



Forestry Department

Food and Agriculture Organization of the United Nations



International Network for Bamboo and Rattan (INBAR)

**GLOBAL FOREST RESOURCES
ASSESSMENT 2005**

PAKISTAN

**COUNTRY REPORT
ON
BAMBOO RESOURCES**

PESHAWAR MAY, 2005

Table of contents

1 Table T1 – Extent of Bamboo Forest	5
1.1 GBRA 2005 Categories and definitions.....	5
1.2 National Data on Bamboo Resources.....	5
1.3 Data for National Reporting Table T1.....	5
1.4 Comments to National Reporting Table T1.....	5
2 Table T2 – Ownership of Bamboo Forest	7
2.1 GBRA 2005 Categories and definitions.....	7
2.2 National Data on Bamboo Resources.....	7
2.3 Data for National Reporting Table T2.....	7
2.4 Comments to National Reporting Table T2.....	8
3 Table T3 – Characteristics of Bamboo Forest	9
3.1 GBRA 2005 Categories and definitions.....	9
3.2 National data on Bamboo in Forests and Other Wooded lands.....	9
3.3 Data for National Reporting Table T3.....	9
3.4 Comments to National Reporting Table T3.....	9
4 Table T4 – Bamboo Growing Stock	11
4.1 GBRA 2005 Categories and definitions.....	11
4.2 National data on Bamboo Resources.....	11
4.3 Data for National Reporting Table T4.....	11
4.4 Comments to National Reporting Table T4.....	11
5 Table T5 – Bamboo Biomass stock	12
5.1 GBRA 2005 Categories and definitions.....	12
5.2 National Data on Bamboo Resources.....	12
5.3 Data for National Reporting Table T5.....	12
5.4 Comments to National Reporting Table T5.....	12
6 Table 6 – Diversity of bamboo tree species	13
6.1 GBRA 2005 Categories and definitions.....	13
6.2 National Data on Bamboo Resources.....	13
6.3 Data for National Reporting Table T6.....	13
6.4 Comments to National Reporting Table T6.....	14
7 Table T7 – Bamboo Removal	15
7.1 GBRA 2005 Categories and Definitions.....	15
7.2 National Data on Bamboo Resources.....	15
7.3 Data for National Reporting Table T7.....	15
7.4 Comments to National Reporting Table T7.....	15
8 Table 8 – Value of Wood Removal	16
8.1 GBRA 2005 Categories and Definitions.....	16
8.2 National Data.....	16
8.3 Data for National Reporting Table T8.....	16
8.4 Comments to National Reporting Table T8.....	16
9 Table 9 – Non Wood Bamboo Product Removal	17

9.1 GBRA2005 Categories and Definitions	17
9.2 National Data on Bamboo Resources	17
9.3 Data for National Reporting Table T9	17
9.4 Comments to National Reporting Table T9	17
10 Table T10– Value of Non Wood Bamboo Product	18
10.1 GBRA 2005 Categories and Definitions	18
10.2 National Data on Bamboo Resources	18
10.3 Data for National Reporting Table T10	18
10.4 Comments to National Reporting Table T10	18
11 Map of country's bamboo resources distribution	19
12 List of bamboo species in the country	19

General Guidelines:

The main purpose of the Country Thematic Report on Bamboo Resources (CTRB) is to develop a Global Bamboo Resources Assessment (GBRA) and to integrate it in the global UN FAO FRA. The approach is to create sub-category on Bamboo in the framework of FRA 2005 (www.fao.org/forestry/fra) to provide supplementary information on bamboo resources. This document provides format for compiling information on Bamboo resources and should be treated as a supplement to the basic documents of FRA 2005 including Specification of National Reporting tables, FRA Working Paper No. 81; Guidelines for Country Reporting, FRA Working Paper No. 82 and Terms and Definitions, FRA Working Paper No. 83.

The country Bamboo Resources Thematic Study Report should clearly and concisely document all data sources that have been selected and used for this reporting process and assign quality rating to the data sources. Comment on any problems encountered in finding relevant data sources. The Report should also indicate if no data sources have been found which meet the requirements. Similarly all the relevant national classification and definitions should be documented clearly and concisely. Comments on any problems or incompatibilities in classification and definitions should also be provided, if necessary. Please email the Bamboo Thematic Report directly to the focal point at INBAR (mlobovikov@inbar.int) with the copy to FAO (kailash.govil@fao.org) as a part of GFRA.

