

# **EVALUATION OF BAMBOO RESOURCES IN LATIN AMERICA**

A Summary of the Final Report of Project No. 96-8300-01-4  
International Network for Bamboo and Rattan

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## Abstract

Latin America is the richest region of the Americas in terms of the diversity and number of woody bamboo species. Twenty genera and 429 species of woody bamboos are distributed from approximately 27° North (*Otate acuminata* found in the north-western part of Mexico) to 47° South (*Chusquea culeou* in Chile) (Judziewicz et al. 1999). Of the woody bamboos found in the Americas, only *Arundinaria gigantea* of North America is not found in Latin America. Of the total 1 100 species and 65 genera of woody bamboos known in the world (Judziewicz et al. 1999), Latin America has 39% of the species and 31% of the genera. Brazil has the greatest bamboo diversity (137 species) followed by Colombia (70), Venezuela (60), Ecuador (42) Costa Rica (39), Mexico (37) and Peru (37). A listing of native woody bamboo species by country is provided in this work.

In general, the exploitation of native bamboo in Latin America is limited to the local use of species found close by. It is only in Colombia, Ecuador and Brazil that bamboo plays a more conspicuous role in the local economy.

It is estimated that bamboo in Latin America covers close to 11 million hectares, and that approximately 11% of every square kilometer of Andean forest is occupied by bamboo.

## Introduction

Bamboo is an alternative resource that helps confront some of the problems affecting the majority of the countries. At the same time, it contributes to environmental and habitat protection as well as economic development.

Bamboo's rapid growth, ease of caring and wide distribution make these plants an ideal renewable resource for the development of local economies in Latin America. In this paper, Latin America is defined as the area from Mexico through Central America and South America, including the Caribbean and the West Indies.

Since pre-Columbian times, bamboo has been used in Latin America and recently has been developed successfully in certain countries. However, despite reports that there are uses of bamboo in every country in the region, bamboo in general should be considered a forest resource with little significance in the local economy in majority of these countries. In general, the exploitation of native bamboos in Latin America is limited to local use of species found close by. It is only in Colombia, Ecuador and Brazil that bamboo plays a more conspicuous role in the local economy.

Recently, it has been calculated that the bamboo-dominated areas in the Amazonian region, is close to 180 000 km<sup>2</sup> (Judziewicz et al. 1999), equivalent to 18 million hectares. However, it is mixed with other Amazonian forest species. Keeping in mind that the presence of bamboo in South-western Amazon is not homogeneous or continuous, and that approximately 11% of every square kilometer of Andean forest is covered by bamboo, it may be estimated that bamboo covers close to 11 million hectares in Latin America.

Latin America possesses approximately 47% of the world's tropical forests and 70% of the world's animal and plant species (CESA 1992). The annual deforestation rate of 1.3% (CESA 1992) has been increasing over the last 10 years as a result of the ever more critical socio-economic situation

in the region that necessitates its inhabitants and governments to find new sources of income at whatever the costs, including ecological.

Unfortunately, the montane forest of the Andean region, where more of the woody bamboo species are found, is decreasing at a high rate owing to both natural and anthropogenic disturbances (Judziewicz et al. 1999; Clark 1995). If the great diversity of the Andean Region with all its utilitarian species and potentially utilitarian species is to be conserved, then some quick actions are required to find solutions that combine legal protection, sustainable development and reforestation of native species.

Architect Moran once noted that in addition to our historical ties and language, we [the Latin Americans] have other ties that bind us, such as those expressed in our bamboo of which the *Guadua*, authentically American, is noteworthy as a valuable alternative and instrument in the solution of the serious housing problems that face Latin American countries. In making an evaluation of bamboo resources in Latin America and in analyzing its present situation as well as forecasting its future, the author too believes in this.

This paper is a summary of the final report of an INBAR project on the “Evaluation of Bamboo Resources in Latin America”, for which the author was the Project Leader. It indicates for every country the number of woody bamboo species, the economic potential of some native species, geographical distribution of bamboos, and the culm size of important bamboos and their local uses. Special attention is given to Colombia, Ecuador and Venezuela. In this summary, only general comments are furnished and a listing of native woody bamboo species by country is provided. Details may be had from the project report, which INBAR intends to publish in the near future.

## **Bamboo Resources in Latin America**

Latin America is the richest region of the Americas in terms of the diversity and number of woody bamboo species. Twenty genera and 429 species of woody bamboos are distributed from approximately 27° North (*Otate acuminata* found in the north-western part of Mexico) to 47° South (*Chusquea culeou* in Chile) (Judziewicz et al. 1999). Of the woody bamboos found in the Americas, only *Arundinaria gigantea* of North America is not found in Latin America. Of the total 1 100 species and 65 genera of woody bamboos known in the world (Judziewicz et al. 1999), Latin America has 39% of the species and 31% of the genera. Brazil has the greatest bamboo diversity (137 species) followed by Colombia (70), Venezuela (60), Ecuador (42), Costa Rica (39), Mexico (37) and Peru (37).

Woody bamboos are found in almost all Latin American habitats with the exception of desert regions. They are distributed from the humid lowland forest at sea level to the highlands in the Andes up to 4 300 m in the natural formation known as “paramo” (Judziewicz et al. 1999).

Because of the very little economic significance of bamboo resource in the majority of the Latin American countries, there is neither an estimate of bamboo forests (cover area) nor an estimate of bamboo production for any country in this region. However, some survey efforts have been made in a few countries (for example Colombia, Ecuador, Nicaragua and Venezuela).

In general, it may be said that the most useful species in Latin America are found in the genus *Guadua* and in the Asiatic genus *Bambusa*, although the genera of *Apoclada*, *Aulonemia*, *Chusquea*, *Elytrostachys*, *Otatea* and *Rhipidocladum* also have species that are used in various ways.

The cultivation of bamboos on a commercial scale in Latin America is limited to a few native and introduced species: *Guadua angustifolia*, *G. amplexifolia*, *Bambusa vulgaris*, *B. tuldoidea* and *Phyllostachys aurea*.

The following sections give an account of the bamboo resources by region and country.

## **Southern South America**

### **Argentina (5 genera, 13 species)**

In Argentina, bamboo does not play a dominant role in forestry. As in the majority of Latin America countries, bamboo exploitation is generally confined to local use of native species in areas close to the source of supply. There is no control over the removal of native bamboos from riverbanks by people, and this has created a shortage of bamboo resources over many years (Burkart 1969).

The genus *Guadua* is concentrated in the provinces of Corrientes, El Chaco, Misiones and the edge of the Parana River in the province of Santa Fe. In Argentina, the *Guadua* genus includes three species: *G. chacoensis*, *G. paraguayana* and *G. trinii* (Burkart 1969; Nicora and Rugolo 1987).

Several Asiatic bamboos were introduced into the country approximately a hundred years ago and became widespread, especially in the north-western part of the country. The most widespread and cultivated ones are: *Bambusa tuldoidea* (tacuara), *B. vulgaris* var. *vittata* (yellow bamboo), *B. arundinacea* (spiny bamboo), *Dendrocalamus asper* (tacuara gigante), *Phyllostachys aurea* and *P. bambusoides* (cana de indias) (Parodi 1936; Turpe 1975).

