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Limited adoption of short rotation coppice: The role of farmers' socio-cultural identity in influencing practice

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ABSTRACT

UK energy policy promotes biomass energy crops as potentially significant contributors to renewable energy targets, but few farmers have planted these crops. Amongst the many possible explanations for this disconnect between policy ambitions and delivery on the ground, the role of farmers' socio-cultural identity has received little attention. This study focuses on the Lockerbie area in south-west Scotland, a potentially favourable location for perennial energy crops because (i) it is biophysically suitable for short rotation coppice (SRC) willow, and (ii) Britain's first wood-fueled power station provides a significant local market. A survey in 2009 explored farmers' perceptions of SRC willow, and the key reasons why they adopt or reject perennial energy crops. The results show that most farmers regard SRC willow as a financially risky, overly committing and inappropriate crop for their farms. Whilst financial factors are influential, even large potential profits would be insufficient to persuade many farmers to adopt SRC. Non-financial factors related to identity, lifestyle, farming culture and the perceived priority of food production powerfully shape the overwhelmingly negative attitudes of farmers to SRC. These findings suggest that biomass energy policy, especially regarding woody crops like SRC willow, needs to be more precisely tailored to influential social factors such as socio-cultural identity and local producer culture.

1. Introduction: biomass in government policies and farmers' minds

Biomass energy crops are being actively promoted in many countries as a component of policies on climate change mitigation and renewable energy, but uptake by farmers has been limited, notably in the UK (Adams et al., 2011). This suggests that there is a disconnect between energy policy objectives and the stakeholder community. Successful delivery of any policy involving land use change depends on decisions made by a multitude of individual land managers, the decision-makers who 'stand at the point where abstract policy imperatives collide with concrete realities' (Constable, 2012:xi). Whilst there is an extensive literature investigating UK farmers' resistance towards planting woodlands, and a growing literature addressing many aspects of establishing perennial energy crops on agricultural land, there has been limited study of the role of farmers' socio-cultural identity[1] in influencing decisions about planting such crops. Here we investigate this dimension using data obtained in 2009 in south-west Scotland concerning one type of perennial energy crop, namely short rotation coppice (SRC).

Scotland has an ambitious statutory target of reducing greenhouse gas emissions by 80% from 1990 levels by 2050 (Scottish Government, 2011). Biomass could make a significant contribution, potentially supplying 8–11% of the entire UK's total primary energy demand by 2020, with energy crops and agricultural residues expected to expand fastest (DfT/DECC/DEFRA, 2012). Consequently, there is strong policy support at both UK and Scottish levels for substantial expansion (DECC, 2009; Scottish Government, 2011), and projections envisage dramatic expansion of energy crops (Howard et al., 2009; DfT/DECC/DEFRA, 2012). For example, one policy-informing scenario envisages the area devoted to energy crops increasing by a factor of 275, expanding from 8000 ha in 2008

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[1] A person's socio-cultural identity is their self-conception and self-perception as part of a social group that has its own distinct culture.

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to cover up to 2.2 Mha of arable and pasture land by 2030, with planting rates reaching 150,000 ha/year (E4Tech, 2009). Various incentives such as establishment grants have been available to facilitate expansion (Alexander et al., 2014a).[2] Given the potential value of perennial energy crops in producing a carbon-neutral fuel, and their capacity to offer a wide range of ecosystem services and other benefits (Karp et al., 2009; Rowe et al., 2009; Mola-Yudego et al., 2014), such policy support is likely to increase (Dwyer, 2011). Indeed, Coleby et al. (2012:374) assert that energy crop production is 'set to drive the most extensive changes in land-use in Britain since the 1950s'. The implications of such changes would be far-reaching, including potentially major effects on landscapes, biodiversity, hydrology and the rural economy (Howard et al., 2009; Karp et al., 2009; Dwyer, 2011; Dockerty et al., 2012).

Clearly, if such crops are to fulfil the dramatically expanded role envisaged by policy-makers, large numbers of farmers will need to choose to adopt them. However, perennial energy crops such as SRC are unfamiliar to most British farmers, not only because of the novel cultivation techniques required but also because in policy terms they sit outside the 'food and farming box' at the interface between agriculture, forestry and energy policies. This introduces additional, unfamiliar risks and uncertainties (Sherrington et al., 2008; Sherrington and Moran, 2010), partly explaining the stark contrast between the official optimism about energy crops (e.g. Scottish Executive, 2007) and the limited areas planted. Whereas the UK Bioenergy Strategy envisages that energy crops of all kinds will cover 0.62–2.43 Mha in England & Wales, the total area planted in the entire UK by 2011 was just 0.01 Mha (DfT/DECC/DEFRA, 2012), with just 6300 ha in Scotland (RESAS, 2011).[3] Since then, the planted area has actually been declining (Wilson et al., 2014). These planting area figures reveal the real extent of the gulf separating policy-makers' aspirations and land managers' practice.

