



## Combating Illegal Timber Trade in India

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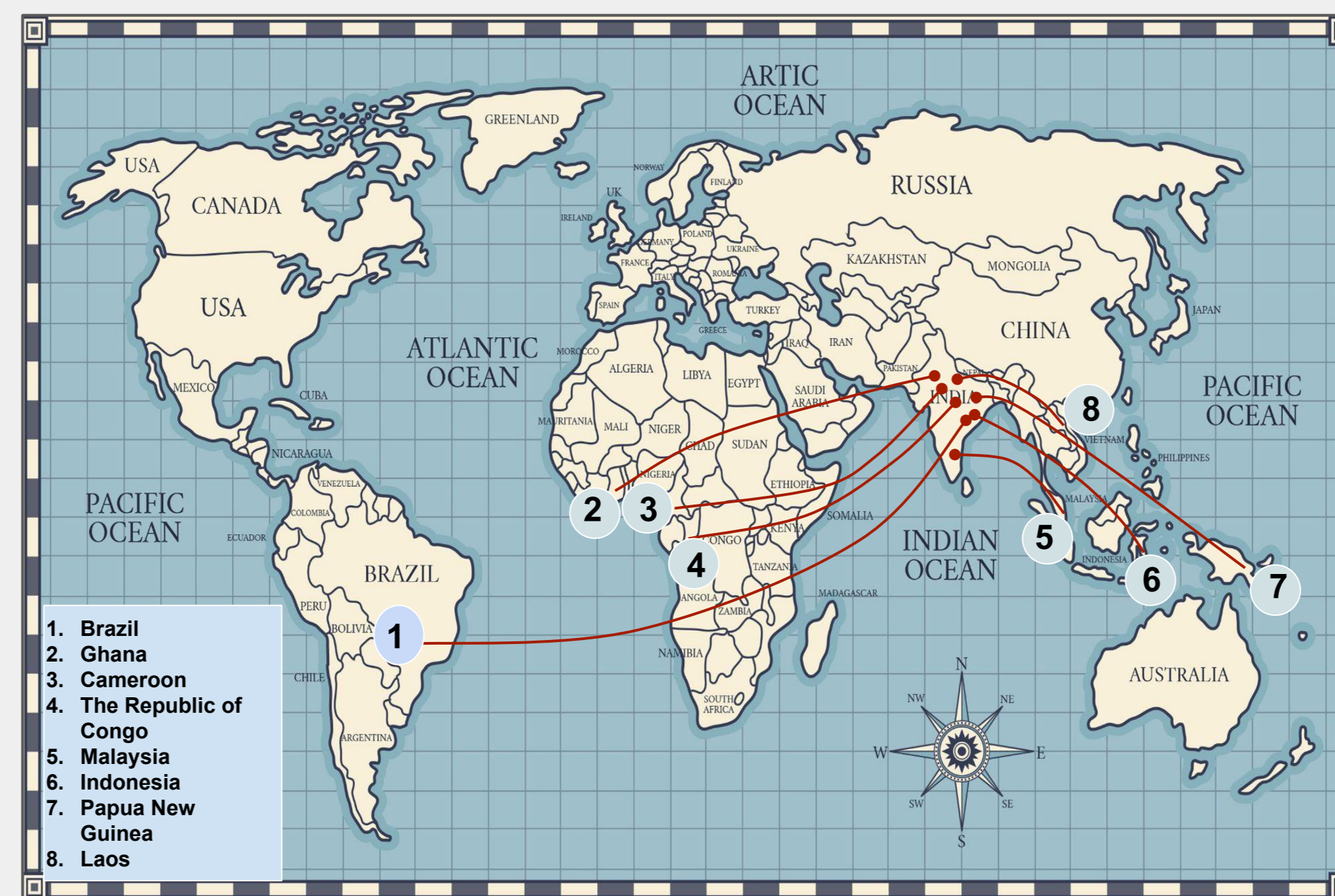
### Abstract

Illegal wood logging and timber trade have become serious threats to forests, raising concerns of deforestation and climate change. Various international laws and regulations have been enacted to ensure global forest protection and sustainable use of forest products. Based on the extent of protection required for the species, CITES has published a species list to be used by foresters and officials for imposing trade regulations and restrictions. India is one of the largest importers of timber, especially tropical hardwoods. Efforts to curb illegal wood trading in India are gaining momentum that requires scientific inputs.

Globally, wood anatomy, DNA barcoding, mass spectrometry, near-infrared spectroscopy, stable isotopes and radiocarbon are the main methods employed for timber testing. Wood anatomy is the most efficient and cost effective tool for wood identification. It has the potential of becoming field deployable, unlike other laboratory based methods. Wood identification can be done both microscopically and macroscopically. In India, macroscopic features are usually studied using a hand lens, but this method is not always reliable for correct identification. In most scenarios, the sample would require anatomical testing in the laboratories, which is a time-consuming and tedious process. In various countries, development of systems like Xylotron and MyWood-id has made macroscopic wood identification fast and easily accessible. These tools are effective in identifying timber species upto family or genus level. India and other countries can employ these systems and train their field personnels to identify wood on the spot. This would require improved hardwares for enhanced images and wood database softwares of major traded timbers. The paper explores the areas that can be improved to combat the illegal wood logging and trading in India.