Following are the native woody bamboo species of Argentina:

- Chusquea andina* R.A. Philippi
- C. culeou* E. Desvaux
- C. deficiens* L.G. Clark
- C. iorentziana* Grisebach
- C. ramosissima* Lindman
- C. tenella* Nees
- C. valdiviensis* E. Desvaux
- Colantheia rhizantha* (Hackel) McClure
- Guadua chacoensis* (Rojas) X. Londoño & Peterson
- G. paraguayana* Doell
- G. trinii* (Nees) Ruprecht
- Merostachys clausenii* var. *clausenii* Munro
- Rhipidocladum racemiflorum* (Steudel) McClure

### **Chile (1 genus 10 species)**

Bamboo in Chile is rarely used as an economic plant, but has some influence on the dynamics and composition of the Chilean Andes forest. The genus *Chusquea* is the only native American bamboo

occurring in the country. It is found in the provinces of Cautin, Chiloe, Concepcion, Llanquihue, Malleco, Nuble, Osorno, Santiago, Valdivia and Valparaiso, and is locally known as “culeo” and “colihue”

It is interesting to note that the geographical distribution of the genus *Guadua* includes all southern Latin American countries, except Chile.

The native woody bamboo species of Chile are:

- Chusquea andina* R.A. Philippi
- C. ciliate* R. A. Philippi
- C. culeou* E. Desvaux
- C. cumingii* Nees
- C. fernandeziana* R.A. Philippi
- C. macrostachya* R.A. Philippi
- C. montana* R.A. Philippi
- C. quila* Kunth
- C. uliginosa* R.A. Philippi
- C. valdiviensis* E. Desvaux

### **Uruguay (2 genera, 3 species)**

Bamboo resources in Uruguay are scarce. There is only one useful species, *G. trinii*, which is sometimes found growing along the forest banks of River Uruguay and its tributaries, in the department of Rio Negro (Rosengurtt et al. 1970). Culms of this bamboo, commonly named “tacuara brava”, have been reportedly used in rural construction (Lombardo 1943; Rosengurtt et al. 1970).

*Bambusa tuldoides* and *Phyllostachys aurea* are cultivated in Montevideo and Soriano Departments (Rosengurtt et al 1970).

The native woody bamboo species of Uruguay are the following:

- Chusquea juergensii* Hackel
- C. tenella* Nees
- Guadua trinii* (Nees) Ruprecht

### **Paraguay (3 genera, 5 species)**

Bamboo is scarcely used in Paraguay for economic activities and, as in Uruguay, does not form a large resource. There are three *Guadua* species with potential uses: *G. chacoensis* (tacuar), *G. paniculata* and *G. paraguayana* (picanilla).

According to Cabrera, bamboos are an important element of the Paraguayan forest. The forest at the lower levels was cleared of them when they flowered and the culms died, but new bamboo plants had regenerated by the following year and were forming an impenetrable wall.

Following are the native woody bamboo species of Paraguay:

- Chusquea ramosissima* Lindman
- Guadua chacoensis* Rojas X. Londoño & L.G. Clark

*G. paniculata* Munro  
*G. paraguayana* Doell  
*Merostachys clausenii* var. *clausenii* Munro

## Central and Northeastern South America

### Brazil (17 genera, 135 species, 2 subspecies)

Brazil is the country with the greatest diversity and the highest percentage of endemic woody bamboos in Latin America -- 137 species (32% of Latin American bamboo species) and 17 genera (85% of Latin American bamboo genera). The states of Sao Paulo, Minas Gerais, Santa Catarina, Bahia and Parana have the greatest diversity of woody bamboos.

Foremost among the world centers of bamboo diversity are the Atlantic forests of Brazil, which extend from the state of Paraiba to Rio Grande do Sul in a mostly narrow coastal strip characterized by abundant rainfall (Moris et al. 1983), and include 22 genera and 62 species (woody and herbaceous) (Judziewicz et al. 1999).

Several exotic bamboo species were introduced to Brazil during the period of colonization by the Portuguese (de Barros and Egashira 1993). These species are widely distributed around the country and, along with some natives ones, have a large number of uses -- building material (including raw material for low-cost housing); source of food for people and livestock; raw material for making a wide variety of handicrafts; source of medicine; raw material for paper pulp; for erosion control; as ornamental plants; etc. Bamboo is also under research as possible source of ethanol (Burman and Filgueiras 1993; Azzini and de Barros 1993).

The area of bamboo forests in Brazil is still not clearly determined. However, it is known that the states of Amazonas and Acre have the largest area of bamboo. The extent and distribution of bamboo-dominated forest in south-western Amazon basin are uncertain. Recently, with satellite imagery, aerial photographs and site investigations, it has been calculated that the bamboo-dominant area is close to 180 000 km<sup>2</sup> (Judziewicz et al. 1999), or 18 million hectares.

At least three woody bamboo genera have been reported in this bamboo forest: *Arthrostylidium*, *Elytostachys* and *Guadua*. The most dominant genus is *Guadua*, with *G. weberbaueri*, *G. sarcocarpa*, *G. superba*, *G. aff. paraguayana*, *G. capitata*, *G. ciliate*, *G. glomerata* and several unknown species forming an impenetrable tangle of thorny vegetation.

The common view in Brazil is that the bamboo resources of the country are infinite. Even then, the alarming rate of destruction, especially of the ecosystems where the majority of native bamboo species are found, calls for an intensive campaign to protect some bamboo species from indiscriminate felling and extinction (Burman and Filgueiras 1993). It is also recommended that germplasm banks or living collections from different climatic regions of the country be established, and that ecological studies of the species with greatest economic potential be intensified. Some efforts in these areas have already begun; for example, the existing living collections at the Agronomic Institute of the Experimental Center of Campinas in the state of Sao Paulo.

Currently, some Asiatic bamboos, principally the genera of *Bambusa* and *Dendrocalamus*, fill a more important economic role than any native species in Brazil.

Of the 17 genera of woody bamboos native to Brazil, it can be said that only *Actinocladum*, *Apoclada*, *Chusquea*, *Guadua* and *Merostachys* consist of any species that have or could have any potential use.

The native woody bamboo species of Brazil are the following:

*Actinocladum verticillatum* (Nees) Soderstrom  
*Alvimia auriculata* Soderstrom & X. Londoño  
*A. gracilis* Soderstrom & X. Londoño  
*A. lancifolia* Soderstrom & X. Londoño  
*Apoclada arenicola* McClure  
*A. cannaviera* (Silveira) McClure  
*A. simplex* McClure & L.B. Smith  
*Arthrostylidium fimbrinodum* Judziewicz & L.G. Clark  
*A. grandifolium* Judziewicz & L.G. Clark  
*A. simpliciusculum* (Pilger) McClure  
*Arthrostachys capitata* (Hooker) Benthman  
*Atractantha amazonica* Judziewicz & L.G. Clark  
*A. aureolanata* Judziewicz  
*A. cardinalis* Judziewicz  
*A. falcata* McClure  
*A. radiata* McClure  
*Aulonemia amplissima* (Nees) McClure  
*A. aristulata* (Doell) McClure  
*A. effusa* (Hackel) McClure  
*A. glaziovii* (Hackel) McClure  
*A. goyazensis* (Hackel) McClure  
*A. radiata* (Ruprecht) McClure & L.B. Smith  
*A. ramosissima* (Hackel) McClure  
*A. setigera* (Hackel) McClure  
*A. ulei* (Hackel) McClure & L.B. Smith  
*Chusquea acuminata* Doell  
*C. anelythra* Nees  
*C. anelytroides* Doell  
*C. attenuata* (Doell) L.G. Clark  
*C. baculifera* Silveira  
*C. bahiana* L.G. Clark  
*C. bambusoides* (Raddi) Hackel  
*C. bradei* L.G. Clark  
*C. caparaoensis* L.G. Clark  
*C. capitata* Nees  
*C. capituliflora* var. *capituliflora* Trinius  
*C. capituliflora* var. *pubescens* McClure & L.B. Smith  
*C. erecta* L.G. Clark  
*C. fasciculata* Doell

