The Multifunctional Farm Household Enterprise: Using Farm Microdata to Assess the Rural Economy Impacts Generated by Farmer-Operated Off-Farm Businesses

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DOI: 10.1481/icasVII.2016.f34

*The views expressed here are those of the authors and may not be attributed to the Economic Research Service, U.S. Department of Agriculture, Brandon University, or the University of Saskatchewan.

ABSTRACT

Rural development specialists working with agricultural statistics confront the tension between collecting data for the purposes of measuring farm sector performance versus that of assessing farm household well-being. While it is recognized that the activities of the farm enterprise and farm household generate a broad spectrum of market relationships in their local economies – linkages found in capital markets, commodity production, household consumption, and alternative income-generating activities on and off the farm, most agricultural data collection systems focus primarily on commodity production and just the basics of farm household structure (Bollman, 1998). The survey instrument that embraces the dual mission of collecting data on the farming enterprise and on farm households can allow specialists to study a broader complement of farm-rural economy linkages (Johnson, et al, 2008). Such a survey generates a more comprehensive quantitative assessment of the farm household as a multifaceted enterprise and its linkages to the rural economy (Vogel, 2012).

In this case study, we exploit microdata on farm household activities drawn from U.S. and Canadian national agricultural surveys to shed light on the impact of farmers who simultaneously operate off-farm businesses on their local communities– a farm/rural interface often overlooked by agricultural economists and rural development specialists alike. These entrepreneurial farmers provide additional employment and growth opportunities separate from commodity production for

their rural economies. Hence, instead of depending on the local communities' resilience for their household well-being, they contribute to it.

We use the Agricultural Resource Management Survey jointly administered by the Economic Research and the National Agricultural Statistic Services of the U.S. Department of Agriculture and the Farm Financial Survey administered by Statistics Canada. Given the sufficiently detailed data on these farmer-operated off-farm businesses, we are able to use the input/output modeling toolkit to recover estimates of nonfarm value added, sales, and employment generated by them. With respect to the rural economy, we find that the share of a rural county's employed nonfarm labor force linked to these off-farm businesses increases the further they are located from the urban core. Thus, the business acumen of these farm portfolio entrepreneurs is an even more valued intangible asset for communities in more remote rural areas.

For developing economies with large farming populations, data on the full complement of farm household enterprise activities can provide opportunities of regional development specialists to analyze the potential breadth of farm-generated development pivots.

Keywords:, off-farm businesses, farm microdata, entrepreneurship, rural resilience.

1. Introduction

In the current global economy, some elements in the development processes in agriculture remain intertwined with those of the rural economy, while other relationships have attenuated. in part to the increasing scale and concentration of farm operations and in part to the economic diversification of many rural economies, the farm links to the local economic base have weakened while the majority of farm households in many countries have at least one household member in non-farm employment. Farmers who simultaneously operate off-farm businesses provide additional employment and growth opportunities for their rural economies.

The activities of the farm *family enterprise* – farm production, farm household consumption plus all other household income-earning activities generate distinct market relationships, but most agricultural data collection systems focus primarily on family *farm enterprise* and just the basics of farm household structure (Bollman, 1998, Johnson et al., 2008). The survey instrument that collects data on these market relationships generates a more comprehensive quantitative assessment of the farm household as a multifaceted enterprise and its linkages to the rural economy (Vogel, 2012).

This case study shows how using farm sector microdata for rural development purposes is able to uncover additional contributions made by a small segment of U.S. and Canadian farm families to their communities' well-being. By simultaneously operating both farm and off-farm businesses, these farm families appear to use their comparative advantage in being able to organize resources across multiple enterprises when new business opportunities arise. A large body of case study research classifies these multifunctional farm families as "portfolio entrepreneurs" (Carter and Ram, 2001; Seuneke, et al., 2013).

In the local economy, off-farm business income serves a dual purpose. First, from the farm household's perspective, off-farm business income represents an additional, potentially lucrative source of household income. In section 2,
Survey (ARMS) jointly administered by the Economic Research and the National Agricultural Statistic Services of the U.S. Department of Agriculture and the Farm Financial Survey (FFS) administered by Statistics Canada to examine the incidence and distribution of these farm portfolio entrepreneurs (FPEs).[1] Second, from the perspective of the local economy, off-farm business income represents profit income derived from these FPEs marshaling local resources in producing nonfarm goods and services, without which they may have been imported or not available at all. In

section 3, we use elements of the social accounting matrix modeling toolkit to estimate of their contributions to local output, nonfarm value added income, and employment.

