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Does multifunctionality matter to US farmers? Farmer motivations and conceptions of multifunctionality in dairy systems

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ABSTRACT

The concept of multifunctionality describes and promotes the multiple non-production benefits that emerge from agricultural systems. The notion of multifunctional agriculture was conceived in a European context and largely has been used in European policy arenas to promote and protect the non-production goods emerging from European agriculture. Thus scholars and policy-makers disagree about the relevance of multifunctionality for United States agricultural policy and US farmers. In this study, we explore lived expressions of multifunctional agriculture at the farm-level to examine the salience of the multifunctionality concept in the US. In particular, we investigate rotational grazing and confinement dairy farms in the eastern United States as case studies of multifunctional and productivist agriculture. We also analyze farmer motivations for transitioning from confinement dairy to rotational grazing systems. Through interviews with a range of dairy producers in Wisconsin, Pennsylvania, and New York, we found that farmers were motivated by multiple factors – including improved cow health and profitability – to transition to rotational grazing systems to achieve greater farm-level multifunctionality. Additionally, rotational grazing farmers attributed a broader range of production and non-production benefits to their farm practice than confinement dairy farmers. Further, rotational grazing dairy farmers described a system-level notion of multifunctionality based on the interdependence of multiple benefits across scales – from the farm to the national level – emerging from grazing operations. We find that the concept of multifunctionality could be expanded in the US to address the interdependence of benefits emerging from farming practices, as well as private benefits to farmers. We contend that understanding agricultural benefits as experienced by the farmer is an important contribution to enriching the multifunctionality concept in the US context, informing agri-environmental policy and programs, and ultimately expanding multifunctional agricultural practice in the US.

1. Introduction

1.1. The emergence of multifunctionality as a policy concept

Over the past century, the United States has seen the growth of high intensity agricultural systems (Mann, 1999) that are linked to the homogenization of the rural landscape (Brown and Schulte, 2011). This 'productivist' model of agriculture seeks to maximize outputs and profit (Wilson, 2007) and has contributed to both industrial productivity in agricultural systems as well as the rise of environmental problems such as soil erosion, habitat loss, and decreased water quality with both local and global effects (Foley et al., 2005). In response to these issues, a growing, yet still limited agricultural movement has emerged that is hypothesized to contribute greater non-production benefits than productivist agriculture, such as enhanced environmental conservation, improved rural socio-economic viability, cultural heritage, and scenic amenities. The concept of multifunctional agriculture (MFA) has gained prominence as a way to describe and promote this suite of social, environmental, and economic benefits. Most broadly, multifunctionality refers to the notion that agriculture "jointly produces" non-commodity benefits beyond the production of food and fiber (OECD, 2001). Benefits emerging from MFA are discussed primarily in terms of their contribution to the public or common good, thus highlighting the broad scale services that certain agricultural practices contribute.

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Multifunctionality has emerged as an important agricultural policy and academic concept over the past 10–15 years, though the scope of its usage has been somewhat limited. The concept was initially conceived of in the context of European Union (EU) agricultural policy as a strategy to describe the non-production goods emerging from European agriculture and ultimately protect domestic subsidies for systems that produce these "non-trade distorting" services (Freshwater, 2002; Hollander, 2004; Wilson, 2007). Subsequent examinations of multifunctionality have been influenced by this European framing and its beginnings as a strategic agricultural trade policy. In the EU, many countries have internalized the multifunctionality concept through agri-environmental policies that provide direct payment to farmers for production of the public goods (*e.g.* scenic landscapes, environmental services), while US agri-environmental policies have focused more on mitigating negative externalities of agriculture (*e.g.* reduced water quality, soil erosion) (Baylis et al., 2008). While some are pushing for the inclusion of MFA and payment for non-production agricultural services in the cadre of US agricultural policy (*e.g.* Jordan and Warner, 2010) others question the applicability of the multifunctionality concept outside Europe and in the US, in particular (Blandford and Boisvert, 2002; Freshwater, 2002). However, scholars are working to examine the generalizability of multifunctionality to new geographic and cultural contexts such as Australia, Japan, Thailand, and New Zealand (*e.g.* Caron-Flinterman et al., 2010; Hollander, 2004; Holmes, 2006; Shiratani et al., 2008; Tipraqsa et al., 2007). We seek to explore the concept of multifunctionality in a US agricultural context, building on recent work (Boody et al., 2005; Freshwater, 2002; Hollander, 2004; Jordan and Warner, 2010).

