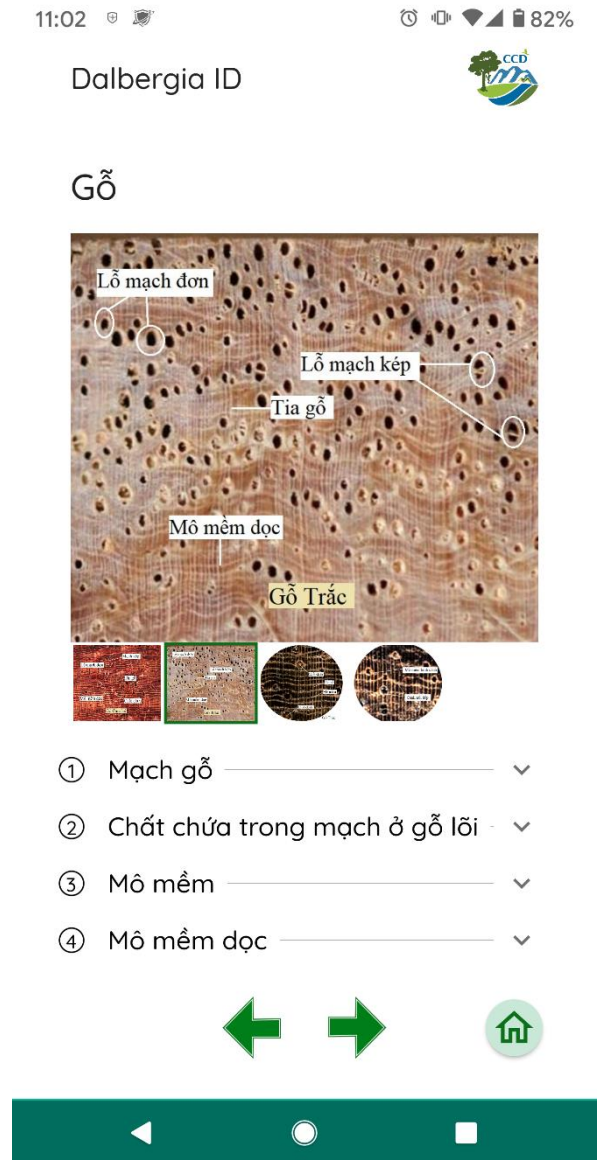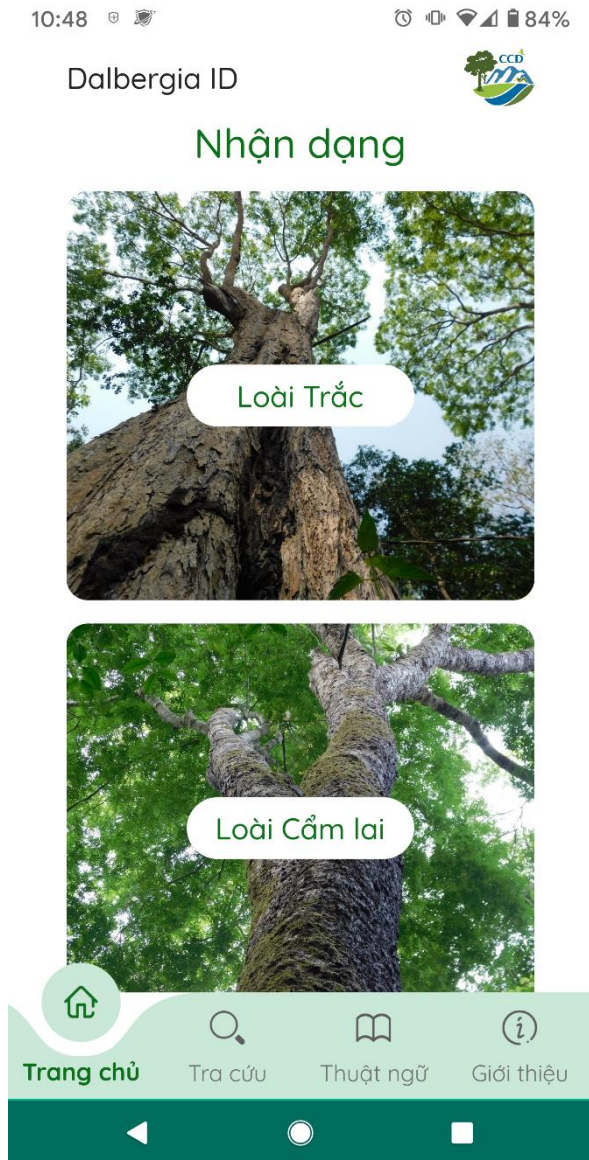# REPORT ON THE DEVELOPMENT OF AN APP FOR THE IDENTIFICATION OF *DALBERGIA COCHINCHINENSIS* AND *DALBERGIA OLIVERI* IN VIETNAM

