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Mapping UNSW Impact
Global Development

Primary SDG	**15: LIFE ON LAND**
Broad theme	Improve land use planning and policy
Research	Using historical data, simulation models and policy frameworks to improve land use and planning in the Lower Mekong
Impact region	Laos and Vietnam (Lower Mekong river basin)
Faculty	Science
School/Institute	School of Biological, Earth and Environmental Sciences
Academic	Professor Graciela Metternicht
Project partners	DFAT (Australia Awards Scholarship) – funding of approximately $280,000 over four years, 2016-2020
	Mekong River Commission – providing data
Related SDGs	6: Clean Water and Sanitation
	2: Zero Hunger

Elevator pitch

UNSW research is measuring the links between land use and water quality around the lower basin of the Mekong River to ensure food security in the 'rice and fish bowl' of the region. Graciela is also advising the UN on how countries can best utilise their land to ensure sustainable food supplies and avoid land degradation.

The Challenge: How can we protect food supplies in the Lower Mekong Countries, and worldwide?

Lower Mekong countries are shifting toward industrialised agriculture with a focus on commercial cash crops for export, yet rice and fish remain key local crops. In 2016, Lower Mekong countries produced around 14% of the world's total rice, and the Mekong system supports the world's largest inland fishery industry. Around 60 million people rely on the river basin for food security and livelihood. Around Laos's capital, Vientiane, increasing farming activity along the river has raised concerns about soil and chemicals seeping into the river and damaging water quality.

Land degradation is a key issue for developing countries like Laos and Vietnam. Deforestation, mining, erosion and salination can result in desert-like ecosystems barren of life. Degraded land is common where the ecosystem is fragile from arid conditions or human impact from heavy agriculture. It can result in fatal events like landslides and flash flooding, and it can cause soil erosion and soil infertility, harming famers and threatening food security.

UNSW's solution: Measure links between land use and water quality, provide frameworks to manage land use

Using 20 years of historical data supplied by the Mekong River Commission, Graciela and her team are looking to establish a relationship between land use around the lower basin of the Mekong River and the river's water quality using models developed by CSIRO. With further funding, UNSW can investigate forward-looking models that simulate changes in land use and the impact those changes will have on water quality. A simulation model would be invaluable for planning agencies.

Graciela is also part of a 25-person team advising the UN to combat desertification, land degradation and drought. As of September 2017, 113 countries have adopted scientific framework provided by Graciela and a team of multi-disciplinary international experts. With further funding, Graciela would like to offer a scholarship or research fellow position to investigate one or a handful of countries that have adopted the framework to find out what is working and what isn't.

The Impact: Improve land use and food security around the Mekong, and globally

Findings from the Mekong River project could establish a direct link between how land is used and the impact that use has on water quality. Graciela aims to provide step-by step instructions on how to effectively manage land use to maintain or improve water quality in the region, sustaining vital rice and fish industries that depend on Mekong water. Local governments can use historical and simulation models to better plan for land use and set water quality targets. Findings can also help farmers to make decisions that make their farms and the region's ecosystem more sustainable.

Graciela's land degradation work is helping countries to systematically plan for better food security and air and water quality. These benefits limit a country's exposure to natural disasters. Countries can protect land that is ideal for farming, target land that can be nurtured for future farming, and train farmers in how to limit soil erosion and avoid using chemicals to ensure nearby water remains sustainable.

Researcher

Graciela Metternicht is Professor of Environmental Geography at the PANGEA Research Centre of the School of BEES. She is former Director of UNSW's Institute of Environmental Studies, Professor of Spatial Sciences at Curtin University and Head of Discipline and Professor of Geospatial Systems and Environmental Management at the University of South Australia (UNISA). Her current research focus is environmental management and policy, an area she was inspired to work in during her time as UN Regional Coordinator of Early Warning and Assessment for Latin America and the Caribbean.

Ben Falkenmire 16.10.17