

TITLE: Vision of the Bamboo in Cuba. Retrospective, current situation and perspectives.

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SUMMARY.

The Bamboo was introduced in Cuba in the second half of the XIX century and today it counts with a rich collection of 7 goods and 19 species of native bamboo as well as 7 goods and 22 species and 4 exotic varieties.

The species of native bamboo are of small size and herbaceous, reason for the one which they don't have economic value. However the Asians exotic species have penetrated visibly in the local economy of the country, being constituted the species *Bambusa vulgaris* var. *vulgaris* Shard, the exotic one more cultivated and adapted to the edafoclimatic conditions of Cuba.

It didn't go up to 1989 with the foundation of the National Group of the Bamboo, the Institute of Forest investigations (IIF) that began to carry out organized works with these species, through an approved program of Investigations for the Cuban State that contemplated the lines of:

- ❖ Ecology and Botany.
- ❖ Handling Propagation and use.
- ❖ Cured and preservation.
- ❖ Physical and mechanical estates.
- ❖ Recommendation uses.

In the year 1994 it began to obtain the first results, those that immediately were introduced in the productive practice through the Integral Forest **Enterprise**, standing out among other results the reforestation of the Basins hidrográficas and the strips hidrorregulators of the rivers: Cauto, Bayamo, Zaza, Almendares, Toa, Duaba, Miel, Guaso etc.

Also in the year 2000 it presented an industrial development project to the one which was approved in 2002 by this Organization and beginning the Installation of a Shop of agglomerated boards or panels of Bamboo, at the moment in phase of Investigative production. The Cuban State has given great importance to the use of these species in the field, before aforementioned and therefore the Ministry of the Agriculture of Cuba, as well as other tenets areas has incorporated these species in their prospective plans of reforestation.

All this redounded among other things, in helping. It is necessary to avoid the erosion in fragile areas, to have wooden elements that it avoids the pressure to the forests, as well as to the fixation of CO₂ of the atmosphere.

INTRODUCTION.

The Republic of Cuba is an archipelago constituted by the Island of Cuba, The Island of the Youth and around 4 195 keys and other islands. It has a total surface area 110 922 Km₂ and is located at the entrance of the Gulf of Mexico, in the middle of the Caribbean Sea.

The countries next to Cuba are: 180 Km to the north of the United States of North America, to the west the peninsula of Yucatan, United States of Mexico at 210 Km. To the east with the Republic of Haiti at 77 Km, and to the south with the Island of Jamaica at 140 Km. The islands of the Bahamas are at the northwest of Cuba at the extreme west.

Most of the Cuban territories are formed by a fertile plain. The most mountainous groups important are: The Sierra de los Organos, in the Western Region, the Sierra del Escambray, in the country center, La Sierra Maestra in the southern region of the west end and La Sierra Nipe-Sagua-Baracoa, in the north of those, west territories. The biggest country elevation is the Real Pick of the Turquino which reaches at a height of 1974 msnm.

The moderate subtropical climate is due to the vicinity of the Tropic of Cancer and to the Long and narrow configuration of the archipelago, it receives the action of the winds trade, and during the winter the influence of masses of cold air coming from the north. The months of rain are from May to October and the dry period from April to November.

The island of Cuba is exposed to the hurricanes, starting from June to November. Political and administratively, It is divided in 14 provinces and a special municipality. The provinces are from west to east: Pinar del Río, Habana, Ciudad de la Habana, Matanzas, Villa Clara, Cienfuegos, Sancti Spiritus, Ciego de Ávila, Camagüey, Las Tunas, Holguín, Granma, Santiago de Cuba and Guantánamo.

The population of Cuba is of 11, 2 million habitants, the capital is Havana with more than two million habitants, other important cities are: Santiago de Cuba, Holguín, Santa Clara, Matanzas, Cienfuegos, Camagüey, Ciego of Ávila, Bayamo. The special municipality Isla de la Juventud it is to the South of the provinces of Habana. (Atlas of Cuba, 1985).

RETROSPECTIVE.