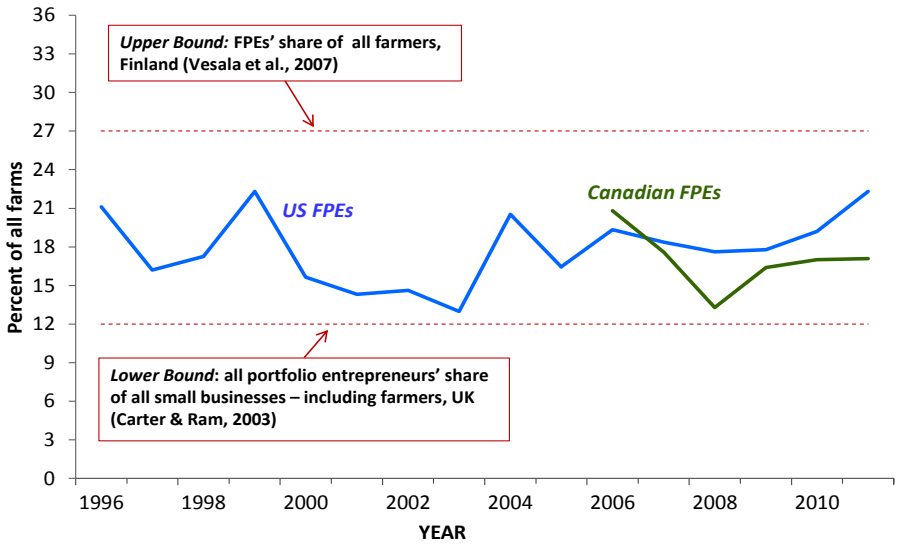
2. View from the Farm Gate: Characteristics of U.S. and Canadian FPEs

Why do farm households become portfolio entrepreneurs? For small farms generally, the ability to make a living solely from farming has declined over time as economies of size increasingly limit the profit potential of smaller operations. These multifunctional farm households rely on portable skills, multiple job-holding, and multiple enterprises as the basis for maintaining their household incomes. Farm households with excess resources at their disposal may operate a second enterprise if adjacent land or other key inputs become too costly or unavailable, or if nonfarm opportunities appear to be more profitable than intensive development of existing farm resources. For large commercial family farms with multiple operators, operating an off-farm business can provide an income and career path for extended family members, insuring that they remain part of the broader family farm business (Vogel, 2013).

Statistics on the incidences of farm and nonfarm portfolio entrepreneurship are uneven, ranging from 12 percent of all small businesses in England to 27 percent of Finnish farm households (Carter and Ram, 2003; Mikko Vesala, et al., 2007). Although ARMS collects data on off-farm business income annually, the data necessary for estimating farmer-operated off-farm business contributions to their local economy exist only for the years 2006-2012. For these years, FPEs reported the industrial sectors to which their businesses belonged, profit income, and how many workers their businesses employed. For the Canadian case, data on off-farm business income from the FFS was collected every two years prior to 1995 and continuously only for 2006-2011.

U.S. and Canadian FPEs represent a relatively small, enduring segment of all farm households, averaging 17.9 for the U.S. and 17.1 for the Canadian case (Figure 1). Vogel (2012) found that most of these farm families operated nonfarm businesses out of necessity, a small segment as part of family-enterprise growth and wealth generation strategies, and an even smaller portion as part of a transitional pathway into and out of farming. Compared to other types of small business entrepreneurs, farm and nonfarm portfolio entrepreneurs are more likely to rank their ability to organize resources and spot new opportunities as a greatest strength, more likely motivated by wealth creation, and to have invested more capital from both internal and external sources in their businesses (Westhead, et al., 2005).[2]

Figure 1. Incidence of Canadian and US farm portfolio entrepreneurship, 1996-2011



Source: USDA, ERS, ARMS, 1996-2011; Statistics Canada, FFS, 2006-2011.

