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FORESTRY PLANNING & DEVELOPMENT PROJECT
Government of Pakistan-USAID

A POSITION PAPER

ON

A NATIONAL TREE IMPROVEMENT

PROGRAM

FOR

PAKISTAN

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POSITION PAPER

NATIONAL TREE IMPROVEMENT PROGRAM

Introduction

Dr. D. Richards[1] in his consultancy report "A Plan of Work for Technical Training in Tree Improvement Tree Seed Technology and Nursery Technology" stated, "As the forestry programs of Pakistan continue to develop, those responsible for reforestation and subsequently forest productivity will become increasingly concerned about the genetic quality of planting stock and the opportunities to achieve better planting stock through selection". His concerns are well founded. Dr. Richards' recommendations included a workshop on seed technology which was presented at the Pakistan Forest Institute (PFI) by Drs. F. Bonner and J. Vozzo of the USFS Seed Laboratory, Starkville, Mississippi. The workshop leaders, Drs. Bonner and Vozzo also stressed the future need for large quantities of high quality seed ("improved seed") to meet future planting needs. One goal of the Forestry Planning and Development project is "to reverse the process of deforestation in Pakistan and to expand the extremely limited forest base." This project goal can not be achieved without quality seed to produce quality seedlings for reforestation. Obviously this goal "...reverse deforestation....." can only be achieved through large scale future plantings which dictate the needs for large quantities of quality tree seed.

"Improved seed" is being produced for purchase by PFI; however, this "improved seed" is limited. As the demand for quality seed increases the ability of PFI to meet the demands will decrease because of the lack of resources needed to expand their current program. Richards presents (see figure 1) an "Assessment" of Pakistan's current tree improvement program within the context of a ten year planning period. This matrix is the summation of his discussions during his consultancy.

Figure 1 ASSESSMENT OF NATIONAL PROGRAM STATUS WITH THE CONTEXT OF A TEN YEAR PLANNING HORIZON

SPECIES	1st GEN SEED ORCHARDS		2nd GEN SEED ORCHARDS		3rd GEN SEED ORCHARDS		SEED QUANTITY	SEED QUALITY	NURSERIES		SEEDLING QUANTITY	SEEDLING QUALITY	AREA TO BE PLANTED ANNUALLY	PLANTATION SURVIVAL RATES	OVERALL ASSESSMENT
	Size	#	Size	#	Size	#			Size	#			(Known to field officers)		
1. Pinus roxburghii	L	L	L	L	L	L	S	U	L	L	S	U	?	U	U
2. Dalbergia sissoo	L	L	L	L	L	L	S	U	L	L	S	S	?	S	U
3. Acacia nilotica	L	L	L	L	L	L	S	U	L	L	S	S	?	S	U
4. Eucalyptus camaldulensis	L	L	L	L	L	L	S	U	L	L	S	S	?	U	U
5. Pinus wallichiana	L	L	L	L	L	L	S	U	L	L	S	U	?	U	U
6. Cedrus deodora	L	L	L	L	L	L	S	U	L	L	S	U	?	U	U
7. Abies webbian	L	L	L	L	L	L	S	U	L	L	S	U	?	U	U
8. Morus alba	L	L	L	L	L	L	S	U	L	L	S	S	?	S	U
9. Group	L	L	L	L	L	L	S	U	L	L	S	S	?	S	U
Salix															
Populus															
Salmalia															
Robinia															
10. Overall Assessment	L	L	L	L	L	L	S	U	L	L	S	U	?	U	U

L = Low S = Shortage U = Unsatisfactory S = Satisfactory ? = Unknown at national level

Note that quantities of seed and seedlings are the only cells that have been ranked satisfactory, all other cells in the matrix are ranked either low, shortage, or unsatisfactory.

[1] Richards, D.P. 1991 "A Plan of Work for Technical Training in Tree Improvement, Tree Seed Technology and Nursery Technology" consultancy report. Winrock International, July 91, pp32.

Questionnaires (Appendix C) were sent to 90 DFO requesting information concerning how much seed will be needed in the next 10 years to meet their planting goals. In addition they were asked where they got their seed and related seed management questions. To date 16 questionnaires have been returned. In all but three of the districts seed is obtained from local sources, i.e., existing plantations, canal banks or local contractors. In any case the importance of quality tree seed is not stressed. However three of the districts were aware of the improved seed and were purchasing it from PFI. The amounts of seed needed seemed inflated i.e., Shisham 2000 kg/year for the next 10 years; E. camaldulensis 20 to 30 kg/year for the next 10 years. These values are not reasonable unless a large quantity of seed is currently being wasted. Based on the returned questionnaire the importance of tree seed needs to be emphasized if Pakistan is to meet its reforestation goals.

There is a long term need for quality seed and it must be addressed as soon as possible. PFI scientists have been concerned about improved seed and have been involved in some form of tree improvement since early 1960. A bibliography of their tree improvement research papers is appended (Appendix A). The purpose of this paper is to review these publications in general terms and to evaluate the progress of PFI's tree improvement program. Based on this review suggested recommendations for future actions will be made.

Tree Improvement

Tree improvement in Pakistan has followed two lines of development: 1. the use of exotic species to complement Pakistan's native tree species (species trials); and 2. the selection and breeding of individuals from populations of native species.

Species trials: The introduction of exotics is the current strong point of Pakistan's tree improvement program. Pakistan is active in international species networking trials (F/FRED, CISRO). In addition to networking many other species trials have been planted throughout Pakistan from 1960 to the present. The results of these trials indicate a rich flora of tree species that are adaptable to the diverse environments of Pakistan. In many cases these exotics have outperformed the local native species. A list of successfully tested exotics is in the Appendix B.

The real success stories with exotics have been:

1. Eucalyptus spp.
2. Leuceana leucocephala
3. Populus spp. (including the testing of hybrid clones)

E. camaldulensis, Leucaena, and Populus are grown in Pakistan in such large numbers and under such different environment conditions they probably can be safely considered "Land Races" (for all practical purposes native species) and are included in PFI's selective breeding programs.

With exotic species trials, care should be taken not to evaluate performance on the basis of mean growth of any selected characteristic because of natural selection that may be occurring. Only seed from surviving individuals in initial trials should be collected and that seed used in comparison trials in order to insure that survival characteristics are not confounded with other important growth qualities. New species like Paulownia must be

tested over a wide range of stress conditions before it should be considered an acceptable exotic. Early test results indicate that Paulownia has the potential of becoming another fast growing exotic to add to the list of trees for future regeneration programs. The introduction of fast growing exotics represents the quickest and probably the cheapest way to increase wood outputs; however there are also potential risks (extreme weather conditions, diseases and insects problems) that must be considered and evaluated carefully before final decisions are made to release a species for operational use.