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1. Introduction

Rosewoods of the *Dalbergia* genus are characterized by their hard, beautiful, durable timber, and the timbers are free from termites. Some *Dalbergia* species have been harvested and traded for decades to serve the luxury furniture market. *Dalbergia cochinchinensis* and *D. oliveri* are among the most threatened species of rosewoods. In Vietnam, *D. cochinchinensis* and *D. oliveri* are widely distributed from the central to the southeast region. They are found in different habitat types including evergreen broad-leaved forests, semi-deciduous and deciduous forests, and bamboo–broad-leaved mixed forests.

However, over-exploitation and their slow growth characteristics have placed huge pressure driving their population to significantly decline and even to extinction out in most of their known ranges. Some small populations in protected areas and protection forests in the Central and Southern provinces of Vietnam are still under threat of illicit logging. Therefore, concentrating strong efforts in the management and protection of these species are necessary and urgently needed. However, one of the difficulties in the management, conservation, and law enforcement of *D. cochinchinensis* and *D. oliveri* is the lack of capacity of law enforcement forces to identify the two species for priority protection and the failure to identify the scientific nomenclature of their products.

The Center for Nature Conservation and Development (CCD), with support from the project "Strengthening the management and conservation of *Dalbergia cochinchinensis* and *Dalbergia oliveri* in Vietnam" which is funded by the European Union through the CITES Tree Species Programme, has developed a mobile application in Vietnamese, named *Dalbergia* ID, to help enforcement officials and staff of protected areas to identify the species easier in the course of their work.

2. Development Process

The App was developed based on the published "Identification Manual for *Dalbergia cochinchinensis* and *Dalbergia oliveri"* in Vietnamese which was also developed by CCD. The App was developed not only to identify both the species based on their biological and wood characteristics of the specimen but also to provide detailed descriptions of the species, habitat and ecology, as well as their distribution and status.

A botanist, a timber expert and the project team had worked together to create a database containing many tables and forms that can be queried when inputting information of one or two or more specimens into the App. The database and the Manual were sent to an IT team for designing the App's interfaces using the Adobe XD software. These interfaces of the App were discussed among the project team's members and upon their agreement coding was done by the IT team. The App was then sent to botanists, researchers, and technical officers for field testing. All comments and feedbacks were collected for further improvement to the App.

3. Description of the App

The App contains the full description of the two species as in the printed copy, including species name, distribution maps, biological and ecological characteristics, conservation status, morphological features of mature trees and regenerated trees, and macroscopic features of the timbers. For each species, the scientific name, standard trade name (Vietnamese and English), and vernacular names are also given in accordance with national and CITES standards. The identification system used in the App is based on features of leaves, flowers, pods, and timber, which are visible by direct observation or with a hand-held magnifier. Coloured photographs

were taken and carefully selected to illustrate prominent features to enable the two species to be identified in the field.

As the App will be used by law enforcement officials such as customs officials, forest rangers and environment policemen who are not familiar with the botanical terminology, definitions and explanations of the terms, a full description of *D. cochinchinensis* or *D. oliveri* is also provided in the App for guidance, as well as in the preparation of specimens for identification.

To look up a specimen for checking whether it is *D. cochinchinensis* or *D. oliveri* or not, users can access to a full description of the species from the homepage or make queries in the interactive identification system from the look-up page.

From the look-up page, users can choose the types of specimens (leaves, flower, or pod or just timber) that they have in possession. However, users can only select to look up by morphological characteristics or by macroscopic features of timbers. The look-up page will then move to the question section corresponding to what the users have chosen in the previous step.

