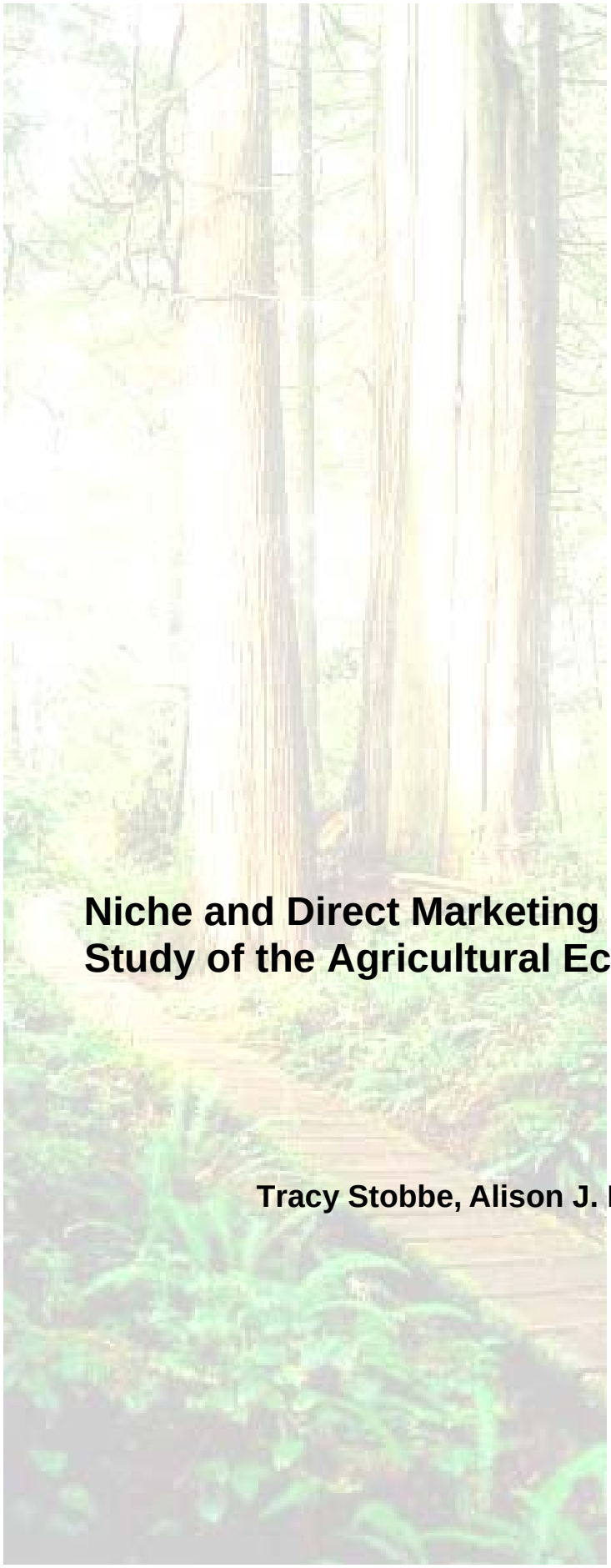

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Niche and Direct Marketing in the Rural-Urban Fringe: Study of the Agricultural Economy in the Shadow of a Large City

Tracy Stobbe, Alison J. Eagle and G. Cornelis van Kooten

November 2009

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Niche and Direct Marketing in the Rural-Urban Fringe:
A Study of the Agricultural Economy in the Shadow of a Large City

Tracy Stobbe, Alison J. Eagle and G. Cornelis van Kooten

Abstract

Farmers in the rural-urban fringe (RUF) face unique challenges. Spillovers from the urban region and competition for land increase the costs of farming relative to farming farther removed. Yet, there is greater potential for off-farm employment and niche marketing of farm products, providing more income options to RUF farmers. In this research, we employ a survey of direct- and niche-marketing farmers located in the RUF of Vancouver, Canada to examine how the rural-urban interface affects farms, particularly their long-term survivability and sustainability. From a list of 102 direct marketing and organic farmers, we managed to elicit twenty-nine completed surveys. Annual gross farm receipts averaged almost $500,000, similar to the census average for all farms in the region. Incomes varied significantly among respondents and farmers produced a wide range of products, and yet exhibiting a willingness to invest in their farms. Respondents had been farming for an average over twenty years and are highly educated.

Compared with farmers near Victoria, on Vancouver Island, producers who use direct marketing or organic methods in the Vancouver RUF have higher gross farm incomes, rely less on off-farm income and are much more likely to carry farm debt. Direct marketing also contributes to total farm sales, with only 19.5% of product value marketed at the farm-gate, at farmers' markets or through delivery programs, compared to 57.3% of farms near Victoria. Wholesalers, distributors and processors play a larger role on the mainland, likely because the amount of farm product available makes operation of such facilities economically feasible.

Key Words: Direct marketing, organic farming, niche marketing, agritourism, local agriculture, farm survival

1. Introduction

Productive agriculture in the rural-urban fringe (RUF) faces challenges and opportunities unique to its location. Agricultural production costs are higher due to competition for land and other resources and due to urban-source externalities (traffic, pollution) (Eagle, 2009), while farmers are under-compensated (or not at all compensated) for the provision of landscape views, open spaces and other environmental services (e.g., wildlife habitat) enjoyed by the public. This can result in lower rates of agricultural productivity than socially optimal. On the other hand, there exist distinct possibilities for off-farm employment and non-conventional marketing of farm products in the RUF, including access to farmers' markets, local restaurants, a larger labour pool than exists in more remote rural areas, and customers for agritourism or direct farm sales. High land prices also stimulate greenhouse and nursery investments that intensify the agricultural productivity of land.

The objective of the current research is to examine the economic prospects and environmental sustainability of farmer adaptation to the challenges of the RUF through such activities as organic production, direct marketing, and intensification of production. A survey of farmers within the Greater Vancouver Regional District (GVRD) and the Fraser Valley Regional District (FVRD) in British Columbia, Canada, was used as the primary data collection instrument. The research sought to determine answers to the following types of questions: What opportunities do farmers pursue to secure an adequate income? What obstacles and challenges do they encounter? Is investment in agricultural land generating sufficient returns from agricultural production or are landowners increasingly dependent on capital gains from rising land prices? Do farming strategies that digress from the conventional commodity-based marketing system improve agricultural returns on investment? How do farmers utilizing organic production and/or

direct marketing methods differ from other farmers in the same region, if at all? Do farmers benefit financially from environmentally friendly agricultural practices? What is the role of local, provincial, and federal agricultural and other policies affecting agriculture?

The remainder of the paper is organized as follows. First, we present background information, including a discussion of agricultural production at the urban fringe and associated economic issues, recent developments in local and organic agricultural marketing, and a description of the study region and the relevant agricultural policies that affect it. Then we describe the research methods used, followed by the presentation of results and discussion. A final section provides some conclusions and discusses policy implications.

