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WOOD IDENTIFICATION (WOOD ID) TECHNOLOGIES TO STRENGTHEN LAW ENFORCEMENT IN INDONESIA

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Why Wood Identification?

Mostly modus operandi of the illegal logging crimes in Indonesia indicted is **document forgery**[1]
- manipulating delivery records to obscure the species and origin of the wood and
- selling forged export eligibility certificates

Most preparators are **couriers or drivers.**

Law enforcement agencies and forestry-related institutions have **diverse interests and authorities.**

Application forensics and technologies are recommended to settle down illegal logging.

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Explore the possibility of WOOD ID technologies application by law enforcement agencies

Conducted **assessment and stakeholder mapping** in 8 locations to explore the possibility of Wood ID application and develop strategies to implement Wood ID technologies in different areas of law enforcement.
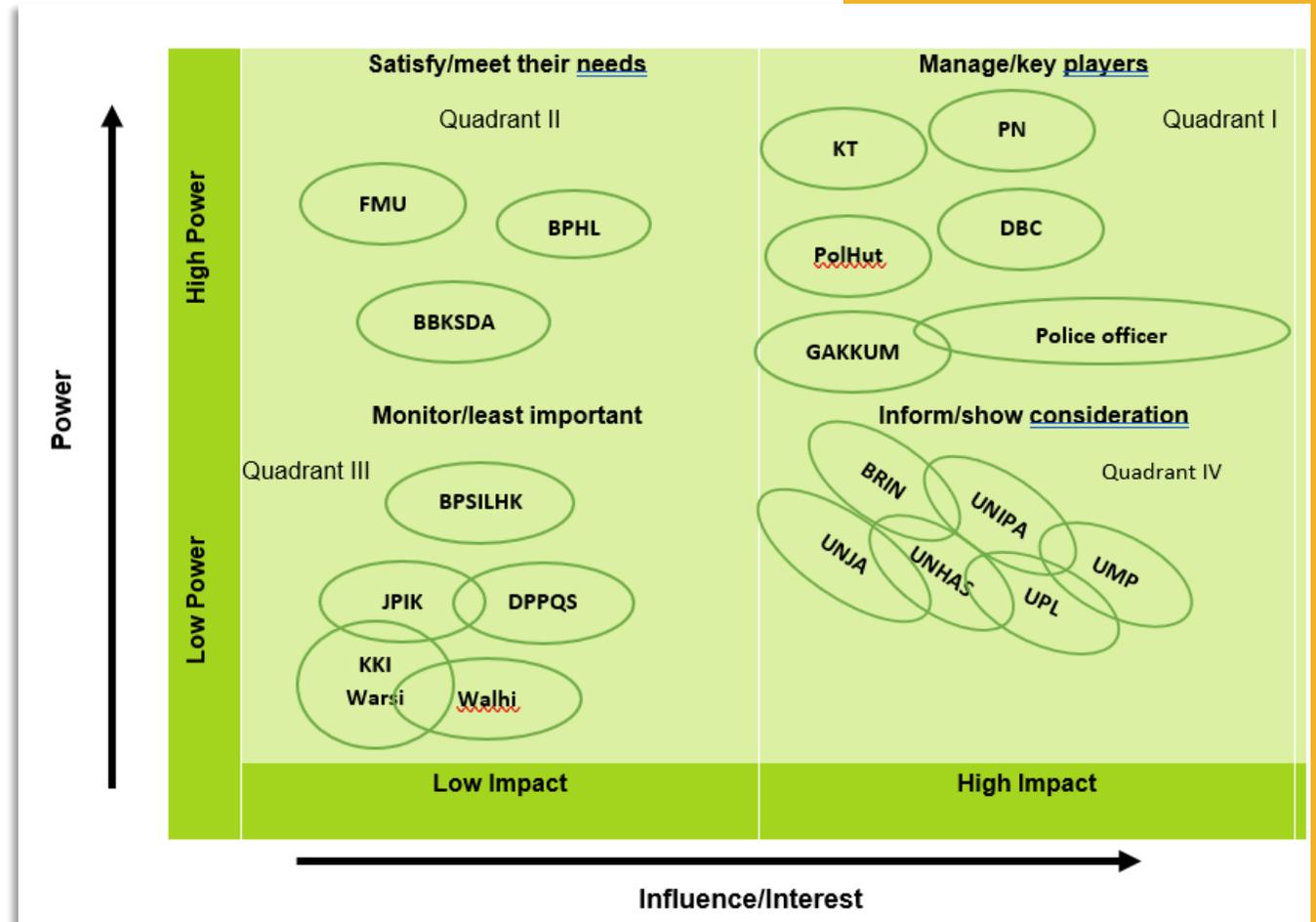
Key findings on the possibility of WOOD ID technologies application by law enforcement agencies

- Wood anatomy is **mostly used** for species verification, which relies on two institutions, namely Xylarium Bogoriense and Sustainable Forest Management Office, MoEF.