*C. gracilis* McClure & L.B. Smith  
*C. heterophylla* Nees  
*C. ibiramae* McClure & L.B. Smith  
*C. juergensii* Hackel  
*C. leptophylla* Nees  
*C. linearis* N.E. Brown  
*C. meyeriana* Doell  
*C. microphylla* (Doell) L.G. Clark  
*C. mimosa* ssp. *australis* L.G. Clark  
*C. mimosa* ssp. *mimosa* McClure L.B. Smith  
*C. nudiramea* L.G. Clark  
*C. nutans* L.G. Clark  
*C. oligophylla* Ruprecht  
*C. oxylepis* (Hackel) E. Ekman  
*C. pinifolia* (Nees) Nees  
*C. pulchella* L.G. Clark  
*C. ramosissima* Lindman  
*C. riosaltensis* L.G. Clark  
*C. sclerophylla* Doell  
*C. sellowii* Ruprecht  
*C. tenella* Nees  
*C. tenuiglumis* Doell  
*C. tenuis* E.G. Camus  
*C. urelytra* Hackel  
*C. wilkesii* Munro  
*C. windischii* L.G. Clark  
*Colantheia burchellii* (Munro) McClure  
*C. cingulata* (McClure & L.B. Smith) McClure  
*C. distans* (Trinius) McClure  
*C. intermedia* (McClure & L.B. Smith) McClure  
*C. lanciflora* (McClure & L.B. Smith) McClure  
*C. macrostachya* (Nees) McClure  
*C. rhizantha* (Hackel) McClure  
*Cricuma asymmetrica* Soderstrom & X. Londoño  
*Elytrostachys* sp.  
*Eremocaulon aureofimbriatum* Soderstrom & X. Londoño  
*Glaziophyton mirabile* Franchet  
*Guadua calderoniana* X. Londoño & Peterson  
*G. ciliata* X. Londoño & Davidse  
*G. glomerata* Munro  
*G. latifolia* Kunth  
*G. macrostachya* Ruprecht  
*G. maculosa* (Hackel) E.G. Camus  
*G. paniculata* Munro

*G. aff. paraguayana* Doell  
*G. sarcocarpa* ssp. *sarcocarpa* X. Londoño & Peterson  
*G. superba* Huber  
*G. tagoara* (Nees) Kunth  
*G. trinii* (Nees) Ruprecht  
*G. virgata* (Trinius) Ruprecht  
*G. weberbaueri* Pilger  
*Merostachys abadiana* Sendulsky  
*M. argentea* Sendulsky  
*M. argyronema* Lindman  
*M. bifurcata* Sendulsky  
*M. bradei* Pilger  
*M. burmanii* Sendulsky  
*M. calderoniana* Sendulsky  
*M. caucaiana* Sendulsky  
*M. ciliata* McClure & L.B. Smith  
*M. clausenii* var. *clausenii* Munro  
*M. clausenii* var. *mollior* Doell  
*M. exserta* E.G. Camus  
*M. filgueirasii* Sendulsky  
*M. fischeriana* Doell  
*M. fistulosa* Doell  
*M. glauca* Sendulsky  
*M. kleinii* Sendulsky  
*M. kunthii* Ruprecht  
*M. lanata* Sendulsky  
*M. leptophylla* Sendulsky  
*M. magellanica* Sendulsky  
*M. medullosa* Sendulsky  
*M. multiramea* Hackel  
*M. neesii* Ruprecht  
*M. petiolata* Doell  
*M. pilifera* Sendulsky  
*M. pluriflora* E.G. Camus  
*M. polyantha* McClure  
*M. procerrima* Sendulsky  
*M. ramosissima* Sendulsky  
*M. riedeliana* Doell  
*M. rodoniensis* Sendulsky  
*M. scandens* Sendulsky  
*M. sellovii* Munro  
*M. skortzovii* Sendulsky  
*M. sparsiflora* Ruprecht  
*M. speciosa* Sprengel

*M. ternata* Nees  
*M. vestita* McClure & L.B. Smith  
*Myriocladus grandifolius* Swallen  
*M. neblinaensis* Swallen  
*M. paludicolus* Swallen  
*M. virgatus* Swallen  
*Rhipidocladum parviflorum* (Trinius) McClure

**Bolivia (9 genera, 24 species, 1 subspecies)**

Bamboo in Bolivia has been used by Andean communities in traditional production of musical instruments and baskets, and as cattle forage. An estimate of the area of bamboo forest in the highlands or lowland regions of this country does not exist.

The botanical survey conducted during the last decade in the lowland regions of Bolivia has reported two genera: *Actinocladum* and *Elytrostachys*, in addition to three species of *Guadua* to be added to Bolivia's bamboo inventory. Eastern Bolivia has *G. capitata*, *G. chacoensis* and *G. paniculata* growing in dry closed-type plant communities; two other species, *G. sarcocarpa* and *G. superba*, occur in north-eastern Bolivia at the border with Brazil and Peru, in the huge bamboo-dominated forest. From the 24 species reported in Bolivia, only three have some economic and/or cultural role: *Aulonemia queko*, *Rhipidocladum harmonicum* and *Guadua paniculata*.

*Guadua paniculata* in Bolivia occurs in the departments of Beni and Santa Cruz, growing in dry forests at 200-700 m elevation. It is locally named "guuapa" and is extracted from existing native populations. There is a need for silvicultural plans for the management of the natural stands or for the establishment of new plantations.

Following, the native wood bamboo species of Bolivia:

*Actinocladum verticillatum* (Nees) Soderstrom  
*Arthrostylidium canaliculatum* Renvoize  
*Aulonemia boliviana* Renvoize  
*A. herzogiana* (Henrard) McClure  
*A. logipedicellata* Renvoize  
*A. queko* Goudot  
*A. tremula* Renvoize  
*Chusquea delicatula* Hitchcock  
*C. longipendula* O. Kuntze  
*C. lorentziana* Grisebach  
*C. scandens* Kunth  
*C. spicata* Munro  
*Elytrostachys* sp.  
*Guadua capitata* (Trinius) Munro  
*G. chacoensis* (Rojas) X. Londoño & Peterson  
*G. paniculata* Munro  
*G. paraguayana* Doell  
*G. sarcocarpa* ssp. *purpurea* X. Londoño & Peterson

*G. sarcocarpa* ssp. *sarcocarpa* X. Londoño & Peterson  
*G. superba* Huber  
*G. weberbaueri* Pilger  
*Merostachys* sp.  
*Neurolepis weberbaueri* Pilger  
*Rhipidocladum harmonicum* (Parodi) McClure  
*R. racemiflorum* (Steudel) McClure

### **Peru (8 genera, 36 species, 1 subspecies)**

Bamboo resources in Peru are abundant and could represent a large potential supply. Some efforts have been made by the government to develop bamboo resources, especially in the Amazon region. Some data exist regarding the extent of bamboo area in this region. It is known, for example, that the Ucayali river basin (between the Tambo and Urubamba), has an area of 400 000 ha covered with *Guadua* (Londoño & Peterson, 1991; ONERN, 1976). However, there is no data on the area of each species or genera at the national or regional level.

Peru could be one of the richest Andean countries in terms of bamboo diversity but more fieldwork and taxonomic research need to be done. At present, Peru is known to have 8 genera and 36 species, with the richest bamboo diversity being in the departments of Pasco and Cuzco, and with the largest bamboo area in Madre de Dios and Amazonas.