2. Background

2.1 Urban Fringe Agriculture

In the rural-urban fringe, externalities and uncompensated public goods are likely to result in levels of agricultural output that are sub-optimal from a social perspective, unless appropriate policies are instituted. For example, agricultural landscapes and associated environmental goods and services tend to be enjoyed by urban residents, but farmers are not compensated for their provision and, as a result, neglect to take such benefits into account in making land-use decisions. In the RUF, traffic congestion, development pressure, fragmented farmland tracts, and conflicts over typical farm practices increase agricultural production costs. While the total numbers of farms in Canada continue to decline (by 37.3% from 1971 to 2006), BC farm numbers have increased (by 7.8% in the same period). However, the growth in average farm receipts in BC has not kept pace with the rest of the country (83% versus 143% in the rest of Canada), suggesting that farms in BC are becoming less productive and less competitive, potentially because of the large number of hobby farmers (Stobbe et al., 2009). In 2006, 48% of

BC farms were of a hobby nature, earning less than $10,000 in gross farm income, versus 22% for all Canadian farms. With fewer numbers of farmers managing increasingly larger tracts of land, concerns have been raised that these land managers are unable to provide sufficient oversight to achieve optimal environmental stewardship.

Farmland protection is often initiated by urban residents. Ninety percent of BC residents support urban development limits to protect farmland (Quayle, 1998), while 95% favor policies that preserve farmland (Ipsos Reid Public Affairs, 2008). The vast majority (94 to 98%) of residents also feel that agriculture benefits the community (BC Ministry of Agriculture & Lands, 2007; Walker, 2005), even without lifestyle or employment connections. Therefore, urban residents have a significant impact on the policies that affect land use and land use change at the urban fringe. Farmland protection mechanisms have been instituted in BC and other regions, but the primary impetus has been to prevent sprawl and maintain the landscape for the enjoyment of urban, rather than rural, residents.

As cities and transportation networks expand, the composition of the rural population changes as more rural residents (including farmers) are employed in urban centres. This impacts the economic viability of agriculture in positive and negative ways. For example, off-farm income opportunities help farmers better manage risks related to weather, markets, and production by providing a financial backstop not available in other farming communities. However, households with no connection to agriculture may locate in the RUF for lifestyle reasons, commuting to work in the urban center. Rural land is thereby converted to non-agricultural uses, increasing the potential for conflicts related to farm 'nuisances'.

As a result of their close proximity to urban neighbours and an influx of non-farm rural dwellers, the success and survival of RUF farms depends on effective communication with

neighbours, buffers between divergent land uses, and appropriate policies that protects normal farm practices. Governments and others can also work to encourage sufficient social capital in the community (Libby and Sharp, 2003). Social capital is comprised of relationship networks, trust (e.g., among neighbours), reciprocity and positive emotions; it reduces conflicts and can impact the effect and utility of different policy choices in land-use management.

Throughout Canada, jurisdictions at different levels have implemented policies to protect farmland and farm practices (e.g., 'right-to-farm' legislation), while offering varying levels of support to marketing initiatives. Reduced agricultural property taxes shift more of a municipality's tax burden to non-farming residents, in effect providing some compensation for the provision of farm-related public goods. These and other farmland protection measures, along with product marketing support, address challenges that are unique to urban-fringe agriculture, where heightened land use competition and environmental quality concerns are more visible. In British Columbia, the most notable provincial policies are the Agricultural Land Reserve (ALR) created by the *Agricultural Land Commission Act* (1973/2002) and the *Farm Practices Protection (Right to Farm) Act* (1996). Established in 1973, the ALR removes development rights from agricultural land, which reduces market prices (Eagle, 2009), and the Right to Farm Act provides a forum for addressing conflicts related to farm practices.

Hedonic models of farmland values find that prices per unit area decrease with increased parcel size and greater distance from major cities (Cotteleer et al., 2009; Huang et al., 2006). As agricultural land at the urban fringe is developed and/or subdivided, land prices increase due to expectations for continued development. These expectations often result in disinvestment in agriculture – idling farmland or switching to activities that require mobile capital (Berry, 1978).

Alternatively, some farmers at the urban fringe have responded to development pressure

and rising land values by relying on innovative agricultural marketing and/or intensifying land use. For example, market vegetable, greenhouse, and organic production tend to be concentrated near urban centres (Beauchesne and Bryant, 1999; Frederiksen and Langer, 2004; Purdy, 2005). The past decade has seen strong growth in direct-farm marketing, certification of organic agriculture, and intensive production methods (Hofmann et al., 2009; Macey, 2004; Purdy, 2005). By utilizing direct-farm sales and agritourism, these innovations are able to capture some of the non-market value associated with public goods.

An alternate explanation of the expansion into direct marketing and agritourism views these activities as a final attempt to save the farm. In this version, farmers pursue whatever means available to increase gross farm receipts or farm income before they are forced to exit the industry. We discuss this theory more in the results section.

2.2 Direct Marketing and Organic Production

The (real and perceived) environmental and social benefits from organic and locally-oriented agriculture have, in recent years, prompted a move toward and advocacy for organic food production and direct marketing. In addition to using fewer external inputs (primarily chemicals) than conventional farming (Hoeppner et al., 2005; Stockdale et al., 2001), agro-ecological methods that are commonly used in organic farming reduce soil erosion and nutrient losses from leaching (Poudel et al., 2002; Reganold et al., 1987), and increase the biodiversity of both crops and native species on farms (Bengtsson et al., 2005). In some cases, organic agricultural practices have even improved soil quality (Glover et al., 2000), although some studies have found lower levels of available nutrients (Gosling and Shepherd, 2005). Therefore, although the environmental benefits appear to be primarily positive, the entire agricultural system needs to be considered when determining impacts on long-term sustainability.

By paying higher prices and/or incurring higher costs to reach local farm-stands, consumers demonstrate a willingness to pay for locally produced products that may also incorporate environmentally-friendly practices, such as organic production or integrated pest management (IPM). Increased consumer demand for locally produced products is also observed in the growth of Community Supported Agriculture (CSA) programs and farmers' markets, in supermarket purchases of local products, and in media publicity (Buck et al., 1997; Darby et al., 2008; Ross, 2006). With increasing public awareness of environmental sustainability issues (e.g., climate change), much current support for locally- and regionally-produced food centres around reducing greenhouse gas emissions related to transportation and production. The perceived positive health benefits of local food, primarily fresh fruits and vegetables, has prompted provincial education and health authorities to lend support to the marketing of local agricultural products (Government of British Columbia, 2007; Herman et al., 2008).

