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Analysis of the relevance of agroforestry to the Magdalen Islands, Quebec

Report of the agroforestry study
done October 12–14, 2010

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Agriculture and Agri-Food Canada
by André Vézina

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1. Introduction

The Magdalen Islands are an archipelago situated in the Gulf of St. Lawrence and belonging to the province of Quebec. Most of the archipelago lies within the municipality of Îles-de-la-Madeleine, which has a population of 12,000 inhabitants. The total surface area of the archipelago is about 200 km², of which 30% is dunes. The wooded cover accounts for about 25% of the surface area. Harvesting during early colonization nearly wiped out the commercial forest, and as a result the forest today is generally young and in regeneration (Agence régionale de mise en valeur des forêts privées de la Gaspésie-les-Îles – AFOGÎM). The current volume of commercial timber from the Islands' forest meets only a small portion of the needs of the Madelinots for forest products (saw timber and firewood). It is interesting to note that the forest of Brion Island (protected area) covers nearly 70% of its surface area. There are some 3,800 hectares of untilled land on the Magdalen Islands.

Agriculture on the Magdalen Islands is limited by climate; the wind is a major factor that inhibits the planting of crops. The introduction of agroforestry systems would improve the microclimatic conditions and provide, over the short and medium terms, biomass for various uses (such as energy, bedding, ramial chipped wood) and, over the longer term, construction lumber and firewood.

At the invitation of Robert Robitaille, an agronomist with the MAPAQ, André Vézina, Biopterre Project Manager, and Stéphane Gariépy, Regional Sustainable Agri-Systems and Ag-land Manager at Agriculture and Agri-Food Canada, conducted a mission to the Magdalen Islands on October 13–14, 2010. The activities over the three half-days consisted of on-site meetings with producers the mornings of October 13 and 14, and a series of presentations to various stakeholders the afternoon of October 13.

The purpose of the mission was to analyze the relevance of agroforestry to the Magdalen Islands in cooperation with local organizations and to identify potential locations for demonstration sites. The specific objectives were:

- a) to gather information about the land occupancy by fields and woodlands on the Magdalen Islands;
- b) to prepare a presentation about agroforestry adapted to the context of the Magdalen Islands;
- c) to conduct a workshop for stakeholders from the agricultural, natural resources, water management, community development and transport sectors with an interest in agroforestry on the Magdalen Islands;
- d) to visit potential demonstration sites for agroforestry systems;
- e) to write a synthesis report of the discussions and visits, with recommendations.

For easier reading, the site visits have been grouped under a single section, followed by a brief report of the stakeholders meeting.

2. Site visits

All site visits were conducted in the company of Robert Robitaille, an agronomist with the Quebec Ministry of Agriculture, Fisheries and Food (MAPAQ), and Benoit Boudreau, a forestry technician with the municipality of Îles-de-la-Madeleine and the head of tree planting projects on the Islands.

VISITS THE MORNING OF OCTOBER 13

Visit 1: Truck farming enterprise of Jean Gagnon

This site is located near L'Étang-des-Caps, in the town of Bassin. The producer, Jean Gagnon, has started a small asparagus and raspberry enterprise that is protected by artificial windbreaks that are 1.3 m high (photo 1). He intends to plant a double row of willow and white spruce to the west and north to improve the microclimate of the plots. The asparagus field is already protected by a willow hedge. To the north of his plot, the producer has land that could also be planted with fruit or market garden crops. An intercropping system of double rows of willows (on 1.5 m-wide black plastic mulch) spaced 10 m apart interplanted with rows of small fruits or vegetables is one avenue of interest to the producer, particularly as he would like to use the ramial wood produced when the willows are cut every three years.

Visit 2: Plantations of Benoit Boudreau

Mr. Boudreau drove us to various plantations started over the past ten years. Our visit included a young plantation of sugar maple, red oak, red ash, yellow birch and hybrid larch (photo 2). The hardwoods were protected from rodents by tree shelters.

This visit showed us the extent to which wind is a dominant factor on the Magdalen Islands. When fully exposed to the wind, the trees are stunted; when in a protected environment, they can grow to sizes suitable for commercial use. It would be advisable to make the most of the protection afforded by the existing spruce stands to introduce hardwoods such as maple, ash and linden. The microclimate in the open areas within the spruce stands would allow the hardwoods to grow well.



