



A framework for the management of land use change in water resources planning

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The role of land use and land use change on the hydrological cycle is well known. However, the impacts of large scale land use change are poorly considered in water resources planning, unless they require direct abstraction of water resources and associated development of infrastructure e.g. Irrigation Schemes. However, large scale deforestation for the supply of raw materials, expansion of the areas of plantation forestry, increasing areas under food production and major plans for cultivation of bio-fuels in many developing countries are likely to result in extensive land use change. Given the spatial extent and temporal longevity of these proposed developments, major impacts on water resources are inevitable. It is imperative that managers and planners consider the consequences for downstream ecosystems and users in such developments.

In this paper, a framework for the consideration of the impacts of large scale land use change on water resources is presented. Drawing on experiences from South Africa, where the establishment of exotic commercial forest plantations is only permitted once a water use license has been granted, the framework adopts the “green water concept” for the identification of potential high impact areas of land use change and provides for integration with traditional “blue water” water resources planning tools for more detailed planning. Appropriate tools, ranging from simple spreadsheet solutions to more sophisticated remote sensing and hydrological models are described, and the application of the framework for consideration of water resources impacts associated with the establishment of large scale sugar cane and *jatropha curcas* plantations is illustrated through examples in Mozambique and South Africa.

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