Local farm products can and do enter the conventional food marketing chain to be available in grocery stores, but some experts believe that direct marketing, through farm stands, farmers' markets, community supported agriculture box programs and so on, is the only way for near-urban farmers to attain sufficient income in the current economy (Warner, 2005). Some increasingly popular restaurants have also become a significant market outlet for farm products, promoting unique and local food. Agritourism can increase consumer awareness of agricultural systems, thus enhancing social capital (neighbour relations), providing market outlets, and improving farm economic sustainability. Although requiring some different skills than those involved in farm production, direct marketing can help farmers re-capture some of the financial value otherwise going to wholesalers, distributors, and retailers. Some consumers attach a premium to face-to-face interactions with farmers that is not possible via conventional channels.

2.3 Study Region

The current research focuses on Langley and Abbotsford municipalities, which are near the city of Vancouver in southwestern British Columbia. The district municipality of Langley is a rapidly developing urban fringe area, situated within the GVRD (a forty-five minute commute to Vancouver). Abbotsford is somewhat farther away in the FVRD, but less than an hour commute from Vancouver, although traffic congestion during peak hours can significantly increase the duration of the commute. The Langley and Abbotsford municipalities are over 300 km^2 in size and together have a population exceeding 200,000 (Table 1). Annual population growth rates in the areas ranged between 5% to 6.5% throughout the 1970s and early 1980s, but dropped to less than 2.0% after 2000.

In addition to their urban identities, the Langley-Abbotsford area represents some of the best soils and climate in Canada (Runka, 2006), with a significant portion of the total land area devoted to farming. In contrast, rural agricultural areas in other parts of BC are characterized by relatively low average population density and more extensive agricultural activity (Table 1). The Langley-Abbotsford region produces a large variety of agricultural outputs from raspberries, cranberries, and blueberries to grains and horticultural crops, dairy, and greenhouse products (BC Ministry of Agriculture and Lands, 2006). Farmland in the study region experiences significant development pressure, with the major cities occupying some of the only flat, fertile lands in the area because of the mountainous geography of British Columbia. It is estimated that about 2.7% of British Columbia's nearly 2.7 million hectares is capable of supporting agriculture and only about 0.6% (592,440 hectares) is considered prime farmland (Runka, 2006). As the cities have grown, increasing land-use conflicts and pressures have mounted on the farmland.

Table 1. Selected Population and Agricultural Statistics for British Columbia and Two Municipalities in Study Region (Abbotsford and Langley)

	British Columbia	Abbotsford	Langley
Area, sq km	924 815	359.4	306.9
Population			
1971	2 184 621	31 033	21 936
2006	4 113 487	123 864	93 726
Change '71 to '06	+ 88.3%	+ 299.1%	+ 427.3%
Change, 2001 to 2006	+ 5.3%	+ 7.2%	+ 7.9%
Pop'n density, 2006, per km^2	4.2	344.7	305.4
Agriculture, 2006 data			
Number of farms	19 844	1 197	1 292
Total farm area, ha	2 835 458	27 295	12 970
% of total area	3.1%	76.0%	42.3%
Average farm size, ha	143	23	10
Farms < 4 ha (10 acres)	27%	29%	49%
Farms < $10,000 gross income	48%	28%	54%

Source: Agricultural Census of Canada (1971, 2006), Census of Canada (1971, 2001, 2006)

In the early 1970s, it was estimated that approximately 6,000 hectares of farmland was lost annually to development (Hanna, 1997). In response, the provincial government created a province-wide zoning system, the ALR, under which farmland cannot be sub-divided, developed or used for non-agricultural purposes, unless a variance was obtained from the Agricultural Land Commission (ALC). While the ALC and ALR have evolved over time, the agricultural land reserve remains intact having changed little in the past thirty-six years.

Eligible farmland in BC benefits from reduced property taxes. While farmland tax rates vary by municipality, the land-only property tax can be as low as 5% to 8% of that for an equivalent parcel not having farm status (Eagle, 2009). The thresholds for meeting farm status are low: for a parcel of 0.8 to 4.0 hectares, $2,500 of annual gross farm receipts must be earned once every two years to qualify. If a parcel can be included within a larger farm, the annual gross farm-income requirement for land to achieve farm status can be as low as 5% of the actual farm-

purpose value (e.g., $180/ha for land assessed at $3600/ha). The tax system undoubtedly benefits farmers, but an unintended consequence is the incentive it provides to those who would purchase a small farm as an alternative to a residential lot in the city, thereby converting agricultural land into large rural estates that are used as marginally productive hobby farms (Stobbe et al., 2009).

3. Research Methods

A mail-out survey was sent to farmers in the GVRD and FVRD who market their products locally and/or use organic production practices. A list of 106 farmers was compiled from two publicly-available lists – the Direct Farm Marketing Association (DFMA) and the Certified Organic Associations of British Columbia (COABC). The survey was sent in November 2008. Survey respondents were told that the survey took about thirty minutes to complete; they were also offered a $15 Home Depot gift card and a coupon to a local restaurant valued at $25. In December 2008, a follow-up postcard was mailed out reminding them of the survey. Finally, in January 2009, follow-up phone calls were made and/or emails sent as a final reminder. In total, twenty-nine surveys were returned for a response rate of 27.4%. This response rate is not atypical of such surveys.[1]

Survey questions were related to farm size and characteristics, capital investments, employees, marketing, and off-farm work. The survey also included a section on community and social involvement, participation in various farm programs, and opinions about the impacts of specific government agricultural programs and initiatives. Demographic questions were included to allow for differential analysis based on gender, age, or other demographic features.

Thirty-five percent of surveyed farms were located in Langley or nearby Aldergrove,

[1] A telephone survey of farmers conducted for the Canadian government by the Environics Research Group (2000), for example, reported a response rate of 12%, about the same as that reported by Bell et al. (1994) in their study of farmers' participation in Tennessee's Forest Stewardship Program.

41% in Abbotsford, 17% from other municipalities in the Greater Vancouver Regional District (e.g., Delta or Surrey), and 7% from other municipalities in the Fraser Valley Regional District (e.g., Chilliwack). With the majority of farms in Langley and Abbotsford, comparisons with the Agricultural Census focus on these two municipalities. We use a series of t-tests to determine whether there were significant differences between Statistics Canada's information on all farmers in the area and our sample of direct marketing and organic farmers. We also test for differences within the sample between geographic areas, and different farm activities (organic versus conventional, agritourism versus other, etc.).

Regression analyses were conducted using STATA 10. Models employed (1) years of farming experience, (2) income, and (3) recent investment activity as dependent variables. The regression models followed the function form:

$$Y_i = \alpha_0 + \alpha_1 C_{1i} + \ldots + \alpha_K C_{Ki} + \beta_1 F_{1i} + \ldots + \beta_M F_{Mi}$$

where Y_i represents the i^{th} observation of the dependent variable (of which there are several); C is a set of K farm characteristics; F is a set of farm and operator characteristics; α_j (j=0, …, K) and β_m (m=1, …, M) are parameters to be estimated; and ε is the error term for n farms.