Photo 1: Artificial windbreak protecting a raspberry plot

Photo 2: Hardwood plantation with tree shelters



Photo 3: Hedges of osier willows would benefit from being cut back

Photo 4: Hayfields of Jude Renaud

Photo 5: Potential site of a small-fruit crop

During the visit, we also saw sugar maples protected from the wind which were showing good growth. As the windbreak hedges are fully exposed to the wind, they must consist of several rows of trees so that the trees in the first rows can protect the trees in the rows behind. The use of willow for that purpose is very effective. Its rapid growth ensures the short-term protection of crops and of other plants making up the hedge. The planted willows grow at least 1 m annually in plastic mulch, but much less when planted in hay (without too much care). Several of the willow hedges visited would benefit from being cut back to make them sturdier and lower (photo 3). We saw several species of willow that were giving good results, but osier willow (*Salix viminalis*) is the most common.

Visit 3: Potential site for intercropping (willow-forage)

We concluded the visit with a walk through the hayfields of Jude Renaud, who has fairly extensive croplands (photo 4). This would be a worthwhile test site for willow-hay intercropping or willow plantations for producing biomass.

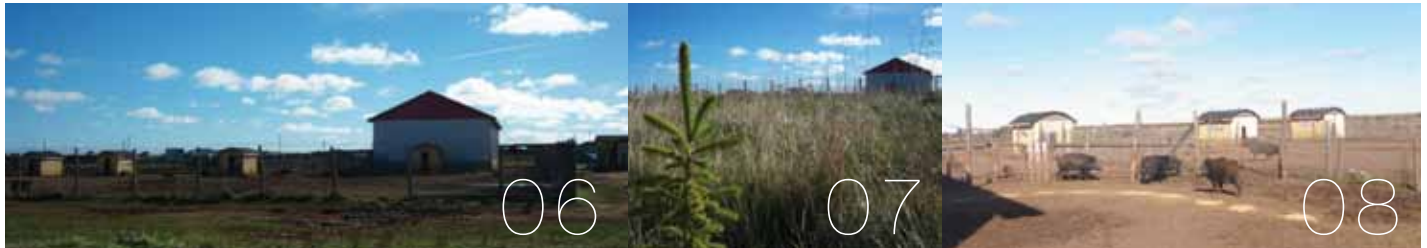
VISITS THE MORNING OF OCTOBER 14

Visit 4: Miel en Mer honey producers

First, we visited the enterprise Miel en Mer (<http://mielenmer.com/>). Owners Jules Arseneau and Ingrid Bastien plan to produce mead from small fruits, which they would like to grow on site. Being situated in the Buttes Pelées sector of Havre-aux-Maisons, they want to protect their small-fruit plantations from the wind.

Last spring, the owners planted a row of osier willow to the west and north of their plots. We advised them to weed this plantation manually, as the plants were spreading into the hay. We also advised them to plant several additional rows (to the west), with the neighbour's consent, as the prevailing wind conditions at that location are harsh. We recommended another row of willow and a row of white spruce. We also visited a potential site (photo 5) for a small-fruit crop to the northeast of the house. This site has southern exposure and is well protected from winds by the knolls. We suggested planting a windbreak hedge (three rows) to the north of this plot to create a thermal effect.

3. Stakeholders meeting



Photos 6, 7 and 8: Planting of a five-row hedge to protect a boar pen

Visit 5: Boar producer

The farm of Jeannot Aucoin, a boar producer, is located on Chemin des Caps, in Fatima. In 2010, he planted a windbreak hedge consisting of eight rows of trees: one row of willow, two of black spruce, one of birch, two of white spruce and one of black pine (photos 6, 7 and 8). The trees seem to be taking very well. Judging from the growth of nearby trees, this hedge should grow well and within ten (10) years be able to provide adequate wind shelter for the boars and hide the buildings. To the east of the buildings, the producer leases land for horticultural production and these crops would also certainly benefit from the presence of windbreak hedges.

Visit 6: Sheep producer

Finally, we visited Denis Arseneau, a sheep producer. He owns an excellent riparian strip of willow and spruce (photo 9). He is interested in planting another on the west slope of the waterway as well as several other shelterbelts to protect his pastures.

The stakeholders meeting was held the afternoon of Tuesday, October 13, in the MAPAQ office in Cap-aux-Meules.

