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## **Bamboo species to site matching**

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### **Abstract**

Bamboo species can grow in areas where the climate and soil are suitable for their environmental requirements. A geographic information system (GIS)-based program can display the potential areas suitable for each species according to the bamboo climate and soil requirements. INBAR is going to do bamboo species to site matching on global level. This paper shows a brief introduction on how this task will be completed.

### **Introduction**

Due to bamboo's contribution and great potential to social, economic, environmental and rural development, on the global level there is an increasing interest to develop bamboo forest/plantation. There are some questions to answer when bamboos are going to introduce other sites than their natural distribution areas such as where is the natural bamboo distribution area? What are the environmental requirements of each bamboo species? Where are the suitable area for growing bamboos other than in their natural habitats? What is the land suitability/productivity for rainfed and irrigated conditions in the introduction/growing area? Bamboo species to site matching can find the answers for these questions.

Several institutions such IPGRI (International Plant Genetic Resources Institute), FAO, CIAT (Center of International Agriculture at <http://www.floramap-ciat.org/floramap/portada.htm>) have done on the work similar to species-site matching. CIAT has a programme FloraMap on CD for five crops; FAO has a programme Ecocrop for 1971 plants that started in 1993 (<http://ecocrop.fao.org/>). Global Agro-ecological Zones ([http://www.fao.org/catalog/book\\_review/giii/x8489-e.htm](http://www.fao.org/catalog/book_review/giii/x8489-e.htm)), digital global climate map, digital soil map of the world and derived soil properties are available from FAO. Even the third version of Ecocrop became online in May 1999 at <http://pppis.fao.org>. The methodology for bamboo species-site matching should be known. FloraMap has used only climatic data, but Ecocrop has used climatic and soil data. If possible, bamboo species to site matching uses also climatic and soil data.

## Material and Methodology

### Material

Bamboo flora, papers, other publications and bamboo experts' consulting service are bamboo information sources for bamboo species to site matching. They are listed as follow:

China Forest, vol.4: Bamboo forest (China Forest Editing Committee)  
Flora of Chinese bamboo (Geng and Wang)  
Priority bamboos and rattans (IPGRI & INBAR)  
Manual of Grasses (Royal Horticultural Society)  
PROSEA 7: Bamboos (Dransfield and Widjaja)  
Index to Japanese Bambusaceae (Suzuki)  
Illustrated Horticultural Bamboo Species of Japan (Okamura, Tanaka, Konishi, and Kashiwagi)  
Genera Graminum (Clayton & Renvoize)  
Bamboos of Peninsular Malaysia (K. M. Wong)  
Compendium of Chinese Bamboos (Zhu, Ma, and Fu)  
Bamboos of Nepal and Bamboos of Bhutan (Stapleton)  
Bamboos of the World (Ohrnberger)  
Bamboos of India (Seethalakshmi and Kumar)  
American Bamboos (Judziewicz, Clark, Londoño, and Stern)  
Bamboo and Rattan Genetic Resources in Certain Asian Countries (Vivekanandan, Rao, and Rao).  
Notes on Some Species of Phyllostachys (Chao & Renvoize)  
ABS bamboo resource list 2000  
Other bamboo publications  
Other data sources: Consulting service of bamboo experts, IPGRI, volunteers

Bamboo database should collect the following data:

Latin name/synonym, alias, max/average/min size (dbh/diameter at ground level, height), shooting time, harvesting age, and use (timber, shoot, handicraft, weaving, medicine, agricultural use, soil and water conservation, ornament etc.)

Climatic and soil databank should include the following data:

Min. temperature of the coldest month, max temperature of the hottest month, yearly and monthly rainfall, rainfall/evapotranspiration, rainfall distribution (summer rain/winter rain), elevation, soil pH, salt content etc.

Softwares below are essential tools for bamboo species to site matching.

GIS (ARC/INFO AML), Access, Visual Basic 6.0, Global/regional digital climatic map considering altitude (DEM—digital elevation model), Productivity predicting program like Plantgro in Australia.

## **Methodology**

There are two ways to find bamboo environmental data essential to species-site matching: Via bamboo bibliographies or expert's consulting service or overlapping a digital climatic map and a bamboo distribution map to find bamboo species' climatic/soil requirement. Besides bamboo species' environmental requirements can be available from sources/trial data of current introduction areas.

### Procedure of species-site matching

There are two flow charts for species-site matching:

Location (latitude, longitude, altitude)--- Site matching--- the possible bamboo species to grow (optimal, medium, poor) (Fig. 1).

