

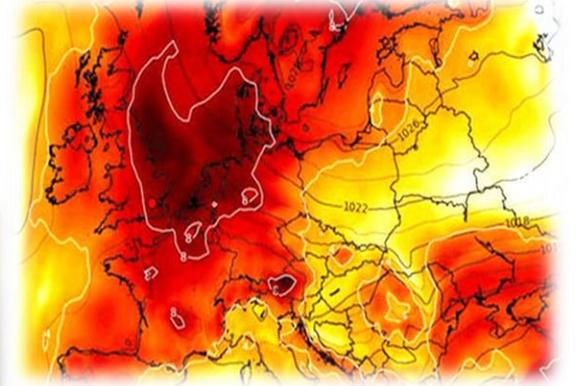
Marginal land: Definition used to identify land as marginal and therefore suitable for biomass crops

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Overall Challenges



Sustainable Farming and Resilience in Agricultural and Food Systems

Supergen Bioenergy Hub



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Land Availability

- Land is a limited resource but multi-functional, needed for food, feed, timber, and fibre production, as well as for nature conservation and climate protection.
- To use land for bioenergy crop production, it is important to understand and assess the impacts of such cultivation on food supply and the environment.
- To avoid potential competition with food crops, it has been proposed that the expansion of these crops should be focused on marginal agricultural land.



Marginal Land Concept

- Poorly defined, leading to difficulties in the assessment of both the amount and location of land availability for bioenergy crops.
- Hampering efforts to assess the potential economic, environmental and societal impact of bioenergy crop expansion.
- A generalized understanding and knowledge of marginal land concept, assessment and management are limited and diverse.



Definition of Marginal Land

- The concept of marginal land is not new and was used as a term in the 19th century by Ricardo (1817).
- The definition of marginal land varies across time, location and discipline with objectives to meet multiple management goals.
- Classify a land as being “marginal” in one place or for one purpose can result in land being considered productive in another place or for a different purpose (Allen et al., 2016; Edrisi and Abhilash, 2016; Lewis and Kelly, 2014).



Definition of Marginal Land

- Lower biomass yields (Meehan et al., 2017)
- Land of low agricultural productivity (Defra , 2010)
- Economically, combination of yields and prices barely covers cost of production or lands not in commercial use (Kang et al., 2013).
- Severe limitations for sustained application of a given use and/or are sensitive to land degradation and/or have lost already part or all of their productive capacity as a result of inappropriate human intervention and also include contaminated and potentially contaminated sites that form a potential risk to humans, water, ecosystems, or other receptors (Elbersen et al., 2018).



Definition of Marginal Land

Land Suitability

- Land unsuitable for food production (Nuffield Council on Bioethics, 2011; RFA, 2008)

Land Quality

- Ambiguous lower quality land (Bauen et al. 2010)

