Energy Policy 117 (2018) 166–172

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Where did the marginal land go? Farmers perspectives on marginal land and its implications for adoption of dedicated energy crops

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ARTICLE INFO

Keywords:
Farming
Attitudes
Marginal land
Energy crops
Bioenergy

ABSTRACT

Dedicated energy crops such as miscanthus and short rotation coppice willow were expected by UK policy and academic modelling to be deployed across large swaths of UK marginal lands in response to farm and market level incentives, delivering on bioenergy policy objectives. Yet, this never materialised. This article examines a previously unanalysed component of this policy failure by comparing and contrasting policy and farmer perspectives on marginal land as a suitable site for energy crops.

Drawing on qualitative interviews with 32 livestock, arable and mixed farmers in England this research suggests that the policy framing of energy crops on marginal land to resolve sustainability controversies, was translated by the farming community into 'energy crops are *for* marginal land'. This acted as a multifaceted barrier to dedicated energy crops due to complex interactions between farmers' personal and cultural values, on-farm practices, technologies, regulations and market developments. Farmers, never considered their land marginal *enough*, consequently this policy framing invoked considerable resistance. This highlights the importance of embedding understandings of farmers' cultural values, on-farm practices, technological change, and tensions between different bodies of regulation when articulating new policy initiatives and the way in which policy narratives translate into practical settings.

1. Introduction

Cultivating dedicated energy crops such as miscanthus and short rotation coppice willow on marginal land has been consistently cited as an attractive means of achieving sustainable bioenergy and lignocellulosic biofuels feedstock production in academic and policy literature in the UK. However, in many instances the expectation that dedicated energy crops would find a willing home on UK marginal lands has remained just that. Expectations put forward in UK policy (DEFRA et al., 2007; HM Government, 2009; DECC et al., 2012) and academic research (Haughton et al., 2009; Lovett et al., 2009; Turley et al., 2010) identified considerable tracts of marginal land in the UK. Furthermore, policy modelling identified price thresholds at which dedicated energy crops were presumed to become highly lucrative for farmers (DEFRA et al., 2007; DECC et al., 2012). While the Energy Crops scheme (2000 – 2013), provided 50% establishment grants to reduce the high up-front establishment costs perceived to be a barrier to cultivation. With these farm level and market incentives in place, alongside expectations of large tracks of suitable land, energy crops were anticipated to undergo rapid expansion in numerous policy documents throughout the early 2000s (Biomass Task Force, 2005; DEFRA et al., 2007; DECC et al., 2012). In practice farmers have not planted significant quantities of miscanthus or SRC willow in the UK. Planted acreage has instead declined since 2009 from an already low base (DEFRA, 2013).

This raises the important question, why, despite a long period of dedicated farm level and market level incentives, alongside explicit policy support for energy crops and bioenergy, did energy crops fail to meet expectations. The limited array of social science research on dedicated energy crop adoption has, to date, primarily focused on on-farm experiences with the crops, and farmer attitudes to this new cropping system. In the process, they have highlighted practical on-farm barriers, economic barriers (Sherrington et al., 2008; Sherrington and Moran, 2010; Convery et al., 2012) and broader industry failures (Adams and Lindegaard, 2016) as underpinning farmer apathy to dedicated energy crops. This small body of literature provides a number of key insights; however, it has not examined an unstudied component for understanding the failure of dedicated energy crops. Farmer perspectives on marginal land, and its implications for their attitudes towards dedicated energy crops.

To answer this empirical question, the paper draws on literature from the sociology of modelling, which has explored, in a variety of contexts, the way in which modelling practices construct an inevitably selective reading of and gaze upon the world (Leach and Scoones, 2013;

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https://doi.org/10.1016/j.enpol.2018.03.011
Received 5 November 2017; Received in revised form 6 February 2018; Accepted 4 March 2018

Morgan, 2009; Kruse, 2012). In particular, aiming to link these insights to a rich body of rural sociology that has focused on farmers values, behaviour, culture and practices (Burton, 2004; Burton et al., 2008; Convery et al., 2012; Morris and Potter, 1995) as a means of addressing a knowledge gap regarding farmer attitudes towards the concept of marginal land in the context of understanding (non)adoption of dedicated energy crops in the UK. Following this work, the analysis examines farmer values, practices, and perspectives towards energy crops but shifts focus to place emphasis on examining the disjuncture between marginal land as outlined in policy and academic modelling, and on-farm understandings, opposed to just focusing on the energy crops per se. This is an understudied area of social science research regarding energy crops specifically, and how farmers value land more broadly, and the implications this has for land use and management decisions.

Previous work specifically on marginal land has focused on examining policy assumptions (Shortall, 2013) or has focused on marginal land in the global south. Much of this work has highlighted the implicit value-based assumptions within formal policy land categorisations (Borras and Franco, 2010; Franco et al., 2010). Although adopting different approaches they touch upon the distance between abstract policy categorisations of land and on ground realities. This paper explicitly examines these realities in the context of UK farmers.