A logistical binary (logit) model is utilized in the analysis, with the dependent variable taking on a value of 1 if the farm has agritourism and 0 if otherwise. Using the logistical distributional function, we can write the probability of an application's success as:

$$P_i = E(Y = 1 \mid X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}},$$

where β_1 represents the coefficient on an intercept term and β_2 represents a vector of coefficients on the vector of regressors, X.

Finally, the results were compared to a very similar survey conducted on the Saanich Peninsula during the spring of 2008.

4. Descriptive Results

About 46% of the farms in Abbotsford and 33% in Langley are considered to be hobby farms, based on a definition that a hobby farm is less than ten acres in size.[2] Overall, eleven farms (38%) in the study area can be considered hobby farms based on their size.

4.1 Farm size, crops, and location

Survey results indicate a range of farm types, farmer characteristics and opinions, perhaps reflective of the diversity of the farm economy in the Fraser Valley. Average farm size was 79.5 acres, but the median was 25 acres due to an outlier at 700 acres (Figure 1). Farm products included vegetables, berries, eggs, dairy, chickens, and bees (honey) (Figure 2).

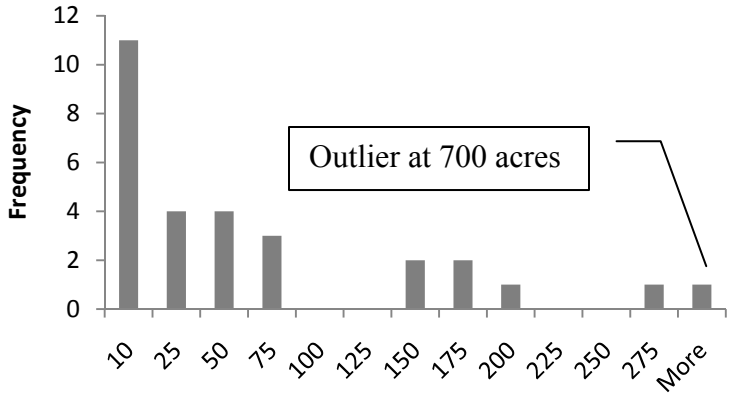

Figure 1: Distribution of farm sizes

[2] A clear definition of a hobby farm does not exist. Revenue Canada, for instance, defines it as a farm that requires off-farm income to support it. In the survey, the survey response was unrepresentative of actual distribution of hobby farms using the <$10,000 gross receipts method. Using the <10 acres method as a filter for hobby farms produced a more realistic data set.

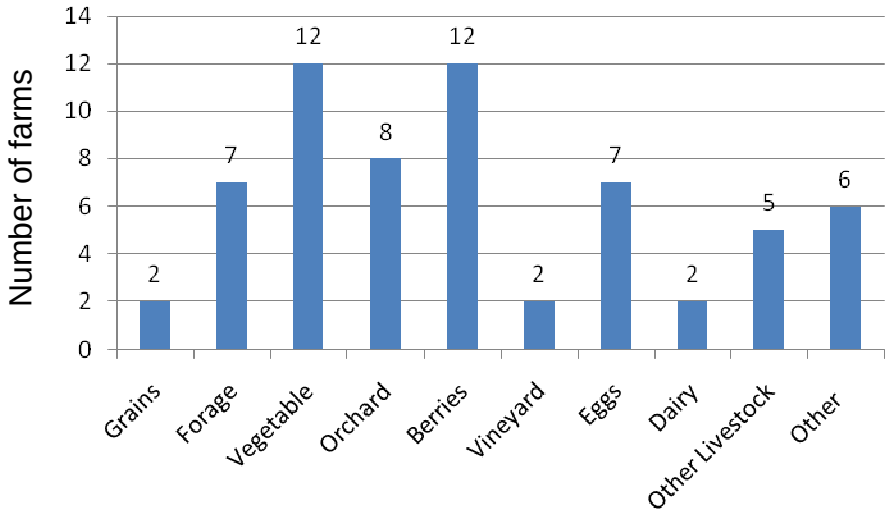

Figure 2: Agricultural products reported
Note: Some farms produce more than one type of product.

4.2 Farmer age, experience, and education

The average age of the primary farm operator was fifty-three years, and ranged from under twenty-five to over seventy-five; 3.4% were under twenty-five, 6.9% were between twenty-five and thirty-four, 20.7% were between thirty-five and forty-four, 13.8% were between forty-five and fifty-four, 37.9% were between fifty-five and sixty-four, 13.8% were between sixty-five and seventy-four, and 3.4% were older than seventy-five. Abbotsford farmers tended to be younger than those in Langley (average age of forty-seven versus fifty-three years). These ages are similar to that reported in the Agricultural Census of Canada, confirmation that survey participants are representative of the total farmer population and that, east in some respects, direct marketing and organic farmers are similar to other farmers. Respondents have an average of 21.3 years of farming experience with a range of two to forty years. Female operators (comprising 28% of all primary operators) have fewer years of farming experience compared to male operators (15.4 yrs versus 23.6 yrs).

Survey respondents have a wide range of education levels; 10% completed high school,

38% completed some college, university or trade school, 24% graduated from college, university or trade school – 14% had a master's degree and 14% a PhD. Furthermore, they tend to be more educated than the average population: 90% of farm operators have completed at least some postsecondary education, while only 60% of the BC population aged twenty-five to seventy-four (51% in Abbotsford, 59% in Langley) are educated past high school (Statistics Canada, 2006b).

4.3 Farm financial statistics

Farm income and financial success was also highly variable in the survey. The average reported gross farm receipts were $464,000 (median $375,000), but two farms had less than $10,000 while six reported over $1 million (Table 2). For net farm income, the average was $75,600 (median $17,500), but over a third of respondents earned less than $5,000 net farm income (and two farms explicitly reported losses). Almost 80% of farms reported carrying farm debt, although the debt is highly skewed. (Table 3)

Table 2: Gross Farm Receipts (2007) frequencies

Gross Receipts	No. of farms	*Percent*
Less than $10,000	2	*6.90%*
$10,000 up to $25,000	2	*6.90%*
$25,000 up to $50,000	4	*13.79%*
$50,000 up to $100,000	3	*10.34%*
$100,000 up to $250,000	3	*10.34%*
$250,000 up to $500,000	6	*20.69%*
$500,000 up to $1 million	3	*10.34%*
More than $1 million	6	*20.69%*

4.4 Farm equipment and human capital

All farms in the survey used some equipment in their enterprise.[3] The average value of farm equipment was $211,000 per farm ($140,000 per farm once you take out an outlier at $2,340,000). The breakdown of how many farms use the various categories of equipment is as follows: 86% use tractors, 55% use cultivators, 34% use processing equipment, 31% use roto-tillers, and 28% use harvesters.