Each bamboo species--- Site matching--- the potential introduction/growing area (mapping the optimal, suitable and unsuitable area) (Fig.2).

## **Predicted outputs**

The recent outputs are bamboo database included bamboo information and their environmental requirements as well as Program of Bamboo Species to Site Matching. In the future the output is Bamboo productivity prediction on sites.

## **Reference**

T H Booth, 1995, Matching trees and sites, Proceedings of an international workshop held in Bangkok, Thailand. ACIAR Proceedings No. 63, 126p.

Fig. 1 Flow chart 1 of Bamboo-site matching

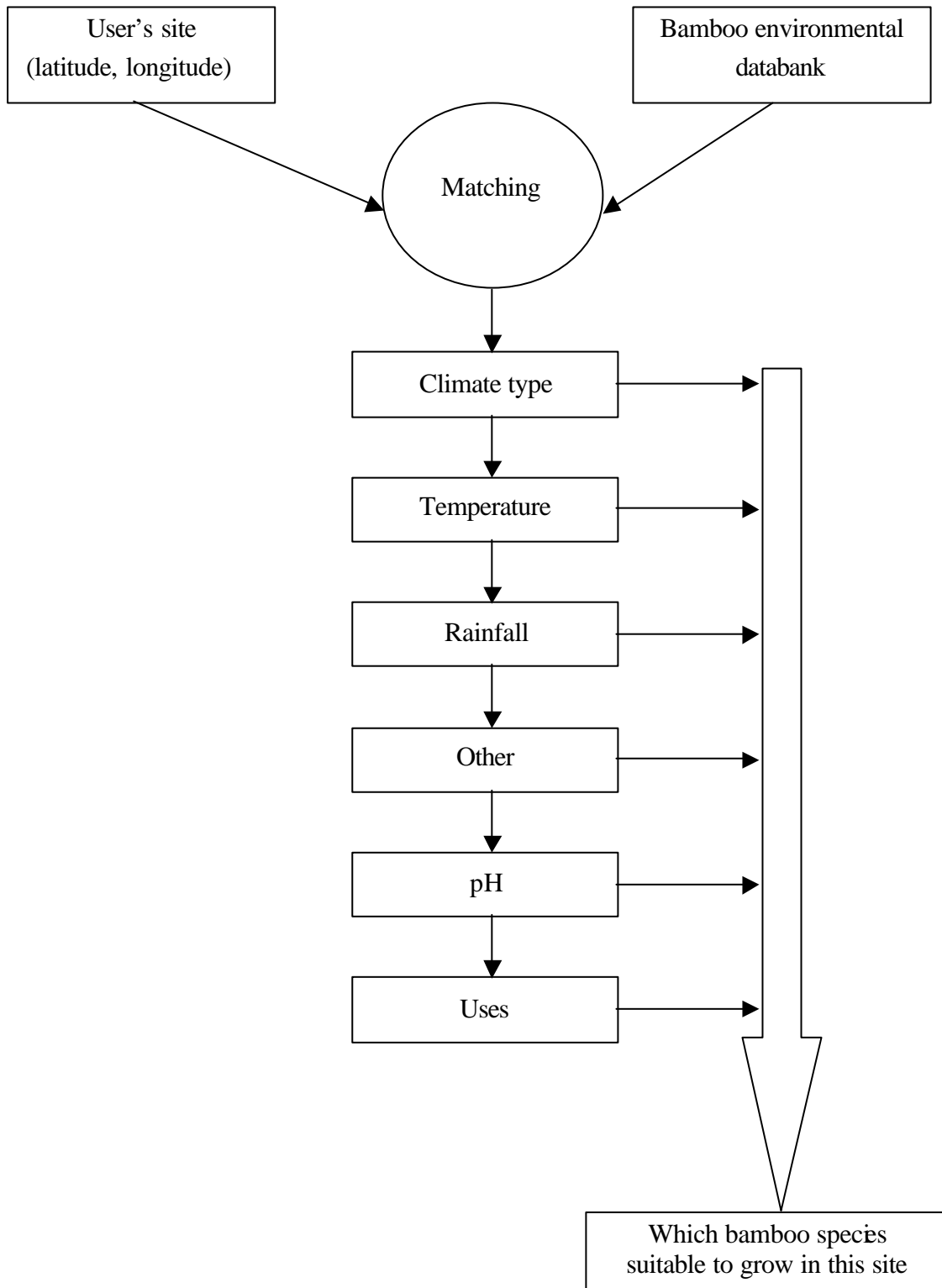


Fig. 2 Flow chart 2 of Bamboo-site matching