In 2007, 395,583 U.S. farm households earned US $21.6 billion US off-farm business income and 39,243 Canadian farmers similarly earned CA $2.1 billion (Table 1).[3] The incidences of portfolio entrepreneurship by farm sales class among all U.S. and Canadian farm households also lie in the established range in Figure 1, suggesting that the human capital skills unique to farm portfolio entrepreneurship are universal and not directly linked to farm size.[4]

The distribution of farms across farm sales classes is different in the U.S. and in Canada – in 2007, the USDA ARMS survey reported that 58% of U.S. farms had sales under $10,000 whereas the Canadian 2006 Census of Agriculture showed that only 22% of Canadian farms had sales under $10,000. Thus, with a similar incidence of portfolio entrepreneurship in each sales class (Table 1), we find a much larger share of FPEs operating small farms in the U.S., compared to Canada. In 2007, 82 percent of U.S. FPEs were small farms with gross sales of less than $50,000, whereas only 48 percent of Canadian FPEs were classified as such. Medium-sized farms with sales between $50,000 and $249,999, and large farms with $250,000 or more in sales accounted for 52 percent of Canadian FPEs versus 21 percent of U.S. FPEs.

Table 1. Number of U.S. and Canadian FPEs and their off-farm business income, 2007

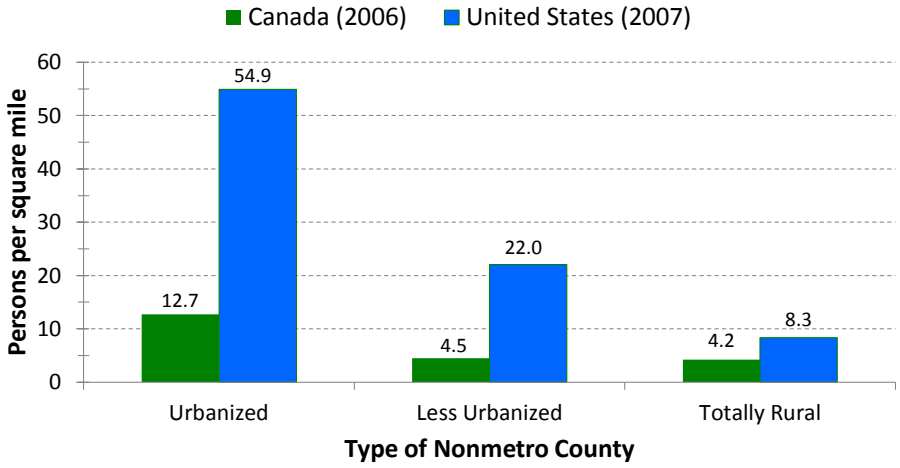
	*Farm Sales Class**			
	Less than $50,000	$50,000 up to $249,999	$250,000 or more	All
United States				
Number of farm portfolio entrepreneurs	325,617	41,864	28,102	395,583
Percent	82.3	10.6	7.1	100.0
Percent of all farms	19.5	14.8	13.7	18.4
Off-Farm business income (US $ millions)	17,028.0	3,053.3	1,538.0	21,618.9
Percent	78.8	14.1	7.1	100.0
Canada				
Number of farm portfolio entrepreneurs	19,008	12,450	7,785	39,243
Percent	48.5	31.7	19.8	100.0
Percent of all farms	16.0	17.4	20.0	17.1
Canada (CA $ millions)	1,091.0	600.7	427.8	2,119.9
Percent	51.5	28.3	20.2	100.0

*Farm sales classes were demarcated in U.S. dollars for U.S. FPE's and Canadian dollars for Canadian FPE's (2007 exchange rate: 1 USD = 1.07 CAD).

Sources: U.S. Department of Agriculture,Economic Research Service, 2007 Agricultural Resource Management Survey; Statistics Canada, 2007 Farm Financial Survey, and 2006 Census of Agriculture.

What underlying factor accounts for the disproportionately higher share of small farms among U.S. PFEs relative to Canada? Is it important to sustaining rural livelihoods? For the rural development specialist, a natural candidate is the role of population density. Figure 2 depicts average population densities for nonmetropolitan (rural) counties by the size of their urban populations in the 48 contiguous U.S. states (excluding Alaska and Hawaii) and in the Canadian provinces (excluding the Northern Territories). Nonmetropolitan counties with urban populations of 20,000-249,999 inhabitants are classified as 'urbanized', as 'less urbanized' for those with urban populations of 2,500-19,999 inhabitants, and 'totally rural' for those counties with less than 2,500 urban inhabitants. Within each of the three county types, population densities in US rural counties are 2 to 4 times higher than Canadian counties. In the Canadian counties, the centers of urban activities – be they small cities, towns, or villages – serve a much broader rural expanse than for corresponding U.S. counties. Regardless of the size of the urban center, higher population densities in rural counties may constrain farm-size expansion, but they can offer more opportunities for farm households to earn income in the nonfarm economy and more business opportunities for the entrepreneurial farm family.