### Introduction

- India is the fourth largest importer of tropical hardwoods, meeting about 30% requirements through import.
- India has serious illegal timber imports with Brazil and Papua New Guinea.
- Illegal wood logging and timber trade have become serious threats to forests, raising concerns of deforestation and climate change.



- Various international laws and regulations have been enacted to ensure global forest protection.
- CITES has published a species list to be used by foresters and officials for imposing trade regulations and restrictions.

### Laws in India to combat illegal timber trade:

- National Forest Policy 1988
- National forest commission 2006
- Draft National Forest Policy-2016, report by Indian Institute of Forest Management (IIFM)

### Techniques to combat illegal logging

#### Wood Anatomy

#### DNA barcoding

#### Mass spectrometry

#### Near-infrared spectroscopy

#### Radiocarbon

#### Stable isotopes

Other than wood anatomy, all other approaches are comparatively quite complex and costly. Wood anatomical study is the simplest and cost effective tool for timber identification

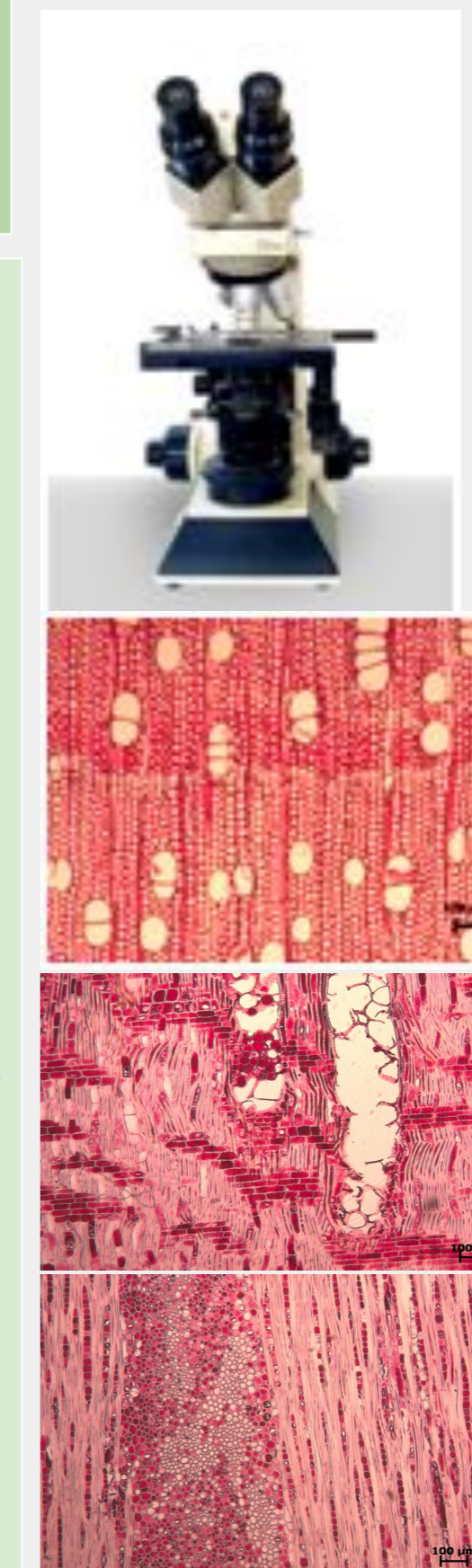
### Macroscopic Wood Identification

- First reliable identification of traded timber.
- Based on the observations of features using hand lens.
- Transverse section is the most useful to identify diagnostic features.
- Commonly used in India as on-the-field identification by trained and experienced forest officials.
- Suspected illegal timber are sent for certified microscopic identification.



### Microscopic Wood Identification

- Light microscopy techniques are used.
- Wood anatomical features are studied as per the IAWA list for hardwoods and softwoods.
- Microscopic slides, literature and databases are used as reference material.
- In India, this is commonly used to identify the seized suspected timbers for officials.



### System Based Identification

- Computer-aided systems have been gaining popularity for their quick, reliable and on-the-spot timber identification, for example XyloTron.
- Smartphone based systems are MyWood-ID, AIKO and XyloPhone.
- These field deployable systems help to bypass the laboratory constraints.
- Equip the forest officials for quick identification of common illegally traded woods.