*Guadua weberbaueri* and *G. sarcocarpa* are widespread in the lowland Amazonian region of Peru (departments of Amazonas, Cuzco, Huanuco, Junin, Loreto, Madre de Dios, Pasco and San Martin), covering more than 500 000 ha at elevation of 100 to 1 500 m in sites of mature and successional forest on alluvial soil along rivers (Londoño and Peterson 1991). They are locally known by different names such as “paca”, “ipa”, “Kapiro”, “Mame”, “Marona” or “chig kan” (McClure 1947; Londoño and Peterson 1991)<sup>1</sup>. These two species are notorious for their well-developed thorns, present on both culms and branches, and for forming dense curtains extremely difficult to penetrate.

The native woody bamboo species of Peru are:

*Arthrostylidium simpliciusculum* (Pilger) McClure  
*Aulonemia haenkii* (Ruprecht) McClure  
*A. hirtula* (Pilger) McClure  
*A. humillima* (Pilger) McClure  
*A. parviflora* (Presl) McClure  
*A. queko* Goudot  
*Chusquea aspera* L.G. Clark  
*C. barbata* L.G. Clark  
*C. decolorata* Munro  
*C. delicatula* Hitchcock  
*C. depauperata* Pilger  
*C. dombeyana* Kunth  
*C. exasperata* L.G. Clark

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<sup>1</sup> Also Tovar, A. 1998. Personal communication on PROBONA Project. Quito, Ecuador.

*C. huantensis* Pilger  
*C. inamoena* Pilger  
*C. neurophylla* L.G. Clark  
*C. peruviana* D.G. Camus  
*C. picta* Pilger  
*C. polyclados* Pilger  
*C. pubispicula* Pilger  
*C. scandens* Kunth  
*C. smithii* L.G. Clark  
*C. spicata* Munro  
*C. straminea* Pilger  
*C. tarmensis* Pilger  
*C. tessellata* Munro  
*Elytrostachys* sp.  
*Guadua glomerata* Munro  
*G. sarcocarpa* ssp. *purpuracea* X. Londoño & Peterson  
*G. sarcocarpa* ssp. *sarcocarpa* X. Londoño & Peterson  
*G. superba* Huber  
*G. weberbaueri* Pilger  
*Merostachys brevispica* Munro  
*Neurolepis fimbriiligulata* ssp. *peruviana* L.G. Clark  
*N. weberbaueri* Pilger  
*Rhipidocladum harmonicum* (Parodi) McClure  
*R. racemiflorum* (Steudel) McClure

### **The Guyanas (8 genera, 13 species)**

Bamboo resources in the Guyanas (French Guyana, Guyana and Surinam) are unimportant to the local economy. Some ethnobotanical uses -- such as for making lances, bows, arrowheads, arrow shafts, knives and fishing harpoons -- have been reported by the indigenous people.

The most promising species are found in the genus *Guadua*, namely *G. latifolia*, *G. macrostachya*, *G. weberbaueri* and *G. glomerata*.

Other uses of bamboo in this region is limited to minor uses such tools and small implements for fishing and hunting, and as a medicinal plant (Grenand et al. 1987).

Following are the native woody bamboo species of the Guyanas:

*Arthrostylidium scandens* McClure  
*A. venezuelae* (Steudel) McClure  
*Aulonemia deflexa* (N.E. Brown) McClure  
*Chusquea linearis* N.E. Brown  
*Guadua glomerata* Munro  
*G. latifolia* (Humb & Bonpl) Kunth  
*G. macrostachya* Ruprecht  
*G. weberbaueri* Pilger

*Merostachys retrorsa* McClure  
*Myriocladus distantiflorus* Swallen  
*Neurolepis angusta* Swallen  
*Rhipidocladum racemiflorum* (Steudel) McClure  
*R. sibilans* Davidse, Judziewicz, & L.G. Clark

## Northwestern South America

### Colombia (70 species, 9 genera)

Colombia has the second highest woody bamboo diversity in Latin America. At present, 9 genera and 70 species are reported, with 24 species being endemic and at least 12 species remaining to be described.

The Andean region has the largest quantity and greatest diversity of woody species (89%) and the Eastern Cordillera is the richest with 55% of all woody bamboos reported until now. About 60% of the woody species are found from 2 000 to 3 500 m altitude (Londoño 1990).

The Colombian departments (states) with the highest woody bamboo diversity are Norte de Santander, Cundinamarca, Cauca, Valle del Cauca, Antiquia, Huila, Narino and Quandio.

The majority of species belong to *Chusquea* genus (30%), with the rest of the species belonging to the genera *Neurolepis*, *Arthrostylidium*, *Aulonemia*, *Elytostachys*, *Merostachys*, *Rhipidocladum*, *Guadua* and *Otatea*.

Colombia is one of the few countries in Latin America where bamboo plays a notable role in local economy and traditional culture (McClure 1966).

In Colombia, the genera *Aulonemia*, *Chusquea*, *Elytostachys*, *Guadua* and *Rhipidocladum* include several species that are used by various native and rural mestizo communities to satisfy basic necessities (Londoño 1990). Even though only *G. angustifolia* has any real economic value, there is a history of bamboo culture, processing and utilization in the country. There are population inventories as well as significant research on management, production, marketing and industrial uses for *G. angustifolia*. The impact of the rest of the species on the local economy is minimal. These are utilized only by people close to the source.

Colombia's area of *Guadua* forests is estimated at 51 500 ha, of which 46 261 ha area has natural forests and 5 260 ha cultivated ones. The total area of natural *Guadua* forest in the four central-western departments represents 44% of the national total, with 75% of the *Guadua* stands between 0.4 and 10 ha in size (Bernal 1996; CVC-PAFC 1995). Only 16-20% of this area has proper management (CVC-PAFC 1995).

With an average production of 1 000 culms/ha/year (Castaño 1993), the total *Guadua* culm production for the four central-western departments can be calculated to be 20.3 million of green culms per year, equivalent to 911 745 ton/year in green conditions (45 T-m/ha).

The native woody bamboo species of Colombia are:

*Arthrostylidium auriculatum* X. Londoño & L.G. Clark  
*A. chiribiquetensis* X. Londoño & L.G. Clark

*A. ecuadorensis* Judziewicz & L.G. Clark  
*A. pubescens* Ruprecht  
*A. punctulatum* X. Londoño & L.G. Clark  
*A. simpliciusculum* (Pilger) McClure  
*A. venezuelae* (Steud) McClure  
*A. virolinensis* X. Londoño & L.G. Clark  
*A. youngianum* L.G. Clark & Judziewicz  
*Aulonemia bogotensis* L.G. Clark, X. Londoño & Kobayashi  
*A. patula* (Pilger) McClure  
*A. pumila* L.G. Clark & Londoño  
*A. queko* Goudot  
*A. robusta* L.G. Clark & X. Londoño  
*A. trianae* (Munro) McClure  
*Chusquea albilanata* L.G. Clark & Londoño  
*C. angustifolia* (Soderstrom & Calderon) L.G. Clark  
*C. antioquiensis* L.G. Clark & X Londoño  
*C. arachniforme* L.G. Clark & X. Londoño  
*C. aff. fendleri* Munro  
*C. grandiflora* L.G. Clark  
*C. latifolia* L.G. Clark  
*C. lehmannii* ssp. *lehmannii* Pilger  
*C. lehmannii* ssp. *farinosa* L.G. Clark & X. Londoño  
*C. ligulata* Munro  
*C. londoniae* L.G. Clark  
*C. longiprophylla* L.G. Clark  
*C. maculata* L.G. Clark  
*C. pallida* Munro  
*C. purdieana* Munro  
*C. scandens* Kunth  
*C. serpens* L.G. Clark  
*C. serrulata* Pilger  
*C. simpliciflora* Munro  
*C. sneidernii* Asplund  
*C. spadicea* Pilger  
*C. spathacea* L.G. Clark  
*C. spencei* Ernest  
*C. spencei* X *C. tessellata* (hybrid)  
*C. subulata* L.G. Clark  
*C. tessellata* Munro  
*C. tuberculosa* Swallen  
*C. uniflora* Steudel  
*Elytrostachys clavigera* McClure  
*E. typical* McClure  
*Guadua amplexifolia* Presl