Table 3: Farm Debt (as of 2007) and Net Farm Income (2007) frequencies

	Farm Debt		**Net Farm Income**	
Debt	No. of farms	*Percent*	No. of farms	*Percent*
Less than $5,000	6	*21.43%*	10	*34.49%*
$5,000 up to $10,000	1	*3.57%*	2	*6.90%*
$10,000 up to $25,000	2	*7.14%*	5	*17.24%*
$25,000 up to $50,000	1	*3.57%*	4	*13.79%*
$50,000 up to $100,000	1	*3.57%*	2	*6.90%*
$100,000 up to $250,000	3	*10.71%*	2	*6.90%*
$250,000 up to $500,000	6	*21.43%*	3	*10.34%*
More than $500,000	8	*28.57%*	1	*3.45%*

Almost 90% of farms in the survey employed hired labour. Twelve farms (41.38%) employ year-round full-time labour, eight farms (27.59%) employ year-round part-time labour, ten farms (34.49%) employ seasonal full-time labour, and fourteen farms (48.28%) employ seasonal part-time labour.

4.5 Farm investments

In terms of investments made in the past five years (such as new machinery, facilities,

[3] One farm reported no equipment but indicated that a neighbour brought in the crop (hay) for them. It is reasonable to assume that the neighbor used equipment in doing so.

land, fencing, or soil improvements), the average is $319,000 per farm, with a median of $41,000. Figure 3 shows the popularity of different types of farm investments – new machinery, irrigation investments, and facilities other than greenhouses top the list. Finally, Figure 4 shows how investment dollars across all farms is distributed across the different categories of investment. Though 41% of farms made some irrigation investments, the fact that irrigation accounts for only 4% of total investment dollars indicates that irrigation is a relatively cheap investment to make. A similar story can be told for fencing, soil improvement, and road investments.

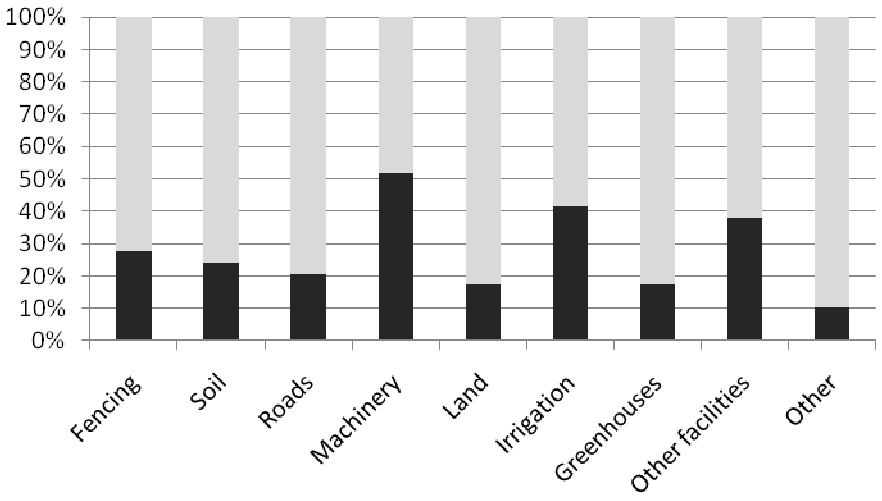

Figure 3: Percentage of farms making investments in different areas (2002-2007)

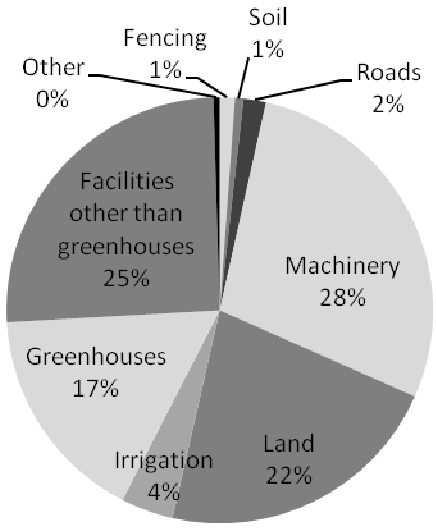

Figure 4: Distribution of total investment dollars (2002-2007)

4.6 Agritourism, IPM, and direct-marketing

One of our key research questions concerns the differences that exist between niche- or direct-marketing farmers and conventional farmers. In the survey, twenty-two farms (75.9%) use non-conventional production practices (IPM, certified organic, or non-certified organic) on at least half of their land (and a majority use it on all of their land). Ten farms (34.5%) use solely certified-organic production practices. As well, 59% of respondents are involved in agritourism, with the different agritourism activities provided in Figure 5. With respect to marketing, the majority still occurs through traditional agricultural marketing routes, such as wholesalers (43.6%), distributors (9%), and processors (25.6%). A smaller share is sold via direct marketing routes such as farmer's markets (3.7%) and U-pick or farm stand (15.4%).

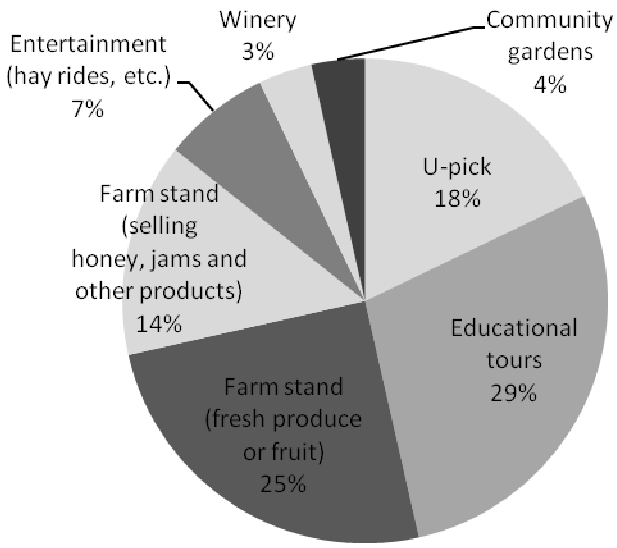

Figure 5: Agritourism activities
Note: several farms have multiple agritourism activities represented in this pie chart.

4.7 Farm success

One way to measure farm success is to ask farmers directly about the situation on their farm. The results from two opinion questions are summarized in Table 4. It reveals a great deal of variability in how farmers feel about their financial position. For the question dealing with the ability to build equity, negative opinions (41.4%) outweigh positive ones (20.6%).

