

Agroforestry

Serving Communities

Provincial Workshop
November 17 & 18th, 2006
Edmundston, New Brunswick

Workshop Proceedings



UNIVERSITÉ DE MONCTON
CAMPUS D'EDMUNDSTON

Faculté de foresterie

This workshop has been organised by the Faculté de Foresterie of the Université de Moncton, Campus Edmundston



**UNIVERSITÉ DE MONCTON
CAMPUS D'EDMUNDSTON**

Faculté de foresterie

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The opinions made in the following texts reflect the points of view of their authors and thus engage only those.

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Advisory Committee

We wish to thank the members of the Advisory Committee and the organizations they represent for their essential involvement toward the success of this event:

- Maurice Basque New Brunswick Department of Agriculture and Aquaculture
- Dick Bellefleur New Brunswick Federation of Woodlot Owners Inc.
- Yves Boulet New Brunswick Christmas Tree Growers Co-operative
- Jean-Louis Daigle Eastern Canada Soil and Water Conservation Center
- Janette Desharnais / Anne Lebrun-Ruff INFOR Inc.
- Caroline Pagé Faculté de Foresterie, Université de Moncton - Campus Edmundston
- Yvon Poitras New Brunswick Maple Syrup Association Inc.
- Robbie Ritchie Forêt expérimentale of the Faculté de Foresterie, UMCE
- Daniel Soucy New Brunswick Department of Natural Resources
- Linda Volpé Agricultural Alliance of New Brunswick



UNIVERSITÉ DE MONCTON
CAMPUS D'EDMUNDSTON

Faculté de foresterie

December 15th, 2006

Dear symposium participants,

We are happy to send you the proceedings of the first provincial workshop on agroforestry. With the theme of *Agroforestry serving communities*, this workshop allowed us to share a wealth of information on agroforestry and to identify interesting action paths ahead to develop those practices in New Brunswick. You were many to participate, even beyond our expectations, with more than 150 people present on November 17th and 18th, 2006.

The high level presentations, the various locations that participants came from, as well as the motivation of our partners, all contributed in making this event a real success, and for which we are really proud. Furthermore, this workshop was an opportunity to exchange information and our thoughts on an emerging and promising sector for our province.

We hope you will benefit from the information contained in this document and that it will be useful to you in developing or adopting agroforestry practices. We also hope that the recommendations set forth will help define future actions in order to maximize the benefits of agroforestry for New Brunswick communities.

Finally, we want to thank all the people that have helped to make this workshop possible. First of all, special thanks to our Coordinator, Ms. Caroline Pagé. We also want to mention the involvement of the Advisory Committee members and the students of the Faculty of Forestry at the Université de Moncton, and we also want to recognize the financial partners of this project; without all these people, this event would not have been such a great success.

Best regards,

Dean of the Faculty,

Lise Caron

Table of contents

Honorary Guests Address

Address of the Honourable Donald Arseneault, New Brunswick Minister of Natural Resources.....	7
Address of the Honorable Ronald Ouellette, New Brunswick Minister of Agriculture and Aquaculture	11

Opening Conference

How Agroforestry can serve Communities.....	16
<i>Luc C. Duchesne, President and CEO, Forest BioProducts Incorporated</i>	

Session 1: Agroforestry Serving Agriculture

The Added Value of Windbreaks and Forested Riparian Buffers	18
<i>André Vézina, Instructor, ITA La Pocatière</i>	
Evaluation of native trees and shrubs planted on berms	19
<i>Brenda Penack, Coordinator, Bedeque Bay Environmental Management Association</i>	
The Impact of Agroforestry Buffers on Biodiversity in Lowbush Blueberry Agroecosystems.....	20
<i>Steve Javorek, Research Biologist, Agriculture & Agrifood Canada</i>	

Session 2: Agroforestry Serving New Markets

Agroforestry - Roles and Issues in Sustainable Land use Systems	22
<i>Henry DeGooijer, Agroforestry Development Manager, Agriculture & Agrifood Canada</i>	
Non-timber Forest Products in Sugar Bushes: Enhancing and Developing Sugar Bush Resources in NB.....	23
<i>Robbie Ritchie, Technology Transfer Officer, Experimental Forest of the Faculté de Foresterie, UMCE</i>	
<i>Chantal Levesque, Vice-présidente, Érablière de la Montagne Verte</i>	
Agroforestry with a First Nations Flavour	24
<i>Natacha Sirois, Instructor, Centre of excellence in agricultural and biotechnological sciences</i>	
<i>Richard Wallace, Madamaska Maliseet First Nation</i>	
Mushroom Production on Logs.....	25
<i>Richard O'Breham, Mycoflor Inc.</i>	25