Despite the continued support for agri-environmental policies intended to promote agricultural multifunctionality in the EU and the US, most of these policies are voluntary conservation programs that have had uneven farmer participation (Baumgart-Getz et al., 2012; Wilson and Hart, 2000). Scholars argue that this lack of broad base adoption signals the disconnect between policy intentions and farmers' motivations, and suggest that many agri-environmental policies are not 'culturally sustainable' at the farm and community-level (Burton and Paragahawewa, 2011; Wilson and Hart, 2000). Thus, to promote these broader agricultural benefits through policy, we need to understand how multifunctionality emerges from the micro-scale through farmer decision-making and farm management. Consequently, scholars have called for additional study of farm-level expressions of multifunctionality (Renting et al., 2009), as well as examination of the "evolving motivations of the actors involved" (Renting et al., 2009, pp. S155) in MFA to better understand the factors driving farmers' transitions. To date, there has been little examination of how farmers themselves conceive of multifunctionality on their farm, across the landscape, and in the public sphere, particularly in US agriculture. Thus, it is unclear whether the MFA concept is salient to US farmers and whether future policies seeking to promote multifunctionality may be relevant to how farmers think about, speak about, and make decisions about their land. In this study, we use multifunctionality as an analytical lens to examine farmers' decision-making and how they understand the benefits emerging from their agricultural practice. We seek to develop farm-based account of multifunctionality, working to enhance the relevance of the MFA concept across scales. Ultimately, this study contributes to conversations about ways to promote MFA, particularly in the United States.

Readers may draw parallels between the concepts of multifunctionality and ecosystem services. Though these concepts are similar in examining the "functions" produced through ecosystem processes, multifunctionality is a more interdisciplinary concept. Ecosystem services refer to the benefits that humans derive directly from ecosystem processes (Costanza et al., 1997). However, multifunctionality also includes non-ecosystem derived benefits that emerge through socio-ecological relationships – in this case in an agricultural setting – such sense of community and enhanced quality of life. For example, our work and the work of others have demonstrated that farmers practicing rotational grazing report improved well-being under a rotational grazing system (Undersander et al., 2002). This improved well-being does not come directly from ecosystem processes, but is linked to the social, economic, behavioral, and ecological aspects that emerge from rotational grazing systems. Multifunctionality continues to be a focus of agricultural research and policy and has greater conceptual relevance for our research.

1.2. Multifunctionality in rotational grazing and confinement dairy

Our study examines farmer conceptions of MFA in rotational grazing (RG)[1] and confinement dairy farms in three states in the eastern United States. In RG systems, farmers rotate livestock through pastures to maximize pasture yield and grazing efficiency, as well as to diminish the impact of animals on the soil and vegetation. RG has emerged most strongly in the past three decades in the eastern United States, though confinement-based dairy is still the dominant form of dairy production. The archetypical model of confinement dairy production has distinct animal diet and land-use practices from RG. For example, confinement operations have more land in crops that serve as feed for cows or at least rely on croplands as a source of grain for their cattle. This land-use difference (*i.e.* more pasture in RG systems and more cropland in confinement systems) has implications for environmental services. In particular, grazing farms may contribute to improved soil and water conservation (Boody et al., 2005; Digiacomo et al., 2001; Randall, 2001; Sovell et al., 2000), support enhanced biodiversity through providing habitat for grassland birds (Paine et al., 1995), and enhance stream habitat for fish and macro invertebrates (Lyons et al., 2000; Raymond and Vondracek, 2011; Vondracek et al., 2005). Research also indicates that RG systems may promote social and economic benefits such as improved profitability (Taylor and Foltz, 2006), enhanced quality of life (Aschmann and Cropper, 2007), and improved human and cow health (Undersander et al., 2002). Further, previous work on dairy production in Scotland finds links between the multifunctionality of dairy farms and their ultimate technical efficiency, suggesting that greater multifunctionality positively affects individual farm management outcomes (Barnes, 2006).

Despite growth in intensive grazing systems, rotational grazing dairy operations are uneven and arguably stalled on the broader landscape; between 10 and 26% of dairy operations practice RG in our study regions (Nott, 2003; PATS, 2007; Winsten et al., 2010). Confinement dairy is the most widely practiced system of dairy production in the US and provides tangible benefits to the farmers who practice it. Confinement dairy farmers have the capacity to closely monitor, control, and supplement cow nutrition and thus generally produce more milk per cow than RG dairy farmers (Hafla et al., 2013). Also, there is social and economic momentum surrounding confinement dairy due in part to the strong market infrastructure that supports confinement systems and the

[1] Rotational Grazing (RG) is also commonly described as Management Intensive Rotational Grazing (MIRG) or management intensive grazing. We consider these terms interchangeable, but will use rotational grazing (RG) for the purposes of this article.