General information

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Date of submission of 1st draft:	March 1 2005
Date of submission of 2nd draft	April 1 2005
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1 Table T1 – Extent of Bamboo Forest

1.1 GBRA 2005 Categories and definitions

Category	Definition
Bamboo on Forest Land	Bamboo on lands defined as "Forest" in FRA 2005.

1.2 National Data on Bamboo Resources

1.2.1 Data sources

References	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Cultivation of Bamboo in Pakistan Dr.K.M.Siddiqui	H	Bamboo Plantation Area	1994	Pakistan Journal of Forestry, April, 1994
Survey of Bamboo Growing Areas in Punjab	H	Bamboo Plantation Area	1995	Annual Progress Report, Pakistan Forest Institute
Survey of Bamboo Growing Areas in Punjab	H	Bamboo Plantation Area	2005	Pakistan Forest Institute, Peshawar

1.2.2 Classification and definitions

National class	Definition
Bamboo Plantations	Plantations of Bamboo raised on private lands as compact plantations on 0.5 acre of land. Bamboos found in areas other than forests. It corresponds to the definition of bamboo on other land of FRA 2005.

1.2.3 Original data1.3 Data for National Reporting Table T1

GBRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Bamboo on forest land			
Monopodial bamboo area	NIL	NIL	NIL
Sympodial bamboo area	9	14	20
TOTAL	9	14	20

1.4 Comments to National Reporting Table T1

Efforts were made in eighties to introduce different species of bamboos from Bangladesh, China, Sri Lanka and Thailand in to Pakistan. Some of them are well adapted to climatic conditions of Punjab. 21 species were introduced from Bangladesh and 4 from Thailand and China. Some of the outstanding species in this regard are *Dandrocalamus giganteus*, *Dandrocalamus stictus*, *Bambusa arundinacia*, *Bambusa tulda*, *Dandrocalamus*

hamiltonii, Bambusa vulgaris, Dandrocalamus longispthus and the ornamental species Phyllostachys aureau.

Bamboo plantations have been raised on good agricultural lands in Sargodha, Jhang, Khoshab and Mandibhaudin districts of Punjab province in Pakistan. Most of these plantations are on 0.5 acres of lands. In Chunian sub division of Kasur district, small farmers have also successfully established small bamboo groves of 4-10 acres area. Bamboo plantation area increases or decreases with the market demand in the domestic as well as in the Middle East markets. Dandrocalamus stictus, Bambusa tulda and Dandrocalamus hamiltonii are the major species grown on private farmlands.

2 Table T2 – Ownership of Bamboo Forest

2.1 GBRA 2005 Categories and definitions

Category	Definition
Private ownership	Same as FRA: Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Same as FRA: Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Same as FRA: Land that is not classified either as "Public ownership" or as "Private ownership".

2.2 National Data on Bamboo Resources

2.2.1 Data sources

References	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Cultivation of Bamboo in Pakistan Dr.K.M.Siddiqui	H	Ownership of Bamboo plantation	1994	Pakistan Journal of Forestry, April, 1994
Survey of Bamboo Growing Areas in Punjab	M	Ownership of Bamboo plantation	2005	Pakistan Forest Institute, Peshawar

2.2.2 Classification and definitions

National class (Bamboo)	Definition
Private ownership	Same as FRA: Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Same as FRA: Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Same as FRA: Land that is not classified either as "Public ownership" or as "Private ownership".

2.2.3 Original data

2.3 Data for National Reporting Table T2

GBRA 2005 Categories	Area (1000 ha)	
	1990	2000
Private ownership	9	14
Public ownership	Nil	Nil
Other ownership	Nil	Nil
Total	9	14

2.4 Comments to National Reporting Table T2

Bamboo plantations have been raised on private agricultural lands in Punjab Province of Pakistan under agro-forestry system. Plantation area increases or decreases with the demand in the market especially in the export markets. Demand for bamboo in the local market is also influenced by the timber prices in the market.