Session 3: Agroforestry Serving the Environment

Shelterbelt Establishment for Livestock Buildings in the Maritimes	28
<i>Sabrina Ellsworth, Demonstration Coordinator, ASRP</i>	
Riparian Zone Restoration in the Kennebecassis Watershed	29
<i>Brent Stanley, Project Manager, KIWRC</i>	

Session 4: Agroforestry Serving New Markets

Bioeconomy, bioproducts and biomass: stick it to the man.....	30
<i>Luc C. Duchesne, President and CEO, Forest BioProducts Incorporated</i>	
Biofuels Potential.....	31
<i>Kris Sullivan, Quality Control, Bio-D Énergie Inc.</i>	

Round Table Report

Agriculture and forestry issues	
Agroforestry practices with the best potential	
Actions recommended	
Recommendations	

Appendices

Participants Profile	38
Workshop Evaluation	39

Agenda

Château Edmundston, 100, Rice Street, Edmundston, NB

FRIDAY, NOVEMBER 17 TH 2006	
12:30	Registration
13:15	Welcome <i>Opening remarks</i>
13:45 F	Opening Conference : How Agroforestry can Serve Communities <i>Luc Duchesne, Forest BioProducts Incorporated, ON</i>
Agroforestry Serving Agriculture Conference session	
14:15 F	Added Value from Windbreaks and Forested Riparian Buffers <i>André Vézina, Institut de Technologie Agricole de La Pocatière, QC</i>
14:45 E	Agroforestry in an Agricultural Watershed - Planting on a Berm at Maple Plains, PEI <i>Brenda Penack, Bedeque Bay Environmental Management Association, I.-P.-É.</i>
15:05 E	The Impact of Agroforestry Buffers on Biodiversity in Lowbush Blueberry Agroecosystems <i>Steve Javorek, Agriculture and AgriFood Canada, NS</i>
15:25	Question Period
15:45	Refreshment Break
Agroforestry Serving New Markets Conference session	
16:05 E	Agroforestry: Roles and Issues in Sustainable Land use Systems <i>Henry De Gooijer, Prairie Farm Rehabilitation Administration, Agriculture and AgriFood Canada, SK</i>
16:25 F	Non-Timber Forest Products in Sugar Bushes <i>Chantal Levesque, Érablière de la Montagne Verte & Robbie Ritchie, Forêt expérimentale, UMCE, NB</i>
16:40 F	Natives Agroforestry <i>Richard Wallace, Madawaska Maliseet First Nation & Natacha Sirois, CESAB, NB</i>
16:50 F	Cultivating Mushrooms on Logs <i>Richard O'Breham, Mycoflor inc., QC</i>
17:10	Question Period
17:30	End of Conferences Cocktail - <i>Cash bar</i>
18:30	Banquet <i>Cochair by the Honourable Donald Arseneault, NB Minister of Natural Resources and the Honourable Ronald Ouellette, NB Minister of Agriculture and Aquaculture</i>

SATURDAY, NOVEMBER 18 TH 2006	
8:30	Registration and Welcome
Agroforestry Serving the Environment Conference session	
9:00 E	Shelterbelt Establishment for Livestock Buildings in the Maritimes <i>Sabrina Ellsworth, Atlantic Swine Research Partnership, NS</i>
9:20 E	Riparian Zone Restoration in the Kennebecasis Watershed <i>Brent Stanley, Kennebecassis Watershed Group, NB</i>
Agroforestry Serving Economic Development Conference session	
9:40 F	Bioeconomy, Bioproducts and Biomass: stick it to the man <i>Luc Duchesne, Forest BioProducts Incorporated, ON</i>
10:00 F	Biofuels Potential <i>André Long and Pierre Migner, APIDEL, QC</i>
10:20	Question Period
10:40	Refreshment Break
11:00	Round Table <i>Current issues, development perspectives and needs</i>
12:00	Lunch
13:00	Plenary Session <i>Report from round table Comments and questions from the participants</i>
13:50	Closing Remarks

