Connecting Mobile4D and Lao DECIDE: Mobile Reporting, Information Integration, and Decision Making in the Lao PDR

Christian Freksa, Michael Epprecht, Thatheva Saphangthong, Thomas Barkowsky, Jasper van de Ven, Peter Haddawy
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Under the leadership of the Ministry of Agriculture and Forestry of Lao PDR two information processing systems for collecting, integrating, and presenting knowledge for smart decision making have been developed in cooperation with European universities: Mobile4D and Lao DECIDE. While the development of the two systems has originally been carried out separately, they feature complementary capabilities that can be connected to form a powerful information management infrastructure for a wide range of applications.

Data Collection and Communication

Mobile4D is a mobile, smartphone-based system supporting real-time collection and integration of data as well as multi-way communication. It supports on-site location-based reporting of events with relevant information, including on matters such as natural disasters, and infectious diseases in humans, animals, and agricultural crops. Communication in Mobile4D goes from the reporting individual up to the responsible authorities and back to the reporters. Moreover, relevant reported pieces of information can be locally distributed to neighboring communities in order to immediately inform them about time-critical issues and organize help. Mobile4D is currently deployed and used in several provinces in the north and south of the Lao PDR.

Information Sharing and Integration

The Lao DECIDE info is an information management system which provides an online platform for government institutions to share and integrate key information from the social, economic, environmental, and agricultural sectors to facilitate analysis for informed planning and decision making. Government institutions share key datasets in a standardized manner in a common framework, facilitating integrated analysis for sustainable development planning. Within a network of research institutions, jointly with the sectoral experts, the integrated database serves as the basis for conducting strategic information analyses for better-informed planning and decision making. While the data in DECIDE is owned and controlled by individual institutions of the Government of the Lao PDR, access to data and the derived knowledge is granted to a wide range of users.
Knowledge and Information Communication

The usability of the data and analyses depends on the ability to present, visualize and communicate them in a timely manner and effectively tailored to the needs of users. With suitable presentation the available information can be made accessible not only to experts but also to affected users and decision makers. By connecting Mobile4D and Lao DECIDE we are able to combine real-time mobile information collection with cross-sectoral information integration, both at a high level of spatial resolution, and realize a targeted, timely communication of integrated information and knowledge to relevant users.

The innovative information presentation tools are suitable for highly specific data to be communicated adequately to a wide range of decision makers and end users. The communication functionalities facilitate direct communication of information to individuals and communities though both desktop and mobile user interfaces.

Informed Coordination and Decision Making

The connection of Lao DECIDE and Mobile4D will support decision makers in monitoring and planning tasks, as well as in coordination tasks with and in the field through the following features:

- Integration of data and information from a wide range of sectors and topics;
- Online integration of updated local information immediately as it becomes available;
- Spatio-temporal analysis and reasoning facilities to provide novel insights into complex situations;
- Efficient communication tools between central coordinating bodies, peripheral task forces, as well as affected individuals and communities.

Way Forward

In a pilot study, the features of the integrated services of Mobile4D and Lao DECIDE have been demonstrated in reporting occurrences of *ceracris kiangsu* (yellow-spined bamboo locust) in its various stages in Luang Prabang Province in 2017. Drawing on the integrated information base, analytical models can be developed and integrated into corresponding tools that could predict the development of the locust population in any region of interest, and that could provide predictions about where and when the locusts will move to enable more effective control measures.

Visualization of occurrences of locust reports

This study shows that the integration of Mobile4D and Lao DECIDE may enable powerful information systems for tasks like the monitoring and prediction of outbreaks of infectious diseases, natural disasters, infrastructural disruptions, or plagues of any type.

www.capacitylab.org  info@capacitylab.org  www.decide.la  michael.epprecht@cde.unibe.ch