Cuba is the Island of America that has the richest diversity bamboos. In it there are located 7 goods and 19 species of native bamboos, as well as seven goods, 22 species and 4 exotic varieties, introduced at the end of the XIX century and until half of the XX century. The native bamboos are generally of small sizes and herbaceous. Due to that they don't have economic value. Nevertheless, the exotic Asians species have penetrated visibly in the local economy of the country. (Sastry 2001).

The *Bambusa vulgaris* var. *vulgaris*, is maybe the most exotic, cultivated in Cuba and in the region of the Caribbean, where it has become an important supplying source of wood with multiple uses. It was the first species introduced in the second half of the XIX century and it continues being today the species of bamboo of more propagation and use in the island. It grows

to the long and wide country and in all types of earth. In Cuba this bamboo species is known with the denominations of Caña Brava or bamboo.

It is observed in big quantities, mainly in the regions of the center and west of the country, in the hidrorregulators strips, basins and mountainous areas, their height averages oscillates between 13-16 meters, the diameter between 10-12 cm and the gross between 8-12 mm (Betancourt, 2003).

The other species arrived to our country in the period. They were introduced by the University of Harvard going to the Botanical Garden "La Soledad," at this moment Botanical Garden of Cienfuegos. (anexo.1)

The well-known Latin American species as *Guadua angustifolia* Kunth, as introduced in 1940 and it has been adapted satisfactorily to the conditions edafoclimaticas of the Botanical garden. Today this specie has been spread in other regions of the country with good results. (Ricardo and Herrera, 1995).

Besides the *Bambusa vulgaris* var. *vulgaris* and the *Guadua angustifolia* Kunth, others exotic species have spread in the island. They are: *Bambusa bamboos*, *Bambusa tulda*, *Dendrocalamus strictus*, *Dendrocalamus asper*, *Bambusa vulgaris* var. *vitata* and *Bambusa multiplex*. (Sastry 2001).

The second bambúes collection in Cuba is in the National Botanical Garden of Havana, although several provinces of the country (Holguín, Sancti-Spiritus, Granma And Isla de la Juventud possesses *Bambusetum* with several species. Also it can be observed bamboo plantations in the center of recreation and tourism, Stations Experimental, private properties etc. This has been possible starting from the material provided by the Botanical Gardens.

In general sense the cultivation of the exotic species of bambúes didn't have the stability that it was expected. During the period of 1930-1950 some projects settled down to great scale to cultivate the *Bambusa vulgaris*, but it never began.

But it is not up to 1989 with the creation of the National Group of Bamboo and Ratan (GNBR), bay the Institute of Investigations of the Ministry of Agriculture (MINAG), that it begins to develop investigative works starting from a National Project (1990-1995), for Cuban and international specialists, with different species of Bamboo, contributing several results to the productive practice. These investigations were materialized in the Forest Experimental Station of Tope de Collantes, belonging to the Institute of Forest Investigations, in the province of Sancti Spiritus. The road opened up for the scientific investigation as regards ecology, botany, propagation, handling, physical-mechanical estates of the culms of several bamboos species works, Enterprise by made up with cement, as well as other investigations, of estates and uses, vegetable coal etc.

From 1999 the Plan of National Plantation of Bamboo was elaborated, together with the Forest National Direction of MINAG, that began to be executed in the year 2000, in the Forest Integral Enterprise (EFI, it is 30 in the whole country), and for others tenants. This plantation program annually analyzes and it upgrades according to the approach of the managers and other tenants (CHART No.1).

CURRENT SITUATION.

At the moment concludes the Experimental Prototype of Bamboo Shop for the making of panels or boards, badges and profiles product of the Project ONUDI XP/CUB/02/007 in the Forest Integral Enterprise Bayamo, the MINAG and the Forest National Direction have also approved the limits for the crop of the bamboo based on the Technical Manual of the Bamboo Approved and published by the Institute of Forest Investigations.