F : Presented in French

E : Presented in English

Honorary Guests Address

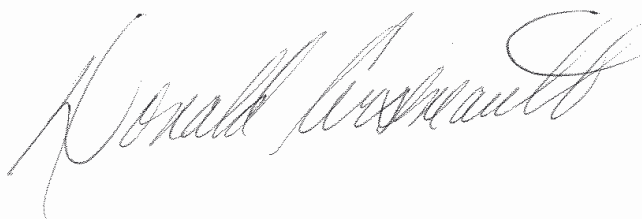


From left to right : Maxime Beaudoin, agroforestry student; Honourable Ronald Ouellette, NB Minister of Agriculture and Aquaculture; Honourable Donald Arseneault, NB Minister of Natural Resources; Alikée Harel, agroforestry student.

Agroforestry Workshop

**November 17th, 2006
Edmundston**

**Speaking Notes
Donald Arseneault
Minister Natural Resources**

A handwritten signature in dark ink, appearing to read 'Donald Arseneault', written in a cursive style.

Address of the Honourable Donald Arseneault, New Brunswick Minister of Natural Resources

Bonsoir. Bienvenue à Edmundston. Il me fait plaisir de vous saluer de la part du premier ministre Shawn Graham et du gouvernement du Nouveau-Brunswick.

Je sais que cet atelier a amené ici des participants de partout dans notre province ainsi que du Québec et des autres provinces des maritimes. J'espère que tout le monde profite de l'hospitalité unique du Nouveau-Brunswick et plus spécialement de celle du nord-ouest de la province.

Agroforestry is an approach to land use that incorporates trees into farming systems to accomplish environmental, economic and social goals, and allows for the growing of trees and crops on the same piece of land.

That sounds a lot like the family farm. Many of our province's private woodlot owners are also farmers. The woodlot is an important part of the farm that provides many benefits including: saw logs, stove-wood and shelter for wildlife.

L'agroforesterie présente plusieurs bénéfices, comme des sources de revenus diversifiées, une production biologique accrue, une meilleure qualité de l'eau et un milieu de vie amélioré pour les gens et pour la faune. Les fermiers adoptent la pratique de l'agroforesterie parce qu'ils veulent augmenter leur stabilité économique et améliorer la gestion des ressources naturelles dont ils prennent soin.

En tant que ministre des Ressources naturelles, je suis très près du secteur forestier de notre province, secteur qui a été appelé le moteur de notre économie provinciale. La foresterie fournit plus de 23 milles emplois directs et indirects avec des salaires totalisant 1,1 milliard de dollars.

La foresterie représente environ 11 pour cent de notre produit intérieur brut et compte pour environ 40 pour cent de nos exportations. Elle fournit des recettes fiscales de 264 millions de dollars par année et 3,7 milliards de dollars de produits sont envoyés par nos usines.

Over half of the land in our province is Crown land. This public land is owned by the people of New Brunswick and it is my job, as Minister, to make sure it is managed in the best interest of all New Brunswickers.

Our biggest challenge is to balance the competing interests of all stakeholders. Hunters, snowmobilers, forestry companies, environmentalists and a wide range of other stakeholders all have strong opinions on how this public land should be managed.

Everyone has a vested interest. Everyone wants the Minister and government to make concessions to their stakeholder group. The hardest thing for me to do is to have to say NO. My job is to strike a balance and make sure the land is respected and managed wisely.

Future generations will look back and judge us on how we managed the public land. Decisions we make today will have impacts for a long time. That is why we have to get it right.



Notre gouvernement croit fermement au développement de produits à valeur ajoutée en foresterie et en agriculture. Nous allons continuer à investir dans la recherche et dans le développement de transformations, d'emballages et de mises en marché à valeur ajoutée.

Our Charter for Change places great emphasis on agriculture and forestry. We have already established a new Department of Agriculture and Aquaculture. We are naming a new cabinet committee to work with industry to further modernize forestry in our province. We will ensure there is equitable market treatment for private woodlot owners.

Integrating trees and shrubs with the other enterprises on a farm can create additional sources of income, spread farm labour throughout the year, and increase the productivity of the other enterprises, while protecting soil, water, and wildlife.