Table 4: Two opinions questions dealing with the farm's financial success (where 0 was "strongly disagree" and 5 was "strongly agree")

Scale	"I am satisfied with our current level of farm income"	"Our household farm income is sufficient to maintain our standard of living and build equity/capital"
0	3.4%	27.6%
1	20.7%	13.8%
2	24.1%	17.2%
3	20.7%	20.7%
4	10.3%	10.3%
5	20.7%	10.3%

Another indicator of farm success is the percent of farms with off-farm employment and the extent to which households rely on off-farm employment. In our survey, 59% of respondents

had off-farm employment, leaving just 41% to the farm full-time. Of those with off-farm income, 27% had off-farm income that accounted for less than 10% of their total household income, for 17% it contributed between 10% and 25%, for 14% it contributed 26%-50%, for another 14% it contributed 51%-75%, for 7% it contributed 76%-90%, and for 21% of respondents off-farm income accounted for more than 90% of total household income.

4.8 Farm conflicts

One measure of agricultural sustainability in the urban fringe is whether farms are able to co-exist peacefully with residential neighbours and other land uses. In the survey, 45% of respondents reported taking action to resolve or prevent a conflict with a non-farming neighbour. These actions ranged from changing the nature of farming activities to reduce dust, odour, or noise (71.4%), installing vegetative buffers between properties (57.1%), participating in environmental conservation efforts (57.1%), and participating in local agriculture awareness campaigns (14.3%). Of those who spent any time resolving or preventing conflicts, the average was 39.73 hours over the course of the year (with a range of one to 156 hours). Of those who spent any money resolving or preventing conflicts, the average was $1,960 per year (with a range of $300 to $5,000).

5. Statistical Analysis

5.1 Statistical tests

When analyzing the results, it is possible to split the data up along several interesting dimensions. One dimension is the spatial location of the farms. Are farms in the GVRD that are near to Vancouver different from those in the FVRD that are farther away? Using t-tests, it turns out that several factors are statistically different between the GVRD and FVRD farms. GVRD

farms incorporate agritourism to a higher degree than FVRD farms (p-value of 0.014). Not surprisingly, GVRD farms also rely more on U-pick marketing than FVRD farms (p-value of 0.059). Respondents from the FVRD tend to have more strongly positive opinions about the ALR, right-to-farm legislation, and local agricultural zoning (p-values of 0.017, 0.056 and 0.054 respectively). Finally, though only moderately significant, it appears that GVRD farms have more women as primary operators (p-value of 0.13).

Another way of segmenting the data is by farmers' use of conventional growing practices versus IPM or organic growing practices. It turns out that conventional farmers have been farming for longer (p-value of 0.033), but that organic farmers tend to have more operators per farm (p-value of 0.014) and more female operators (p-value of 0.026).

A final way of bisecting the data is on the basis of agritourism. It appears that farms not using agritourism have significantly higher net farm income (p-value of 0.037), spend significantly more time on resolving or preventing conflicts with non-farm neighbours (p-value of 0.081), and invest more in machinery and irrigation (p-values of 0.053 and 0.028). Operators who rely on agritourism have a moderately higher percentage of off-farm income (p-value of 0.113) and tend to be older (p-value of 0.037).

Using t-tests to compare the survey results from Statistics Canada census data, we find that many fewer farmers in our survey were earning less than $10,000 of gross farm receipts per year compared to census data from Langley and Abbotsford. Our survey showed that 20% of our Langley sample earned less than $10,000 in gross receipts whereas the census data indicate that 54% of the farm population in Langley sells less than $10,000 of farm output. Likewise, the census shows that 28% of Abbotsford farmers earn less than $10,000 annually whereas no Abbotsford farmers in our sample earned less than $10,000. Similarly, when looking at the

percentage of farms carrying farm-related debt, our sample is significantly different from the Agricultural Census. The Census indicates that 57% of farms in Langley have debt, while 75% of the respondents from Langley claimed to be in debt; 80% of survey respondents from Abbotsford claimed to be in debt compared with only 33% of census farms.

We utilize correlations and regression models to determine inter-relations among factors in the survey. Off-farm income is negatively related to gross receipts (r = -0.6592) and net farm income (r = -0.6518), indicating that those with a higher percentage of off-farm income have lower gross farm receipts and net farm income. Off-farm income is also moderately negatively related to vegetable production (r = -0.3504) and berries (r = -0.3039), but positively related to dairy (r = 0.3217). This suggests that vegetable and berry growers rely less on off-farm income than dairy operators.

Those with innovative marketing practices also rely more on off-farm income (r = 0.5169). Innovative marketing is associated with agritourism (r = 0.5063) and is moderately negatively associated with both time spent on resolving or preventing conflicts (r = -0.2745) and money spent on conflicts (r = -0.2434). This may indicate that those using agritourism and innovative marketing have fewer conflicts with neighbours or can more easily resolve those conflicts. This is reinforced by the fact that farmers using higher proportions of conventional methods tend to spend more money on resolving or preventing conflict (r = 0.8237). Finally, conflicts with neighbours are associated with growing berries (r = 0.3426), and with higher gross farm receipts (r = 0.3709). Berry growers and larger farms tend to employ more intensive production methods including application of manure (a negative externality for urban residents).

5.2 Regression results

Multivariate regression models have the advantage of being able to compare many

variables at once while controlling for the influence of other variables. Several regression models are employed, including both linear and binary-dependent models. The first model examines factors related to gross farm receipts (Table 5). From the regression results, years of farming is negatively related to gross farm receipts, although receipts rise with an increase in the number of operators working the farm. Grain crops provide lower revenues on average than other crops. Reliance on direct- or niche- marketing practices also lowers gross farm receipts, but social capital (as measured by volunteer work or membership in a professional organization) enhances farm earnings for some reason. Unsurprisingly, as a farm household's reliance on off-farm income rises, farm receipts decline. Farm earnings rise with operator age.

Table 5: OLS regression model results (n=29)

Model	**Y=Gross farm receipts**	**Y=Money spent reducing conflicts**
Variable	**Coef. (p-value)**	**Coef. (p-value)**
Years farming	-0.07628 (0.091) *	15.3216 (0.016) **
Own the farm? (0 no, 1 yes)		-33.3593 (0.899)
Number of operators	1.13903 (0.052) **	378.528 (0.006) ***
Grains	-0.24465 (0.086) *	63.7828 (0.005) ***
Forage	0.02581 (0.277)	10.1081 (0.064) *
Vegetables	0.00747 (0.150)	
Berries	-0.00120 (0.759)	10.1800 (0.000) ***
Dairy	0.04068 (0.001) ***	3.37868 (0.100) *
Total value of equipment		-0.00218 (0.000) ***
Total investments (past 5 years)		0.00070 (0.000) ***
Gross farm receipts		86.0765 (0.095) *
Net farm income		-58.9033 (0.149)
Agritourism? (0 no, 1 yes)	0.59186 (0.415)	-1508.86 (0.000) ***
Innovative marketing? (0 no, 1 yes)	-4.48472 (0.000) ***	162.979 (0.524)
Donated blood in past year? (0 no, 1 yes)	1.35089 (0.207)	-1234.11 (0.001) ***
Volunteered in the past year? (0 no, 1 yes)	2.07230 (0.036) **	-563.998 (0.009) ***
Gave to charity in past year? (0 no, 1 yes)		-400.800 (0.025) **
Hosted a party in the past year? (0 no, 1 yes)		1269.51 (0.000) ***
Belong to professional org.? (0 no, 1 yes)	1.72747 (0.035) **	
Attend church/temple regularly? (0 no, 1 yes)		164.224 (0.184)
Percent of off-farm income	-0.39544 (0.072) *	97.4604 (0.086) *
Age	1.04741 (0.034) **	
Education	-0.32113 (0.166)	33.8148 (0.282)
Do you own your home? (0 no, 1 yes)		-543.485 (0.052) **
Opinion on agricultural imports	0.89410 (0.002) ***	
Opinion on returns on farm investments	0.52822 (0.040) **	
Constant	-1.31432 (0.495)	144.808 (0.642)
R^2	0.9212	0.9653