- Xylarium Bogoriense has developed a **machine-vision-based wood identification** system called AIKO but the margin of error on AIKO analysis is still quite high.

- DNA, NIRS, and Stable Isotopes are **centralized** in Java Island, while most of the forestry crimes occurred in more forested islands.

- **Limited infrastructure** including labs, database, and skill experts are identified as building blocks to implementing Wood ID technologies.

The current state of WOOD ID development in Indonesia

Method	Current state
Wood anatomy	Analysis is supported by the wood sample collection of Xylarium Bogoriense, which is managed by Research, Development and Innovation Agency, MoEF (FORDA). However, all the researchers will be based in National Research Innovation Agency (BRIN).
Machine Vision	Xylarium Bogoriense, has developed a wood identification app called AIKO to analyse the commercial wood species. This app is accessible to public through smartphone and free of charges. UNODC has procured a Xylotron for Custom Office.
Near infrared spectroscopy	IPB University already tested samples of ebony (*Diospyros celebica)* and found that NIRS technology can discriminate the same timber species among different locations.
Stable isotope	Equipment is available in BRIN, but it has not been tested for wood.
Direct Analysis in Real Time—Time of Flight Mass Spectrometer (DART-TOFMS)	Equipment is not available, but it could potentially be developed, with funding support.
DNA analysis	Its potential as a method to verify wood species and origin is still moderately known. IPB University is collecting the DNA database for 3 species in Sumatera and Kalimantan.

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Request for Wood Identification

- The most requests are from **Police and Gakkum, MoEF**

- **Species identification is needed** to determine state losses and retribution fee

- **Can be conducted on-site but** need more time if there is no database reference

- **Xylarium Bogoriense** is needed if cannot be handled by BPHL (especially for rare species or missing physical/anatomical characteristics)
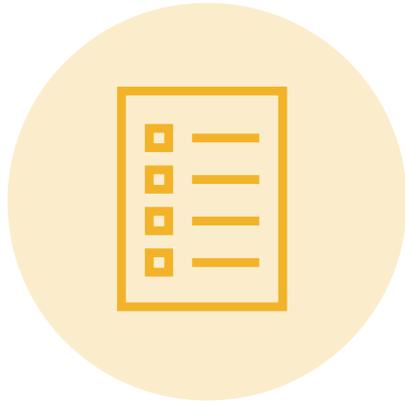
Wood Identification in Jambi