3 Table T3 – Characteristics of Bamboo Forest

3.1 GBRA 2005 Categories and definitions

Category	Definition
Natural bamboo forest	Bamboo area of naturally regenerated native bamboo species.
Plantation	Bamboo area of native or introduced species, established through planting, seeding or assisted natural regeneration.

3.2 National data on Bamboo in Forest

3.2.1 Data sources

References	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Cultivation of Bamboo in Pakistan Dr.K.M.Siddiqui	H	Bamboo Plantation Area	1994	Pakistan Journal of Forestry, April, 1994
Survey of Bamboo Growing Areas in Punjab	M	Bamboo Plantation Area	1995	Annual Progress Report, Pakistan Forest Institute
Survey of Bamboo Growing Areas in Punjab	M	Bamboo Plantation Area	2005	Pakistan Forest Institute, Peshawar

3.2.2 Classification and definitions

National class	Definition
Natural bamboo forest	Bamboo area of naturally regenerated native bamboo species.
Plantation	Bamboo area of native or introduced species, established through planting, seeding or assisted natural regeneration.

3.2.3 Original data

3.3 Data for National Reporting Table T3

GBRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Natural bamboo forest	NIL	NIL	NIL
Plantation	9	14	20
TOTAL	9	14	20

3.4 Comments to National Reporting Table T3

Almost 100 percent bamboo resources are on private farms. Farmers in Punjab either raise pure stand of bamboo or manage bamboo plantations with agricultural crops. Most of the farmers use rhizomes for planting bamboos. Shoot cuttings are also used for bamboo cultivation in Pakistan. Research studies conducted at Pakistan Forest Institute, Peshawar

indicate that for maximum production, bamboo should be grown as pure crop at 2x2 m spacing. However, agricultural crops can be grown for some years if plant spacing is kept greater than 2x2 m.

4 Table T4 – Bamboo Growing Stock

4.1 GBRA 2005 Categories and definitions

Category	Definition
Bamboo Growing stock	Weight (tons) of all bamboo forest more than 2 cm in diameter at breast height.
Commercial growing stock of Bamboo	The part of the growing stock of bamboo species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.
Growing stock of Common bamboo species	Weight (tons) of the most common bamboo species.

4.2 National data on Bamboo Resources

4.2.1 Data sources

References	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Bamboo as a source of long fiber pulp in Pakistan by Kanwar.M. Suleman	H	Growing stock	1994	

4.2.2 Classification and definitions

Category	Definition
Bamboo Growing stock	Weight (tons) of all bamboo forest more than 2 cm in diameter at breast height.
Commercial growing stock of Bamboo	The part of the growing stock of bamboo species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of 5cm or more.
Growing stock of Common bamboo species	Weight (tons) of the most common bamboo species.

4.2.3 Original data

4.3 Data for National Reporting Table T4

GBRA 2005 Categories	Total weight (tons)		
	1990	2000	2005
Bamboo Growing stock	93,000	144,000	206,000
Commercial growing stock of Bamboo	61,000	95,000	136,000
Growing stock of Common bamboo species	74,000	115,000	165,000

Note: if possible, please (1) breakdown by species groups (2) include information on the minimum diameter used as thresholds and (3) provide coefficient of number of culms per a ton of weight

4.4 Comments to National Reporting Table T4

Average growing stock of bamboo grown on farmlands is estimated about 8 tons/per hectare. More than 66 percent of the growing stock is considered commercial growing stock having clum diameter of more than 5 cm. More than 80 percent of the growing stock consist of three major species i.e Dandrocalamus stictus, Bambusa tulda and Dandrocalamus hamiltonii.

5 Table T5 – Bamboo Biomass stock

5.1 GBRA 2005 Categories and definitions

Category	Definition
Above-ground biomass of Bamboo	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass of Bamboo	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.

5.2 National Data on Bamboo Resources

5.2.1 Data sources

References	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Bamboo Biomass Estimation Study	H	Above Ground Biomass	2005	Pakistan Forest Institute, Peshawar.

5.2.2 Classification and definitions

Category	Definition
Above-ground biomass of Bamboo	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass of Bamboo	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.

