed under a working scheme/plan to be approved by the Resident in consultation with the owners who will also sign the agreement. Resident was also empowered to make rules to regulate sale and removal of forest produce, hunting, shooting, fishing, etc.

### Method of Exploitation

According to the system in vogue so far the forests are sold by the local owners to the purchasers by direct negotiations fixing price per tree, per log or per scantling as the case may be. The price so fixed is directly recovered from the purchasers by the owners in addition to 'Salamis' and 'Pagris' paid to them. An agreement for the sale is drawn by the owners and the purchaser in writing and submitted to the respective Deputy Commissioner for attestation. On its being attested, the D. C. forwards the agreement to the Divisional Forest Officer for marking. The Divisional Forest Officer conducts the marking according to silvicultural availability and prepares a proper draft agreement for the trees marked and sends it to the Resident Commissioner, Northern Areas, at Gilgit through the Conservator of Forests, Northern Areas at Gilgit for sanctioning of the agreement and also signing it as lessor. On receipt of the sanctioned agreement, the Divisional Forest Officer issues the work order. It has remained customary to include in the agreement any trees subsequently marked in the portion of the leased forest which could not be originally marked before drawing up of the agreement for one or the other reasons.

The lessees have to pay royaltly and organisational charges on the outrun basis. The rates per cubic metre are different for different species:—

Royalty Rates:	Deodar : Rs.	105/-	per m <sup>3</sup>	Log form
	Kail :	77/50	„ „ „ „	
	Fir, spruce :	52/50	„ „ „ „	

For Sawn timber these rates are to be increased by 25%.

Locally timber is not sold. Petty P.W.D. contractors who are issued trees for works pay royalty at the rate of Rs. 52/50 per m<sup>3</sup> of sawn timber. This payment as royalty is in addition to the price of trees recovered by the owner.

Recently, a working scheme has been prepared to put these forests to scientific management. The scheme covers a period of 25 years. The fellings done over the past 20 years have also been included in the work plan as an attempt to regularize the exploitation leaving thus, only 5 years for the future management programme.

This working scheme, however, does not cover all the forests in the private ownership but includes only those sold out to the contractors. The scheme has not yet been sanctioned by the Resident/Commissioner. This is interesting to note that even within 5 years, the scheme will be subject to changes as and when some forest is sold by the owners as the negotiations between the contractors and owners keep on continually.

This is a pretty sorry state of affairs. Some sort of control over the sale of forest trees must be exercised by the Government.

### Silvicultural System

Silvicultural system being applied to these forests is selection-cum-improvement. The fellings are regulated by the following methods.

Exploitable dia limit at B. H. is fixed to be 72 cm. All trees dead, with 2/3rd crown dead, malformed, moribund, mold and diseased are removed. One of 2 green trees on cool northern and north eastern aspect, or out of 3 on sunny southern and south western aspects and on exposed sunny aspects only one out of 4 trees is to be felled.

Among immature classes C-grade ordinary thinnings, are to be conducted for Kail and Deodar and B-grade for Fir and Spruce.

No marking is done in the protection belt constituting about 90 metre strip below the upper limit of coniferous crop where snowfall is heavy.

### Government Forests

No working plans or working schemes are available for these forests. They are, however not exploited commercially. No reliable statistics exist as regards the extent of forest area. Forests are mainly in scattered patches and do not make a sizable unit for exploitation.

The forests have been burdened with rights. The procedure for the exercise of various rights and privileges which the local population enjoys, has been stated under Gilgit Sub-Division Forest Rules, 1946 which are too ambiguous to be successfully employed.

### Method of felling timber by the Right Holders

Bonafide residents of an area where the forest is situated and who have legal rights in the forest, have to apply to the Divisional Forest Officer concerned to allow to fell timber for his personal use. The validity of the application is duly verified by the staff of the Forest Department and so the sanction granted accordingly.

Petty P.W.D. contractors get the trees after paying royalty at the rate of Rs. 52/50/m<sup>3</sup> for sawn timber.

### Extraction from the Forest

Timber is extracted from the forest both in round as well as in converted form.

Round timber, after logs are made out of the tree, is collected at one point and rolled or slid to the nullah bed from where it is floated down to the river Indus. Logs are collected at Darband where they are made into rafts and floated to Khairabad timber depot.