The continued testing of exotics should be encouraged, but the testing of exotics should not be at the expense of the development of breeding programs for native species.

The Selection and Breeding of Native Species: As reforestation programs increase in number and size, some Pakistani foresters responsible for planting programs have become concerned about the genetic quality of planting stock. Selection and selective breeding offer a source of improved seed to produce better seedlings. The first step in a selection program is to assess the kinds and sources of genetic variation present in a particular species. PFI has established a number of provenance tests to study these variation patterns.

Breeding programs have been started with the following species:

Conifers
1. *P. wallichiana*
2. *P. roxburghii*
3. *Cedrus deodara*

Broadleave
1. *Dalbergia sissoo*
2. *Populus ciliata*
3. *P. euphratica*
4. *Eucalyptus camaldulensis*
5. *Acacia nilotica*

Tentative seed zones have already been established for blue pine (*Pinus wallichiana*). Differentiation in blue pine is so sharp that it has been divided into two taxonomic varieties. Similar work has been started with other native and exotic species, but the number of candidate species is so large that a priority list must be developed to focus this effort.

Variation patterns serve as a guide to determine whether stand or single tree selection systems are to be used. Then selections are made and progeny testing begins. PFI should be commended for the number of progeny tests they have established. Progeny testing is essential for estimating heritability and combining ability. Heritability estimates the amount of genetic control of a characteristic and combining ability estimates how trees will breed with other trees. Heritability also allows the calculation of genetic gain which in turn allows economic evaluation of a breeding program. Heritability estimates have been attempted for a limited number of species, but the estimates do not seem realistic. There appears to be problems with experimental design or with data analysis. More large scale progeny tests are needed for better estimations of heritability.

At the same time progeny tests are established, seed orchards should be planted as well as interim seed production areas located. Seed orchard and seed production area management is also dependent upon good progeny test data. Since these data are lacking or incomplete, it severely hampers rouging or attempts at program evaluation. PFI has

established "seed orchards" and seed production areas, but more are needed. Only through a collaborative effort between PFI and the Provincial Forest Departments can the necessary test data be obtained upon which an operational tree improvement program can be successfully built. Siddiqui (1991) provides a good summary of work in progress at PFI. It is clear that PFI's program has been hampered by the lack of manpower and resources needed to accomplish the large scale production of "improved seed".

Conclusions

Pakistan has a viable tree improvement program. The program is limited by the lack of trained personnel, finances, and awareness and cooperation at the provincial level. PFI has done a commendable job, but has been limited to an opportunistic approach largely dependent upon funding from donor countries. Pakistan's reforestation programs are increasing and will continue to do so as the country develops. To provide high quality seed Pakistan needs a well planned operational tree improvement program that is coordinated at the national level and implemented at the provincial level. Funding must also be a cooperative effort coming from both provincial and federal levels. PFI must take the major leadership role in such a program. They will have to provide the professional guidance, the training and the research needs for such a program. A program at the national level will provide the opportunity to pool resources, both provincial and federal, to provide for common seed needs and at the same time allow each Province the independence to produce seed that is unique to that particular area.

Such a program would facilitate large scale species, provenance, and progeny testing over diverse geographical and environmental areas. Data produced from these tests will provide the quantitative information needed to operate an efficient national tree improvement program. More important such a program will provide the "improved seed" for quality trees to satisfy the future reforestation needs of Pakistan.

Recommendations

PFI, in collaboration with the Forestry Planning and Development Project Technical Assistance Team need to:

1. Develop and present a workshop to where Provincial leaders would enhance their understanding of the importance, costs and benefits of a cooperative, operational tree improvement program for Pakistan and could begin to define a tree improvement program goals and objectives.

2. Prepare and implement a national tree improvement plan.

3. Provide short-term technical refresher training to PFI scientist in tree improvement and forest tree seed technologies.

4. Prepare and present a series of tree improvement short courses to train field level staff.

5. Prepare and present a series of forest seed technology short courses or workshops to train field level staff.

6. Strengthen the offering at PFI in the all aspects of tree regeneration including:

   a. Basic plant physiology
   b. Genetics
   c. Nursery practices
   d. Seed handling
   e. Soils
   f. Ecology
   g. Relative topics

7. Closely coordinate forest genetics research with the immediate needs of a national tree improvement program.

Appendix A

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Appendix B

List of exotics tested in different ecological zones in Pakistan

Acacia albadia
A. aneura
A. cyclops
A. nilotica
A. senegal
A. victoriae
A. tortilis

Bambusa hamiltonii
B. tulda

Cryptomaria jappnica

Casuarina glauca
C. montana
C. suberosa

Dalbergia latifolia

Eucalyptus alba
E. annulata
E. amplifolia
E. botyrides
E. camaldulensis
E. citriodora
E. europhylla
E. fruiticetorum
E. gomocephalla
E. grandis
E. globulus
E. hemiphloia
E. largiflorens
E. macrthurii
E. maculata
E. microtheça
E. melanophloia
E. occidentalis
E. populnea
E. robusta
E. rudis
E. saligna
E. tereticornis
E. torelliana

Larix decidua
L. leptolepis

Leucaena leucocephala

Paulownia elongata
P. catalpifolia
P. fortunei
P. fargesii

Picea abies
P. smithiana

Pinus ayacahuite
P. canariensis
P. caribaea
P. elliottii
P. greggii
P. khysya
P. michoacana
P. montezumae
P. nigra
P. mugo
P. cocarpa
P. pseudostrobus
P. patula
P. radiata
P. taeda
P. roxburghii
P. wallichiana

Populus deltoides (with 60 clones)

Prosopis alba
P. chilensis
P. tamarugo

Robinia pseudoacacia
and Salix species

Best performers as evaluated by PFI

- A northern source of E. camaldulensis from Australia for the plains of Pakistan
- A seed source of Acacia nilotica from Pune, India alongwith Acacia viotoriae and A. albida.
- Prospis chilensis from Chile and P. pallida under arid conditions.
- K-67 variety of L. leucocephala under irrigated conditions.
- ST-66 and 67 clones of Populus deltoides under irrigated conditions.
- P. greggii under sub-tropical conditions of Pakistan.

Appendix C

Tree Seed and Planting Survey Results

PAKISTAN FOREST INSTITUTE, PESHAWAR

TREE SEED AND PLANTING SURVEY

(1)

AUGUST - 1991

1. Plantation target ha. for plants between Jan. 1992 to Dec. 2000.

Total Area (ha)

Year	Spring		Monsoon		Total area (ha)
	State Forest	Private Forest	State Forest	Private & other Forest	
1992	320	700	-	500	1520
1993	320	750	-	550	1620
1994	320	800	-	600	1720
1995	320	850	-	650	1820
1996	320	900	-	700	1920
1997	320	950	-	750	2020
1998	320	1000	-	800	2120
1999	320	1050	-	850	2220
2000	320	1100	-	900	2320

b) Total area to be planted by different species (ha.)

	Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1.	Shisham	600	600	600	600	600	600	600	600	600
2.	Simal	700	700	750	800	850	900	950	1000	1050
3.	Eucalyptus	100	170	220	270	320	370	420	470	520
4.	Kikar	20	50	50	50	50	50	50	50	50
5.	Others (Poplar etc.)	100	100	100	100	100	100	100	100	100

c) Number of trees/ha. of trees planted by species.

	Name of tree species	Tree/ha.	Spacing (m)
1.	Shisham (Dalbergia sissoo)	1820	2.3 * 2.3 m
2.	Simal (Bombax ceiba)	1820	2.3 * 2.3 m
3.	Eucalyptus (Eucalyptus camaldulensis)	2000	2.0 * 2.0 m
4.	Kikar (Acacia nilotica)	1820	2.3 * 2.3 m
5.	Poplar (Populus euroamericana)	400	5.0 * 5.0 m

2. Estimated quantity of seed (in kg) needed to achieve the above planting targets by species:

Name of tree/ species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Shisham (D.S)	6000	6000	6000	6000	6000	6000	6000	6000	6000
2. Simal (B.C)	2100	2100	2250	2400	2550	2700	2850	3000	3150
3. Eucalyptus (E.C)	3	4.5	6	7.5	9	10.5	12	13.5	14
4. Kikar (A.N)	40	100	100	100	100	100	100	100	100
Total									

3. Current sources and methods of seed collection by species.

Name of species	Source of collection	Method of collection
Shisham, Simal Kikar,	Local tree stands	Manual
Eucalyptus	P.F.I. Peshawar	Purchase from P.F.I.

4. Your actual/cost of seed/kg for 1991 by species:
(Include cost of collection un-cleaned seed)

Name of tree species	Cost/Kg
Shisham	Rs. 2.50
Simal	Rs.20.00
Kikar	Rs. 1.50

5. Your actual cost for cleaned seed by species for Cal.year 1991.
(Include costs to have seed ready for planting).

Name of tree species	Cost/kg. cleaned seed
Shisham	Rs. 2.50
Simal	Rs.20.00
Kikar	Rs. 1.50
Eucalyptus	Rs.200.00 from P.F.I.

*****

DIVISIONAL FOREST OFFICER,
FAISALABAD FOREST DIVISION
FAISALABAD

Mastung; Quetta;

C-2

PAKISTAN FOREST INSTITUTE, PESHAWAR.

TREE SEED AND PLANTING SURVEY

AUGUST, 1991.

1. Plantation target ha. for plants between Jan'1992 to Dec,2000

Total area(ha.).

Years.	Spring	Monsoon.
1992	210	10
1993	220	10
1994	220	10
1995	220	10
1996	230	10
1997	230	10
1998	240	10
1999	240	10
2000	250	10
Total :-	1760	90

b) Total trees to be planted by different species ha.

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1.Tamarix gallica	200	200	200	200	200	200	200	200	200
2.Mulberry	10	10	10	10	10	10	10	10	10
3.Others.*	10	20	20	20	30	30	40	40	50

* Other:- includes all broad leaf and pine etc.

c) Number of trees/ha of trees planted by species:

Name of tree species.	Trees/ha.
1. Tamarix gallica (by cuttings)	1740
2. Hybrid mulberry " "	1740
3. Russian olive " " Elaeagnus spp.	174
4. Robinia pseudoacacia	150
5. Ailanthus altissima	150
6. Pine (P.eldesica).	150

2. Estimated quantity of seed (in kg) needed to achieve the above planting targets by species.

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Robinia pseudoacacia	5	5	8	8	8	8	8	8	8
2. Ailanthus	5	5	8	8	8	8	8	8	8
3. Pine.	6	6	9	9	9	9	9	9	9

3. Current sources and methods of seed collection by species.

Name of tree species.	Course of collection	Method of collect:
1. Robina	Collected from the established plantations/ tree in the month of Sept/Oct.	
2. Ailanthus.	--do--	
3. Pine.	Collected and later on cleaned. Before seedage tested for its viability.	

P/2

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4. Your actual/cost of seed/kg for 1981 by species:
(include cost of collection un-cleaned seed).

5. Your actual cost of cleaned seed by species for cal.year,1981.
(include costs to have seed ready for planting).

Name of tree species.	cost/kg. cleaned seed.

Deputy Director,
Soil Conservation, Mustung.

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TREE SEED AND PLANTING SURVEY

A U G U S T 1991

1. Plantation target (ha) for plants between Jan. 1992 to Dec. 2000:

Total Area (ha)

Years	Spring	Monsoon
1992	450.62	-
1993	408.43	-
1994	442.06	
1995	418.14	-
1996	452.55	-
1997	426.00	-
1998	393.39	-
1999	378.06	-
2000	378.38	-

b) Total area to be planted (species wise in hac) by different specie, ha.

Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Shisham	64.26	49.57	50.86	53.21	49.87	50.70	53.13	38.72	50.58
2. Eucalyptus	386.36	358.86	391.20	364.93	402.66	375.30	340.26	339.34	327.80

c) Number of trees/ha of trees planted by species:

Name of tree species	trees/ha	spacing (m)
1. Eucalyptus camaldulensis	3500	
2. Shisham (D. sissoo)	2200	

2. Estimated quantity of seed in Kg needed to achieve the above planting targets by species;

Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Eucalyptus	33.50	35.75	39.00	36.25	40.00	37.25	34.00	34.00	32.50
2. Shisham	2050	1650	1625	1700	1600	1625	1700	1250	1620

3- Current sources and methods of seed collection by species:

Name of tree species.	Source of collection.	Method of collection.
1. Eucalyptus.	From Bahawalpur plantation.	By manual Labour.
2. Shisham.	From Canalside plantation & standerds in Plantations.	-do-

4- Actual/cost of seed/KG for 1991 by species; (include cost of collection un-clean/seed).

1- Eucalyptus :260/-P.Kg.

2. Shisham : 2/-P.Kg.

5- Actual cost for cleaned seed by species for Cal. Year 1991 (include costs to have seed ready for planting)

Name of tree species.	Cost/Kg. cleaned seed.
As per para No.4 above.	

Divisional Forest Officer,
Bahawalpur Forest Division,
Bahawalpur.
Asif

PAKISTAN FOREST INSTITUTE, PESHAWAR
TREE SEED AND PLANTING SURVEY.

(4)

August, 1991.