5.2.3 Original data

5.3 Data for National Reporting Table T5

GBRA 2005 Categories	Bamboo Biomass (ton dry weight)		
	1990	2000	2005
Above-ground biomass of Bamboo	51,000	79,000	113,000
Below-ground biomass of Bamboo	8,119	12,199	17,990
Total of living biomass	59,119	91,199	130,990
TOTAL	59,119	91,199	130,990

5.4 Comments to National Reporting Table T5

For the calculation of above ground biomass, a factor of 0.55 was multiplied with growing stock. For the estimation of below ground bio-mass a factor of 0.1592 was multiplied with the weight of above ground biomass.

6 Table 6 – Diversity of bamboo tree species

6.1 GBRA 2005 Categories and definitions

Category	Definition
Number of native Bamboo species	The total number of native tree species that have been identified within the country.
Number of introduced Bamboo species	The total number of introduced tree species that have been identified within the country.
Number of critically endangered Bamboo species	The number of native tree species that are classified as “Critically endangered” in the IUCN red list.
Number of endangered Bamboo species	The number of native tree species that are classified as “Endangered” in the IUCN red list.
Number of vulnerable Bamboo species	The number of native tree species that are classified as “Vulnerable” in the IUCN red list.

6.2 National Data on Bamboo Resources

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Potential Distribution of Wood Bamboos in South, South-East and East Asia, Papua New Guinea and Australia Working Paper 42 UNEP-WCMC	H	Native Bamboo Species	2001	Nadia.et.al
A Note on Bamboo in Pakistan. Zahoor Ahmad National Agriculture Research Council (NARC), Islamabad, Pakistan	H	Native Bamboo Species	2005	

6.2.2 Classification and definitions

Category	Definition
Number of native Bamboo species	The total number of native tree species that have been identified within the country.
Number of introduced Bamboo species	The total number of introduced tree species that have been identified within the country.
Number of critically endangered Bamboo species	The number of native tree species that are classified as “Critically endangered” in the IUCN red list.
Number of endangered Bamboo species	The number of native tree species that are classified as “Endangered” in the IUCN red list.
Number of vulnerable Bamboo species	The number of native tree species that are classified as “Vulnerable” in the IUCN red list.

6.3 Data for National Reporting Table T6

GBRA 2005 Categories	Number of species (Year 2000)
Native Bamboo species	3
Introduced Bamboo species	13
Critically endangered Bamboo species	1

Endangered Bamboo species	-
Vulnerable Bamboo species	-

6.4 Comments to National Reporting Table T6

Bamboos are of limited diversity in Pakistan. Three species grow naturally in Pakistan. *Arundinaria falcata* in the NW Himalayas at 1,200-2,000 m. It occurs in the undergrowth in forests of oak, firs and mixed trees, usually on northern slopes or in ravines. It is part of a wider gene pool through the Himalayas. It is used for making baskets, mats and pipes. *Bambusa bambos*. It is rare in the Ravi river eastward. It is absent in the hills. This species is extensively used for construction. *Dendrocalamus strictus* is found in Punjab and Kashmir. It is found also in mixed vegetation on Marghalla hills surrounding Islamabad. It is used for construction and a variety of purposes. This forms part of a gene pool extending across Hindustan and usually growing below 1,200 m. In Pakistan, the resources are shrinking.

7 Table T7 – Bamboo Removal

7.1 GBRA 2005 Categories and Definitions

Category	Definition
Bamboo Wood removal	The Bamboo wood removed (volume) for production of goods and services other than energy production (woodfuel).
Woodfuel Bamboo removal	The Bamboo wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

7.2 National Data on Bamboo Resources

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Survey of Bamboo Growing Areas in Punjab	M	Bamboo Plantation Area	1995	Annual Progress Report, Pakistan Forest Institute
Survey of Bamboo Growing Areas in Punjab	M	Bamboo Plantation Area	2005	Pakistan Forest Institute, Peshawar

7.2.2 Classification and definitions

National class	Definition
Bamboo Wood removal	The Bamboo wood removed (volume) for production of goods and services other than energy production (woodfuel).
Woodfuel Bamboo removal	The Bamboo wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

7.2.3 Original data

7.3 Data for National Reporting Table T7

GBRA2005	Bamboo removal (ton)		
	1990	2000	2005
Bamboo wood removal	61,000	95,000	136,000
Bamboo woodfuel removal	NA	NA	NA
Total	61,000	95,000	136,000

7.4 Comments to National Reporting Table T7

In Pakistan, almost all of the bamboo resources are on farmlands and bamboo is harvested by clear cutting the bamboo field and stumps are left for next crop. Generally the farmers prefer the sale method in which all the marketing function are performed by the buyers. Leaves and small branches are left in the field which are used as fuel or for shelter.

