AGRICULTURE AND INNOVATION IN THE URBAN FRINGE: THE CASE OF ORGANIC FARMING IN QUEBEC, CANADA

AUDRIC BEAUCHESNE & CHRISTOPHER BRYANT

Département de géographie, Université de Montréal, CP 6128 Succursale Centre-ville, Montréal, Québec, H3C 3J 7 Canada. E-mails: audric.beauchesne@bc.sympatico.ca & cr_bryant@stratec.ca

Received: June 1998; revised September 1998

ABSTRACT
This paper presents the urban fringe as an area where alternative forms of agriculture, i.e. organic farming, are favoured through closer access to such resources as a large urban market and specialised agricultural services. An analysis of organic farming in Quebec, Canada, shows that urban fringe areas account for the highest level of activity in organic farming compared to other regions, confirming the presence of conditions encouraging innovation. Concentrations of organic farming are also present within urban fringe areas, suggestive of other factors, e.g. the role of local actors, which also influence the development of alternative and innovative forms of agriculture.

Key words: Agriculture, innovation, urban-fringe, organic, Quebec

INTRODUCTION
Cities and agriculture have long been thought of as adversaries (Bryant & Johnston 1992). The urban fringe has often been identified as an area of conflict with an overall negative impact on farming. In the past, many studies focused on the amount of agricultural land converted to urban functions and the subsequent need for farmland protection (McCuaig & Manning 1982; Furuseth & Pierce 1982). Far less attention was given to the possible positive effects of urban agglomerations on agriculture and the innovative ways in which farmers dealt with and adapted to the stresses and advantages of the urban fringe.

More recently, however, the urban fringe has been viewed not only as an area where negative forces operate but also one where innovation and adaptation are stimulated (Bryant 1984, 1997; Rickard 1991). Part-time farming, pick-your-own operations, direct sales and agri-tourism are some of the better known examples of innovation and adaptation developed by farmers to take advantage of the proximity of urban centres in North America, Western Europe and elsewhere (Bryant et al. 1982; Fleury & Donadieu 1997).

This exploratory research expands on this, arguing that the urban fringe environment also encourages other innovative forms of agriculture, notably organic farming. Organic farming is both a social and technological alternative to conventional farming, even though this dichotomy hides a more complex reality (Durham 1998; Lampkin 1994). However, organic farming comes closest to an ecologically based notion of ‘sustainable’ agriculture so that compared to ‘conventional farming’ it is indeed an innovation (Bowler 1992).

First, the conceptual framework relating to innovation in the urban fringe is presented, focusing on the conditions underlying the emergence of landscapes of agricultural adaptation and innovation. Second, the distribution of organic farming in Quebec is analysed, both at metropolitan and intra-metropolitan region scales.
AGRICULTURAL INNOVATION IN THE URBAN FRINGE

Many studies have addressed the issue of agricultural innovations, ranging from determining the factors that affect the development of innovation in agriculture to their geographical manifestations (Clark 1986; Roberts & Hollander 1997; Scorgie 1995). The urban fringe is a significant geographic context for the study of agricultural innovation because of the importance of agriculture there to many countries’ agricultural economies (Bryant & Johnston 1992).

From the mid 1970s, various studies of urban fringe agriculture have underscored the existence of multiple forces and factors of change influencing agriculture and the farm family (see Bryant & Johnston (1992) for a review of much of this literature). These forces/factors of change are associated with several geographical scales, which must be recognised if we are to understand the dynamics of urban fringe agriculture. For this study, the scales that appear most important in influencing the concentrations of organic farms within the province of Quebec are regional and local. In other areas, macro-scale forces may also be significant. For instance, in the European Union, agri-environmental incentives may effectively favour organic farming in regions other than metropolitan regions in some countries, i.e. the concentrations of organic farmers in inland marginal areas of Portugal (Firmino 1998).

These forces of change can be either positive or negative for agriculture (Figure 1), the outcome depending upon the interplay between the local and regional, positive and negative, forces of change. The urban fringe mosaic is thus socially constructed by local, and regional, actors operating within the economic, socio-cultural, political and biophysical contexts (represented as ‘filters’ on Figure 1) at all scales (Marsden et al. 1993; Bryant 1995).

