

'Underutilised' agricultural land: its definitions, potential use for future biomass production and its environmental implications

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A growing bioeconomy and increased demand for biomass products on food, health, fibre, industrial products and energy require land resources for feedstock production. It has resulted in significant environmental and socio-economic challenges on a global scale. As a result, consideration of such effects of land use change (LUC) from biomass production (particularly for biofuel feedstock) has emerged as an important area of policy and research, and several potential solutions have been proposed to minimise such adverse LUC effects. One of these solutions is the use of lands that are not in production or not suitable for food crop production, such as 'marginal', 'degraded', 'abandoned' and 'surplus' agricultural lands for future biomass production. The terms referring to these lands are usually associated with the potential production of 'marginal crops', which can grow in marginal conditions (e.g. poor soil fertility, low rainfall, drought) without much water and agrochemical inputs. In our research, we referred to these lands as 'underutilised' agricultural land and attempted to define them for our case study areas located in Australia and Central and Eastern Europe (CEE). Our goal is to identify lands that can be used for future biomass production and to evaluate their environmental implications, particularly impacts related to biodiversity, water and soil at a landscape scale. The identification of these lands incorporates remote sensing and spatially explicit approaches. Our findings confirmed that there was no universal or single definition of the term 'underutilised' agricultural land as the definitions significantly vary by country and region depending not only on the biophysical environment but also political, institutional and socio-economic conditions. Moreover, our results highlighted that the environmental implications of production of biomass on 'underutilised' agricultural land for biomass production are highly controversial. Thus land use change scenarios with low-impact crops and production system must be designed for future biomass production taking into consideration climate, land use, local biophysical conditions and relevant policies (e.g. conservation) within a regional/ landscape planning framework.