1. Plantation target ha. for plants between Jan. 1992 to Dec. 2000:

Total Area (has)

Years	Spring	Monsoon	Remarks.
1992	88.9	-	It will be raised under scheme, "Expansion of Sericulture activities in punjab-Moriculture Development Phase-II".
1993			
1994			
1995			
1996			
1997			
1998			
1999			
2000			

B) Total Area to be planted by different species, ha.

Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Morus alba	88.9	Nil							
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									

P.....Contd/2

Cf. Dev & Working Plan Lahore.

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C) Number of trees/ha of trees planted by species:

Name of tree species	Trees/ha
1.Morus alba	15,50,400/250.22
2. -	
3. -	
4. -	
5. -	
6. -	
7. -	

2.Estimated quantity of seed in kg needed to achieve the above planting targets by species:

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1.Morus alba			Nil						
2.									
3.									
4.									
5.									
6.									
Total									

Remarks:- Planting is raised through shoot cutting.

3.Current sources and methods of seed collection by species:

Name of tree species	Source of collection	Method of collection
	Nil	

4.Your actual /cost of seed/Kg for 1991 by species:
(include cost of collection un-cleaned seed)

Name of tree species	Cost/Kg

5.Your actual cost for cleaned seed by species for cal.Year 1991
(include costs to have seed ready for planting).

Name of tree species	Cost/Kg cleaned seed
- Nil-	

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(5) C-5

PAKISTAN FOREST INSTITUTE, PESHAWAR

TREE SEED AND PLANTING SURVEY

Dir/Swat-Malakand

AUGUST 1991

1. Plantation target ha. for plants between Jan. 1992 to Dec. 2000:

Total Area (ha)

Years	Spring	Monsoon
1992	4,611 Acre.	1991: 29 Acre.

b) Total area to be planted by different species, ha.

Name of tree Species	Years 1992	1993	1994	1995	1996	1997	1998	1999	2000
Various forests species.	23,05,500	--	--	--	--	--	--	--	--

c) Number of trees/ha of trees planted by species:

Name of tree species	Tree/ha.	
1. Various forest species.	? 21,978,500 ie 500 trees/-Acre	Over an area of 43957 Acre during Phase.II of the project(7/87 to 9/91)

2. Estimated quantity of seed(in kg) needed to achieve the above planting targets by species:

Name of trees speices.	1992	1993	1994	1995	1996	1997	1998	1999	2000

As the project period is to be expired on 30.6.1992, therefore, the quantity of seed cannot be calculated at this stage.

3. Current sources and methods of seed collection by species.

Name of trees species.	Source of collection	Method of collection

The trees planted by this project are not mature, therefore, collection of seed from these trees is not possible.

4. Your actual/cost of seed/kg for 1991 by species: (Include cost of collection un-cleaned seed).

Name of tree species.	Cost/Kg.
As per column No.3	

5. Your actual cost for cleaned seed by species for Cal. year 1991 (include cost to have see ready for planting).

Name of tree speicies	Cost/kg. cleaned seed
As per column No.3	

Divisional Forest Officer,
Watershed Management Project,
Dir/Swat at Saidu Sharif.

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PPAKISTAN FOREST INSTITUTE PESHAWAR. (6) C-6

TREE SEED AND PLANTING SURVEY.

AUGUST-1991.

1. Plantation target ha.for plants between Jan.1992 to Dec:2000.

Total Area (ha).

Years.	Spring.	Monsoon.
1992	Target not communicted.	
1993	-do-	
1994	-do-	
1995	-do-	
1996	-do-	
1997	-do-	
1998	-do-	
1999	-do-	
2000	-do-	

b) Total area to be planted by different species,ha.

Name of Tree species.	Years. 1992	1993	1994	1995	1996	1997	1998	1999	2000.
1.	Target not communicated.								
2.	-do-								
3.	-do-								
4.	-do-								
5.	-do-								
6.	-do-								
7.	-do-								
8-	-do-								
9.	-do-								
10.	-do-								

c) Number of trees/ha of trees planted by species:

Name of tree species.	Trees/ha.
1.	Blank.
2.	Not applicable.
3.	
4.	
5.	
6.	
7.	

Contd ....P/2.

2. Estimated quantity of seed in kg needed to achieve the above planting targers by species:-

Name of Tree Species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1.									
2.									
3.									
4.									
5.									
6.									
7. Total									
8.									

Blank.

3. Current sources and methods of seed collection by species:

Name of tree species.	Source of collection.	Method of collection.
Babul	Through seed contrac--tors.	Collection of Babul seed from Bhans (Squating places of animals).
Eucalyptus.		Eucalyptus seed ~~from~~ direct. from Trees.

4. Your actual;cost of seed/kg for 1991 by species: (include cost of collection un-cleaned seed).

Name of tree species.	Cost/kg.
Babul	Rs: 4.00 Per Kg.
Eucalyptus.	P/calculate from Sukkur.

5. Your actual cost for cleaned seed by species for Cal:year 1991 (include costs to have seed ready for planting).

Name of tree species.	Cost/Kg.cleaned seed.

DIVISIONAL FOREST OFFICER,
EXTENSION DIVISION-I-
SUKKUR.

PAKISTAN FOREST INSTITUTE, PESHAWAR
TREE SEED AND PLANTING SURVEY
AUGUST, 1991

(7)

1. Plantation target ha. for plants between Jan, 1992 to December, 2000:

Total Area (ha)

Years.	Spring	Monsoon.
1992. ----------	320	-
1993. ----------	400	-
1994. ----------	800	-
1995. ----------	1100	-
1996. ----------	1100	-
1997. ----------	1170	-
1998. ----------	1200	-
1999 ----------	1250	-
2000 ----------	1300	-

• Monsoon planting in Northern areas is not feasible.

b). total area to be planted by different species, ha.