Regional forces acting on the urban fringe

At this level (i.e. the metropolitan region), two main subsets of forces of change are identified. Negative forces, such as land speculation, urban encroachment and land use incompatibilities, are frequently associated with deterioration in

urban fringe farming. Often singled out as the main cause of agricultural land loss and declining farm viability near urban areas, they have provided much of the justification for farmland protection programmes and the control of urban sprawl (Bryant & Johnston 1992; Hanna 1997; Nelson 1992).

Positive forces, on the other hand, exert a favourable effect. From the perspective of innovation, a certain degree of stress (i.e. associated with the presence of population segments with different values) may have a beneficial impact in stimulating creative adaptation. In addition, of course, there are the more classic positive factors such as better access to large urban markets, including urban population segments who are environmentally conscious and concerned to consume ‘healthy’ foodstuffs. Furthermore, such zones are close to many specialised services and suppliers. In the case of organic farming in Quebec, many specialised organic fertilisers, pesticide suppliers and organic food distributors are found in these regions (Table 1). Finally, there are several urban markets where organic farmers can sell direct to the consumer.

Table 1 shows the distribution of certified organic corporate members. Certified organic corporate members include transformation and distribution industries that have received organic certification, such as cheese and soya milk transformation industries. Clearly, the largest concentrations of certified corporations are in the Montreal metropolitan region, with approximately 30% of organic corporate members. Other metro regions, while having smaller concentrations, account for yet another 33% of the total corporate activity.

In addition to these regional forces, there are other forces and factors associated with the different localities in the urban fringe. It is their existence and how they interrelate with forces from other scales that create the potential for differentiation between localities within the urban fringe.

Local forces influencing change in the urban fringe

Local specificities may affect the type of agricultural development that occurs within a specific urban fringe locality. Again, there are positive and negative forces and factors operating through local filters.
Figure 1. *Regional and local forces affecting agricultural change in the urban fringe.*
Socio-political filters include both the local political environment that influences agricultural development and the social context in which farmers and residents operate. On the positive side, for example, the local political environment can influence the development of innovative practices by making resources available (not necessarily financial) to encourage farmers to adopt innovative practices (providing for local specialised produce markets is an example). The social context influencing the development of agricultural innovations ranges from individual factors (values, family structure, agricultural history) to formal (i.e. the presence of a dynamic agricultural association) and informal social networks. On the negative side, some municipalities may be against the development of local markets because of an unwillingness to deal with parking issues and other land-use conflicts. In terms of economic structure (farm size, product mix, ownership structure), some localities may be better positioned to support the development of organic farming. Conversely, conventional farming may be so powerful and competitive in some localities that it is unlikely that any moves to diversify or develop alternative paths for agricultural development will be made. The agricultural community may even discourage certain types of alternative development paths (Bryant 1995). On the other hand, some urban fringe communities have attracted particular population segments with specific values regarding the environment, thus creating favourable local market conditions.

Biophysical conditions also vary from locality to locality within the urban fringe and this may have an influence on agricultural development paths. It can be hypothesised for example that, all things being equal, an area with a poor agricultural resource base will be more likely to succumb to the negative regional forces in the urban fringe compared to an area with a favourable biophysical resource base.

### Landscapes of agricultural change in the urban fringe

These different forces and factors of change combine from the different scales to produce different types of agricultural landscapes of change. Bryant (1984) classified them as landscapes of ‘normal’ agricultural development, landscapes of ‘agricultural adaptation’ and landscapes of ‘agricultural degeneration’. The conceptualisation presented in Figure 1 thus provides a powerful explanatory framework to account for the complex mosaic of the mix of landscapes encountered frequently in the urban fringe.

1. **Landscapes of agricultural degeneration** are areas where the negative effects of the urban fringe are dominant. Here, agricultural degeneration is often due to the negative effects of an urban fringe location combined with certain local and individual factors, such as the lack of agricultural succession, competition from another locality or very inadequate field structures.

2. **Landscapes of normal agricultural development** are zones where agriculture still follows the conventional development path. There are many such areas in Montreal’s urban fringe as elsewhere, i.e. the large vegetable growing region of the Jardin de Napierville area, or the many cereal production zones that are relatively isolated from the negative effects of the urban fringe.

