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Understanding the global land-use marketplace

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Over 7 billion humans inhabit Earth and our population increases by more than a hundred per minute. Satisfying the resource demands of seven-plus billion people whilst sustaining the Earth System is a delicate balancing act. We need to balance resource use with regenerative capacity and this balance must avoid tipping points beyond which return and recovery are impossible. Tipping points in the physical, biogeochemical and ecological components of the Earth System have all been proposed - adding the global land-use marketplace to such a list may not be obvious but it undeniably deserves attention. The land is where most humans live most of the time. It meets most food, fuel, freshwater and fibre requirements and shapes Earth's climate. As land is essentially a finite resource this leads to intense competition. Monetizing land resources is nothing new. Choice of agricultural practice has long been governed in part by economics. But in recent years monetization has extended to include new dimensions such as carbon trading and biodiversity offsetting. Our land-use marketplace now has to optimise food, fibre and fuel production whilst maintaining and enhancing land's role as a carbon sink, a hydrologic reservoir and a support for biological diversity. International (and national) environmental policies aim to find a balance between such competing uses. These policies call for accurate, accountable and timely evidence concerning how, when and where land resources are changing. In 2013 the European Space Agency will launch the first of the Copernicus programme's Earth Observing Sentinel satellites. These technologically advanced systems are matched to data acquisition and processing strategies that should provide scientific evidence concerning the land on an unprecedented scale. This paper provides one vision of how Earth science will benefit from the Sentinels and their associated services and how this science will subsequently inform and shape policies, especially those linked to Multilateral Environmental Agreements. Examples will show how the science can promote transparency and good governance, help build knowledge-bases, capacity and markets and illustrates how Copernicus services and the Sentinels are an important component of EU international co-operation.