Legend: Gakkum, MoEF | Police | Court | Prosecutor
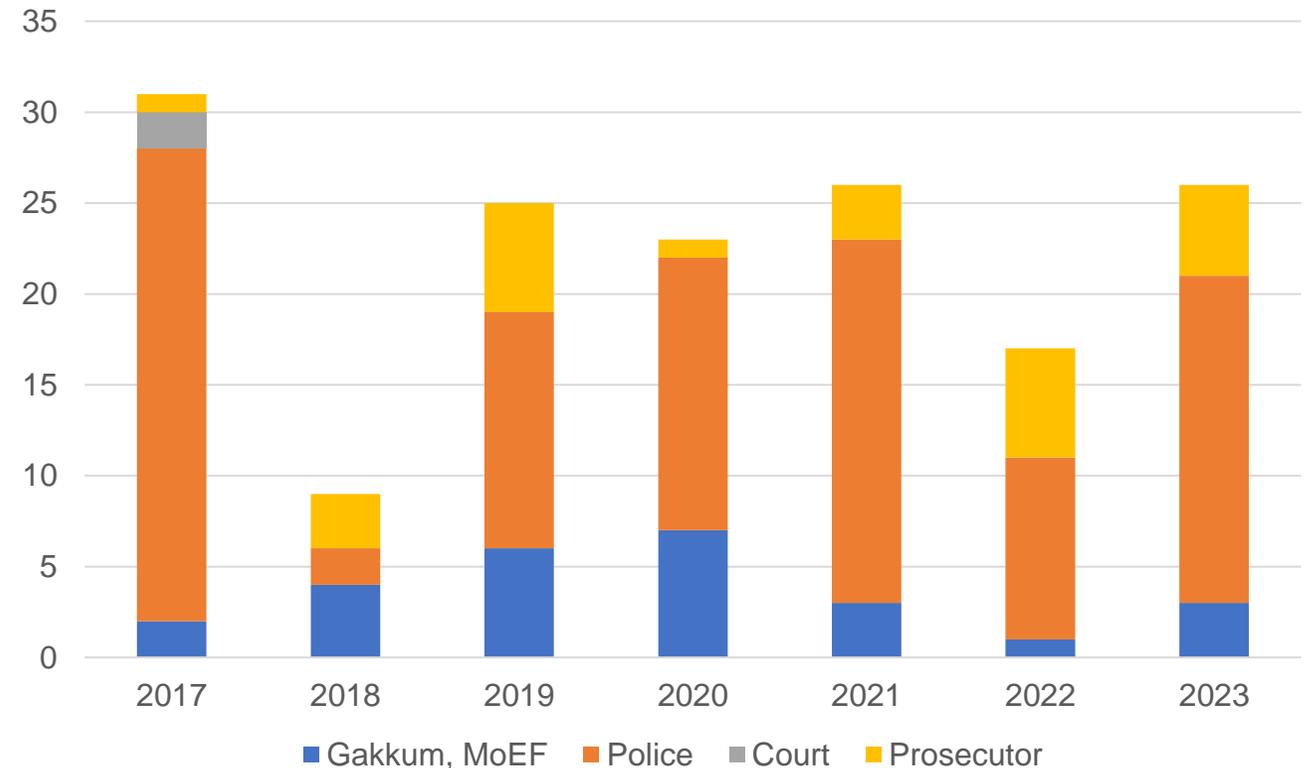
Source: Sustainable Forest Management Office (BPHL), Jambi
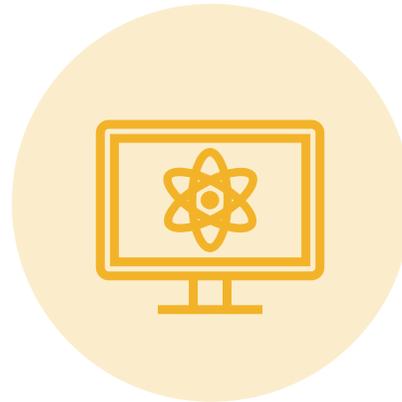
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Main Barriers to implementing the WOOD ID

POLICY

- Time constraints on investigation (90 days)
- Casuistic the use of Wood ID

INFRASTRUCTURE

- Advanced technology is centralized in Java Island.
- Database limited and scattered
- Limited labs accredited and expert as reference

POLITICAL

Merger of institutional research into the National Research and Innovation Agency (BRIN)

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What we do:
Institutional engagement and capacity building

- **Introduce** the use of Wood ID and the possibility to applied.

- **Identify** which wood identification technology to fit the needs of law enforcement (e.g. for forest authorities, law enforcers, and customs)

- **Connecting** law enforcement agencies with scientists.

- **Capacity building** for the field officers to understand the basic wood anatomy to verify their suspicion.

- Stakeholders involved in this activity include local CSOs, forest authorities, law enforcers, customs, lecturers, and lab officers.

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What we do:
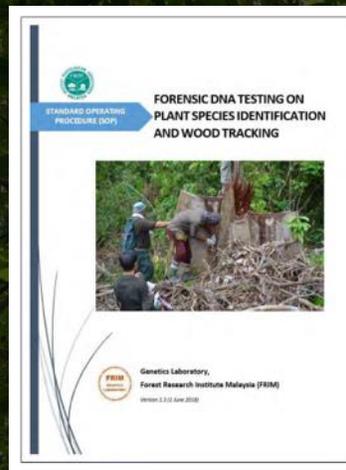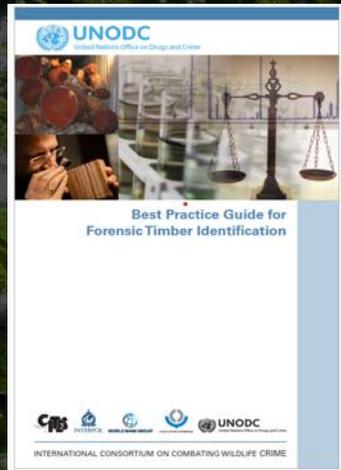# Support for WOOD ID database and analysis

Sampling is essential to build wood reference database, so the technologies can be applied more efficiently.

Broader the knowledge by **increase the capacity of universities to apply advance method on Wood ID.**

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WHAT NEXT?

Develop protocol/ guideline on genetic timber identification technique

Test case to increase capacity and possibility to apply Wood ID

Legal Formality for Law Enforcement

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Thank you!

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