

# Oil palm—a modeled crop: Scientists developed a model for oil palm cultivation

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Australian scientists have developed a model for oil palm cultivation, aimed at helping growers of the crop maximize the yields of their plantations, while minimizing detrimental environmental impacts.

The model was recently published in the journal *Environmental Modeling & Software*.

"Oil palm has become a major crop in the tropics, cultivated on more than 39 million acres of land," co-author Dr Paul Nelson of James Cook University (JCU) said.

"Demand for the product continues to grow, and the industry is expected to keep expanding in the foreseeable future.

"At the same time, there is significant concern about the industry's environmental impacts, with many purchasers wanting only certified sustainable palm oil.

"Given that this is one of the most important industries in the tropics, our aim is to contribute to a research-based approach to its management. Growers need information that will help them make decisions that are good for both productivity and the environment."

The researchers built an [oil palm](#) system model, using the internationally recognized APSIM (Agricultural Production Systems Simulator) framework. The model is called APSIM Oil Palm.

"APSIM is the gold standard for simulating crop systems," Dr Nelson said. "It enables the simulation of systems that cover a range of plant, animal, soil, climate and management interactions. APSIM is undergoing continual development and it's underpinned by rigorous science and software engineering standards.

"By applying APSIM Oil Palm, producers will be able to evaluate effects of their soil type, climate and management on their water balance, nutrient balance, soil organic matter and greenhouse gas emissions."

Dr Nelson said agricultural systems modeling was often used in sustainability studies, along with field measurements.

"APSIM Oil Palm can be used in on-farm decision making and in assessing risk, yield forecasts and government policy, as well as providing a guide to research and education."

"It's a valuable tool which was not previously available to oil palm growers.

"Like any computer modeling exercise the outcome depends on good quality data, which has previously been a problem for many oil palm growing areas.

"For this study we used large data bases on soil and climate from three sites in Papua New Guinea. We plan to test its applicability in other areas as more localized information becomes available.

"This is a highly detailed model which involved simulating the growth of oil palm fronds, stems, roots and fruit bunches, and accounting for variations in soil, light, rainfall and temperature, " Dr Nelson said.

"We did the work together with Australia's Commonwealth Scientific

and Industrial Research Organization (CSIRO) and the Papua New Guinea Oil Palm Research Association."

The research was funded by the Australian Center for International Agricultural Research (ACIAR).

Earlier this month (2-4 December 2014) the model's developers, including Dr Nelson, ran a workshop in Jakarta, Indonesia, to train 20 scientists from six countries in using the model.

It is hoped that the participants (12 from Indonesia, three from France, two from Colombia and one each from Liberia, Malaysia and Netherlands) will use and further develop the model to help improve sustainable production of this important crop.

**More information:** [www.sciencedirect.com/science/.../S1364815214001947](http://www.sciencedirect.com/science/.../S1364815214001947)

Provided by James Cook University

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