3. **Landscapes of agricultural adaptation** are areas where despite the existence of negative urban fringe effects acting upon agriculture, other local factors lead to adaptation as some farmers take advantage of the positive regional market forces in the urban fringe. The opportunities thus outweigh the negative forces. Pro-active strategies taken by the farmer, groups of farmers or even by the

<table>
<thead>
<tr>
<th>Metro regions of Quebec</th>
<th>No. of certified corporate members (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal</td>
<td>8 (30%)</td>
</tr>
<tr>
<td>Quebec City</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Hull</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Sherbrooke</td>
<td>3 (11%)</td>
</tr>
<tr>
<td>Trois Rivières</td>
<td>3 (11%)</td>
</tr>
<tr>
<td>Total</td>
<td>17 (63%)</td>
</tr>
</tbody>
</table>

*Source:* Compiled from organic growers association membership lists (Organic Crop Improvement Association, DEMETER, Québec-Vrai, and Garantie-Bio).
community can make the difference between whether the area will become a landscape of agricultural adaptation or one of degeneration. Organic farming is a good example of an activity and an adaptation that can emerge in a landscape of agricultural adaptation whereby enterprising individuals take advantage of both positive regional and local forces.

The regional picture – These three broad types of agricultural landscapes make up the mosaic of agricultural landscapes and dynamics in the urban fringe of a particular metropolitan region. Together, they constitute the aggregate regional picture of the entire agricultural sector in a metropolitan region. If the urban fringe constitutes a favourable environment for certain forms of agricultural innovation, such as organic farming, we can hypothesise that organic farming should be concentrated in the urban fringe of major metropolitan regions, reflecting a stronger presence of landscapes of agricultural adaptation there.

ORGANIC FARMING IN QUEBEC

The general context – There are approximately 525 certified organic members in Quebec. While representing only about 1.5% of all farms (0.5% if certified maple producers are excluded), it is still an important agricultural industry with associated sales of C$38 million in 1993 (MAFAQ 1993). Of these 525 producers, approximately 300 are certified maple syrup producers, while 192 are certified growers, and 27 are certified corporate members. The distribution of the 192 certified growers (Figure 2) generally reflects the limits of the five largest metropolitan regions in the province of Quebec (Figure 3).

The concentration of organic farming in metropolitan regions – In order to analyse the regional distribution of organic farms, regions were defined for cities with a population of over 100,000 (e.g. Montreal, Quebec City, Hull, Sherbrooke, and Trois Rivières (Figure 3, Table 2)). Census Metropolitan Areas (CMAs) are defined by Statistics Canada as urbanised zones that, based principally on labour commuting flows, constitute the metropolitan region of a particular city. However, the influence of urban agglomerations on agriculture generally extend beyond these official CMA boundaries, as most farm operations are found in the area just outside the CMA. Therefore,
for this study, ‘modified metropolitan regions’ were defined to include all census divisions that had at least a part of their territory in the CMA, as well as other census divisions to form a contiguous region surrounding the city (Figure 3).

Three census divisions were excluded from the study as they represented highly specialised areas that exert undue influence on patterns. Two were excluded near Quebec City because they contained unusually high numbers and proportions (around 50%) of maple syrup operations (considered as farms by the national census board), and one was excluded near Montreal because of its unusually high number of intensive vegetable producing farms.

The location and number of organic farms were obtained from the 1997–98 memberships of four of the province’s organic farming associations (Organic Crop Improvement Association, DEMETER, Garantie-Bio, and Québec-Vrai. The Organic Growers and Buyers Association of Quebec provides certification for maple syrup producers exclusively). The total number of farms was obtained by using the 1996 Census of Agriculture. This data provided the basis for the remainder of the analysis. Interpretative information was also obtained from mail-in questionnaires sent to all certified organic producers and interviews with key leaders in the organic agriculture associations regarding factors influencing organic production.

Table 2.

<table>
<thead>
<tr>
<th>Metro regions of Quebec</th>
<th>City population (% of total)</th>
<th>Modified* metro region population (% of total)</th>
<th>Number of census divisions (% of all CDs in province)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal</td>
<td>1775846</td>
<td>3618001</td>
<td>18</td>
</tr>
<tr>
<td>Quebec City</td>
<td>504605</td>
<td>719970</td>
<td>7</td>
</tr>
<tr>
<td>Hull</td>
<td>217609</td>
<td>271605</td>
<td>3</td>
</tr>
<tr>
<td>Sherbrooke</td>
<td>132430</td>
<td>242178</td>
<td>5</td>
</tr>
<tr>
<td>Trois-Rivières</td>
<td>140541</td>
<td>160224</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>2771027 (39%)</td>
<td>5019976 (70%)</td>
<td>35 (35%)</td>
</tr>
</tbody>
</table>

Source: Statistics Canada 1996.