Je vous remercie de m'avoir invité à votre événement. Je suis content de voir que vous discutez de questions liées à l'agroforesterie. Je crois que c'est un sujet important qui sera bénéfique pour nos régions à l'avenir. Je vous souhaite beaucoup de succès et j'ai hâte de travailler avec plusieurs d'entre vous.

Merci.

Notes for a speech / Notes pour un discours

Hon. / L'hon. Ronald Ouellette

Minister /Ministre



L'AGROFORESTERIE AU SERVICE DES COMMUNAUTÉS

AGROFORESTRY SERVING COMMUNITIES

Château Edmundston

Edmundston, NB

November 17, 2006 – 6 :30 p.m. / le 17 novembre 2006 – 18 h 30

Address of the Honorable Ronald Ouellette, New Brunswick Minister of Agriculture and Aquaculture

Bonsoir, Mesdames et Messieurs.

Je suis heureux d'être des vôtres ce soir pour fraterniser avec les intervenants des milieux agricoles et forestiers du Nouveau-Brunswick, des Maritimes et du Québec à l'occasion de ce tout premier colloque en agroforesterie au Nouveau-Brunswick.

As Minister of the new Department of Agriculture and Aquaculture, I'm pleased to welcome those of you who traveled from outside the province to participate in this important workshop on agroforestry. And as a lifelong resident of beautiful Northwestern New Brunswick, I'm very proud to welcome you in my neck of the woods, so to speak.

Je remercie sincèrement Madame Lise Caron, de même que les organisateurs du colloque, de nous avoir invités, M. Arseneault et moi-même, à partager ces quelques moments avec vous.

La Faculté de Foresterie du campus d'Edmundston de l'Université de Moncton est un chef de file dans le secteur de l'agroforesterie au Canada, puisqu'elle offre déjà, conjointement avec le Centre d'excellence en sciences agricoles et biotechnologiques de Grand-Sault, un baccalauréat appliqué en agroforesterie.

Ce programme innovateur produira des professionnels qui renforceront la main-d'oeuvre spécialisée du Nouveau-Brunswick et qui seront en mesure de développer des pratiques innovatrices de gestion des terres agricoles et des surfaces boisées.

C'est d'ailleurs là une perspective que j'envisage avec plaisir. Le thème de votre colloque, « L'Agroforesterie au service des communautés », est d'autant plus opportun puisque ce seront les communautés qui, en bout de ligne, en ressortiront gagnantes.

Agriculture is as important to New Brunswick's economy as its traditional family values are to its social fabric.

Our government is committed to supporting family farms and to ensuring that young people who want to make their livelihood in agriculture have that opportunity.

The agriculture industry is diverse in our province, combining a little over 3,000 farms with 100 processing plants to produce in excess of \$1,1 billion worth of agri-food and beverage products in 2005.

Comme vous pouvez le constater, l'agriculture est une industrie importante pour l'économie provinciale, une industrie qui fournit de l'emploi à plus de 8 000 personnes, auxquelles s'ajoutent 6 500 travailleurs du secteur de la transformation.

Nous sommes d'ailleurs très chanceux au Nouveau-Brunswick d'avoir un groupe d'agriculteurs si déterminés à produire des aliments sûrs et nutritifs de qualité élevée, sans parler de leur appui au développement durable de l'agriculture pour les générations à venir.

L'agroforesterie représente sans contredit un intérêt de la part du secteur agricole afin d'améliorer l'environnement et procurer un revenu additionnel aux agriculteurs.

C'est une pratique qui offre de nombreux avantages sous forme de revenu diversifié, d'une plus grande production biologique, d'une meilleure qualité du sol et de l'eau, et de biodiversité.

Je considère que nos agriculteurs pourraient en tirer profit, car beaucoup d'entre eux exploitent des boisés en plus de pratiquer la culture et l'élevage.

With respect to selected aspects of agroforestry, staff within our Department are currently working with agricultural producers in establishing shelterbelts, windbreaks and buffer zones. In particular, we have been involved with developing windbreaks within blueberry fields and tree plantings to stabilize riparian areas.

These practices will not only benefit the environment but also the agricultural producers and the communities in which they live.