Logs may be converted at spot by handsaws or rolled to a saw mill established at a central point amidst the forest. Sawn timber is taken to the forest road head using dry slide or 'pathru'. Timber is transported by jeeps or small trucks upto K.K.H. and then trucks are used to take the timber to Dargai which is the main timber market for mountainous areas.

With the completion of K.K.H., the route may change and the timber be lifted to Havelian instead of Dargai.

### Aerial Ropeway

Perhaps a better logging practice could be the use of aerial ropeway system. One of the forest contractors working in Thore Nullah forests installed the system and extracted timber quite conveniently. With the expiry of the term, the ropeway was dismantled. Being an efficient technique, its use is recommended for future working.



Fig. 6: Birch wood has been used extravagantly for the erection of fences.  
(Photo authors).



Fig. 7: Timber in log form collected at a transit depot near Thor on the K.K.H. for transportation to the plains. (Photo authors).

### Labour Supply

Skilled labour is imported from N. W.F.P. and the Punjab whereas petty works are carried out by the local labour. Contractors have to pay for the food of the labour while in the forest, free of cost. He has also to supply the necessary equipment i.e., the saws, axes, etc. Even Diesel for the saw mill is supplied by the contractors.

### Prices

Timber after being taken to Dargai or Khairabad, is directly sold to the contractors who offer a price of Rs. 630/- to 760/ per m<sup>3</sup>. for deodar and kail timbers in the converted form whereas timber in the round is sold from Rs. 525/- to 630/- per m<sup>3</sup>.

Firewood in Gilgit Town is sold presently at a rate of Rs. 28/ to 32/- per 100 Kg. Price has been raised from Rs. 5/- in 1956 to Rs. 12/- in 1972 and now the present prices.

Cost in other places is not very different from that mentioned above.

### Cost of Exploitation

The average cost of exploitation involved is as under:

#### (a) For Sawn Timber

		Rate rupees	
		cft.	m <sup>3</sup>
(i) Felling	..	0.06	2.10
(ii) Logging	..	0.02	0.70
(iii) Sawing	..	1.00	35.00
(iv) Collection in the forest	..	0.30	10.50
(v) Sliding to nullah side over average 7 km.	..	1.35	47.25
(vi) Floating in nullah, average 21 km.	..	1.92	67.20
(vii) Catching at the roadside and supervision	..	0.08	2.80
(viii) Loading and transportation to Dargai	..	1.50	52.50
(ix) Import Duty	..	0.75	26.25
(x) Chackabandi at Dargai	..	0.05	1.75
(xi) Establishment charges etc.	..	0.50	17.50
(xii) Royalty (for Deodar timber)	..	3.75	131.25
Total: ..		11.28 per cft. or	394.80 per m <sup>3</sup> .

(b) *For Round Timber*

(i) Felling	..	0.06	2.10
(ii) Logging	..	0.02	0.70
(iii) Extraction out of forest and collection	..	0.75	26.25
(iv) Rolling and sliding average 7 Km.	..	2.75	96.25
(v) Floating in the nullah average 21 km.	..	0.60	21.00
(vi) Compensations average	..	0.15	5.25
(vii) Tax by Khans along the river Indus	..	0.45	15.75
(viii) Catching at Darband, stacking and subsequent making of the raft	..	0.20	7.00
(ix) Rafting to Khairabad	..	0.20	7.00
(x) Catching and Chakabandi at Khairabad	..	0.20	7.00
(xi) Import Duty	..	0.75	26.25
(xii) Loss of timber in transit (approximately)	..	0.75	26.25
(xiii) Royalty and organizational charges (for Deodar)		3.00	105.00
Total:		..	9.88 per cft. 241.85 per m <sup>3</sup>

The calculations have been made according to British system of measurements and then converted to Metric.

## RECREATION VALUE

This country of loftiest peaks, embedded within which are beautiful green valleys studded with eye-catching lush crops encircled by fruit laden trees, silvery streams, forested slopes downtread by the wild animals, presents a great scope for the developmen of Re-creational potential. The tract is famous as a tourists' paradise all over the world. During summer, the town of Gilgit is seen packed with the tourists frm within and outside the country. The field of enjoyment can be widened by taking measures for developing this industry which includes appreciation of land scape, mountaineering, wildlife, photography, bird watching and fishing etc.