* Based on the regions defined in Figure 3.

Note: Defined by authors. See text for detailed explanation.

Figure 3. Metropolitan regions* of Quebec.
influencing intra-regional spatial concentrations of organic farms.

Location coefficients were used to measure the degree of specialisation or concentration of organic farms within the different metropolitan regions of Quebec. Location coefficients are a simple way of measuring the relative specialisation or concentration of a specific activity (the number of organic farms) in a given area (a metropolitan region) compared to some measure of total activity (all farms), in relation to the importance of that specific activity for a broader geographic unit (the province of Quebec). Any location coefficient with a value greater than 1.0 indicates a relative concentration of that activity in the specific spatial unit under consideration. Caution must however be exercised in interpreting location coefficients. They are relative measures of concentration, rather than absolute measures of location. Thus patterns must be interpreted cautiously when the numbers involved are small. In our analysis, the results would point to similar conclusions regardless of whether location coefficients or absolute numbers are used.

RESULTS

Analysis at the metropolitan region level highlights differences between metropolitan and non-metropolitan regions. Analysis at the local level suggests whether there exist important landscapes of agricultural adaptation.

Concentrations of organic farms at the regional level - Table 3 shows the importance of organic farms within the metropolitan regions of Quebec. These regions account for the majority of organic farms in the province. Montreal accounts for the highest number with 44 farms, representing approximately 23% of all organic farms in the province, compared to about 18% of the total number of farms. The resulting location coefficient of 1.3 indicates a relative concentration of organic farming within that region compared to the rest of the province. The other urban regions of Quebec also account for most of the remaining organic farming activity in the province. Particularly noteworthy are the important concentrations observed in the Sherbrooke and Hull regions, both with a location coefficient of 2.

In all, the five metropolitan regions account for 55% (105 farms) of all organic farming activity but only 37% (13177 farms) of total farming activity. Thus, organic farming is relatively concentrated within the urban fringe areas of Quebec’s largest metropolitan regions.

Intra-regional concentrations of organic farms - Within each metropolitan region, there are areas where organic agriculture is more concentrated compared to the other census divisions in each respective region. Table 4 shows the census divisions with the highest degree of concentration of organic farms in
Table 4. Areas of concentration within metropolitan regions.

<table>
<thead>
<tr>
<th>Metropolitan regions of Quebec</th>
<th>Census division with high concentrations of organic farms</th>
<th>No. of organic farms in census division (% of total within division)</th>
<th>Total no. of farms in census division (% of total within division)</th>
<th>Location coefficienta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montreal</td>
<td>Haut Richelieu</td>
<td>8 (18%)</td>
<td>717 (11%)</td>
<td>1.6</td>
</tr>
<tr>
<td>Quebec City</td>
<td>Lotbinière</td>
<td>11 (61%)</td>
<td>953 (38%)</td>
<td>1.6</td>
</tr>
<tr>
<td>Hull</td>
<td>Papineau</td>
<td>9 (75%)</td>
<td>389 (43%)</td>
<td>1.7</td>
</tr>
<tr>
<td>Sherbrooke</td>
<td>Memphremagog</td>
<td>6 (26%)</td>
<td>348 (15%)</td>
<td>1.7</td>
</tr>
<tr>
<td>Trois Rivières</td>
<td>Francheville</td>
<td>6 (75%)</td>
<td>508 (48%)</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Source: Compiled from organic growers association membership lists (Organic Crop Improvement Association, DEMETER, Québec-Vrai, and Garantie-Bio) and Statistics Canada 1996.

a Location coefficient = \( \frac{\text{Organic farms in census division}}{\text{Total farms in census division}} \) \times \( \frac{\text{Total farms in metro region}}{\text{Organic farms in metro region}} \)

Indeed, the concentrations of organic agriculture at the metropolitan region level is really only a statistical abstraction or generalisation of what is, in effect, a very heterogeneous pattern at the local level. It is apparent that individual factors have the potential to play an important role in the creation of landscapes of agricultural adaptation in the urban fringe. In a future publication, the information from questionnaires will be used to assess the importance of local dynamics in constructing these particular concentrations of organic farming activity.

ACKNOWLEDGEMENTS

A research grant from the Social Studies and Humanities Research Council of Canada to C.R. Bryant is gratefully acknowledged.

REFERENCES