Drawing on 32 qualitative seated and farm walk style interviews with arable, mixed and livestock farmers from the North West, Humberside and East Midlands conducted in 2012–2013 the analysis will highlight three key themes. Firstly, that farmers have considerable pride in their land holding which impacts on its use and management. Second, marginal land was deemed marginal by farmers, and thus its uses inflexible. Third, land quality emerges from complex arrangements of on-farm practices, regulations and relationships with other farmers and contractors. The article will examine the implications for energy crops of each of these themes in turn. Finally, this article will examine how these findings are important for future modelling and policy engaging with land management and use.

2. Marginal land: policy origins

The contemporary discussion on using marginal land to grow perennial energy crops for bioenergy and lignocellulosic biofuels is the most current point in a long and shifting history of debate about how to utilise marginal lands to solve socio-economic or environmental conundrums. The establishment of the Forestry Commission to co-ordinate domestic timber production following the First World War would eventually result in large quantities of the uplands and marginal land being converted to coniferous plantations (Forestry Commission, 2015). However, post-Second World War experiences with prolonged rationing meant marginal land was later called upon to provide more than just timber but cattle and sheep (Ellison, 1953). This suggests long-standing tensions over using marginal land and competition between forestry and agricultural uses. Additionally, the use of marginal land for growing perennial crops utilised in energy systems is not a particularly novel one. In the 1980s, McElroy and Dawson (1986) discussed the potential to use marginal land in Ireland for growing short rotation coppice to fuel rural bioenergy facilities and possibly lignocellulosic ethanol production. Although this potential did not come to fruition. The multitude of possible uses of so called marginal land is suggestive of the elastic nature of marginal land as a concept (HM Government, 2009).

Using marginal land to meet government objectives received renewed impetus with the publication of the Gallagher Review (RFA, 2008). Again, in the context of biofuels, but unlike the earlier work of McElroy and Dawson (1986) who focused on lignocellulosic fuels, in response to concerns over the indirect impacts of first generation biofuels. As the report notes, policy must ensure "agricultural expansion to produce biofuel feedstock is directed towards suitable idle or marginal land …" (RFA, 2008, p. 7). This claim tackles the problem of potential negative consequences from land use change, due to expansion of cropping, or the use of prime existing agricultural lands for energy (Nuffield Council on Bioethics, 2011), through shifting policy attention to the prospects of utilising underused, marginal or perhaps spare lands. The use of marginal land was not however limited solely to meeting the needs of first generation biofuels. Marginal lands became a key site onto which anticipated future dedicated energy crops for lignocellulosic biofuels and bioenergy would be grown more broadly (see HM Government, 2009)

These claims have not been without detractors, with authors such as Booth et al., (2009, p. 113) arguing "The basic premise recommended by the Gallagher Review, that biofuel crop production should be segmented to appropriate idle or marginal land, is unlikely to stand up as a viable option when put to close scrutiny". Likewise, the premise of the Gallagher Review also signals a shift from early policy documents. Most notably the Royal Commission for Environmental Pollution (Royal Commission on Environmental Pollution, 2004) report, *Biomass as a Renewable Resource* which noted that energy crops grown on "the lowest quality land … could also result in reduced yields." (p. 11). Here marginal land is a problem impeding high yields (Shortall, 2013). However, the claims made within the Gallagher Review have taken a position of prominence. This was most notable in the UK Renewable Energy Strategy (HM Government, 2009) in which marginal land was claimed to reduce food versus fuel conflict risk and negative environmental consequences of greenhouse gas emissions due to indirect or direct land use change. However, simply stating the providence of using marginal land is insufficient. Its potential availability, location and thus the attainability of using marginal land requires further work mapping out this marginal land.

3. Mapping marginal land: assumptions and expectations

In the context of UK energy policy, Shortall (2013) conducted a study that aimed to tease out the embedded assumptions relating to the framing of marginal land. This identified three main policy framings: first, land unsuitable for food production; second, ambiguously defined lower quality land; and third, economically marginal land. For Shortall (2013), the first two definitions relate to lower quality agricultural land that is not suitable for food production. Several normative assumptions are contained within this definition. Principal among these assumptions is that a significant amount of marginal land is available for productive cultivation and that energy crops can be targeted to this land. Modelling has been an important aspect in legitimising these assumptions. The third definition, economically marginal land, defines the marginality of land on the basis of its break-even economic margin (Turley et al., 2010). This break-even point is contingent on the set of dominant agricultural practices and market conditions within which the land is utilised. Many of these assumptions are implicitly and explicitly embedded within the modelling efforts informing UK policy on energy crops and marginal land.

Mapping studies such as Haughton et al. (2009), Lovett et al. (2009), conducted as part of the RELU programme, and Turley et al. (2010), directly commissioned by DECC and undertaken by the Food and Environment Research Agency[1] (FERA) in conjunction with ADAS (see DEFRA, 2009) have been highly influential, informing policy (such as HM Government, 2009) and later modelling with regards to marginal land in the UK (such as Smith et al., 2014). These studies aim to define marginal land from a cartographic perspective and utilise geographic information systems (GIS) mapping to determine the spatial availability of marginal land for energy crops.

The nature of this approach gives justifiable prominence to biophysical categories that are deemed important in determining land quality, and can be displayed in the form of a map. A consistent

[1] FERA is an executive research agency of DEFRA.