Note: * moderately significant, ** significant, *** highly significant

The second model examines factors associated with social capital – namely, the amount of money spent on resolving or preventing conflicts with neighbours (see Table 5). Some of the most interesting results here show that, for every additional year of farming, people spend about $15 more mitigating conflicts; increasing the number of farm operators by one leads to about $379 more on conflict-mitigating expenditures; grain growers spend about $64 dollars more on average; agritourism farmers spend about $1,509 less than those without agritourism; and those

who donated blood, volunteered their time, or donated to a charity spent less on conflict reduction/prevention ($1,234, $564 and $401, respectively). Clearly, neighbours are more positively inclined towards agritourism operations, while social capital (as measured by community involvement) facilitates acceptance of agricultural activities in the community. Notice, however, that hosting a private party is not considered a mechanism for enhancing social capital; indeed, it is seen by neighbours as an externality, with survey respondents who indicated that they hosted a party having to spend more ($1,270 annually) to appease neighbours.

Regression models exploring the relationship between the total value of products marketed through innovative methods[4] and other factors revealed few significant variables. One model is presented in Table 6. The model is interesting because it indicates that innovation reduces gross farm receipts. This result could support the conjecture that farmers are turning to innovative marketing in the Fraser Valley as a last ditch attempt to save their farms, perhaps because the innovation could promise higher returns in the future while reality indicates that is unlikely. Alternatively, it could simply indicate that farmers pursue innovative marketing as a life-style choice rather than for profit-related reasons. For example, farmers may prefer the direct contact with customers that farmer's markets and farm stands offer, even though they earn less profit on average.

The other significant variable in Table 6 shows that, as the number of farm operators increases, the total value of goods that are sold through innovative channels also increases. This result may, however, be biased by the few farms in the survey that have multiple operators and sell their products through a co-op.

[4] Innovative methods include farmer's markets, farm stands, CSAs, off-farm retail, co-ops and restaurants.

Table 6: OLS regression results: Dependent variable is the total value of products marketed by innovative methods – farmer's markets, CSAs and co-ops (n=29)

Explanatory variable	Coef. (p-value)
Gross farm receipts	-0.14721 (0.000) ***
Number of farm operators	0.14025 (0.025) **
Constant	1.14105 (0.000) ***
R^2	0.6337

Note: * moderately significant, ** significant, *** highly significant

In the final regression model, we explain factors explaining respondents' decisions to pursue agritourism ventures. Do these farms offer agritourism activities as a way of meeting a perceived demand and thus maximize profits, or is it a choice implemented as a last chance to save the agricultural business? Or are other factors causing farmers to offer agritourism options? The regression results are provided in Table 7. Results indicate that landowners are less likely to engage in agritourism as net farm income increases, when operators spend more time earning off-farm income, if a significant investment in the farm has been made in the last five years, and if vegetables or grain production are the principal activities of the farm enterprise. Agritourism is highly correlated with age, and to a lesser extent farm size and education (but at the 15% level of statistical significance or better). Agritourism ventures are not as profitable as conventional farms, and they seem to be run by people who fit the same mould as hobby farmers (Stobbe et al., in press). This suggests that lifestyle factors may be more important to farmers pursing agritourism ventures than simply maximizing their agricultural profit.

Table 7: Logistic regression model results; Dependent variable =1 if farm has agritourism, 0 otherwise (n=29)

Independent Variable	Coef. (p-value)
Education	0.77933 (0.152)
Age	1.35235 (0.033) **
Net farm income	-1.60926 (0.021) **
Percent of off-farm income	-0.72780 (0.159)
Vegetables	-0.09374 (0.095) *
Grains	-0.44144 (0.037) **
Total investments (past 5 years)	-4.89 e-06 (0.083) *
Total acres	0.03984 (0.112) +
Constant	1.30986 (0.621)
Pseudo R^2	0.5421

Note: + borderline significant * moderately significant, ** significant, *** highly significant

6. Comparisons with Saanich Peninsula

There are suggestions that farming in British Columbia's lower mainland region (GVRD and FVRD near Vancouver) – including direct marketing and organic farming – possesses some significant differences from that on the Saanich peninsula on Vancouver Island (near the capital city, Victoria). For all farm marketing types, farms on the lower mainland are larger (both in physical size and gross income), there are fewer hobby farms, and organic farming is less prevalent (Statistics Canada, 2006a). We compare results from a previous survey on the Saanich peninsula with the current research, finding additional differences, and some similarities, between direct marketing and organic farmers in the two regions.

While the farmers surveyed in both regions were selected from comparable lists of certified organic growers and those marketing through the local Farm Direct Marketing Associations, size differences prevail and marketing of farm products differs significantly. In the GVRD and FVRD, almost 80% of direct marketing and organic farms carry debt, while producers on the Saanich peninsula are largely debt free (75% of those with >$10,000 in gross farm income had no farm debt) (Eagle, 2009). The average gross farm receipts and physical farm

size on the lower mainland were more than twice that on the Saanich peninsula (Table 8). More of the farms on the lower mainland derive the majority of household income from the farm, although there is still a significant dependence on off-farm income in both regions. Farmers in Saanich are also somewhat younger and have less experience farming.

Table 8: Selected characteristics of direct marketing and organic farmers in two regions of British Columbia, values are mean of observations unless otherwise indicated

	Saanich Peninsula		Lower Mainland	
	All Farms (n=25)	>$10,000 gross receipts (n=20)	All Farms	>$10,000 gross receipts
Annual gross farm receipts, $	196 400	244 000	463 600	497 600
Farm size, ha	13.1	15.8	32.2	34.2
Most (>90%) of household income comes from farm	20%	25%	28%	29%
Farmer age	50.5	50.2	52.9	52.7
Years farming	16	17	21	22
Investments in past 5 yrs, $	92 000	111 000	319 300	341 600
# of operators per farm	2.0	2.1	1.9	1.9
Certified organic	36%	30%	38%	33%

Source: Eagle et al., 2009

Direct farm sales play a much higher role near Victoria, as 59% of total farm product value on the Saanich peninsula was direct-marketed, compared with only 20% on the lower mainland. In Figure 6, a breakdown of marketing of all farm products for both regions is provided. Farm stands are prominent near Victoria, likely because the farms are within an easy drive of the majority of the urban population. Being further removed from the market leaves lower mainland farmers more reliant on wholesalers, distributors, and processors. Also, the larger concentration of farms in the region may make such businesses more viable.