Je constate que le programme du colloque comprend l'étude de ces questions et à ce sujet, j'aimerais remercier la faculté de foresterie de l'UMCE qui a eu l'heureuse initiative d'organiser ce colloque.

Je remercie tout particulièrement Madame Caroline Pagé qui a agi à titre de coordonnatrice du comité d'appui au colloque, composé d'étudiants du programme d'agroforesterie, qui ont investi temps et efforts pour assurer la réussite de ce premier colloque.

Vous avez réussi à attirer des orateurs de marque et j'espère que les sujets traités aujourd'hui et demain résulteront dans une plus grande sensibilisation du potentiel économique, social et environnemental relié à l'adoption de pratiques d'agroforesterie.

Je constate que le programme du colloque comprend également des ateliers sur la bioéconomie et, plus particulièrement, sur le potentiel des biocarburants.

Comme la plupart d'entre vous le savent probablement déjà, le Nouveau-Brunswick est le site de la première usine de raffinage de biocarburant à base de plante au Canada atlantique, plus précisément à Waterville, près de Woodstock.

Notre ministère a collaboré à l'établissement de l'usine entre autres en effectuant des essais visant à cibler les meilleures cultures susceptibles de servir de matière première à la production de biocombustibles.

This is an important step forward for New Brunswick because activities at the new plant will assist in gathering information that will help determine the parameters for a competitive bio-fuels industry in the province.

It will make it easier to determine what crop yields the best results and what renewable products can be produced for a profit to enhance food safety and help the environment by reducing greenhouse gas emissions.

When operating at full capacity, this pilot facility can be scaled up to a commercial capacity of approximately 2.5 million litres per year, requiring approximately 4,000 hectares of canola.

Un autre projet de fabrication de biodiesel à partir de canola pourrait voir le jour très bientôt, dans la municipalité de Clair, située tout près d'ici. Ce projet, qui devrait entrer en production l'an prochain, donnera aux agriculteurs de la région la possibilité d'ensemencer une nouvelle culture de rotation.

En plus de la production de carburant, les promoteurs, qui sont de la région de Clair et du Québec, entendent utiliser le tourteau de canola, un sous-produit constitué des résidus des graines obtenus après extraction de l'huile, dans l'alimentation du bétail.

Je suis donc très heureux qu'il y ait du mouvement de ce côté, et très heureux aussi de constater que des représentants de clubs agro-environnementaux de la province participent au colloque.

Les producteurs agricoles qui sont membres de ces clubs sont proactifs en ce qui concerne la protection de l'environnement. La grande majorité d'entre eux ont d'ailleurs adopté un plan de ferme environnemental en vertu du Programme Canada - Nouveau-Brunswick pour l'élaboration et la mise en oeuvre de plans de ferme environnementaux.

Ce programme encourage les producteurs à effectuer une évaluation complète des risques environnementaux de leur exploitation agricole et encourage l'adoption de pratiques qui améliorent la durabilité de l'agriculture et contribuent à assainir l'environnement.

En terminant, je formule le vœu que ce colloque atteigne l'objectif de mieux renseigner, non seulement les agriculteurs, mais également les représentants des ministères dont M. Arseneault et moi-même sommes les titulaires, et de les sensibiliser davantage à l'agroforesterie.

Nous cherchons à mieux connaître l'agroforesterie et les retombées qu'elle offre pour le Nouveau-Brunswick. Nous anticipons donc avec plaisir la perspective de prendre connaissance des conclusions du colloque.

Again, thank you for your invitation, have a great evening, as well as productive deliberations tomorrow and a safe return trip back to your home.

Je vous remercie à nouveau de votre invitation et vous félicite de votre implication dans les dossiers qui affectent les industries agricole et forestière. Je vous souhaite du succès avec la suite du colloque ainsi qu'avec le programme d'agroforesterie, ici, à Edmundston et à Grand-Sault.

Merci et bonne soirée.