Such policy-stakeholder disconnects are hardly a new phenomenon; policy design often fails to take full account of the characteristics of the relevant actors, as studies of innovation adoption by farmers have shown (White et al., 2009; Sattler and Nagel, 2010; Ma et al., 2012). Two areas of particular relevance to this study which illuminate the nature of this disconnection are (i) the promotion of farm forestry and agroforestry in Scotland, and (ii) the implementation of agri-environmental policies internationally. These are now briefly reviewed.

Increased integration between farming and forestry in Scotland has been encouraged for many decades (Mackay, 1995), but the policies have met with limited success. A key reason for this is that there exists a long-standing antipathy amongst Scottish farmers towards tree planting and management, arising from a deep-seated sense of differentiation between farming and forestry within the respective professional communities (Towers et al., 2006; Warren, 2009, pp.332ff). Despite the many cogent arguments for adopting farm forestry and agroforestry, the persistence of this 'deep cultural divide between farming and forestry' (FCS, 2012: 2) constitutes a significant barrier (Burgess et al., 1999; Morgan-Davies et al., 2003; Sibbald, 2006). Tenant farmers, who farm over a third of Scotland's main agricultural holdings, are especially alienated because owners typically retain control of woodlands (Towers et al., 2006). The failure of policy design to recognise this phenomenon of cultural 'tribalism' has militated against greater integration, and has hindered farmers' adoption of land uses involving tree species.

Secondly, and more broadly, a substantial international literature explores the long-standing discrepancy between agri-environmental policies and farmers' values and motivations (Wilson, 2001; Burton et al., 2008). Numerous barriers have been identified which impede the adoption of sustainable and/or conservation-orientated agricultural practices (Rodriguez et al., 2008; Moon and Cocklin, 2011). Amongst the most common are the characteristics and attitudes of farmers themselves, including an oft-reported reluctance to change (Burton et al., 2008). Policies based on the assumption that the 'right' level of payment will deliver desired outcomes ignore the complex web of factors which influence farmers' decisions, and the fact that farmers' goals usually constitute a mix of economic, social and environmental objectives (Farmar-Bowers and Lane, 2009; Greiner et al., 2009; Miller et al., 2009; Greiner and Gregg, 2011). Farmers tend to be strongly influenced by perceptions of what constitutes 'good farming' amongst their farming peers (Ryan et al., 2003; Burton, 2004a, 2012; Burton et al., 2008; Rodriguez et al., 2008), as well as by a deeply engrained production-orientated mindset (Macgregor and Warren, 2006; Gorton et al., 2008). Farmers are thus not the pure profit maximisers of economic models but are influenced by social norms, cultural beliefs, socio-psychological factors, aesthetic judgements and personal values concerning nature, family and community (Edwards-Jones, 2006; Rodriguez et al., 2008; Cope et al., 2011).

Because agricultural systems are complex social-ecological systems, the effectiveness of policies and policy instruments will depend upon a sound understanding of the motives and perceptions (including self-perceptions) of farmers who are the key actors (Feola and Binder, 2010; Blackstock et al., 2010). This is particularly relevant when policies are seeking to promote new behaviours such as the growing of non-food crops like trees (Zubair and Garforth, 2006). Thus 'the personal attitude of the single farmer … is of utmost importance' (Sattler and Nagel, 2010:71) because, notwithstanding the overarching framework of agricultural regulations, incentives and policy aspirations, what actually happens on the ground is the product of decisions by individual farmers (Cope et al., 2011).

Given that land use futures are largely determined by farmers' decisions, policy targets will only be achieved when farmers choose to adopt new practices. Self-evident as this might seem, it is striking that policy formulation and technical assessments of potential tend to ignore it. As Cope et al. (2011:855) observe, policy-makers 'typically focus on biophysical and economic criteria that influence farmers' land use decisions at the expense of "intrinsic" socio-cultural motivations'. The prevailing presumption has been that, if the pricing and support structures are right, farmers will be willing to establish large areas of energy crops. This is exemplified by the UK Renewable Energy Strategy which identifies land availability, crop yields, and waste management as key factors affecting future biomass supplies (E4Tech, 2009) but conspicuously omits any consideration of farmers' willingness to plant energy crops. Consequently, examining the critical linkage between policy aspirations and delivery may help to explain the gulf which currently separates technical assessments of the large potential of energy crops and the small area planted.

One of the suggested explanations for this frequently observed gap is the existence of socio-psychological barriers to adoption created by farmers' perceptions and motivations (Alexander et al., 2014a; Mola-Yudego et al., 2014). While farmers in many

[2] At the time of this study, support for SRC crops of willow or poplar was available under Axis 1 of the European Commission Regulation EC 1698/2005 with the explicit intention of aiding farm diversification and carbon sequestration. A contribution to costs up to a maximum of £1000/ha was offered, subject to the planting of a minimum area of 2 ha at a minimum stocking density of 10,000 cuttings/ha for a minimum period of 5 years. Separately, under the banded Renewables Obligation, electricity generation from energy crops is supported at a higher level than regular biomass.

[3] This figure covers the 33,600 larger holdings (≥1 ha) only, and so slightly underestimates the total area of SRC on all farms in Scotland (52,300 holdings).