*G. angustifolia* Kunth  
*G. angustifolia* var. *bicolor* Londoño  
*G. angustifolia* var. *nigra* Londoño  
*G. glomerata* Munro  
*G. paniculata* Munro  
*G. superba* Huber  
*G. weberbaueri* Pilger  
*Merostachys* sp.  
*Neurolepis acuminatissima* (Munro) Pilger  
*N. aperta* (Munro) Pilger  
*N. aristata* (Munro) Hitchcock  
*N. mollis* Swallen  
*N. nobilis* (Munro) Pilger  
*N. petiolata* Davidse & L.G. Clark  
*N. silverstonei* Davidse & L.G. Clark  
*N. stuebelii* (Pilger) Pilger  
*Otatea fimbriata* Soderstrom  
*Rhipidocladum abregoensis* X. Londoño & L.G. Clark  
*R. angustiflorum* (Stapf) McClure  
*R. geminatum* (McClure) McClure  
*R. harmonicum* (Parodi) McClure  
*R. longispiculatum* X. Londoño & L.G. Clark  
*R. parviflorum* (Trinius) McClure  
*R. racemiflorum* (Steudel) McClure

### **Ecuador (6 genera, 42 species)**

Ecuador, for its size, possesses an impressive diversity of woody bamboos (Clark 1997). Up to the present, 6 genera and 42 species have been identified (11 endemics ones), with about 15 species remaining to be described.

It is difficult to evaluate the contribution that the rural communities have made to the country's economy because their productive effort has been statistically underestimated. Unlike other Latin American countries, Ecuador has included some bamboo species of the Andean forest (2 000 m above sea level) in its natural resources management program.

The Ecuadorian woody bamboos are largely montane, with half of the species found at an altitude of 2 500 to 3 500 m (Clark 1997). The greatest diversity in Ecuador is found in the eastern Cordillera, with 74% of the total species, followed by the western Cordillera with 38% (Clark 1997).

The provinces of Loja, Napo, Pichincha, Azuay and Chimborazo have the greatest woody bamboo diversity. Although the Pacific watershed has the least bamboo species diversity, it is where bamboo has primary importance in terms of economy and applications.

Among the 6 woody bamboo genera, *Chusquea* claims the vast majority (41%) of the species. *Arthrostylidium*, *Aulonemia*, *Rhipidocladum*, *Neurolepis* and *Guadua* are also present, but with lower diversity.

*G. angustifolia*, because of its economic importance, occupies a prime position in the economy of the country. Species of *Chusquea*, *Aulonemia* and *Rhipidocladum* also have several reported uses among the highlands communities.

The area of *Guadua angustifolia* in the Ecuadorian natural forest is estimated to be 2 000 ha, of which 18 792 ha occurs in the five provinces of the Coastal Region. The total area of natural *Guadua* forest in the Coastal Region represents approximately 75% of the national total, with 93% of the *Guadua* stands below 0.5 ha in size.

With an estimated average production of 1 376 culms/ha/year, the total amount of *Guadua* culm production for this region is 25.86 million of green culms per year, equivalent to 814 500 tons/year in green conditions (43.3 T-m/ha in green condition).

The banana producers have selected *Bambusa vulgaris* as the most recommended bamboo for the production of “cujes” (props) because of its ease of reproduction, rapid growth, greater growth of culms per unit area and smaller culm size (which facilitates harvesting and use).

The native woody bamboo species of Ecuador are the following:

*Arthrostylidium ecuadorensis* Judziewicz & L.G. Clark

*A. simpliciusculum* (Pilger) McClure

*A. youngianum* L.G. Clark & Judziewicz

*Aulonemia haenkei* (Ruprecht) McClure

*A. hirtula* (Pilger) McClure

*A. longiaristata* L.G. Clark & X. Londoño

*A. patula* (Pilger) McClure

*A. queko* Goudot

*Chusquea albilanata* L.G. Clark & X. Londoño

*C. exasperata* L.G. Clark

*C. falcata* L.G. Clark

*C. lehmannii* ssp. *lehmannii* Pilger

*C. lehmannii* ssp. *farinosa* L.G. Clark & X. Londoño

*C. leonardiorum* L.G. Clark

*C. londoniae* L.G. Clark

*C. loxensis* L.G. Clark

*C. macclurei* L.G. Clark

*C. neurophylla* L.G. Clark

*C. perligulata* (Pilger) McClure

*C. aff. polyclados* Pilger

*C. scandens* Kunth

*C. serpens* L.G. Clark

*C. simpliciflora* Munro

*C. subulata* L.G. Clark

*C. tessellata* Munro  
*C. uniflora* Steudel  
*Guadua angustifolia* Kunth  
*G. superba* Huber  
*G. weberbaueri* Pilger  
*Neurolepis aperta* (Munro) Pilger  
*N. aristata* (Munro) A. Hitchcock  
*N. asymmetrica* L.G. Clark  
*N. elata* (Kunth) Pilger  
*N. fimbriiligulata* ssp. *fimbriiligulata* L.G. Clark  
*N. nana* L.G. Clark  
*N. nobilis* (Munro) Pilger  
*N. rigida* L.G. Clark  
*N. stuebelii* (Pilger) Pilger  
*N. villosa* L.G. Clark  
*N. weberbaueri* Pilger  
*Rhipidocladum harmonicum* (Parodi) McClure  
*R. racemiflorum* (Steudel) McClure

### **Venezuela (10 genera, 60 species)**

Venezuela has the third highest woody bamboo diversity in Latin America. At present 10 genera and 60 species, 18 of them endemics, are reported with several species remaining to be described. A large part of the diversity is in the Guyana region, which has the endemic genus *Myriocladus* as well as endemic species of *Arthrostylidium*, *Aulonemia*, *Neurolepis* and *Rhipidocladum*.

The Venezuelan states with the highest woody bamboo diversity are: Bolivar, Amazonas, Tachira, Distrito Federal and Merida. The southern states (Amazonas and Bolivar) hold the greater diversity and number of woody bamboo species (63%), followed by the Andean region (38%).

The majority of the species belong to the genera *Myriocladus* and *Chusquea* (37%). The rest of the species are from the genera *Guadua*, *Aulonemia*, *Arthrostylidium*, *Neurolepis*, *Rhipidocladum*, *Elytrostachys*, *Merostachys* and *Atractantha*.

The genus *Guadua* is well represented in Venezuela and only Brazil has a greater *Guadua* species diversity. Currently in Venezuela, there are seven species described and confirmed with another three or so remaining to be described.

The use of bamboo in the country is not significant and it contributes little to the local economy. However, interest has been expressed by various government agencies in bamboo as a natural resource.

The genera *Guadua* and *Bambusa* are the only ones that might have at least a modest economic value in this country. Bamboo is still used by peasants and indigenous communities for building homes and for making various household utensils (Pittier 1926; Corredor 1966).

*Bambusa bambos* and *B. vulgaris* are widely cultivated in Venezuela and are mainly used to construct homes, to make racks to dry tobacco and to stabilize riverbanks.

*Guadua angustifolia* and *B. vulgaris* are the most promising species.