Opening Conference



Luc Duchesne

How Agroforestry can serve Communities

Luc C. Duchesne, President and CEO, Forest BioProducts Incorporated

Agroforestry is emerging as a discipline in support of the emerging bioeconomy. Agroforestry systems include forest farming (sun and shade), silvopasture, timberbelts, integrated riparian systems and bioenergy plantations. To be labelled as agroforests, managed ecosystems must meet the criteria of being intentional, intensive, interactive and integrated. In practice, agroforestry involves the manipulation of natural ecosystems to promote or increase bioproducts species populations “in the wild”. Bioproducts, which include non timber forest products, originate from organic matter, either newly grown or discarded, produced through wild harvesting, agriculture or agroforestry ecosystems. In recent years, bioproducts have received accrued interest by the general public, governments and the private sectors of Canada. However, for the bioproducts industry to enter mainstream Canadian industrial culture it is now critical to attempt the integration of the timber industry with the bioproducts industry to benefit both sectors. Bioproducts can be harvested from four types of environment: wild stocks from timber-productive forests, wild stocks from non timber-productive forests or lands, managed stocks from intensively managed forests, and domesticated stocks from agricultural systems. There are four possible types of interaction between the bioproducts and timber industries: independent resource use, competition for resources, complementary resource use and symbiotic resource use. Agroforestry appears as the best possible means for our modern society to create symbiosis between the forest industry and the bioproducts industry, promote biodiversity conservation, reduce procurement cost, or increase product quality. The greatest challenge of agroforestry is to create successful demonstrations which will integrate economic, social, policy and ecological issues into new resource management paradigms that promote the welfare of communities.

Biography

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Dr. Luc Duchesne is an entrepreneur, a thinker and a scientist fully engaged in the bioeconomy. He has received a PhD from the University of Guelph in 1988, an MSc from the University of Toronto in 1985 and a B. Sc. in Forestry from Laval University in Quebec City in 1983. Since 2004, he has been the President and CEO of forest BioProducts Inc, a firm conducting project development in bioproducts. He was the Chief Business Development officer for DynaMotive Energy Systems Corporation from 2003 to 2004. He was a research scientist for Natural Resources Canada from 1990 to 2003. He has been instrumental in mainstreaming the bioproducts industry, particularly in rural and First Nation communities. He has taught undergraduates and graduates at eight universities as an adjunct professor including the Université de Moncton where he is engaged in setting up an industrial chair in agroforestry. Dr. Duchesne is widely published in a broad range of disciplines such as forest economics, bio-energy, bio-technology, molecular biology, entomology, pathology, microbiology, old-growth forests, fire ecology, and non-timber forest products. He is the author or co-author of 85 book chapters and scientific articles, and has presented numerous lectures in symposia, international and national meetings. Among his many publications he has co-authored the book “Bioproducts from Canada’s forests: New partnerships in the Bioeconomy” which has recently been published by Springer.



Session 1

Agroforestry Serving Agriculture



From left to right: Steve Javorek, Brenda Penack, Luc Duchesne and André Vézina.

The Added Value of Windbreaks and Forested Riparian Buffers

André Vézina, Instructor, ITA La Pocatière

The role of windbreak hedges and buffer zones along rivers in agriculture is well documented and accepted by all stakeholders in this sector. Windbreak hedges can increase production yield, reduce soil erosion, protect animals and rearing structures, as well as reduce odours emanating from them. Wooded buffer zones along rivers contribute to protecting water and habitat quality, regulating water flow, and stabilizing banks. Well maintained windbreak hedges and buffer zones along rivers can also beautify the landscape, improve biodiversity, and help reduce greenhouse gasses.

They are generally set up on land belonging to the agricultural producers who lose a certain amount of production area. These producers will also have to consider the cost of establishment as well as maintenance of these improvements. In the case of windbreak hedges, the increase in production yield or the reduction of the cost of heating the structures will compensate at the end of a certain number of years for the costs associated to the establishment of the hedges. As with river buffer zones, the benefits are especially obvious for the whole community and the producers gets very little direct gains back, therefore limiting his willingness to apply this practices. Can introducing value-added trees and shrubs produce extra revenue to the producers inciting him or her to set up windbreak hedges or river buffer zones?

The *Centre d'expertise sur les produits agroforestiers* (CEPAF) has studied the profitability of different models of windbreak hedges used to protect rearing structures for pigs during an implementation project with the *Syndicat des producteurs de porcs de la Mauricie*. Eleven hedge models using one to three rows of trees or shrubs were compared. The windbreak hedges around the pig rearing structures constituted an investment where the economic benefits are palpable 10 to 20 years after their installation. The reduction in costs attributed to heating and snow removal constitute the main sources of revenue. That is why the models that included a row of non-deciduous trees produced the greatest actualized margins (between \$30,000 and \$40,000 after 40 years). The hedge made up of three rows (hybrid poplars, spruces and deciduous trees) is the one that came up with the best actualized margin. This model has the advantages of a rapid protection thanks to the poplars and of a potential harvest of the poplars and the deciduous trees.