The following local stakeholders attended this meeting:

Robert Robitaille, MAPAQ agronomist

Benoit Boudreau, forestry technician with the municipality of Îles-de-la-Madeleine

Denis Arseneau, new sheep producer (Les moutons du large)

Ingrid Bastien, apiary producer (Miel en Mer)

S verine Palluel, responsible for the regional Integrated Land and Natural Resources Management plan for the CERMIM (*Centre de recherche sur les milieux insulaires et maritimes*)

Sylvie Boudreau, Attention FragÎles project manager for establishing a strategic contingency plan for the environment for the Magdalen Islands

Natalia Porowska, project manager of the strategic plan renewal for the agri-food sector of the Magdalen Islands, Master's student in Agroforestry and aspiring producer of organic produce

Yves Martinet, head of the Comité ZIP des Îles-de-la-Madeleine

Sophis Cassis, director of Bon goût frais des Îles-de-la-Madeleine, an organization mandated by socioeconomic stakeholders to promote the Islands' biofoods and coordinate the Table de concertation bioalimentaire des Îles-de-la-Madeleine (biofoods issue table)

Judy Legault, development officer for business assistance, CLD Îles-de-la-Madeleine

Rita Savaria and **Jean Gagnon**, artisan-scale raspberry and asparagus producers

André Vézina (Biopterre) and Stéphane Gariépy (AAFC) spoke with those assembled about the agroforestry potential of the Magdalen Islands. Windbreak hedges, riparian systems, intercropping and short-rotation willow crops are the types of agroforestry development most relevant to the Islands.

Benoit Boudreau then spoke about plantations established by the Municipality over the last ten years. In that period, 300 ha have been reforested thanks to funding from the Quebec Ministry of Natural Resources and Wildlife Forests (MRNF). The Municipality has an annual budget of \$100,000 through phase II and funding from the Program for the development of private woodlots (*Programme de mise en valeur de la forêt privée*). These appropriations are also under review by the Ministry, and nothing is guaranteed for the coming years. Besides distributing trees, in past years the Municipality has provided training to individuals in tree planting, an initiative that has produced good results. In the next few years, the Municipality intends to spend more time maintaining the plantations and a little less on planting (20,000 trees rather than 50,000 trees). The factors that limit tree planting are: uncertainty as to MRNF allocations, skill and aging of the workforce, the rugged topography and the cadastral division of the Islands. Finally,

Mr. Boudreau stressed that many Madelinots do not like willows, despite the fact that they grow well. They are, however, very open to tree planting, as they realize that trees contribute to the quality of life and impact water quality.

At the end of the afternoon, Robert Robitaille discussed the silvopastoral project introduced in Gaspé within the scope of a rural laboratory and the Prime-Vert program and the possibility of assistance for the planting of windbreak hedges.



Photo 9: Riparian strip of willows about 10 years old

4. Discussion and conclusion

During this visit to the Magdalen Islands it was observed that the forest cover is improving thanks to the quality work done by local stakeholders, especially the team of Benoît Boudreau, over the last ten years. Local expertise is invaluable and is deserving of technical and financial assistance to develop the full agroforestry potential of this wonderful archipelago.

Agroforestry is of definite relevance in the context of the Magdalen Islands because it would further increase the wood cover, while increasing crop yields and producing a biomass for use by the islanders. Windbreak hedges, riparian systems and intercropping are the most appropriate agroforestry approaches for this territory. Because of the strong winds, particular attention should be paid to the orientation and design of windbreaks (choice of species, number of rows). The agroforestry systems established should also take into account the scenery on the islands to ensure their aesthetic integration with the existing landscape, which is highly valued from the standpoint of tourism.

As for plantations, the enrichment of white spruce stands with noble hardwoods is a favourable means of diversifying the tree species present. The protection afforded by the spruce trees should enable hardwoods to thrive.

Owing to the available expanses of untilled land (3,800 ha), the energy context that prevails on the Magdalen Islands and the success with growing willows, the opportunity to cultivate short-rotation willow should be evaluated, especially for producing biomass to heat institutional buildings. Willow also has a windbreak effect that would be useful for existing crops and plantings. Biopterre advocates the establishment of an agroforestry demonstration plot of willow and forage intercropping that would be typical of the Magdalen Islands.



Finally, the visit showed that the Magdalen Islands offer a highly diversified agricultural potential from the standpoint of crops and livestock. Improvement of the microclimate through agroforestry would support existing agriculture while promoting the emergence of new enterprises.