*Guadua angustifolia* occurs in the states of Merida, Tachira, Barinas and Amazonas, at lower and middle montane forest, mainly at the edge of riverbanks and creeks, at elevations of 100 to 1 000 m. It is locally called “guafa”, “guafa real” or “bambu” (Mendoza 1992).

*Guadua angustifolia* has been studied in the Forestry Reserve of Ticoporo, in the state of Barinas, where several undergraduate theses from the Faculty of Forestry Sciences of the University of Los Andes were carried out (Calderon and Areque 1965; Corredor 1966; Perez 1967; Mejia 1975; Zerpa 1987; Paredes 1991).

The total area of natural *Guadua* forest in Venezuela is difficult to estimate. There is no national or regional inventory of the *Guadua* forest or clumps that could help in calculating an estimated area. The only available inventory is about the 6 000 ha of *Guadua* (2.88%) in the Forestry Reserve of Ticoporo, which extends to 210 000 ha (Calderon and Areque 1965).

According to Corredor (1966), the average green weight of *G. angustifolia* in Venezuela is 59.6 kg, with an average green weight equal to 44.5 T-m/ha, equivalent to an average dry weight of 30.7 T-m/ha. On comparison with Asiatic species, such as *Melocanna bambusoides* (21 T-m/ha), *B. polymorpha* (22 T-m/ha) and *B. arundinacea* (32-36 T-m/ha), *G. angustifolia* represents a bountiful harvest (Corredor 1966).

The native woody bamboo species of Venezuela are:

- Arthrostylidium longiflorum* Munro
- A. pubescens* Ruprecht
- A. sarmentosum* Pilger
- A. scandens* McClure
- A. schomburgkii* (Bennett) Munro
- A. venezuelae* (Steudel) McClure
- Atractantha amazonica* Judziewicz & L.G. Clark
- Aulonemia chimantaensis* Judziewicz & Davidse
- A. deflexa* (N.E. Brown) McClure
- A. juaensis* Judziewicz & Davidse
- A. purpurata* (McClure) McClure
- A. robusta* L.G. Clark & X. Londoño
- A. subpectinata* (O. Kuntze) McClure
- A. trianae* (Munro) McClure
- Chusquea angustifolia* (Soderstrom & Calderon) L.G. Clark
- C. fendleri* Munro
- C. linearis* N.E. Brown
- C. maculata* L.G. Clark
- C. pallida* Munro
- C. scandens* Kunth
- C. serpens* L.G. Clark
- C. simpliciflora* Munro
- C. spencei* Ernst

*C. tessellata* Munro  
*Elytrostachys clavigera* McClure  
*E. typica* McClure  
*Guadua amplexifolia* Presl  
*G. angustifolia* Kunth  
*G. ciliata* X. Londoño & Davidse  
*G. glomerata* Munro  
*G. latifolia* Kunth  
*G. paniculata* Munro  
*G. aff. paraguayana* Doell  
*G. weberbaueri* Pilger  
*Merostachys maguireorum* McClure  
*M. retrorsa* McClure  
*Myriocladus cardonae* Swallen  
*M. churunensis* Swallen  
*M. distantiflorus* Swallen  
*M. exsertus* Swallen  
*M. grandifolius* Swallen  
*M. involutus* Judziewicz & Davidse  
*M. longiramosus* Swallen  
*M. neblinaensis* Swallen  
*M. paludicolus* Swallen  
*M. simplex* Swallen  
*M. steyermarkii* Swallen  
*M. virgatus* Swallen  
*Neurolepis angusta* Swallen  
*N. diversiglumis* Soderstrom  
*N. glomerata* Swallen  
*N. mollis* Swallen  
*N. pittieri* McClure  
*N. virgata* (Grisebach) Pilger  
*Rhipidocladum ampliflorum* (McClure) McClure  
*R. angustiflorum* (Stapf) McClure  
*R. geminatum* (McClure) McClure  
*R. parviflorum* (Steudel) McClure  
*R. racemiflorum* (Steudel) McClure  
*R. sibilans* Davidse, Judziewicz & Clark

## Central America

The increase in the use of bamboo in Central America in the last 20 years was driven in large measure by the scarcity of other natural resources owing to deforestation, over-harvesting and overpopulation, and to the limitations of the economies of these countries. This has encouraged people to view this rapidly growing, renewable resource as an alternative material for solving

housing problems, for the protection and recuperation of the environment, and for jobs creation through the development of the cottage-level handicrafts industry and the construction sector.

### **Panama (7 genera, 21 species)**

In Panama, bamboo is scarcely used as an economic plant. However, Panama is the third richest country in woody bamboo diversity in Central America: 43% of its species belong to the genus *Chusquea*, and the rest belong to the genera *Arthrostylidium*, *Aulonemia*, *Elytostachys*, *Guadua*, *Neurolepis* and *Rhipidocladum*.

*G. angustifolia* has been cultivated in the Canal Zone Experimental Garden, from where it has been distributed to several Latin American countries, including Peru, Costa Rica, Guatemala and Cuba (US National herbarium). It is doubtful whether this species exists in this country in any natural distribution; it may have spread from the Canal Zone, where it was introduced from Ecuador in 1924 by Mr. Holgar Johansen, according to specimen at the Smithsonian Institution in Washington, D.C.

According to Young and Judd (1992), some of the plants collected as wild have been so suspiciously close to the experiment stations that they might be just escapes. Another unresolved problem in its natural distribution is the role that human cultivation has played in transporting this huge potential species (Young and Judd 1992).

The following woody bamboo species are native to Panama:

- Arthrostylidium excelsum* Grisebach
- A. judziewiczii* Davidse
- A. pubescens* Ruprecht
- A. venezuelae* (Steudel) McClure
- Aulonemia patriae* R. Pohl
- Chusquea amistadensis* L.G. Clark, Davidse & Ellis
- C. grandiflora* L.G. Clark
- C. longifolia* Swallen
- C. pittieri* Hackel
- C. pohlii* L.G. Clark
- C. serpens* L.G. Clark
- C. simpliciflora* Munro
- C. subtessellata* Hitchcock
- C. vulcanalis* (Soderstrom & Calderon) L.G. Clark
- Elytostachys clavigera* McClure
- Guadua angustifolia* Kunth
- G. macclurei* R. Pohl & Davidse
- G. paniculata*
- Neurolepis pittieri* McClure
- Rhipidocladum panamense* R. Pohl
- R. racemiflorum* (Steudel) McClure

### **Costa Rica (8 genera, 39 species)**

Costa Rica is the country with the largest woody bamboo diversity in Central America. At present, 8 genera and 39 species of woody bamboos are reported (Montiel 1998).

The majority of the Costa Rican native woody bamboos (54%) belong to the genus *Chusquea*, and the rest belong to the genera *Arthrostylidium*, *Rhipidocladum*, *Guadua*, *Aulonemia*, *Elytrostachys*, *Merostachys* and *Neurolepis*.

Costa Rica and Mexico are the only countries in Central America where bamboo, especially *G. angustifolia*, has been developed in the last 15 years and where it occupies a significant position in the economy. However, the uses of most native species in Costa Rica have been insignificant (Montiel 1998). It is known that *Chusquea pittieri*, locally called “cana brava” or “caneula”, is used in the province of Cartago for Christmas decorations (herbarium specimen: Pohl 13098). Its culms reach 10-20 m in height and up to 5 cm in diameter, are straight at the base and arched at the tip (Davidse et al. 1994). According to Rodriguez (1990), *C. pittieri* is a promising species for light structures and furniture.

*Elytrostachys clavigera* has been developed in the Valley of Talamanca as a potential material for bamboo weaving (Widmer 1990). It occurs naturally in the provinces of Alajuela, Puntarenas, Limon, San José and Heredia.