For each question section, for example, the question section on flower, users must answer all the questions related to the features of the flower to obtain accurate results. The accuracy of the results will depend on the number of specimens used by the users. The more look-up specimens used the more accurate the results. If the result is *D. cochinchinensis/D. oliveri* or possible *D. cochinchinensis/D. oliveri*, the users can select "see more" to move to the species information page to find a full description of the species. An illustration on how to use the look-up features of the App is as in **Annex 1**.

4. Conclusions

The App can be installed in mobile devices such as smartphones or tablets for use and lookup to rapidly identify *D. cochinchinensis* and *D. oliveri* trees, timbers in the field. The App will help improve the management, protection, trade control and monitoring of the movement of rosewood timbers and rosewood products. For example, forest rangers will be able to correctly identify trees and seedlings of *D. cochinchinensis* and *D. oliveri* which will assist them to develop location maps of these species in their protected area for monitoring and protection. The data could be used by technical staff in prioritizing the application of silviculture measures such as assisted natural regeneration, seeds collection, nursery establishment, and seedlings planting in efforts to increase the rosewood populations in Vietnam.

The App is only compatible with Android devices and although it was built on IOS the strict policies of Apple do not allow others to install apps from alternative sources. The App is available for download from:

https://vietnamccd-my.sharepoint.com/:u:/g/personal/trung_la_vietnamccd_onmicrosoft_com/ETXxC8-eQhdLj06oeKDFpzIBPxdzcbWqG5bSiDItmKnMNQ?e=M6452p (54.5MB)
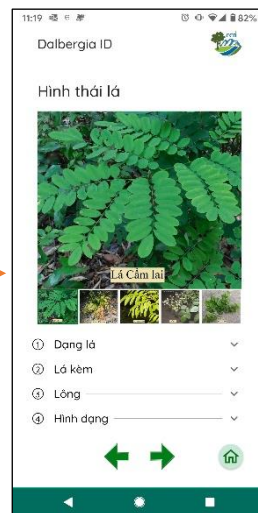
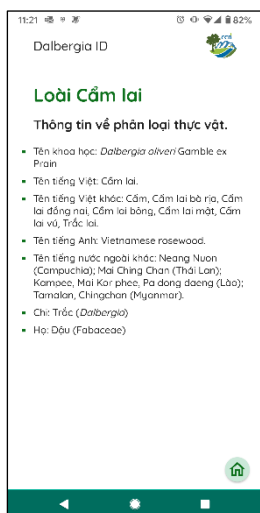# How to use the look-up features of the App
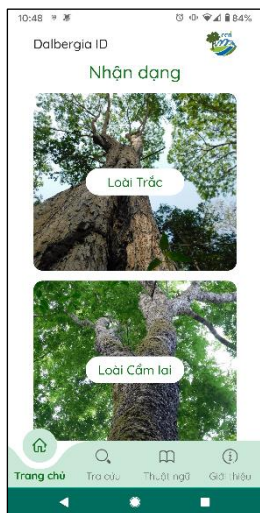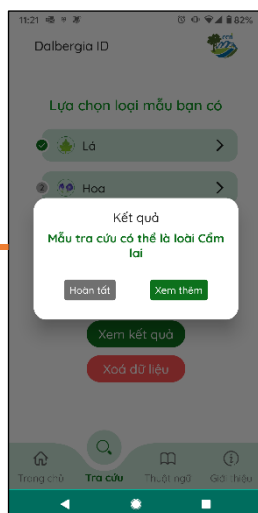

1. Homepage
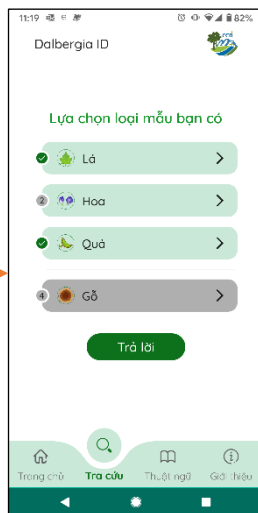
2. Look-up page

3. Question section on leaves

6. Species information page

5. Result page

4. Question section on pod