They have also been carried out agreements of National Collaboration with different Institutions like the Ministry of Superior Education (Forest Ability of the University of Pinegrove of the River, with the Center of Research and development of those You structure and the Materials (CIDEM), of the University of Villa Clara, with the National Association of Small Farmers (ANAP), with the Association of Technicians Agricultural and Forest of Cuba and they get ready protocols of agreements with others Institutions, another National Project was Also approved on Bamboo for the 2006 2009, it stays relationships with different International Institutions as INBAR , FAO etc., as well as you presents a Project of Bilateral Collaboration with Vietnam on the topic of the Bamboo that this in study phase for the foreign part.

PERSPECTIVES.

With the application of the Technical Manual of the Bamboo and the limits of the Direction National Forest of the (MINAG), as well as the Program of Plantation of Bamboo until The 2015 approved in the year 2005, (**CHART No.2**) the perspectives are the following ones:

- ❖ Execution of the Program of Plantation.
- ❖ Execution of the prioritized species of Bamboos.
- ❖ To continue with the Investigations with other promissory species of bigger Productivity that it adapts to our edafoclimatic conditions.
- ❖ To begin with a modest production of panels, badges and profiles (5000 m²/year,) during 2006 and 2008 they enter in production of the areas of other species bigger productivity,
- ❖ To begin the sales that generates the directed Experimental Shop to the Tourist Industry and Local Industry for the making of furniture and others articles.
- ❖ To continue carrying out Agreements with Institutions for the development of the Bamboo.
- ❖ To continue elaborating National and International Projects for the financing of the Investigations and the development of the mainly community Bamboo.
- ❖ Began in the 2006 (second semester) the National project on productive chain, creative indicators, National Norma on the Bamboo, and records of costs).
- ❖ To continue with the training to the state and private producers.

CHART No.1 Inventory of the bamboo until December of the 2005.

	Existence of bamboo Provinces 2001-2005 in (ha)	Existence of bamboo 1900-1994 in (ha)	Existence of bamboo 1995-2000 in (ha)
Pinar del Río	30	20	30
Habana	20	10	10
Ciudad Habana	50	10	15
Matanzas	15	05	00
Villa Clara	30	10	20
Cienfuegos	42	20	10
Sancti Spiritus	65	10	30
Ciego de Ávila	05	00	00
Camagüey	10	00	00
Las Tunas	10	00	00
Holguín	60	180	200
Granma	80	300	400
Santiago de Cuba	85	200	200
Guantánamo	40	40	60
Total	542	735	975

CHART No.2 PROGRAM OF PLANTATION UP TO THE 2015. U/M ha

PROVICES	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Pinar del Rio	20	20	20	20	20	20	20	20	20	20	200
Havana	10	10	10	10	10	10	10	10	10	10	100
C.Habana	10	10	10	10	10	10	10	10	10	10	100
Matanzas	10	10	10	10	10	10	10	10	10	10	100
Villa Clara	40	50	50	50	50	50	50	50	50	50	490
Cienfuegos	10	10	10	10	10	10	10	10	10	10	100
Santi Spiritus	100	100	100	100	100	50	50	50	50	50	750
Ciego de .Avila	10	10	10	10	10	10	10	10	10	10	100
Camagüey	10	10	10	10	10	10	10	10	10	10	100
Las Tunas	10	10	10	10	10	10	10	10	10	10	100
Holguín	100	100	100	100	100	100	100	100	100	100	1000
Granma	200	200	200	150	150	150	150	150	150	150	1650
Santiago de Cuba	300	300	300	200	200	200	200	200	200	200	2300
Guantánamo	20	20	20	30	30	30	30	30	30	30	270
Total	850	860	860	720	720	670	670	670	670	670	7360

Prioritized species of Bamboo of the program of Plantation:

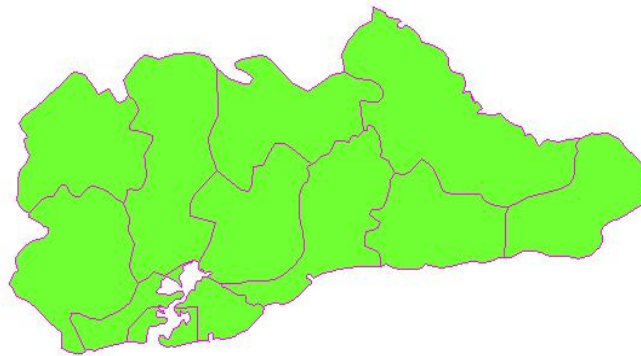
- ❖ *Guadua angustifolia* Kunth 50%
- ❖ *Dendrocalamus asper* 20%
- ❖ *Bambusa tulda* 20%
- ❖ *Bambusa vulgaris* 10%
- ❖ Total 100%

Marco of plantation 7x7 meters and 6 x 6 meters.