8 Table 8 – Value of Wood Removal

8.1 GBRA 2005 Categories and Definitions

Category	Definition
Bamboo Wood removal	The Bamboo wood removed (volume) for production of goods and services other than energy production (woodfuel).
Woodfuel Bamboo removal	The Bamboo wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

8.2 National Data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Survey of Bamboo Markets in Punjab.	H	Value of bamboos	2005	Pakistan Forest Institute, Peshawar

8.2.2 Classification and definitions

National class	Definition
Bamboo Wood removal	The Bamboo wood removed (volume) for production of goods and services other than energy production (woodfuel).

8.2.3 Original data

8.3 Data for National Reporting Table T8

GBRA2005	Value (million USD)		
	1990	2000	2005
Bamboo wood removal	14.52	22.62	32.39
Bamboo woodfuel removal	NA	NA	NA
Total	14.52	22.62	32.39

8.4 Comments to National Reporting Table T8

In Pakistan, a thirty feet bamboo stem having 14-15 kg weight is sold at Rs 200 in the local market. Present estimates have been calculated on the basis of above mentioned market information. One U.S \$=60 Rupees.

9 Table 9 – Non Wood Bamboo Product Removal

9.1 GBRA2005 Categories and Definitions

Category
<u>Plant products / raw material</u>
1. Food
2. Raw material for medicine and aromatic products
3. Raw material for utensils, handicrafts & construction
4. Ornamental plants
5. Other plant products
<u>Animal products / raw material</u>
1. Living animals
2. Other edible animal products
3. Other non-edible animal products

9.2 National Data on Bamboo Resources

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments

9.2.2 Classification and definitions

9.2.3 Original data

9.3 Data for National Reporting Table T9

GBRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
<u>Plant products / raw material</u>			NA	NA	NA
1. Food (bamboo shoots)			NA	NA	NA
2. Raw material for medicine and aromatic products			NA	NA	NA
3. Raw material for utensils, handicrafts & construction			NA	NA	NA
4. Ornamental plants			NA	NA	NA
5. Other plant products			NA	NA	NA
<u>Animal products / raw material (if any)</u>			NA	NA	NA
1. Living animals			NA	NA	NA
2. Other edible animal products			NA	NA	NA
3. Other non-edible animal products			NA	NA	NA