The economic tool developed by the CEPAF to analyze hedges around rearing structures can also evaluate various models of buffer zones along rivers made up of one to three rows of trees or shrubs. The crown closure delay is 40 years for all the models except the one made up of three rows of hybrid willows, where the delay was assessed at only 17 years. This model also produces the highest actualized margin (\$7,500); the other models posted values between \$0 and \$4,000.

Biography

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André Vézina is a forest engineer who also holds a Masters degree in forest management. Since 1985, he has been a professor of agroforestry and geomatics at the *Institut de technologie agroalimentaire* (I.T.A.), *campus de La Pocatière*. He has worked heavily on the development of windbreak hedgerows in Quebec by publishing approximately one hundred publications and papers, and by participating in the development of numerous windbreak projects in most agricultural regions of the province. Since 2004, he has been actively involved with the project dealing with encouraging the establishment of windbreak hedgerows around rearing buildings in Ontario, Quebec and the Maritimes.

Evaluation of native trees and shrubs planted on berms

Brenda Penack, Coordinator, Bedeque Bay Environmental Management Association

Collaborators: PEI Soil and Crop Improvement Association, PEI Dept. of Agriculture, Fisheries and Aquaculture, PEI Dept. of Environment, Energy and Forestry, Bedeque Bay Environmental Management Association, George Webster, The Summerside Air Cadets and Agriculture and Agri-Food Canada

Location: Maple Plains, PEI

Introduction: As part of soil conservation practices in potato producing fields of PEI, producers construct diversion terraces which consist of a grassed waterway and a raised mound (berm) of soil on the downward slope side of the waterway. The whole diversion terrace is then seeded to grass. Every year, producers mow the berms to reduce the spread of weed seeds. This project will examine native trees and native shrubs to determine the benefits or problems of growing shrubs/trees on berms. The project was initiated the spring of 2005 with funding from PEI Soil and Crop Improvement Association. Trees were planted in April of 2005 and shrubs in June of 2005.

Objective: The project will evaluate the survival and growth rate of the trees and shrubs, monitor the effect on the adjacent agricultural crop (potatoes), evaluate insect populations and determine carbon sequestration.

Treatments: The project consists of 13 treatments: 3 native trees (White Birch, Elm and Red Oak) in combination with or without native shrubs (highbush cranberry, beaked hazelnut and red osier dogwood) as well as a control consisting of no shrubs or trees. The treatments are replicated 3 times.

Soil Analysis

Organic Matter (%)	pH	Phosphate (ppm)	Potash (ppm)
3,3	5,9	541	262

Biography

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Brenda Penak has a BSc. From the University of Toronto and a MSc. in Renewable Resource Management from McGill University and has worked in the conservation field for about 20 years, in both government, and non-government sectors in Ontario, Quebec and the Maritimes. In New Brunswick, Brenda worked cooperatively with private and corporate landowners to encourage the stewardship of wetlands and coastal habitat. The Irving Nature Park in Saint John and the Daly Point Reserve in Bathurst, are two projects that were developed as a part of this stewardship program. Ms. Penak has also worked as an independent consultant on Prince Edward Island and for the last 9 years has served as the Executive Director for the Bedeque Bay Environmental Management Association (BBEMA).

The Impact of Agroforestry Buffers on Biodiversity in Lowbush Blueberry Agroecosystems

Steve Javorek, Research Biologist, Agriculture & Agrifood Canada

The recent trend in developing lowbush blueberry land has been towards clearing large tracts of woodland. These large, open areas are characterized by reduced production resulting from significant winter kill and low native pollinator abundance. To alleviate this problem, the industry is now focusing on (1) the establishment of shelterbelts in large developed systems and (2) maintaining natural hedgerows on land under development. This presentation will explore how biotic communities (native pollinators, butterflies, carabid beetles, birds) respond to shelterbelts of various structure (height, width, length, porosity), floristic composition and landscape pattern within blueberry agroecosystems.