Net Return

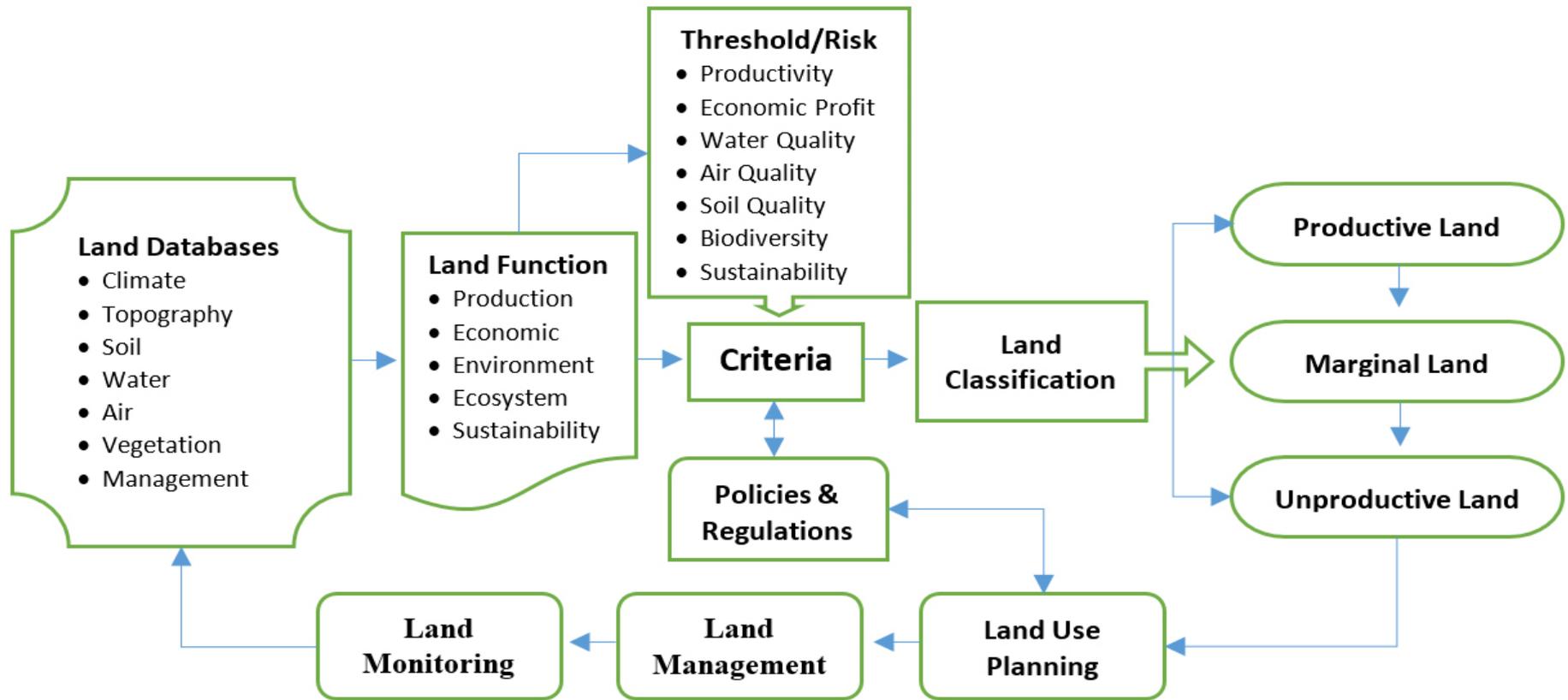
- Economically marginal land (HM Government, 2009; Turley, 2010; Committee on Climate Change, 2011)

Methodology of assessing marginal land

- Variation in the estimates of marginal land availability.
- Three approaches for assessment having difference in methodology and criteria
 1. Qualitative Approach: (i.e. Inadequate rainfall, Any limiting factor of crop production exists)
 2. Quantitative Approach: (i.e. Productivity index, Erosion resistivity index, Threat identification model)
 3. System Approach (i.e. Consider land functions and social, economic impacts, Land Suitability Classifications)



Land-information system for assessment, monitoring and management of Marginal Land



Land availability for bioenergy crops

- Crop production on marginal land may require very careful selection of agronomy, genotype, and species selection.
 - Should we restrict planting only to marginal land?
- Wider social and environmental factors also need to be considered.
- System based approaches provide a mechanism to incorporate a suit of factors into policy and land use decision making but we need an appropriate scope of criteria.

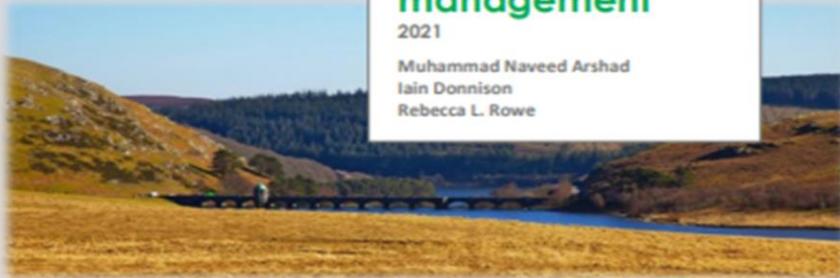


The concept of marginal land has been broadly applied, yet a generalised understanding and knowledge of marginal land in terms of concept, assessment, and management are limited and diverse. The definition of marginal land and assessment methods vary across time, space and discipline to meet multiple management goals. In this report we explore current definitions and how they influence assessments of the availability of marginal lands within the UK and Europe. We use this to make recommendations for the most appropriate application of the marginal land concept in relation to bioenergy cropping. In other words, where the opportunities are to plant energy crops and with what potential impacts.

Marginal lands: Concept, classification criteria and management

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THANKS

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