### Developments towards computer-assisted wood identification in India

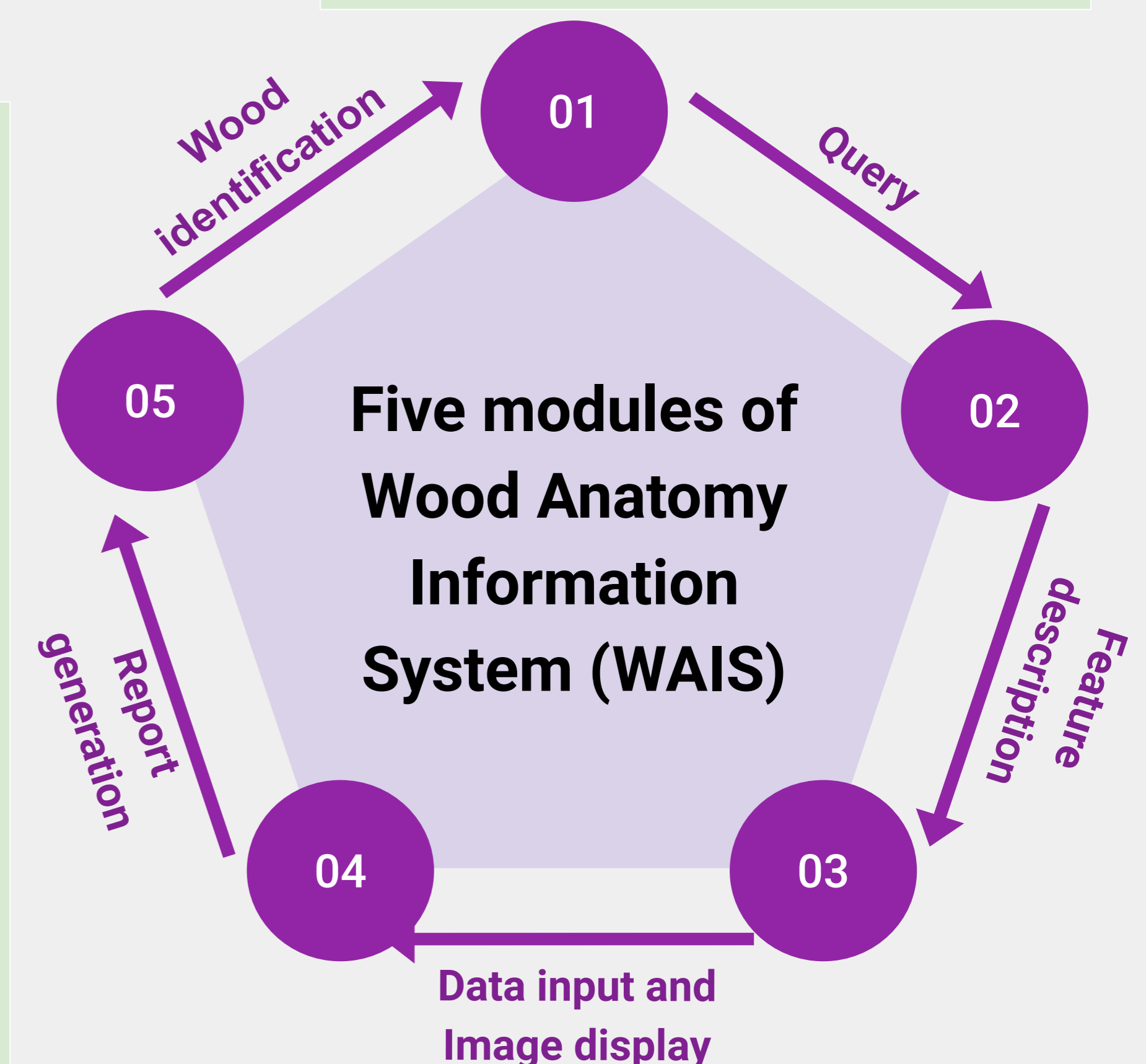
- ★ Forest Research Institute (FRI), Dehradun and Institute of Wood Science and Technology (IWST), Bangalore are leading research institutes in India working on wood identification.
- ★ Wood Anatomy Division of FRI, Dehradun developed computer-assisted identification system named as Wood Anatomy Information System (WAIS).
- ★ Database is developed from the Xylarium FRI, Dehradun (DDw) for Indian hardwoods based on standard IAWA list of features for hardwoods.
- ★ WAIS has been used by FRI to identify Indian hardwoods received from forest officials.

### WAIS

- Wood identification at family, genera and species taxa level through binary search.
- This system filters based on diagnostic anatomical features of unknown sample.

### Limitations

- It can only be employed by trained professionals.
- Includes only Indian Hardwoods.
- Based on microscopic identification only.
- Lab-bound technique.



### Conclusion

- There is a need of more authorized wood identification laboratories in India.
- Proposed computer or smartphone based systems need to be developed to equip the forest official for on-the-spot identification of timber.

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