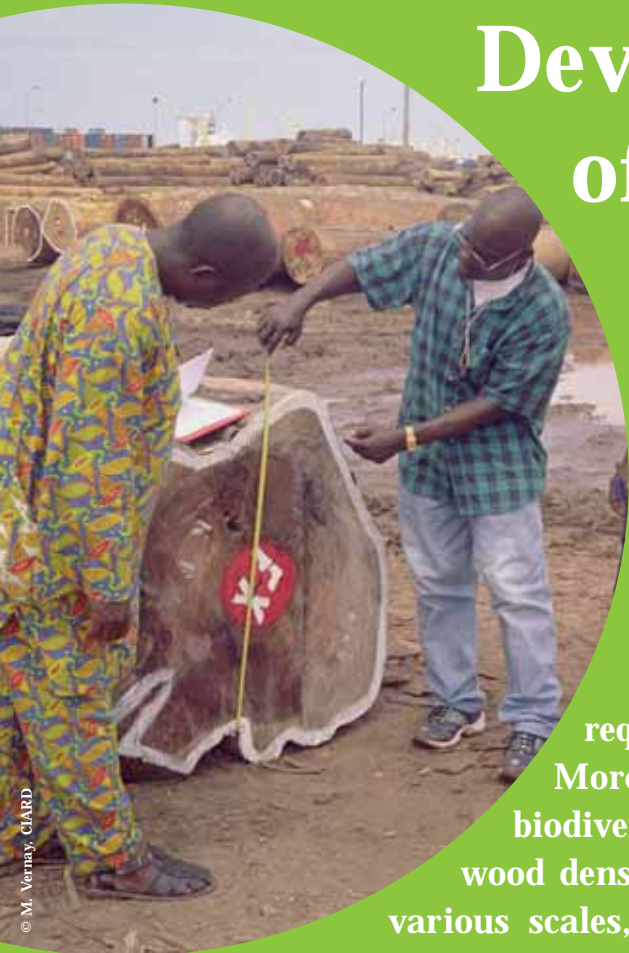


Developing use of tropical woods



Characterizing the diversity of wood species

Knowing the diversity of tropical woody forest species is a necessary stage in qualifying the wood resource and making quality wood products tailored to local people's requirements, primarily for housing and furniture. Moreover, studying the spatial distribution of woody biodiversity based on ecological or xylometric criteria, such as wood density, makes it possible to estimate forest biodiversity on various scales, from plot to continent, along with carbon flux and sequestration. These estimates help in identifying strategies for grouping species and controlling their geographical evolution.

Widening the range of forest species used

In tropical forests, the financial viability of sustainable logging plans and their application by forestry firms is directly dependent on the wood production objective set out by management staff in those firms. Firms that implement sustainable forest management plans do so in order to develop logging and sales of lesser used species with a view to:

- maximizing the profits from logged areas by making optimum use of hitherto neglected



Different types of tropical wood decking
© M. Vernay, CIRAD

species such as monghinza, niové or okan in Africa;

- limiting the pressure on flagship species such as sapele, ayous or iroko in line with the objectives set out in their management plans and homogenizing logging operations in forests;
- maintaining biodiversity through rational logging of a larger number of species for multiple applications.

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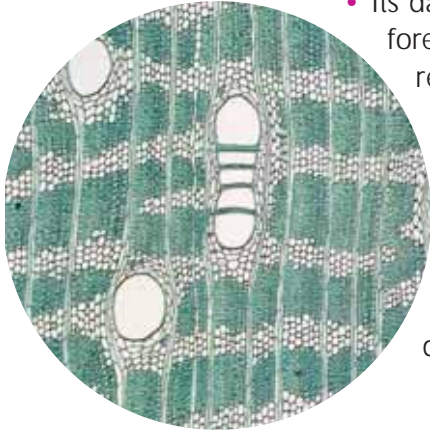
CIRAD conducts the technological diagnoses required to promote these lesser-used species.

To this end, it relies on:

- its wood collection, which contains more than 8000 tropical species. It is a unique reference tool for studying the diversity of wood anatomical structures and thus accounting for the range of different properties;

- its databases and knowledge bases (more than 1200 forest species characterized to date), which are regularly supplemented with the results of physical and mechanical studies of natural durability, processing and use (sawing, drying, secondary processing, finishing).

The homogeneity of the data gathered on a very large number of species from every tropical region boosts the value of these databases on a global level.



Anatomical cross-section of angélique (*Dicorynia guianensis*).
© P. Détienne, M. Vernay, CIRAD



Centre culturel J.M. Tjibaou,
structure made of iroko
(New Caledonia).
© J. Gérard, CIRAD

Favouring carbon sequestration

Carbon sequestration, avoided greenhouse gas emissions, energy generation, etc... tropical woods can be used in many ways to limit the increase in carbon dioxide levels in the atmosphere. Their use plays a major role in limiting global warming, by virtue of the carbon they sequester (500 kg per tonne of wood on average) by absorbing and assimilating carbon dioxide from the atmosphere.

CIRAD is now in a position to assess the effective impact of tropical woods on these environmental functions, using the results of research conducted on their diversity in the main three tropical forest basins: Amazonia, Congo and Indonesia. Once adult, old forests no longer sequester any more carbon, and there is no difference between the carbon sequestered in the wood and that emitted when the wood is destroyed. The "carbon sink" effect is thus limited in time. Forest renewal and logging, followed by use of the wood, are thus essential to enable the forest to continue to develop and to sequester carbon. In the long term, the true carbon sink effect of the forest corresponds to the wood stored outside the forest ecosystem in the form of wood-based products. The ecological footprint of these wood-based products is assessed according to their lifespan and of the sum of the different types of energy required to produce, manufacture, use and recycle those materials.

Characterizing the range of tropical woods thus makes it possible to come up with qualitative and quantitative estimates of forest biomass in tropical regions, and to assess carbon flux and sequestration in natural or planted forests.

CIRAD's databases and knowledge bases on tropical woods thus have many possible applications, which go well beyond the use of forest resources as timber.

Partners

- Ecole nationale supérieure d'arts et métiers, laboratoire bourguignon des matériaux et procédés, France
- Institut technologique Forêt Cellulose Bois-construction Ameublement, France
- Laboratoire de mécanique et de génie civil, University of Montpellier 2, France
- Centre de recherche forestière and Mohammed V University, Faculty of Science, Rabat, Morocco
- Forest Research Institute of Malaysia
- Ecole nationale supérieure polytechnique de Yaoundé, University of Yaoundé, Cameroon
- University of Hamburg, Germany
- University of Tehran, Faculty of Karaj, Iran
- University of Boumerdès, Algeria