## Scenic Beauty

Snow clad mountains, with rugged and bare out crops, scratched by the coloured streams, forming into torrents to join the rivers deep down in the valley bottoms, are the most diagnostic features of the area. Korakoram and Hindukush ranges of the Himalayas have the world's largest glaciers in their laps.

Two of world's highest peaks viz, K-2 and Nanga Parbat also fall within the boundaries of Northern Areas.



Fig. 8: A beautiful landscape—Naltar.

(In the foreground (right) is the Birch forest and in the left corner scattered trees of Spruce can be seen.  
(Photo authors).



Fig. 9: Wildlife in Northern Areas—A cross between Ibex and domestic goat.

(Photo authors)

The valley bottoms wherever arable land is available have been brought under plough and a lush green cover has been produced to cover the land. Arboriculture lends exotic touch to the landscape.

Forests are yet another source of beautification. Wide stretches covered with tall, conical vegetation giving a cut-shape to the horizon in the mountainous background are the greatest God given gift to the man. Besides fulfilling the needs of mankind they also provide the required rest to a tired body and tense mind. Coniferous forests especially of Diamar district are second to none and can be developed into Recreational Resorts.

Similarly, Naltar where skiing facilities exist can further be expanded as a great tourist attraction.

### **Mountaineering**

There are eleven peaks ranging from 5,400 to 6,000 metres; 7 from 6,000 to 6,600; 6 from 6,600 to 7,200; 8 from 7,200 to 7,980 and one each of 7,998 and 8,475 metres. All these peaks are continuously challenging the adventurers. Man since ages is accepting this challenge and has turned victorious except in one case. Godwin Austin or Korakoram-2, commonly known as K-2 has not yet been surmounted by any human being. Its height 8,475 metres was determined by Godwin Austin, hence its name.

The nations participating in the adventure are mostly European especially the French and Italians. Japan is the one Asian country which has contributed most in this field. The fair sex too does not lag behind in this sphere. Most of the parties consist of equal numbers of males and females. A Japanese women team is expected to visit Northern Areas for climbing a 6,130 metres high peak.

Most of the world is aware of this great natural asset of Pakistan and it needs no publicity. Some deficiencies, however, remain i.e. the complete lack of living facilities at the head-quarters and other places. Camping as well as mountaineering equipment is not available in Pakistan, hence all the necessities have to be shipped from abroad. This creates some hindrance in programming. If these facilities could be made available and properly publicized, the number of visitors to Northern Areas may probably be doubled.

These mountaineers are also a source of livelihood for the population of localities surrounding these hill tops, in the form of labour. Parties moving up for the climb have to have some sort of manual help in achieving their object which is provided by the local people. It so happens that even in the absence of modern facilities these tribes—men prove themselves to be better mountaineers. However, an organized effort will be needed to project it further.

### **Wild Life**

Rugged mountains covered by different types of vegetation are the abode of the wild animals who are a part of the natural environment. These animals have been a source of

man's food as well as recreation from the times immemorial. With the destruction of vegetation, the habitat of these animals in Northern Areas has deteriorated. This coupled with the hunting pressure has resulted into their near extinction. Government have taken timely steps to check the ruthless shooting.

The most important animals having survived the guns and poachers are: the biggest sheep in the world known as the Marco polo sheep inhabiting Pak-China and Pak-Afghan borders; the swift and sure footed animals like Markhor, Ibex and Shapu which abound the rugged rocky terrain throughout Northern Areas; Blue sheep of Shighar valley of Baltistan and the rare Musk deer occupying thick shrubby growth in alpine zone. Snow leopard which is another magnificent beast frequents a few parts of the area. This animal together with western horned tragopan (pheasant) has recently gained importance due to the appearance in the Red Data Book which means that the species are in danger. Monal pheasant and snow partridge (Ram chakor) are heavily hunted birds especially the former for its feathers.

Wild animals and birds, if preserved properly, can be a source of welcoming shooters—gun or camera; of course gun shooting can be allowed only in case the removal of certain heads or certain bag is thought necessary.