Name of tree species.	Years. 1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Poplus nigra	100	100	200	300	300	400	400	450	500
2. Poplus euamericana	50	50	100	200	200	200	200	200	200
3. Ailanthus Spp.	50	100	200	200	200	200	200	200	200
4. Robinia psedocacia	100	100	150	200	200	200	200	200	200
5. Eleagnus horlensis	10	20	100	100	100	120	100	100	100
6. Pine Spp.	5	10	10	10	10	10	10	10	10
7. Salix Spp:	5	20	40	90	90	90	90	90	90

c). Number of trees/ha of trees planted by species:-

Name of tree Species.	Trees/ha.
1. Poplus nigra	1076
2. Poplus euamericana	1076
✓ 3. Ailanthus Spp:	1793
4. Robinia psedocacia	1076
5. Eleagnus hortensis	1793
6. Pine Spp:	1076
✓ 7. Salix Spp:	1793

(Contd. on page-2)

2. Estimated quantity of seed in kg needed to achieve the above planting targets by species:

Name of tree species.	1992.	1993	1994	1995	1996	1997	1998	1999	2000
1. Ailenthus	15Kg	15Kg	15Kg	15Kg	15Kg	15Kg	25Kg	25Kg	20Kg
2. Robinia.	15Kg	15Kg	20Kg	20Kg	20Kg	20Kg	20Kg	20Kg	20Kg
3. Elaeagnus hotensis	15Kg	15Kg	15Kg	15Kg	15Kg	15Kg	15Kg	15Kg	15Kg
4. Pinus heterophylla.	10Kg	10Kg	20Kg	20Kg	20Kg	20Kg	20Kg	20Kg	20Kg
5. Pinus wallichina.	10Kg	10Kg	20Kg	15Kg	20Kg	20Kg	20Kg	20Kg	20Kg
6. Total									

3. Current sources and methods of seed collection by species:

Name of tree species.	Source of collection	Method of collection

(Seeds of above spp are collected throught manual labour)

4. Your actual/cost of seed/kg. for 1991 by species:
(include cost of collection un-cleaned seed)

Name of tree species.	Cost/Kg
1. Ailenthus Spp:	RS.20/-
2. Robinia "	Rs.25/-
3. Pine "	Rs.60/-

5. Your actual cost for cleaned seed by species for Cal.year 1991.
(include costs to have seed ready for planting)

Name of tree species.	Cost/kg.cleaned seed.
1. Ailenthus Spp.	Rs.30/-
2. Robinia.	Rs.35/-
3. Pine Spp:	Rs.80/-

12/11/91

GILGIT

(8) C-8

d) NUMBER OF TREES/HA OF TREES [illegible]

Name of tree species	Trees/Ha.
1. Shisham	1[illegible]7500 Ha. ?
2. Eucalyptus.	3760[illegible] Ha. ?

2. ESTIMATED QUANTITY OF SEED [illegible] NEEDED TO [illegible] THE [illegible] TARGETS BY SPECIES:

Name of Tree Species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Shisham Dinsoo	80Md.	90Md.	65Md.	140Md.	80Md.	80Md.	90Md.	93Md.	100Md.
2. Eucalyptus. Camaldulensis	25Kg.	131Kg.	197Kg.	197Kg.	205Kg.	197Kg.	210Kg.	208Kg.	205Kg.

3. CURRENT SOURCES & METHODS OF SEED COLLECTION BY SPECIES:

Name of tree species	Source of collection	Method of collection
1. Shisham	Rum healthy trees	Collected through labour.
2. Eucalyptus Camaldulensis	-do-	-do-

4. Your actual/Cost of seed/Kg for 1991 by species:
(Include cost of collection un-cleaned seed)

Name of tree species	Cost/Kg.
Shisham	75 P.Md.
Eucalyptus.	25 P.Kg.

5. Your Actual cost for cleaned seed by species for Cal. Year 1991. (Include costs to have seed ready for planting).

Name of tree species.	Cost/Kg. Cleaned seed.
1. Shisham	75 P.Md. Clean seed.
2. Eucalyptus.	25 P.Kg. Clean seed.

TREE SEED AND PLANTING SURVEY AUGUST 1991.

1. Plantation target ha. for plants between Jan. 1992 to Dec: 2000.

Total Area (ha)

Year	Spring	Monsoon
1992	9.50 Lac.	7.50 Lac.
1993	9.30 Lac.	6.80 Lac.
1994	10.10 Lac.	7.80 Lac.
1995	9.90 Lac.	7.60 Lac.
1996	10.20 Lac.	7.90 Lac.
1997	9.30 Lac.	7.75 Lac.
1998	10.45 Lac.	7.90 Lac.
1999	10.15 Lac.	7.85 Lac.
2000	10.10 Lac.	7.85 Lac.

n) TOTAL AREA TO BE PLANTED BY DEPARTMENT SPECIES, ha.

Name of Tree Species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
Shisham	194.8	203.6	167.8	235.8	195.2	192.1	203.8	236.9	220.4
Euc:	515.3	366.9	395.8	397.5	413.9	395.0	435.5	425.5	415.2

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PAKISTAN FOREST INSTITUTE, PESHAWAR
TREE SEED AND PLANTING SURVEY.
AUGUST 1991.(ha).

(9)

1. Plantation target ha. for plants between Jan,1992 to Dec,2000:

Total Area

Years	Spring	Monsoon
1992	360 Hec	300 Hec.
1993	400 "	350 "
1994	800 "	450 "
1995	425 "	475 "
1996	445 "	495 "
1997	500 "	520 "
1998	530 "	540 "
1999	550 "	590 "
2000	565 "	650 "
TOTAL	4175 "	4370 "

(b) Total area to shown by different species, ha.

	Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
A. modesta	1. Phulai	500 Hec	550	600	650	685	700	725	750	800	5950
E. camaldulensis	2. Eucaly	100 "	125	150	150	175	200	225	250	275	1650
D. sissoo	3. Shisham	30 "	40	50	50	60	70	70	80	80	530
A. nilotica	4. Kiker	30 "	40	50	50	30	50	50	60	60	420
		660	750	850	900	940	1020	1070	1140	1215	8545 ha.

DFO JHELUM

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c) Number of trees/ha of trees planted by species:-

Name of tree species	Trees/ha.
1. Phulai 10' x 10'	1078 Plants.
2. Eucalyptus 12' x 12'	750 Plants.
3. Shisham 10' x 6'	1798 Plants.
4. Kiker 12' x 12'	75' Plants.

2. Estimated quantity of seed in kg needed to achieve the above planting targets by species:-

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Phulai	1000 Kg	1100 Kg	1200 Kg	1300 Kg	1375 Kg	1400 Kg	1450 Kg	1500 Kg	1600 Kg
2. Eucalyptus	5 "	6 "	7 "	8 "	10 "	11 "	12 "	13 "	14 "
3. Shisham	3500 "	3600 "	3700"	3800 "	4000"	4000 "	4200 "	4500"	4500 "
4. Kiker	150 "	160 "	170"	170 "	160"	160 "	160 "	160"	160"
TOTAL	4655 "	4866 "	5077"	5278 "	5545"	5571 "	5822 "	6173"	6274"

3. Current sources and methods of seed collection by species:-

Name of tree Species	Source of collection	Method of collection
1. Phulai		
2. Eucalyptus	State Forests/Private land.	Manually.
3. Shisham		
4. Kiker		

4. Your actual/cost of seed /kg for 1991 by species:-
(include cost of collection un-cleaned seed).

Name of tree species	Cost/KG
1. Phulai.	Rs 14 per Kg.
2. Eucalyptus.	Rs 150 per Kg.
3. Shisham, Pods	Rs 70/- per mound.
4. Kiker,	Rs 10/- per KG.