The genus *Guadua* in Costa Rica is represented by three species: *G. amplexifolia* (locally called “cana brava”) in the Provinces of Guanacaste and Nicoya; *G. macclurei* in the provinces of Alajuela and Puntarenas; and *G. paniculata* in the provinces of Guanacaste and Puntarenas. The presence of *G. aculeata* needs to be confirmed in the northern part of the country. The species *G. angustifolia* is introduced.

Following, the native woody bamboo species of Costa Rica:

- Arthrostylidium excelsum* Grisebach
- A. judziewiczii* Davidse
- A. merostachyoides* R. Pohl
- A. pubescens* Ruprecht
- A. venezuelae* (Steudel) McClure
- Aulonemia patriae* R. Pohl
- A. viscosa* (Hitchcock) McClure
- Chusquea amistadensis* L.G. Clark, Davidse & Ellis
- C. coronalis* Soderstrom & Calderon
- C. foliosa* L.G. Clark
- C. liebmanni* Fournier
- C. longifolia* Swallen
- C. longiligulata* (Soderstrom & Calderon) L.G. Clark
- C. paludicola* L.G. Clark
- C. patens* L.G. Clark
- C. pittieri* Hackel
- C. pohlii* L.G. Clark
- C. scabra* Soderstrom & Calderon
- C. serpens* L.G. Clark

*C. simpliciflora* Munro  
*C. subtessellata* Hitchcock  
*C. subtilis* Widmer & L.G. Clark  
*C. sulcata* Swallen  
*C. talamancensis* Widmer & L.G. Clark  
*C. tomentosa* Widmer & L. Clark  
*C. tonduzii* Hackel  
*C. virgata* Hackel  
*C. vulcanalis* (Soderstrom & Calderon) L.G. Clark  
*Elytrostachys clavigera* McClure  
*Guadua amplexifolia* Presl  
*G. macclurei* Pohl & Davidse  
*G. paniculata* Munro  
*Merostachys latifolia* R. Pohl  
*Neurolepis pittieri* McClure  
*Rhipidocladum clarkiae* R. Pohl  
*R. maxonii* (Hitchcock) McClure  
*R. pacuarensis* R. Pohl  
*R. pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

#### **Nicaragua (4 genera, 9 species)**

Nicaragua is a country with relatively few species of native bamboos but with widespread *Guadua* species covering the eastern alluvial plains. The genus *Guadua* includes four species: *G. amplexifolia*, *G. aculeata*, *G. macclurei* and *G. paniculata*.

*G. amplexifolia* occurs in greatest abundance in eastern Nicaragua, in a narrow but more or less continuous band along the rivers emptying into the Caribbean between Puerto Cabezas and Bluefields. Occasionally, it occurs in openings in the forest either as pure stands or mixed with trees and shrubs. It is known to the Mesquite community as “cauro” and is used in local construction (McClure and Stevenson 1946).

McClure and Stevenson (1946) estimated a *G. amplexifolia* cover of 12 000 ha; the largest *Guadua* forests were found along the rivers Prinzapolca, Wawa, Coco and Rio Grande. It is probable that the most preserved bamboo area is in the north-eastern part of the country.

In 1945, *Guadua angustifolia* was introduced from the Canal Zone, Panama, into the Agricultural Experimental Station E1 Recreo in Bluefields, where other exotic bamboos were also introduced (Widmer 1990).

It can be said that Nicaragua is a country where government and private institutions have made intensive efforts to explore and develop its bamboo resources.

The native woody bamboo species of Nicaragua are:

*Arthrostylidium excelsum* Grisebach  
*A. venezuelae* (Steudel) McClure

*C. simpliciflora* Munro  
*Guadua amplexifolia* Presl  
*G. aculeata* Fournier  
*G. macclurei* R. Pohl & Davidse  
*G. paniculata* Munro  
*Rhipidocladum pacuarensense* R. Pohl  
*R. pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

### **Honduras (6 genera; 11 species)**

Of the 11 native woody bamboo species occurring in Honduras, only 4, besides several Asiatic ones, have economic potential.

*Otatea fimbriata*, *Guadua amplexifolia*, *G. aculeata* and *G. paniculata* are the native bamboos that can be promoted as useful in environmental protection and in economic activities.

At present, *G. aculeata* grows wild at the western end of Cordillera de Nombre de Dios at 700-900 m elevation, and probably also in the Lancetilla valley. *G. amplexifolia* occurs in the departments of Cortez and Comayagua at 200-700 m elevation. *G. paniculata* is the most widespread *Guadua* species in the country; it is found along riverbanks between Guatemala and Honduras border, and in the departments of El Paraiso, Olancho and Cortez at elevations of 300-600 m.

During the height of banana production, the United Fruit Company made in Lancetilla and extensive experimental planting of native and introduced bamboos for trial as banana props (McClure 1951). About 61% of the exotic bamboos species occurring in Central America are growing in this Experimental Station. *Guadua* was an important resource for the company (McClure 1996). Natural populations of the genus have now diminished by over-harvesting.

Following are the native woody bamboo species of Honduras:

*Arthrostylidium excelsum* Grisebach  
*Aulonemia clarkiae* Davidse & R. Pohl  
*C. deflexa* L.G. Clark  
*C. lanceolata* Hitchcock  
*Guadua amplexifolia* Presl  
*G. aculeata* Fournier  
*G. macclurei* R. Pohl & Davidse  
*G. paniculata* Munro  
*Otatea fimbriata* Soderstrom  
*R. pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

### **El Salvador (6 genera, 11 species)**

El Salvador is the smallest country in Central America, and it has the highest deforestation and overpopulation. Probably, some of the 11 species reported in the country do not exist any more.

There are several reports on the use of native bamboos -- belonging to the genera *Guadua*, *Otatea* and *Elytostachys* -- that occur below 1 000 m elevation.

*G. amplexifolia* occurs in areas adjacent to Tecoluca (San Vicente Department), Zacatecoluca (La Paz Department) and Canton Soledad (Cabañas Department) at elevations of 400 to 800 m. *G. aculeata* occurs in the vicinity of Ahuachapan (Ahuachapan Department) at 900 to 1 050 m elevations. *G. paniculata* (locally known as “cana brava”) is found in the Departments of Cuscatlan and Cabañas growing wild on dry ridges at elevations of 540-870 m. More recently, *G. paniculata* has been reported in Chalatenango Department, at 300 m elevation.

McClure brought around 20 species of Asiatic bamboos from Puerto Rico, the Canal Zone and El Paraiso (Honduras) and planted them at San Andres. At present, the National Center of Agricultural Technology (CENTA) has the largest bamboo collection in the country, with 17 species of native and exotic bamboos, mostly from McClure’s introductions (Widmer 1990).

The native woody bamboo species in El Salvador are the following:

*Chusquea coronalis* Soderstrom & Calderon  
*C. deflexa* L.G. Clark  
*C. liebmannii* Fournier  
*Guadua amplexifolia* Presl  
*G. aculeata* Fournier  
*G. paniculata* Munro  
*Elytostachys clavigera* McClure  
*Merostachys latifolia* R. Pohl  
*Otatea fimbriata* Soderstrom  
*Rhipidocladum pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

### **Guatemala (5 genera, 17 species)**

Guatemala is a country with many species of native woody bamboos, majority of them belonging to the genus *Chusquea* and the rest to the genera *Arthrostylidium*, *Guadua*, *Otatea* and *Rhipidocladum*.

Guatemala is one of the first Central American countries to focus its attention on bamboo as a potential renewable resource. Native woody bamboos are widespread in the country. Although 53% of the species belong to the genus *Chusquea*, only two – *C. longifolia* and *C. nelsonii* -- are reported as useful.