### **Bird Watching**

Recent studies in the United States have shown that increasing urbanization has lead the community to even simplest forms of recreation. Going outdoors has some other objects too besides sight seeing and mountaineering viz-a-viz shooting the wildlife by camera as well as by the gun. Bird watching has emerged as the most widely accepted concept of outdoors as well as urbanistic recreation. City gardens, cultivated fields, forests and range lands have as their inhabitants a variety of bird fauna. Lovers of Nature have just to have a good binocular and watch the movements, trends and behaviour of the most beautiful creatures of God. The extent of watch would depend on the interest of the viewer. One may be interested in the beauty of the plumages, or the daily movements. Some one else may like to witness the habits and behaviour or enjoy the melodious tunes springing in the air whereas a scientist may be interested in the total life span of the bird.

Birds of Northern Areas besides those of game importance prove themselves as lovable creatures. Bright colouration, sweet songs audible in the open and swift movements so enchant the spirits that sometimes it becomes difficult to divert the mind from seeing them.

An allied aspect can be the study, collection or mere enjoyment offered by the tiny insects known as the Lepidoptera (butterflies and moths).

Butterflies in the day time and moths in the night when they hover on the light arouse interest in man and no doubt there are people who are compelled to run after them to

complete their collections. Some of the high altitude fauna is endemic to Northern Areas and it forces many-a-men to visit these areas.

### **Fishing**

Fishing is another important source of recreation. Trout Fish released by the department of Fisheries in running streams is an attraction for the tourists. The small fees levied upon fishing are no hinderance in achieving the enjoyment through this sport.

The sources of Outdoor Recreation mentioned have a great potential in Northern areas and if properly advertised can attract a large number of tourists from within and outside the country. This will not only help to improve the lot of local population but also better the national economy.

### **SUGGESTIONS**

Productive forests are privately owned and Forest Department has no effective control over them. No checks can be imposed on the owners on their sales. Felling for constructional purposes and for firewood is freely carried out. Grass collection and torch wood extraction is practised. Free grazing rights are the main cause of lack of regeneration.

No demarcation of forests has been carried out and the settlement of ownerships and rights is yet to be decided. It has not been possible to prepare stock maps or working plans. Non-applicability of law to preserve forest land and protect it from devastation, helplessness of the foresters to enforce the rules and inadequate number of trained personnel are other serious problems. There is hardly any forest policy. Management trends are guided mainly by the whims of the non-foresters. It is high time that keeping in view the peculiar pattern of ownership and location of the forests, an effective forest policy is framed with the major objectives of (1) perpetuation of the resource through systematic exploitation and intensive artificial regeneration and (2) Maintenance of the quality of human environment and its improvement and development of the tract as a tourist resort.

In order to achieve the desired goals, following steps would be necessary:

#### **Forest Demarcation**

Forest areas, both private as well as government, have not been properly demarcated. No inventory has been made and forests, therefore, can not be managed scientifically. The basic requirement thus is the proper demarcation of forest areas by accurate mapping through aerial photography and subsequently on the spot checking of the findings. Aerial Forest Inventory Project of N.W.F. Province is the only organization in the country busy with surveying the inaccessible mountainous areas. They have already started and

photographed 63,383 hectares in Lower Northern Areas, the main forested tract Photo interpretation will take another 2-3 years.

### **Settlement**

The forests are heavily burdened with rights. It has resulted in extreme deterioration. These rights need to be settled and clearly defined. Efforts should be made to ameliorate/extinguish these rights as far as possible.

### **Control of Private Forests**

81.8% of the total land classed as forests (Coniferous) is private. Control over fellings is the only measure to perpetuate these forests. Steps should be taken to exercise strict management practices by:

Defining the boundaries between state land and private land,

Controlling the sale procedures i.e. Forest Department should acquire the exploitation rights.

Executing marking and felling procedures in accordance with silvicultural and soil conservational techniques,

Vigilant checks on exploitation,

Limiting rights of the local people to the bare minimum by land acquisition or their purchase.

The forest should be managed by the community based on the prescriptions made by the Forest Department in the form of a working scheme or working plan, failing which, the management should be assumed by the Government.

### **Forest Legislation**

To develop long term management it is essential to have an effective legislation to enforce the forest policy. Rules framed by the Conservator of Forests in 1970 should be adopted within the frame-work of Forest Act in force in Pakistan.