5. Your actual cost for cleaned seed by species for Cal.year.1991.
(include costs ~~of~~ to have seed ready for planting).

Name of tree species	Cost/Kg.Cleaned Seed.
	As Above.

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BAHAWALPUR FOREST CIRCLE BWPUR. بہت پودا لگاؤ - جنت میں گھر بناؤ

Pakistan Forest Institute, Peshawar Tree Seed and Planting Survey.

1. Plantation target Ha. for Plants between Jan: 1992 to Dec: 2000:

(10)

Total area (ha)

Year.	Spring. Bwpur.	R.Y.Khan.	Total.	Monsoon. Bwpur.	R.Y.Khan.	Total.
1992	450.62	121.41	572.03 ha	-	80.94	80.94 Ha
1993	408.43	121.41	529.84 "	-	80.94	80.94 "
1994	442.06	121.41	563.47 "	-	80.94	80.94 "
1995	418.14	121.41	539.55 "	-	80.94	80.94 "
1996	452.55	121.41	573.96 "	-	80.94	80.94 "
1997	426.00	121.41	547.41 "	-	80.94	80.94 "
1998	493.39	121.41	614.80 "	-	80.94	80.94 "
1999	378.06	121.41	499.47 "	-	80.94	80.94 "
2000	378.38	121.41	499.79 "	-	80.94	80.94 "

B. Total area to be planted by defferent Species (Ha.)

Name of tree species.	1992.	1993.	1994.	1995.	1996.	1997.	1998.	1999.	2000
Bahawalpur.									
Shisham.	64.26	49.57	50.86	53.21	49.89	50.70	53.13	38.72	50.58
Euclyptus.	386.36	358.86	391.20	364.93	402.66	375.30	340.26	339.44	327.80
R.Y.Khan.									
Eucalyptus.	202.35	202.35	202.35	202.35	202.35	202.35	202.35	202.35	202.35

C. Number of trees/ Ha of trees planted by species.

Name of trees species.		Trees/ha.
Bwpur.	Eucalyptus.	3500
	Shisham.	2200
R.Y.K.	Eucalyptus.	500000/202.35 Hac.

2. Estimated quantity of seed in Kg. needed to achieved the above planting targets by species.

Name of Trees species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
Bwpur.									
Eucalyptus.	38.50	35.75	39.00	36.25	40.00	37.25	34.00	34.00	32.50
Shisham.	2050	1650	1625	1700	1600	1625	1700	1250	1620
R.Y.Khan.									
Eucalyptus.	20	20	20	20	20	20	20	20	20

3. Current sources and methods of seed collection by species.

Name of trees species.		Source of collection.	Method of collection.
Bwpur.	Eucalyptys, Shisham. Shisham.	Bwpur Plantation. Canalside Plants standerds in Plants	By manual Labour. --do--
R.Y.khan.	Eucalyptus comeldulansis.	20 K.G.	Purchased from Pakistan Forest Institute, Peshawar.

(contd....2)

4. Actual / cost of seed/Kg. for 1991 by species
(included cost of collection un-clean/seed)

Name of tree species.		Cost/Kg. cleaned seed.
Bahawalpur.	Eucalyptus.	Rs. 260/-P. Kg.
-do-	Shisham.	Rs. 2/-P.Kg.
R.Y.Khan.		Rs. 200/- P. Kg.

5. Actual cost for cleanedd seed by species for Cal: year 1991.
(include costs to have seed ready for planting.)

Name of species.		cost/Kg. cleaned seed.
Bwpur.	Eucaluptus.	Rs. 260/-P.Kg.
	Shisham.	Rs. 2/- P.Kg.
R.Y.Khan.	Eucalyptus.	Rs. 200/-P. Kg.

Conservator of Forests,
Bahawalpur Circle,
Bahawalpur.

-Tahir-

(11)

TREE SEED AND PLANTING SURVEY AUGUST,1991

1- Planting target(acres)between Jan: 1992 to Dec: 1997. = 12,000 acres.

Years	Spring	Monsoon	Total
1992	1500 acres	500 acres	2000 acres.
1993	1400 "	600 "	2000 "
1994	1200 "	800 "	2000 "
1995	1500 "	500 "	2000 "
1996	1500 "	500 "	2000 "
1997	1400 "	600 "	2000 "

b) Total area to be planted by different species(acres)

Name of Tree/ Species.	Years					
	1992	1993	1994	1995	1996	1997
1. Chir-pine	1000	1000	1000	1000	1000	1000
2. Eucalyptus	300	300	300	300	300	300
3. Robinia	200	200	200	200	200	200
4. Ailanthus	200	200	200	200	200	200
5. Poplar	100	100	100	100	100	100
6. Ipple Ipple	50	50	50	50	50	50
7. Mulbery	50	50	50	50	50	50
8. Sanatha	50	50	50	50	50	50
9. Phulai	50	50	50	50	50	50
Total:	2000	2000	2000	2000	2000	2000

c) Number of trees(acres)planted by species:

Name of tree species	Trees per acre
1. Chir-pine (P. roxburghii)	435
2. Eucalyptus camaldulensis	435
3. Robinia pseudoacacia	435
4. Ailanthus altissima	435
5. Poplar (Hybrid)	435
6. Ipple Ipple (Leucaena leucocephala)	435
7. Mulbery (Morus alba)	435
8. Sanatha Dodonaea viscosa	435
9. Phulai (Acacia modesta)	435

2- Estimated quantity of seed in Kg.needed to achieve the above planting targets by species.

Name of tree/ Species.	1992 (kg)	1993 (Kg)	1994 (kg)	1995 (Kg)	1996 (Kg)	1997 (Kg)
1.Chir-pine	180	180	180	180	180	180
2.Eucalyptus	25	25	25	25	25	25
3.Robinia	100	100	100	100	100	100
4.Ailanthus	80	80	80	80	80	80
5.Poplar	No seed is required.					
6.Ipple Ipple	30	30	30	30	30	30
7.Mulbery	25	25	25	25	25	25
8.Sanatha	60	60	60	60	60	60
9.Phulai	60	60	60	60	60	60

3- Current sources and methods of seed collection by species.

Abandoned seed of all species are available through the local seed suppliers.

4- Your actual/cost of seed/kg for 1991 by species: (include cost of collection un-cleaned seed).

