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Towards sustainable landscapes: insights from the network and connectivity

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What does it mean for a landscape to be sustainable? And what does sustainability mean for the people living on the landscape? As we address whether landscapes are sustainable or under which conditions sustainability can be achieved, it is important to realize that the view we get at system scale can be very different from the view at human scale. Sustainability can mean different things for the system and for the people living on it. The connector between these two views is the river network itself, which is responsible for the distribution of fluxes of water, sediment, and nutrients across the landscape. A leaky river network connects channels and their floodplains, a fundamental property for the construction and maintenance of floodplains and delta plains. In this lecture, I will cover the analysis of landscapes across scales with particular focus on river deltas: what we learn from a system view, what happens at the local/human scale, and how the network fills the gap between these two views. I will also discuss which opportunities exist to inform delta sustainability from studies combining remote sensing, modeling, and field observations. Flux partitioning along delta networks, hot spots of change, and associated rates of change need to be quantified and this information integrated into adaptive delta management strategies for future climate scenarios.