### **Inventory of Growing Stock**

Stock mapping in certain areas has already been started by the Forest Department. Maps can be made with as much detail as possible Even if these are not correct they are better than nothing and can be corrected as time goes on. As no reliable figures exist presently, no reference is possible to this effect.

### **Object of Management**

The forests should be worked on a sustained yield basis to satisfy timber and fuelwood requirements of the country keeping in view the protection of the important

watersheds and soil conservation practices. Provision of recreational facilities is another requirement which would bring natural vegetation and its associated wildlife into lime light.

The forests should be allotted to the following working circles:

Protection Working Circle.

Timber Working Circle.

Grazing Management Working Circle.

Our-door Recreation Working Circle.

#### 1. Protection Working Circle

##### *Objects of Management*

- (i) Protection of forests which are not commercially exploitable due to low stocking or steep slopes.
- (ii) Afforestation of suitable blank areas with the consent of the local people.

The areas with the forest-remains on steep slopes should be included in this working circle. No felling or grazing should be allowed. Soil conservation techniques should be adopted to check the accelerated erosion. Measures to stock the forests anew should be taken. Rights of the population must be suspended in these forests.

#### (2) Timber Working Circle

##### *Objects of Management:*

- (i) Production of timber at a level as close to the productive capacity of the site as permitted by the dictates of watershed protection, and the requirements of perpetuating of the forests under the current political, and socio-economic conditions.
- (ii) Earning of optimum revenue for the state and for distribution among the local people.

Forests included in this working circle would be well stocked coniferous forests and worked on selection-cum-improvement system on a sustained yield basis. Annual cut should be prescribed after the inventory of growing stock.

Demands of fuelwood should also be met from these forests.

### **(3) Grazing Management Working Circle**

#### *Objects of Management:*

- (i) Provide for the local graziers to manage their livestock on the forest/range areas consistent with the use of these lands as watershed areas.
- (ii) Regulate grazing to facilitate commercial working of the forest and establishment of regeneration.

This will be an overlapping working circle. Grazing in the forest will be permitted on deferred rotation system. Sub-alpine and alpine pastures should also be utilized on the same system.

Pre-requisite to this management is proper inventory of the livestock and delineation of summer and winter ranges.

Recommendations made by the Range Management Officer should be given due consideration.

### **(4) Out-door Recreation Working Circle**

#### *Objects of Management:*

- (i) Provide recreation facilities for the locals and to develop tourist trade.
- (ii) Help raise the standard of living of the local population through tourism.
- (iii) Better the existing environment and to take measures to improve it.

This would be an overlapping working circle. All areas thought to be worth recreational value in any respect as mentioned under Recreation Value, would be included. Steps taken to enhance the beauty of the landscape. Wildlife would be managed on the scientific lines. Requisite publicity steps would be taken to attract the people. Facilities for camping be provided for the tourists.

Recommendations made under the sub-head "Recreation Value", should be properly attended to.

### **Method of Exploitation and its improvement**

Presently the forests are sold directly by the forest owners to private contractors, fixing the price per tree, per log or per scantling. The price is recovered by the owners from the purchasers in addition to 'salamees' and 'pagree'. The contractors have to pay royalty

and organisational charges at the rate of Rs. 105/-, Rs. 77/50 and Rs. 5 /50 per cubic metre for deodar, kail, and fir and spruce timbers respectively in the roundform. The royalty rates are increased by 25% for sawn timber.

Government of Pakistan have decided to dispense with the system of private exploitation altogether. The decision has mainly been made due to serious abuses which have crept into the system. Marked increase in the price of timber, serious lapses in control over timber harvesting operations and the neglect of soil conservational measures in the watershed of the country while carrying out exploitation works have been the main causes for the change of the procedure.

It is desirable to replace the present system by departmental harvesting. Though it will not be possible under the present ownership pattern but once the forest policy is defined and settlement done, the control on forest exploitation can be easily exercised. The following suggestions are made to switch over to departmental conversion system.

The existing forest contracts should be allowed to operate till their periods expire because attempting to terminate their contracts would embroil the Forest Department in interminable litigation.

No extension should be given in the period of the contracts and the contractors notified of this fact in advance in a legally valid manner.

All private forests should be leased to the Forest Department and the exploitation carried out by the departmental working.

Owners of private forests may be adversely affected in the initial stages of the switch over but judicious exploitation of their forests would result in enhanced revenue for them.