Name of tree/species	Cost per Kg.
1. Chir-pine	Rs. 100/-
2. Eucalyptus	Rs. 120/-
3. Robinia	Rs. 120/-
4. Ailanthus	Rs. 50/-
5. Ipple Ipple	Rs. 60/-
6. Mulbery	Rs. 60/-
7. Sanatha	Rs. 50/-
8. Phulai	Rs. 50/-

5- Your actual cost for cleaned seed by species for Cal: year 1991(include costs to have seed ready for planting).

Name of tree/species	Cost/Kg cleaned seed
1. Chir-pine	Rs. 120/-
2. Eucalyptus	Rs. 140/-
3. Robinia	Rs. 140/-
4. Ailanthus	Rs. 70/-
5. Ipple Ipple	Rs. 80/-
6. Mulbery	Rs. 80/-
7. Sanatha	Rs. 70/-
8. Phulai	Rs. 70/-

DIVISIONAL FOREST OFFICER
DAUR WATERSHED DIVISION
ABBOTTABAD.

(2) C-12

RAKISTAN FOREST INSTITUTE, PESHAWAR TREE SEED AND PLANTING SURVEY AUGUST, 1991.

1. Palntation target Has for plants between Jan: 1992 to Dec: 2000

Year.	Spring.	Monsoon.
1992	6500	6500
1993	6500	6500
1994	6500	6500
1995	6500	6500
1996	6500	6500
1997	6500	6500
1998	6500	6500
1999	6500	6500
2000	6500	6500

b) Total area to be planted by different speicies (has:)

Name of Speicies.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Chir.	6500	6500	6500	6500	6500	6500	6500	6500	6500
2. Euculptus.	975	975	975	975	975	975	975	975	975
3. Robinia/	3900	3900	3900	3900	3900	3900	3900	3900	3900
4. Ailanthus.	975	975	975	975	975	975	975	975	975
5. Others.	650	650	650	650	650	650	650	650	650

C) Number of trees/Ha of trees planted by speices.

	Name of tree speices.	Trees/ha.
1.	Chir (Pinus roxburghii)	176
2.	Euclyptus. (E. camaldulensis)	176
3.	Robinia pseudoacacia	176
4.	Ailanthus. altissima	176
5.	Others.	176

2. Estimated quantity of seed in (KG) needed to achieved the above planting targets by species.

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Chir.	320	320	320	320	320	320	320	320	320
2. Robinia.	385	385	385	385	385	385	385	385	385
3. Ailanthus.	80	80	80	80	80	80	80	80	80
4. Euclyptus.	24	24	24	24	24	24	24	24	24
5. Others.	32	32	32	32	32	32	32	32	32

(Contd ....Page/2.....)

3. Current sources and methods of seed collection by species.

Name of tree species.	Sources of collection.	Methods of collection.
1. Chir.	i) 50% of collection through labour from chir forests lying in Kunhar W/Shed Division.	Mainually.
	ii) 50% through contractor.	Purchase.
2. Robinia.	i) 40% colection from already afforested ~~plants~~ areas.	Mainually.
	ii) 60% through contractor.	Purchase.
3.		
3. Ailanthus.	Total coblection from already existing plantations.	Mainullay.
4 Eucbyptus.	-do-	-do-
5. Others.	Purchase thpough contractor.	Purchase.

4. Your actual/cost of seed/Kg for 1991 by species (include cost of collection un-cleaned seed).

Name of treespecies.		Cost/Kg.		
Chir.		Rs 60/-	Rs: 19200/-	320 K.g
Robinia.		" 100/-	Rs: 38500/-	385 K.g
Ailanthus.		" 30/-	Rs: 2400/-	80 K.g
Euclyptus.		" 60/-	Rs: 1440/-	24 K.g
Others.		" 50/-	Rs: 1600/-	32 K.g

5. Your actual cost for cleaned seed by species for cal: year 1991 (include cost to have seed ready for planting.)

Name of species.	Cost/Kg cleaned seed.
As per columu No.4 above.	

Divisional Forest Officer,
Kunhar Watershed Division,
Mansehra.

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(RAHIMYARKHAN FOREST DIVISION)

PAKISTAN FOREST INSTITUTE, PESHAWAR TREE SEED AND PLANTING SERVEY.

A U G U S T 1991.

1. Plantation target ha. for plants between Jan.1992 to Dec.2000:

Total Area (ha)

Year.	Spring.	Monsoon.
1992.	121.41 Ha.	80.94 Ha.
1993.	121.41 "	80.94 "
1994.	121.41 "	80.94 "
1995.	121.41 "	80.94 "
1996.	121.41 "	80.94 "
1997.	121.41 "	80.94 "
1998.	121.41 "	80.94 "
1999.	121.41 "	80.94 "
2000.	121.41 "	80.94 "

b) Total area to be planted by defferent species, ha.

Name of tree species.	1992.	1993.	1994.	1995.	1996.	1997.	1998.	1999.	2000
Eucalyptus.	202.35	202.35	202.35	202.35	202.35	202.35	202.35	202.35	202.3

c) Number of trees/ ha of trees planted by species.

Name of tree species.	Trees/ha.
Eucalyptus camaldulensis.	500000/202.35 Hac:

2. Estimated quantity of seed in Kg needed to achieve the above planting targets by species.

Name of tree species.	1992.	1993.	1994.	1995.	1996.	1997.	1998.	1999.	2000
Eucalyptus. Camaldulensis.	20Kg.	20Kg.	20Kg.	20Kg.	20Kg.	20Kg.	20Kg.	20Kg.	20Kg

3. Current sources and methods of seed collection by species;

Name of trees species.	Source of collection.	Method of collection.
Eucalyptus camaldulensis.	20 Kg.	Being purchased from Pakistan Forest Institute, Peshawar.

4. Your actual/cost for seed/Kg for 1991 by species; (include cost of collection un-cleaneseed)

Rs.200/- Per Kg.

5. Your actual cost for cleaned seed by species for Cal.Year 1991 (include costs to have seed ready for planting)

Name of species.	Cost/Kg. cleaned seed.
Eucalyptus. Camaldulensis	Rs.200/per Kg.

Divisional Forest Officer,
Rahim Yar Khan.

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DFO Multan.

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PAKISTAN FOREST INSTITUTE, PESHAWAR

TREE SEED AND PLANTING SURVEY

(14)

AUGUST 1991

1. Plantation target ha. for plants between Jan. 1992 to Dec. 2000:

Total Area(ha) 5528.20 (2238.14)

Years	Spring	Monsoon
1992	417 Acres.	491 Acres.
1993	229 "	492 "
1994	197 "	300 "
1995.	287 "	250-50 "
1996	270 "	400 "
1997	187.4 "	300 "
1998	296.3 "	300 "
1999	269. "	250 "
2000	292 "	300 "

b) Total area to be planted by different species, ha.

