

## Tackling oil palm sustainability challenges in South-east Asia in pursuit of the Sustainable Development Goals

Researchers at the University of Leeds and the University of York, in collaboration with partners such as UTM, Malaysia, have been tackling sustainable development challenges associated with oil palm production and consumption from multiple perspectives. This briefing note sets out the major projects and headline findings in relation to the Sustainable Development Goals.



### **Oil palm waste can generate value and grow green technology industries**

Research by Prof Neil Bruce, Prof Lindsay Stringer, Dr Chong Chun Shiong and others used new enzymes to break down empty oil palm fruit bunches to generate high value chemicals and biofuels. Research has also compared different palm oil mill effluent management options, identifying which technologies offer the largest carbon savings. Using renewable plant biomass as an industrial feedstock for fuels and chemicals presents a major opportunity to break dependence on petroleum and substantially lower net carbon emissions. In Malaysia, empty fruit bunches are an abundant resource. An exciting development arising from this research is the possibility of microbially processing oil palm residues as feedstock for insect larvae, which can then be used as animal feed. The process creates biofertiliser as a by-product, making food production more sustainable.



### **Haze from vegetation and peat fires is a major environmental and human health concern**

Research by Prof Dom Spracklen and Dr Steve Arnold has found that oil palm and wood fibre concessions in Sumatra experience 10-100 times as many fires as protected areas and logging concessions. Fires in central Sumatra and Kalimantan cause most of the haze in Singapore, indicating the regional and transboundary nature of the challenge. In 2015, 69 million people across



Malaysia, Indonesia and Singapore were exposed to poor air quality due to fires, resulting in 6000 to 17,000 excess mortalities, illustrating the scale of the problem for human health. Smouldering peat fires emit a factor 1.8 more particulate pollution than previously thought, meaning public health impacts of haze from peat fires needs to be revised upwards.



### **Transformative solutions to environmental and social challenges in the oil palm sector are needed, alongside broad stakeholder engagement**

Dr Rory Padfield and Dr Effie Papargyropoulou carried out a consultation with 659 palm oil stakeholders from 38 countries, finding that the industry faces diverse environmental and social research challenges. Priorities underscored a need for fundamental science programmes and studies that involve non-academic stakeholders in developing 'transformative' solutions for the oil palm sector. In an analysis of research articles published on palm oil sustainability, knowledge was found to be skewed towards technical/engineering topics, suggesting investment is needed in understanding the major sustainability issues associated with palm oil production. There was found to be a lack of understanding on what constitutes sustainable palm oil, yet an appetite to increase transparency and

traceability along the supply chain. Specifically regarding drainage-based plantations, questions emerged whether sustainable conversion is possible at all.



### **Opportunities exist to enhance sustainability of oil palm production, improving benefits for biodiversity, the environment and society**

Research by Prof Jane Hill and others is testing the environmental impacts of certification criteria for the sustainable production of oil palm, investigating three main areas: biodiversity, environment (including soil, water and greenhouse gases) and society (including community and labour rights, and livelihoods).

**Biodiversity:** Findings have revealed the high biodiversity and carbon stock value of forest patches, the optimal size of patches to maintain high levels of biodiversity, and the benefits of patches for improving landscape connectivity. Enhancing connectivity is vital because as ecosystems become more fragmented it reduces the possibility for animals to migrate, for plants and wildlife to disperse, breed, feed and thrive. Most plantations contain at least one large patch of forest of high conservation value, and if fully reforested, these patches with core areas over >200 ha could support substantial biodiversity. If high conservation value patches were fully reforested, the connectivity benefits could be substantially improved, offering significant benefits for biodiversity.



**Environment:** Large forest patches of a few hundred hectares upward can store substantial amounts of carbon, although some very small and degraded forest patches have similar carbon stocks to oil palm plantations, and may therefore have limited benefits for reducing carbon emissions unless the forest is restored. Warmer temperatures during the 21st century will enable oil palm to grow in new locations, but increased droughts and flooding risk will reduce oil palm yields. Adaptive management for climate resilience is needed, such as irrigation, developing and planting new oil palm varieties, and preparing for changes to pests and diseases.



**Society:** The research found that efforts by Roundtable on Sustainable Palm Oil (RSPO) are helping to enhance intensification of production by smallholders and boost livelihoods, especially by improving the quality of fresh fruit bunches, but there is no evidence that this is reducing agricultural expansion.



### **EU biofuel policies prioritise trade competitiveness and economic growth above environmental protection**

Research by Dr Stavros Afionis and Prof Lindsay Stringer analysed the EU's biofuels policies and the ways in which other countries perceive the EU. They found that while the EU attempts to convey an image of leadership in environmental sustainability, its policy on biofuels was largely unsustainable socially, environmentally and economically. EU policies could negatively affect the environment, as well as undermining the livelihoods of smallholder farmers and their communities in developing countries. Research assessing how the EU is perceived by countries with an interest in biofuels (analysis focused on Brazil's perceptions of the EU) found that while international cooperation experiences with the US generated trust, good will and openness, negative cooperation experiences with the EU led to reduced influence, mistrust and resentment.

For more information, please contact [l.stringer@leeds.ac.uk](mailto:l.stringer@leeds.ac.uk)