The annual felling coupes may be rescheduled if necessary so that departmental operations are not conducted in close proximity to private contracts.

Departmental operations should only be started after an adequate organisation has been created. Timber Harvesting Division in the Forest Department should be created to control exploitation works.

The personnel in charge of the Timber Harvesting Wing would have to be given much wider financial powers and discretion as compared to the territorial staff to enable them to operate on commercial basis.

Adequate financial allocation will have to be made before departmental harvesting can be started.



Fig. 10: Natural regeneration of Blue pine and Spruce. The area has been closed to grazing. (Photo authors).

The departmental operations can only be made successful if the best personnel are put in charge of the operation and are paid generous special pays and given rent free accommodation. The minimum special pay should be 30% of the basic pay.

Initially, timber harvesting can be started using the existing methods—only replacing the large timber contractor by small labour contractors, each for a separate operation, e.g., cutting of trees, cross-cutting felled trees into logs, rolling logs to a road in the forest, transportation by road to the market, etc.

In the long run, it would be necessary to employ permanent workers and to train them in different operations. Simultaneously improved timber harvesting practices can also be started.

### **Artificial Regeneration**

Regeneration is extremely deficient over the area. Though it is imperative that artificial regeneration be carried out to stock the area fully, this would be very difficult at present because the local people do not agree to any control on grazing. It is hoped that after the creation of grazing management working circle, their needs would be met and they would agree to the closure of some areas for artificial regeneration. The forest staff must launch a powerful extension drive to convince the local people of the need for artificial regeneration. Ideally the entire year's coupe should be studied in detail and those areas marked on the map which need artificial regeneration. As much of this area should be taken up for artificial regeneration as possible. To ensure a high degree of success, the work should be intensive, using good quality stock, and adopting pest control measures. Grazing should be completely banned from the area and vigilant watch should be maintained.

### **Nurseries**

Raising of Nurseries is the prime step for the establishment of irrigated plantations and change over from natural regeneration of the forests to artificial regeneration. Trained staff should be made responsible to raise nurseries on scientific lines.

Horticulture, another aspect of tree raising, also needs good planting stock for better crops.

### **Irrigated Plantations**

Agriculture Department is doing its best to popularise fruit tree cultivation with the farmers. A number of nurseries have been set up. Forest Department can make its own contribution in a better way by starting projects like the one in Bhurban (Murree Hills) and Kaghan (Hazara). In these areas the farmers were given free kerosine oil, stoves etc. to save firewood and also monetary help for terracing followed by free distribution of apple plants and saplings of tree species. The project had on the one hand a great impact on the

economy of the people of these tracts and on the other there was a discernable increase in the production of fruits. Indirectly the measures have helped proper management of watersheds. It is high time that a number of projects on similar lines are started in Northern Areas as well. Work can be concentrated on selected areas. Schemes can be prepared to get assistance under the World Food Programme.

With the increase in fruit production the necessity for packing cases will become even more acute. A variety of fruit produced in the area will perish if not exported to other parts of the country. It is highly imperative that plantations of easily workable soft woods are established immediately. If at present scarcity of land and water is felt, the farmers may be induced to plant hybrid poplars instead of the usual *P. nigra* which is seen almost everywhere around the fields. As regards the objection that hybrids are attacked by defoliators or borers and also are liable to wind damage, the problem can be solved by spray of insecticides and introduction of more resistant clones such as *P. deltoides* 63/51, 69/55, 90/60 etc. Certified material can be obtained from the Pakistan Forest Institute in January every year. However, nurseries and field plantations will have to be raised under standardised techniques. Work may be concentrated on *P. alba* as well which is well suited to the tract.

Willows may also be given their due place along streams and water channels. Instead of the usual method, sets may be planted.

### Roadside Planting

Forest Department has prepared a scheme for planting trees along the Indus Highway as well as to establish block plantations wherever feasible. This is going to be a great venture and a challenge to the skill of the foresters. Forest Department is quite capable of delivering the goods and make a name. It is suggested that in addition to other tree species proposed to be planted, *Pinus halepensis* (Quetta pine) may be extensively planted. It is a beautiful evergreen tree for avenue planting, grows comparatively fast and half to one metre tall plants can be planted bare-rooted. Where sufficient road width is available it will be worthwhile to plant 3 to 4 rows or even more.