	Name of tree species	Years 1992	1993	1994	1995	1996	1997	1998	1999	2000
1.	Euc. Camd.	491	492	407	487.5	620	487.4	596.3	519	592
2.	SHISHAM (D. sissoo)	417	229	90	50	50	–	–	–	–
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

.. P.....Contd/2.

c) Number of trees/ha of trees planted by species:

Name of tree species	Trees/ha.
1. Euc.	5,77,652 / 1899.68
2. SHISHAM	6,66,136 / 338.46
3.	
4.	
5.	
6.	
7.	

2. Estimated quantity of seed in kg needed to achieve the above planting targets by species:

Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Euc. (kg)	30	30	25	30	37	30	36	30	36
2. Shisham (mds)	75	45	20	10	10	–	–	–	–
3.									
4.									
5.									
6.									

Total Euc. 284.0 kg Shisham 160.0 mds

3. Current sources and methods of seed collection by species:

Name of tree species	Source of collection	Method of collection
1. Shisham	Govt. Forest.	Annual.
2. Euc.		

4. Your actual/cost of seed/kg for 1991 by species:
(include cost of collection un-cleaned seed)

Name of tree species	Cost/kg
1. Shisham	1.88
2. Euc.	125.0 NIL

5. Your actual cost for cleaned seed by species for Cal.year 1991.
(include costs to have seed ready for planting).

Name of tree species	Cost/kg. cleaned seed
1. Shisham	1.88
2. Euc.	125.00

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Layyah

PAKISTAN FOREST Department, ~~PESHAWAR~~ L.F.D.

TREE SEED AND PLANTING SURVEY (15)

AUGUST 1991

1. Plantation target ha. for plants between Jan. 1992 to Dec. 2000:

Total Area(ha)

Years	Spring	Monsoon
1992	3.00 Lacs	3.00 Lac
1993	2.50	3.50
1994	2.50	3.50
1995	3.00	4.00
1996	3.50	4.50
1997	3.50	4.50
1998	4.00	4.50
1999	5.00	6.00
2000	5.00	6.00

b) Total area to be planted by different species, ha.

Name of tree species	Years 1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Eucalyptus	381	200	250	300	250	200	100	300	250
2. Shisham, Simal									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									

R.....Contd/2.

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c) Number of trees/ha of trees planted by species:

Name of tree species	Trees/ha.
1. Eucalyptus Sho Simal	1800 Mg AV
2.	
3.	
4.	
5.	
6.	
7.	

2. Estimated quantity of seed in kg needed to achieve the above planting targets by species:

Name of tree species	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Eucalyptus	25	15	18	20	18	15	10	20	18
2. Simal/Sh.	150	150	150	150	150	150	150	150	150
3.									
4.									
5.									
6.									
~~Total~~									

3. Current sources and methods of seed collection by species:

Name of tree species	Source of collection	Method of collection
Eucalyptus Sho Simal	By function By collection	Various Revision Various Plantations

4. ~~Your~~ Actual/cost of seed/kg for 199[illegible] by species:
(including cost of collection un-cleaned seed)

Name of tree species	Cost/kg
Eucalyptus Sho Simal	20 Kg 450 Mds

5. ~~Your~~ Actual cost for cleaned seed by species for Cal. year 199[illegible]
(including costs to have seed ready for planting).

Name of tree species	Cost/Kg. cleaned seed
Eucalyptus Simal	20 Kg
Simal/Shyshan	450 Mds

Divisional Forest Divn Lat[illegible]

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TREE SEED AND PLANTING SURVEY OF DIR FOREST DIVISION, TIMERGARA.

(16)

1. Plantation target ha. for plants between Jan.1992 to Dec. 2000 :

Year	Spring.	Monsoon.
1992	2225 ha.	-
1993	2000 ha.	225 ha.
1994	1500 ha.	725 ha.
1995	1000 ha.	400 ha.
1996	800 ha.	700 ha.
1997	1000 ha.	1000 ha.
1998	1000 ha.	1000 ha.
1999	1000 ha	1000 ha.
2000	1000 ha.	1000 ha.

b. Total area to be planted by different species, ha.

Name of tree species.	1992	1993	1994	1995	1996	1997	1998	1999	2000
1. Chir pine	445	445	445	280	300	400	400	400	400
2. Eucalptus	667	667	667	420	450	600	600	600	600
3. Kail pine	222	222	222	140	150	200	200	200	200
4. Deodar. Cd.	111	111	111	70	75	100	100	100	100
5. Ailanthus	333	333	333	210	225	300	300	300	300
6. Walnut J.r	225	225	225	140	150	200	200	200	200
7. Robinia ps.	111	111	111	70	75	100	100	100	100
8. Bottl Bursh	111	111	111	70	75	100	100	100	100

c. Number of trees/ha of trees planted by species :

Name of trees species.	Trees/ha.
1. Chir, Pinus roxburghii	35
2. Eucalyptus camaldulensis	53
3. Kail, Pinus wallichiana	18
4. Deodar, Cedrus deodara	9
5. Ailanthus altissima	26
6. Walnut (J. regia)	18
7. Robinia pseudoacacia	9
8. Bottle Bursh (Callistemon lanceolatus)	8

2) Estimated quantity of seed in kg needed to achieve the above planting target by species.

Name of tree spec:	1992	1993	1994	1995	1996	1997	1998	199	2000
1. Chir (P. roxburghii)	64	64	64	31	44	58	58	58	58
2. Eucalyptus (camal)	72	72	72	46	49	65	65	65	65
3. Kail (P. wallichiana)	19	19	19	13	13	17	17	17	17
4. Deodar (C. deodara)	10	10	10	6	6	9	9	9	9
5. Ailanthus (altissima)	48	48	48	31	33	44	44	44	44
6. Walnut (J. regia)	1958	1968	1218	1305	1740	1740	1740	1740	1740
7. Robinia pseudoacacia	10	10	10	7	7	10	10	10	10
8. Bottle Bursh. (Callistemon lanceolatus)	10	10	10	7	7	10	10	10	10

3) Current Sources and methods of seed collection by species :-

Presently the seed are being collected from different Agencies available in the Province, through local purchaser.

4) Your actual/cost of seed/kg for 1991 by species :

The present market rates of different species of 1991 as under:-

1. Chir, Deodar/Kail. Rs.80/- to Rs.100/- p.kg.
2. Ailanthus. Rs.15/- to Rs.20/- p.kg.
3. Eucalyptus. Rs.200/- per kg.
4. Walnut. Rs.15/- to Rs.20/- p.kg.
5. Robinia and Bottle Bursh. Rs.60/- to Rs.80/- p.kg.

5) Your actual cost for cleaned seed by species for Cal. year, 1991 (included costs to have seed ready for planting).

As per item No.4 above.