ANNEX 1. SPECIES DE EXOTIC BAMBUES IN VAT

- ✓ *Bambusa bambos* (L.) Voss
- ✓ *Bambusa balcooa* Roxbrurg
- ✓ *Bambusa longispiculata* former Gamble Brandis
- ✓ *Bambusa aff malingensis* McClure
- ✓ *Bambusa múltiplex* (Loureiro) Raeuschel
- ✓ *Bambusa múltiplex* cv. Alphonse-Karr
- ✓ *Bambusa múltiplex* cv. Fernieaf
- ✓ *Bambusa múltiplex* cv. Silvestripe.
- ✓ *Bambusa oldhami* Munro
- ✓ *Bambusa polymorpha* Munro
- ✓ *Bambusa tuldoidea* Munro
- ✓ *Bambusa ventricosa* McClure
- ✓ *Bambusa vulgaris* former Schareder Wendel.var. *vulgaris*
- ✓ *Bambusa vulgaris* var. *vitata* A. & C. Riviere
- ✓ *Cephalostachyum pergracile* Munro
- ✓ *Cephalostachyum* sp.
- ✓ *Dendrocalamus asper* (Schultes f.) Backer in Heyne
- ✓ *Dendrocalamus membranaceus* Munro
- ✓ *Dendrocalamus strictus* (Roxburgh) Nees
- ✓ *Gigantochloa apus* (Schultes) Kurz
- ✓ *Gigantochloa verticillata* (Willdenow) Munro
- ✓ *Guadua angustifolia* Kunth
- ✓ *Golden Phyllostachys* TO, & C. Riviere
- ✓ *Phyllostachys flexuosa* A. & C. Riviere
- ✓ *Phyllostachys meyeri* McClure
- ✓ *Pseudosasa japonica* (Siebold & Zuccarini) Makino.

BRIEF CHARACTERISATION THE PROVINCE GUANTANAMO, CUBA



The Province of Guantánamo has a total surface of 6 184.5 Km². It is located in the eastern end of Cuba, almost directly north with the province of Holguín, to the south with the Caribbean Sea, to the east with the windward passage and to the west with the province of Santiago de Cuba.

The fundamental production is coffee, cacao, forest products, several cultures and on a smaller scale the cattle ranch. It is characterized by a mountainous relief, including 75% of the territory, a scene where the forests develop the most forest activity grouped in three Forestry Enterprises. It has in addition a rich hydrographic network. The name of the province in native language means earth between rivers —

The Forestry Enterprise works in the handling and propagation of the bamboo with a program of plantation until the year 2015 from 30 to 40 ha by year. Integral to the Forestry Enterprise of Baracoa municipality included in its forest program the inventory of the bamboo species the objective to know the existence, their situation and to establish new plantations fundamentally of the *Bambusa vulgaris*. The data were obtained with the forest inventory of dry, green adult culms, medium altitude of the east long wait work I am made in the river basin of the Toa rivers and Duaba the total of inventoried area was around of 15 has sets out to work in 20 has

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Picture No.1 Bamboo plantation Cauto River. Granma province.



Picture No.2 Bamboo plantation Duaba River. Guantanamo province, municipally Baracoa.



Picture. 3 making of semi manufactured panels with the species *Bambusa vulgaris* var. *vulgaris*, in the EFI Bayamo, county Granma.



Picture. 4 plantation of *Guadua angustifolia* Kunth, in the municipality Sagua of Tanamo, county of Holguín.