In order to conserve moisture, it is suggested that rock mulch may be provided around the plants in a radius of one metre or so. This will be helpful in survival and growth of the plants.

### Sericulture

Good agriculture land is scarce. People, therefore, prefer to plant fruit trees around their fields. However mulberry trees are not uncommon. They grow nicely and have adapted well to the climatic condition. Fruit is dried and sold. A campaign must be started by the Forest Department to persuade the people to increase the number of mulberry trees on their land for starting sericulture. Statistics can be worked out as to whether fruit trees like peaches, apricots or almonds are more beneficial so far as monetary returns

are concerned. But the point which goes in favour of sericulture is that the operation of rearing silk worms extends over a period of two months only and from one ounce of seed, the farmers can earn 500 to 600 rupees. Whole of the family can be associated in collection of leaves, feeding the larvae etc. With the reopening of historical silk route it is quite natural that the profitable cottage industry of sericulture gets established in the Northern Areas as well for a two-way trade.

### **Forest Industries**

Efforts should be made to develop wood based industries in the Northern Areas, the most appropriate sites being in the vicinity of the forest. Chilas town can be made the centre of a number of industries. This would give employment opportunities to local labour as well as improve their skills. The industries can range from a single unit such as scientific charcoal burning to huge integrated complexes. Some of the suggested industries are pulp and paper, packaging, match manufacture etc, which can easily be based on the available raw material.

### **Forest Staff**

The area is quite extensive and the existing staff at all levels is insufficient. It must be increased for better protection, regeneration and exploitation.

### **Forest Education**

The staff is not trained to hold the responsibilities of the job assigned to them. Out of 18 Forest Rangers only one is trained. Rest of them are either foresters or trained forest guards.

Pakistan Forest Institute caters for the needs of the country in respect of imparting Education pertaining to forestry. Officers as well as the subordinate staff should be sent to the Forest Institute or Forest Schools for training. This will help broaden the knowledge of the forest staff to manage the forests on more sound basis.

### **Forest Research**

Problems arising in the forest in any field of study should be referred to Pakistan Forest Institute, Peshawar. Immediate problem is the regeneration which can be solved through closures, scientific management of grazing and artificial planting. Research can be initiated with these requirements in view.

## **SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS**

### **Natural Forests**

About 12 per cent of the lands of Northern Areas are under forests; the scrub and the conifers cover an area of 5,52,100 and 2,84,900 hectares respectively. Out of the latter type

which is more productive, 2,33,100 hectares are privately owned. Arid climate of the tract has clearly shown its effect on the forests as well. They are of low site quality as compared to similar types available in Pakistan.

### Forest Types

Four broad categories of forests have been identified; Dry subtropical scrub, Dry temperate forests, Sub-alpine forests and Alpine scrub. These have further been classified according to climax, sub-climax, edaphic and deteriorated or regenerated forms. Floristics of each type/sub-type have been recorded along with the locality factors.

### Management of Forests

The privately owned forests are located mainly in Diamar district. Only these forests are worked commercially; government forests are not being exploited at present. Deodar (*Cedrus deodara*) and Kail (*Pinus wallichiana*) are the main timber species which are extracted from production forests. Due to lack of appreciation of the resource and its value in the preservation of watersheds and soil conservation, these forests have always been sold dirt cheap to the outside contractors who have plundered this natural heritage to their maximum personal advantage. Removal of the trees has been carried out ruthlessly without caring for perpetuation of the resource itself. This incessant on-slaught has depleted the soil resulting in accelerated erosion and destruction of watersheds. These malpractices, coupled with free grazing rights have hampered the process of natural regeneration which is almost absent.

The current sale procedure is faulty and goes totally in the favour of purchasers. Government have no control over the timber sales. Owners of the forests enter into negotiations with the contractors on their own and the Forest Department is notified about the sale after the bargains have already been struck. Forests are leased out irrespective of their suitability for exploitation and the foresters act clearly as the marking officers and the controller of timber transport.

In order to improve the management practices and to preserve this important, national resource measures such as demarcation of forest area, settlement of rights, control over private forests, inventory of growing stock, preparation of stock maps and working plans should be taken up on a top priority level.