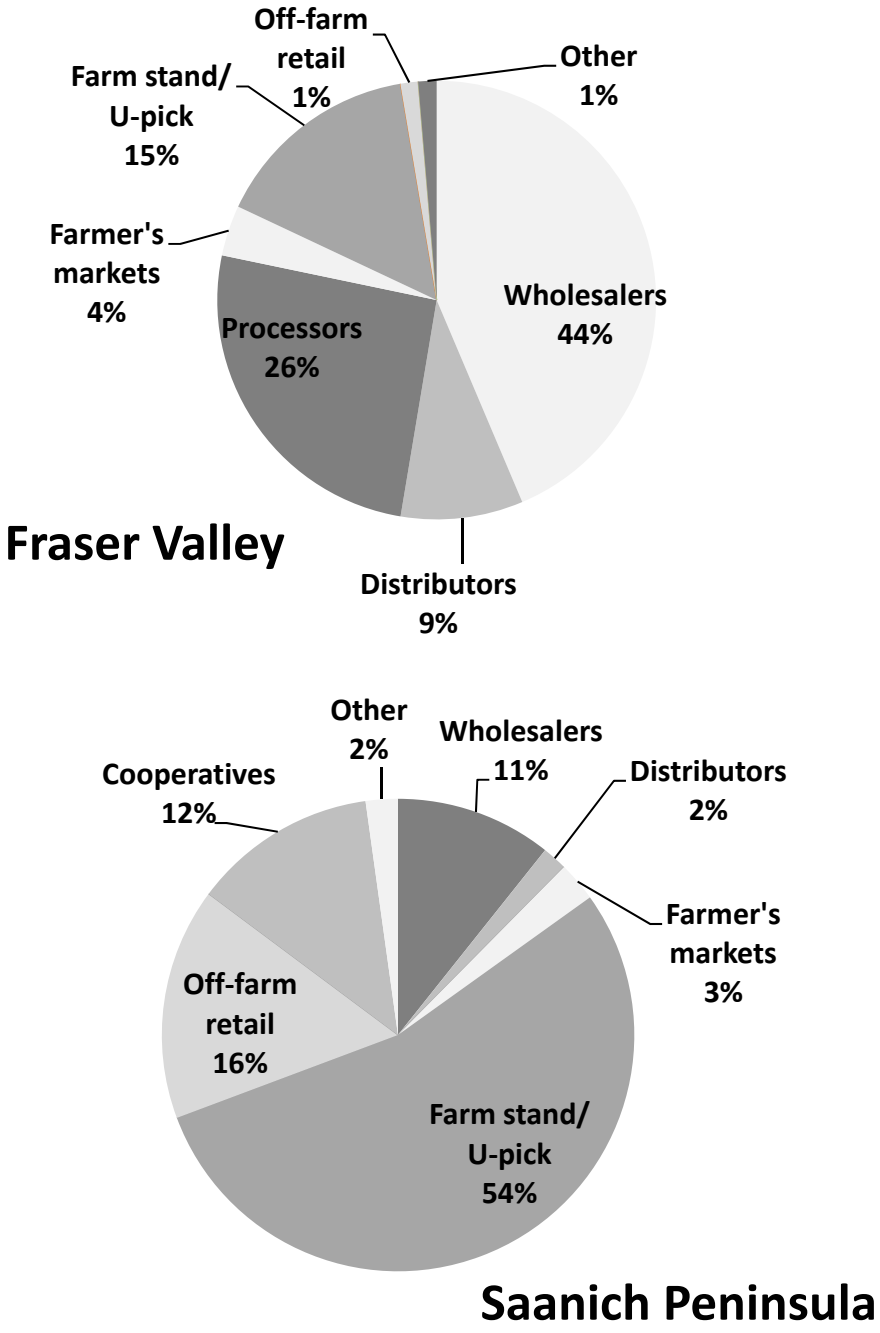

Figure 6. Marketing of farm products for the Fraser Valley and Saanich peninsula; farms listed as direct marketers and/or organic producers. Charts indicate proportion of all products reported (all farms summed together).

7. Conclusions

The results of the current survey are both anticipated and surprising. The perception is that farmers in the rural-urban fringe use direct-marketing and innovative methods because they are more financially secure than those employing more conventional agronomic practices and marketing methods. However, the data are not clear on this point and do not wholly support this conclusion. Farmers using direct- or niche-marketing (such as organic) do not appear to be more profitable than conventional farmers, although those using agritourism do seem to fare better financially, generally having higher net farm incomes. Agritourism is associated with lower financial and time costs dealing with neighbours to resolve or prevent conflicts. It is easy to imagine that agritourism results in traffic and parking problems, and perhaps more frequent trespass of neighbours' properties, but is also possible that the scale of agritourism is small and landowners with an agritourism enterprise are able to reduce spillovers onto neighbouring properties (by reducing or eliminating conventional farm activities and controlling trespass by visitors), and perhaps provide benefits to the local economy as tourists purchase locally-grown food direct from producers or via local restaurants (including the on-site bed and breakfast). If agritourism and direct-marketing are associated with reduced conflict, this could be an effective edge planning tool for government to pursue. To develop appropriate public policy, more research is needed to determine the precise challenges and opportunities facing these enterprises.

Fewer direct-marketing operations are also hobby farms, despite the higher overall proportion of hobby farms in the study regions as determined by the Agricultural Census. There is no widely-accepted definition of what constitutes a hobby farm, so this question cannot be resolved entirely, but if the current survey is indicative of the larger farm economy, then governments wishing to preserve commercially-viable agriculture should consider what they can

do to encourage direct marketing and to increase its profitability.

It is clear from our survey that, while potentially beneficial for the farmer and society, direct-marketing is not without its challenges. Not only is it correlated with lower gross farm receipts, but it is associated with higher farm indebtedness. One explanation is that direct or innovative agricultural marketing requires greater investment, and that such investments still need to pay off; but it could also be that those turning to direct marketing are already heavily indebted and see this as a final opportunity to make their agricultural enterprise profitable. While more citizens are purchasing local farm products and the numbers of farmers' markets are increasing (e.g., Langley's first farmers' market opened in July, 2009), further survey research is needed to establish whether direct marketing, organic production and certification, and other agricultural marketing innovations will enable farms to survive the unique challenges of producing in the rural-urban fringe.

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