Figure 2. Population Densities of Nonmetropolitan Counties by Type*



*2007 U.S. data excludes Alaska and Hawaii; 2006 Canadian data excludes the Northern Territories. Sources: U.S. – USDA, Economic Research Service (2003 Beale county codes); U.S. Dept of Commerce, Bureau of the Census (2010). Canada – Statistics Canada., Census of Population, 2006

3. View from the local economy: economywide contributions of off-farm businesses

From a 'rural wealth creation' perspective, the long run sustainability of a rural community's well-being depends on promoting the economic activities that simultaneously augment its stocks of intangible resources. That is, fostering social and business networks, the capacity to innovate, and institutional malleability – social capital, intellectual capital, and cultural capital – can become important pivots in a rural community development strategy (Pender, et al., 2012). Case studies find that FPEs contribute to their communities' stocks of social and entrepreneurial capital. Our use of farm microdata complements these findings by quantifying the measureable economic impacts of their off-farm businesses.

The 2007 ARMS data allow us to distinguish between two types of FPEs based on whether or not they employ part-time or full-time workers. Off-farm businesses with no employees classified as sole proprietorships are referred to as "survival entrepreneurs" who may face few off-farm employment opportunities or possess limited financial or physical resources for farm enterprise growth. Off-farm businesses with employees are referred to as "growth entrepreneurs" contributing to a community's dynamic process of wealth generation (Markley and Low, 2012).

3.1. Industry Data and Methodology

To estimate the value of sales, labor income, and employment that, in theory, must exist to support the levels of U.S. and Canadian off-farm businesses incomes reported in Table 1, we assume that these businesses exhibit on average the same industrial characteristics as those operated by these countries' establishments not associated with a census-farm. This assumption lets us use the structural relationships embedded in the Canadian and U.S. benchmark input/output tables.[5]

For our simulations, we aggregated the 2007 ARMS data on off-farm businesses into 5 industrial classifications: (i) agricultural services, forestry and fishing, (ii) construction and manufacturing, (iii) utilities, wholesale trade, and transport, (iv) services, and (v) 'unclassified' or 'necessity' proprietorships. The Farm Financial Survey does not collect data on the type of industry to which Canadian off-farm businesses belong. As indicated below in Table 2, we assume that the distribution of Canadian off-farm businesses by sector is the same as in the U.S. We then use the input/output data regarding profit income, labor productivities and input usage for all firms in these sectors to estimate the contribution of Canadian off-farm businesses in each sector. Therefore, the differences between the two countries is generated by the differences within sectors as we assume a common weighting of the data across sectors to generate the national estimates of the contribution of off-farm businesses (Vogel and Bollman, 2012).

We used the fixed relationships between profit income and output embedded in a social accounting matrix (SAM) multiplier model to estimate the contributions to output, value-added income, and employment generated by off-farm businesses. Traditionally, after extracting the matrix of direct expenditure coefficients (**B**) from the data SAM, an exogenous shock to a particular group of industrial sectors or households ($\Delta\mathbf{x}$) multiplied by a matrix of SAM multipliers (**M**) yields economywide effects on sectoral outputs, factor incomes, and household incomes ($\Delta\mathbf{y}$),

$$(1) \qquad \Delta\mathbf{y} = (\mathbf{I} - \mathbf{B})^{-1} \cdot \Delta\mathbf{x} = \mathbf{M} \cdot \Delta\mathbf{x} \, .$$

Given that our farm microdata were collected on current-period enterprise activities, we assume that these off-farm businesses operate in the current period equilibrium. They did not generate any "new" derived demands for intermediate goods and labor services that would have been captured by the SAM multiplier **M**. Instead, we are only allowed to estimate the direct impacts of these off-farm businesses. Dividing the sectoral-level off-farm business incomes ($\boldsymbol{\pi}$) by their direct profit-income coefficients ($\mathbf{B}_{\pi}$) obtained from the 2002 U.S and the 2006 Canadian benchmark input-output tables yields estimates of sector-level output or sales for these off-farm enterprises (**x**),

$$(2) \qquad \mathbf{x} = \boldsymbol{\pi}' \mathbf{B}_{\pi} \, .$$

Given the estimates of total sales (**x**) for U.S. and Canadian off-farm businesses, we use the ratios of sectoral income and employment obtained from their respective input-output tables to estimate these business's contributions to their local economy's value-added income, labor income, and employment for the Canadian case. For the U.S. case, we report the 2007 ARMS employment estimates. As a robustness check, we found that the employment estimates for the U.S. case derived from equation (2) were within 6 percent of the 2007 ARMS employment estimates. Table 2 reports the contributions made by FPEs to their nonfarm economies.