Preparation of the working plans has been stressed with a view to maintaining and improving the present human environment; to produce timber and firewood at a level commensurate with the productive capacity of the site as permitted by the dictates of the watersheds protection and perpetuation of the forests; to earn optimum revenue for the area and distribution of the same to the local people; to protect the deteriorating forests and afforest them wherever possible; to provide for the local graziers to manage their livestock on the forest/range areas; and to provide recreational facilities for the locals and to develop

tourist trade. These objectives can be met by managing the forests under 4 working circles namely; Protection Working Circle, Timber Working Circle, Grazing Management Working Circle and Outdoor Recreation Working circle.

As regards the method of exploitation, it may be departmentalised as far as possible. The existing forest contracts may be allowed to operate till the period of expiry but no extension should be given. All private forests should be leased to the Forest Department and the exploitation carried out departmentally for which a progressive and effective departmental organization would be necessary. Initially timber harvesting can be started using the existing methods, only replacing the big timber contractor by small labour contractors, each for separate operation, e.g. cutting of trees, cross-cutting felled trees into logs, rolling logs to a road in the forest, transportation by road to the market etc.

### Artificial Regeneration

Regeneration is extremely deficient over the area. Though it is imperative that artificial regeneration be carried out to stock the area fully, this would be very difficult at present because the local people do not agree to any control on grazing. It is hoped that after the creation of grazing management working circle, their needs would be met and they would agree to the closure of some areas for artificial regeneration. The forest staff must launch a powerful extension drive to convince the local people of the need for artificial regeneration.

### Nurseries

Establishment of a large nursery of different tree species is a pre-requisite for undertaking all planting programmes in the natural forests as well as irrigated areas. Suitable pieces of land where irrigation facilities are available may be acquired for this purpose. Certified seeds and cuttings etc. of different suitable species can be provided by Pakistan Forest Institute, Peshawar.

### Block and Roadside Plantations

Small sized block plantations and roadside plantations are there. This work can be sufficiently expanded. There is a lot of scope especially for block plantations along the rivers where fast growing species can be planted. Quetta Pine (*Pinus halepensis*), Eucalypts, hybrid and deltoides poplars etc. are recommended for large scale planting.

### Forest Industries

There is hardly any wood based industry in Northern Areas. It is high time that some integrated complexes of saw milling, veneer, pulp and paper, match manufacture, packaging etc. are established near the forests.

### Outdoor Recreation

There is tremendous scope for extension of recreational facilities in the area. Recommendations have been made to develop the tract as a tourist resort.

### Forest Staff, Education and Research

There is an acute shortage of well trained personnel to man this large and valuable estate. With a number of development projects underway, it is highly imperative that the staff should get proper training in forest schools and Forest Institute for different professional levels. Instead of only one circle at present manned by a Conservator of Forests, at least 3 more circles should be created to be headed by a Chief Conservator of Forests. Some problem oriented research studies like establishment of nurseries and afforestation techniques may be initiated in cooperation with the Pakistan Forest Institute, Peshawar.

### Acknowledgements

This trip to write a report on the forests and forestry in Northern Areas was sponsored by the Pakistan Science Foundation. It was undertaken by the authors as a part of the N. D. V. P. expedition to that territory. As foresters we concentrated on the forest types, their past and present management and other disciplines associated with the practice of forestry. Over a period of 37 days, a number of forest areas were covered to get acquainted with different Plant Associations/Types which to our great surprise were discovered to be quite a few, not having been described before.

A number of suggestions have been made for the improvement of forests and their management. Since the Northern Areas form the most important watersheds of Pakistan, a serious thought has to be given to the suggestions, not only to perpetuate the existing tree growth but also to improve the vegetal cover in the larger interest of the country.

The authors are thankful to the Pakistan Science Foundation for arranging this useful trip to some of the hitherto unexplored parts of the country. We owe a special debt of gratitude to Dr. Z. A. Hashmi, Chairman, Pakistan Science Foundation who motivated and persuaded us to join the expedition; this has resulted in vastly improving our knowledge pertaining to forests and other vegetation in Northern Areas.

We are extremely grateful to Mr. Bahadur Ali Khan, Conservator of Forests, Gilgit who so unassumingly helped us find our bearings and offered all the necessary cooperation and help to make our stay fruitful and comfortable.

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