*Guadua* is represented by *G. aculeata*, *G. longifolia* and *G. paniculata*. The largest in size is *G. aculeata*, which occurs at 50-500 m elevations in the departments of Izabal, Quirigua, Retalhuleu and Suchitepequez. The species is locally called “taro” and used for house construction.

*G. angustifolia* was introduced into Guatemala from Panama in 1946 at the Experimental Gardens of the Instituto Agropecuario Nacional (Hda. Chocoma). In the same year, *G. aculeata* from Honduras was also brought and cultivated here. At present, 15 species of Asiatic bamboos are cultivated in the farms at Chocoma, Colombia, La Maquina and Pantaleon (Widmer 1990).

The native woody bamboo species of Guatemala are:

*Arthrostylidium excelsum* Grisebach  
*Chusquea coronalis* Soderstrom & Calderon  
*C. deflexa* L.G. Clark  
*C. lanceolata* Hitchcock  
*C. liebmannii* Fournier  
*C. longifolia* Swallen  
*C. nelsonii* Scribner & J.G. Smith  
*C. pittieri* Hackel  
*C. simpliciflora* Munro  
*C. sulcata* Swallen  
*Guadua aculeata* Fournier  
*Guadua longifolia* (Fournier) R. Pohl  
*G. paniculata* Munro  
*Otatea fimbriata* Soderstrom  
*Rhipidocladum bartlettii* (McClure) McClure  
*R. pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

#### **Belize (4 genera, 4 species)**

This small flat country is the only one in Central America without any *Chusquea* species. Belize, however, is well known for the *Guadua longifolia* populations along the Belize river and its tributaries on the Yucatan Peninsula.

Following are the native woody bamboo species of Belize:

*Guadua longifolia* (Fournier) R. Pohl  
*Merostachys pauciflora* Swallen  
*Otatea fimbriata* Soderstrom  
*Rhipidocladum bartlettii* (McClure) McClure

#### **Mexico (8 genera, 35 species, 2 subspecies)**

Mexico is the second most diverse in Central America in terms of woody bamboos. At present, 8 genera and 37 species are reported with one genus, *Olmeca*, and 14 species being endemic.

The majority (47%) of its species belong to the genus *Chusquea*, and the remaining to *Arthrostylidium*, *Aulonemia*, *Guadua*, *Olmeca*, *Otatea* and *Rhipidocladum*.

In Mexico, some *Guadua* and *Otatea* species are used by local communities. There are several common names for the *Chusquea* species -- such as “Carrizo”, “otatillo”, “camalote” and “chajiche” -- and there are reports that the culms of these are used to make baskets.

*Guadua* has 5 species, almost all of them are utilized for various purposes: *G. aculeata*, *G. amplexifolia*, *G. longifolia*, *G. paniculata* and *G. velutina*.

In the last 5 years *G. angustifolia* has been cultivated in Chiapas and Tabasco. The initial material was brought from Quindio, Colombia, and more than 4 000 ha are cultivated in southern Mexico for commercial purposes. Other commercial plantations are being raised with *G. amplexifolia*.

The most common introduced Asiatic bamboos in Mexico are *Bambusa vulgaris* and *B. vulgaris* var. *vittata*. Probably, there are more Asiatic bamboos but they are not documented in herbarium collections (Davidse et al. 1994).

The woody bamboo species native to Mexico are:

*Arthrostylidium excelsum* Grisebach  
*Aulonemia clarkiae* Davidse & R. Pohl  
*A. fulgor* Soderstrom  
*A. laxa* (F. Maekino) McClure  
*Chusquea aperta* L.G. Clark  
*C. bilimekii* Fournier  
*C. circinata* Soderstrom & Calderon  
*C. coronalis* Soderstrom & Calderon  
*C. foliosa* L.G. Clark  
*C. galeottiana* Munro  
*C. glauca* L.G. Clark  
*C. lanceolata* Hitchcock  
*C. liebmannii* Fournier  
*C. longifolia* Swallen  
*C. muelleri* Munro  
*C. nelsonii* Scribner & Smith  
*C. repens* ssp. *oaxacacensis* L.G. Clark & X. Londoño  
*C. repens* ssp. *repens* L.G. Clark & X. Londoño  
*C. perotensis* L.G. Clark, G. Cortes & Chazaro  
*C. pittieri* Hackel  
*C. simpliciflora* Munro  
*C. sulcata* Swallen  
*Guadua amplexifolia* Presl  
*G. aculeata* Fournier  
*G. longifolia* (Fournier) R. Pohl  
*G. paniculata* Munro  
*G. velutina* X. Londoño & L.G. Clark  
*Merostachys* sp.  
*Olmeca recta* Soderstrom  
*O. reflexa* Soderstrom  
*Otatea acuminata* ssp. *acuminata* Calderon & Soderstrom  
*O. acuminata* ssp. *aztecorum* (McClure & E. Smith) Guzman et al.  
*Otatea fimbriata* Soderstrom  
*Rhipidocladum bartlettii* (McClure) McClure  
*R. martinezii* Davidse & R. Pohl  
*R. pittieri* (Hackel) McClure  
*R. racemiflorum* (Steudel) McClure

## **The Caribbean and West Indies**

The native bamboo species in the Caribbean and West Indies are confined to small-sized bamboos less than 1 cm in diameter. Because of this, they do not have any economic value. However, Asiatic species have entered conspicuously into the local economy on some islands.

At present, the Caribbean and West Indies are known to have 4 genera and 36 species of native woody bamboos, with the richest bamboo diversity being in Cuba. Like Chile, the Caribbean the West Indies islands also do not have any natural distribution of the genus *Guadua*.

*Bambusa vulgaris* is perhaps the most widely cultivated exotic species in the Caribbean region. It is most abundant in the islands of Cuba, Jamaica, Dominican Republic and Puerto Rico, where it has become an important wood source for multiple uses.

The Caribbean not only initiated the industrialization of bamboo in the region, with a small mill located in near St. Augustine in Trinidad, but also initiated the introduction and cultivation of exotic and useful bamboos from the Old World.

The Tropical Agricultural Research Station (TARS) in Mayaguez, Puerto Rico, began the introduction and cultivation of bamboo at the time of its foundation in 1901, and continues to the present day (Edelman et al. 1985). The 1930s and 1940s were perhaps the most active period at TARS with respect to the development of bamboo. During this time, bamboo species from the collection were widely distributed in Puerto Rico and other parts of the Caribbean as well as in several countries of Latin America.

The species *Guadua angustifolia* has been introduced to several Caribbean islands. Besides Puerto Rico, it is cultivated also in the Botanical Garden of Cienfuegos, Cuba, and it is probable that the species has been introduced to the Dominican Republic and Jamaica.

The native woody bamboo species of the Caribbean and West Indies are:

- Arthrostylidium angustifolium* Nash
- A. banoense* Catasus Guerra
- A. cubense* Ruprecht
- A. distichum* Pilger
- A. ekmanii* Hitchcock
- A. excelsum* Grisebach
- A. farctum* (Aublet) Soderstrom & Lourteig
- A. fimbriatum* Grisebach
- A. haitiense* (Pilger) Hitchcock & Chase
- A. multispicatum* Pilger
- A. obtusatum* Pilger
- A. pinicolum* Catasus Guerra
- A. reflexum* Hitchcock & E. Ekman
- A. sarmentosum* Pilger
- A. urbanii* Pilger
- A. venezuelae* (Steudel) McClure
- Chusquea abietifolia* Grisebach
- Neurolepis virgata* (Grisebach) Pilger - Trinidad
- Rhipidocladum prestoei* (Munro) McClure - Trinidad

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