3.2. Results

The summary measure of FPEs' contributions to their communities' well-being is value-added income, defined as the sum of labor and capital income plus indirect business taxes generated by their off-farm businesses. In addition to the value-added income generated by the farm operation, in 2007 off-farm businesses in the U.S. generated an estimated $111.6 billion in sales of goods and services, which resulted in an additional contribution of $54.6 billion to their communities' gross county products (Table 2). Similarly, Canadian farmers operating off-farm businesses generated $12.1 billion in sales, which resulted in $5.5 billion in additional value-added income accruing to their communities. The nonfarm businesses of FPEs paid out $19.7 billion in wages and salaries to 853,100 part-time and full-time employees in the U.S. and almost $2.9 billion in labor income to 68,200 employees in Canada.

For both countries, service sector businesses appear to generate the largest economic footprint in their local communities, accounting for about 55 percent of total value-added and labor income and the largest shares of employment linked to these businesses (Table 2). This outcome reflects the overall pattern of service sector enterprises driving the industrial composition of the two countries' rural and national economies.

Table 2. Contribution of FPEs to the off-farm economy

Item	All industrial sectors	*Industrial sector:* Agriculture, forestry, and fishing	Construction and manufac-turing	Infrastructure (utilities, wholesale trade, and transport)	Services	Unclassified proprietorships (with no employees)
United States		*Percent of total distributed across all categories*				
Off-farm business income (US $ milliions)	21,619	7.9	18.2	7.3	53.5	13.0
Sales (US $ milliions)	111,615	6.0	28.7	8.6	44.1	12.6
Value added Income (US $ milliions)	54,649	5.1	21.5	10.5	56.9	6.1
Labor Income (US $ milliions)	19,723	3.2	28.5	10.8	57.4	–
Jobs (number)	853,129	12.5	21.4	17.7	48.4	–
Canada		*Percent of total distributed across all categories*				
Off-farm business income (Can $ millions)	2,120	7.9	18.2	7.3	53.5	13.0
Sales (Can $ millions)	12,123	7.7	30.1	6.4	44.3	11.5
Value added Income (Can $ millions)	5,501	5.3	21.4	8.1	54.9	10.2
Labor Income (Can $ millions)	2,860	4.8	25.4	8.6	61.2	–
Jobs (Number)	68,194	9.8	19.4	7.2	63.6	–

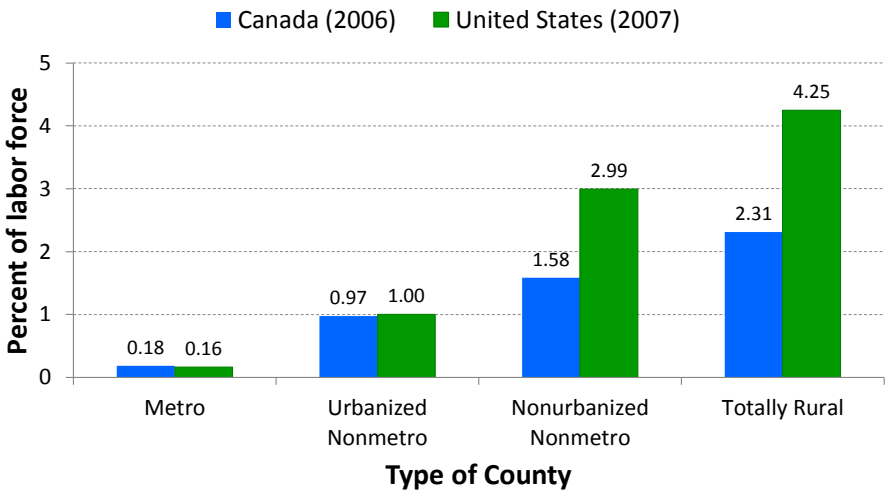
This table's key finding points to the disproportionate contribution growth-oriented FPEs make to rural sustainability. These FPEs operating employer establishments generated 87 percent of all firm sales in the US and 88 percent in Canada, and contributed almost 94 percent of all value-added income from off-farm businesses in the US and 90 percent in Canada (Table 2). Yet, small in number, they make up in the U.S. case only 38 percent of all FPEs, and may represent key fixed-place human capital assets for local communities facing changing agricultural and rural economies (Vogel, 2012).