9.4 Comments to National Reporting Table T9

Data not available

10 Table T10– Value of Non Wood Bamboo Product

10.1 GBRA 2005 Categories and Definitions

10.2 National Data on Bamboo Resources

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments

10.2.2 Classification and definitions

10.2.3 Original data

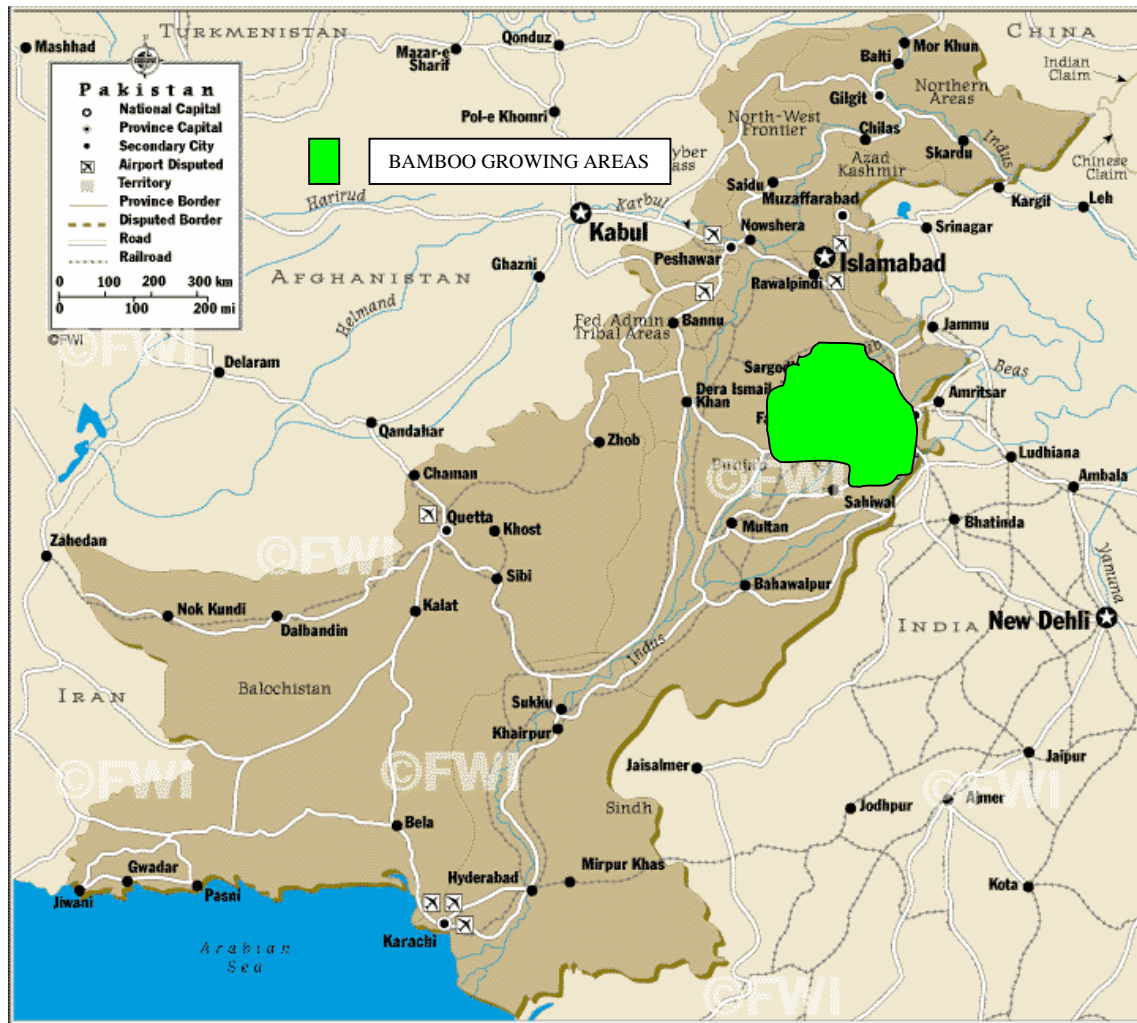
10.3 Data for National Reporting Table T10

GBRA 2005 Categories	Value of the other than culms removal (Million USD)		
	1990	2000	2005
<u>Plant products / raw material</u>			
1. Food (bamboo shoots)	NA	NA	NA
2. Raw material for medicine and aromatic products	NA	NA	NA
3. Raw material for utensils, handicrafts & construction	NA	NA	NA
4. Ornamental plants	NA	NA	NA
5. Other plant products	NA	NA	NA

10.4 Comments to National Reporting Table T10

Data not available.

11 Map of country's bamboo resources distribution



Bamboo plantations have been raised in Sargodha, Mandi Bhaudin, Kasur, Lahore, Khusab and Jhang areas of Punjab province. Most of the plantations have been raised under agro-forestry system on private farms.

12 List of bamboo species in the country

- *Dendrocalamus strictus*
- *Dendrocalamus giganteus*
- *Dendrocalamus hamiltonii*
- *Dendrocalamus longispathus*
- *Melocanna bambusides*
- *Arundinaria falcata*
- *Bambusa arundinacea*
- *Bambusa tulda*
- *Bambusa polymorpha*
- *Bambusa vulgaris*
- *Bambusa nutans*
- *Phyllostachys aurea*.
- *Phyllostachys pubescens*
- *Phyllostachys aureosulcata*
- *Bambusa bambos*
- *B. multiplex*

Arundinaria falcata It is used for making baskets, mats and pipes.

Bambusa bambos This species is extensively used for construction.

B. multiplex in the plains of Punjab is a hedge bamboo.

Dendrocalamus strictus It is used for construction and a variety of purposes.

Dendrocalamus hamiltonii is used for construction and ladder manufacturing and scaffoldings

Bambusa tulda used for construction purposes.