How important are U.S. and Canadian jobs directly tied to FPE off-farm businesses to the rural economy? In both countries, the share of local employment linked to these nonfarm businesses is higher in rural counties that are further from an urban core. In 2007 for both countries, jobs directly linked to off-farm businesses operated by farm households accounted for 0.2 percent of the employed labor force in metro counties and 1 percent in the urbanized nonmetro counties (Figure 3). In the U.S., the share of the total county labor force directly linked to FPEs' off-farm enterprises increased to almost 3 percent in less urbanized nonmetro counties to 4.3 percent in the completely rural counties. For the U.S. case, we observe when traversing the urban/rural continuum a 20-fold increase in the nonfarm employment directly linked to their farmer-run nonfarm employer establishments. In Canada, the shares of the total county labor force directly linked to these off-farm businesses increased to 1.6 percent in the less urbanizes counties to 2.3 percent in the completely rural counties. Similarly, for the Canadian case, we observe a 13-fold increase in the nonfarm employment linked to these farmer-run firms.

These findings suggest two additional stylized facts on the importance of farm portfolio entrepreneurship for rural communities. First, FPEs in the more remote rural areas play an increasingly important role in developing business opportunities. For these rural areas, attracting

outside entrepreneurial resources is difficult. Hence, the place-based FPE's portfolio of intangible and tangible resources becomes a more highly valued development pivot, particularly in densely populated remote rural areas with large numbers of small farms. Second, the increase in the share of the total labor force tied to Canadian farmer-operated off-farm businesses is half that for the U.S. in the less urbanized nonmetro and totally rural counties. For the U.S., the county-level incidence of FPEs among all farmers is halved when the county's population density falls below 5 inhabitants per square mile (Vogel, 2012). For these Canadian counties, their population densities fall below this threshold, such that markets are too thin to support the same incidence of farm portfolio entrepreneurship observed in the more populous counties.

Figure 3. Percent of total county labor force employed directly by farm household operated off-farm businesses by type of county*



*2007 U.S. data excludes Alaska and Hawaii; 2006 Canadian data excludes the Northern Territories. Sources: United States – U.S. Department of Agriculture, Economic Research Service (2003 Beale county codes); U.S. Department of Commerce, Bureau of the Census (2010). Canada – Statistics Canada., Census of Population, 2006

4. Conclusion

FPEs represent a small, but enduring segment of farm households in the U.S. and Canada, but agricultural economists or community development specialists have not recognized their importance to the rural economy. We found that for both the U.S. and Canada the share of local employment linked to these off-farm businesses is higher for rural counties that are more distant from an urban core. In these rural areas with limited resources, local communities increasingly rely on the FPEs as place-based contributors to its economic resilience. We found that the smaller shares of nonfarm employment supported by FPEs in Canadian rural counties relative to the U.S. were accounted for low population densities resulting further in thin markets and limited nonfarm entrepreneurial opportunities.

Rural development specialists working with agricultural statistics confront the tension between collecting data for the purposes of measuring farm sector performance versus that of assessing farm household well-being. In both the U.S and Canada, rural policy and rural programming largely emanate from the ministries of agriculture at both the national and state/province levels. Our study identifies and measures the contribution of FPEs to their local economies. In each country, the addition of a few more key questions to the ongoing farm surveys

and censuses can improve our understanding of this and other rural development opportunities (Bollman, 1998). For countries in which separate household-level data on their rural economies is difficult or costly to collect, amended agricultural data collection systems allow the agricultural policymakers and researchers concerned with agricultural sustainability and the rural development policymakers and researchers concerned with rural community sustainability to explore the extent of the overlap between the two.

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[1] Our data comes from U.S. and Canadian farm surveys in which one business enterprise is a census-farm. In this paper a 'farm' refers to a 'census-farm'.

[2]Scholars of small business entrepreneurship classify as 'novice' entrepreneurs those farmers whose sole business is the farm operation, or 'serial' entrepreneurs if having operated another farm or nonfarm business prior to running their current farm operation.

[3] We used 2007 data to establish a pre-Great Recession benchmark. Figueroa-Armijos, et al. (2012) found that the Great Recession induced a decline in 'growth' entrepreneurship in U.S. rural areas and an increase in 'necessity' entrepreneurship due to employment losses and business enterprise failures.

[4] This research was based on an earlier ERS farm typology that has subsequently been revised (Hoppe and MacDonald, 2013).

[5] For a detailed discussion on the methodology, data development, calibration, and robustness tests, see Vogel and Bollman (2012).