Biography

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Research Biologist with Agriculture and Agri-Food Canada specializing in landscape ecology / biodiversity issues related to agricultural and adjacent land. Research lead for the National Agri-Environmental Health Analysis and Reporting Program (NAHARP) Wildlife Habitat on Farmland Indicator. Here we use multi-scale land cover analysis to investigate the impact of habitat change on populations of terrestrial vertebrates and selected invertebrates in the Canadian agricultural landscape. Current research activities in my lab include: *Conservation and Sustainable Use of Bees in the Agricultural Landscape*; *The Impact of Agro-Forestry Buffers on Biodiversity*; *Bee Diversity and Community Structure in the Chiquibul National Rain Forest, Belize*; *The Effect of Land Use Pattern on Species Distributions in Extensively and Intensively Managed Agricultural Landscapes*



Session 2

Agroforestry Serving New Markets



From left to right: Richard O'Breham, Natacha Sirois, Patrick Pedneault, Robbie Ritchie, Chantal Levesque and Henry de Gooijer.

Agroforestry - Roles and Issues in Sustainable Land use Systems

Henry DeGooijer, Agroforestry Development Manager, Agriculture & Agrifood Canada

Agroforestry may be defined as the intentional mixing of trees and/or shrubs into agricultural production systems to create environmental, economic and social benefits.

Many proponents view agroforestry as a viable land use or land management system that can provide economic returns while also providing environmental protection. Well designed agroforestry systems can increase biodiversity and more efficiently utilize moisture, space, nutrients and energy from a given area of land.

The diversity of agroforestry practices inherently makes them resilient and provides farmers with greater flexibility in coping with uncertainties of drought, frost, pests, and other phenomena that can lead to production failure.

However, the adoption of agroforestry systems can be limited by acceptance of the stakeholders in agroforestry including the public, policy makers and producers who must be able to receive an economic return for their efforts and investments in agroforestry practices.

For the additional understanding, acceptance and support of agroforestry, important issues such as pertinence to stakeholders, leadership, visibility, focused programming and funding, research and development and tech transfer must be addressed.

Biography

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Henry DeGooijer graduated from the University of Saskatchewan (1983) with a Bachelor of Sciences in Agriculture (Soil Science Major). From 1983 to 2001, he was employed as a Research Officer with the Land Resource Centre, at the University of Saskatchewan.

He is also the owner and operator of 20-20 Ag Services Consulting Firm from 1991 to 2006 where he is working in areas of agricultural software development and Land Evaluation. He also worked on contract with Agriculture Canada and Environment Canada to develop the National Greenhouse Gas Accounting and Verification System for agricultural Green House Gas estimates for the past 4 years.

Moreover, Henry is a grain and livestock producer in Saskatchewan. He started experimenting with the integration of tree systems (Agroforestry) into his farm operation in 2003.

In July 2006, he joined the Agroforestry Division of AAFC/PFRA in Indian Head, Saskatchewan.

Non-timber Forest Products in Sugar Bushes: Enhancing and Developing Sugar Bush Resources in NB

Robbie Ritchie, Technology Transfer Officer, Experimental Forest of the Faculté de Foresterie, UMCE

In Canada, non-timber forest products (NTFPs), including maple sap products, generated \$241 million in 1997 (Duchesne *et al.* 2000). The expansion of the global market and the accrued demand for products naturally lead to the prediction that there may be a potential to increase the production of native products by two to three fold. However, the lack of adequate training of harvesting personnel along with a lack of knowledge on the available NTFP resources may lead to the exhaustion of certain resources. Furthermore, it may be better to produce some of these products through artificial means rather than through harvest in natural settings. Therefore, we must look into acquiring knowledge on the needs of these plants and mushrooms. Fine-tuning inventory and production techniques for NTFPs is an important step in contributing to the rural communities of Canada.

The development needed for food production (and in some cases natural pharmaceuticals) that is complementary to maple syrup production, fits into the general trend towards the enhancement of regional products, a tendency that was successfully put forth by the economic push of many regions to favour regional economic development, notably in regions with weaker economies. The concept of regional production, when applied carefully, leads to the characterization of products, to production technologies, and to a *savoir-vivre* associated to the particular traits of the region, as much on a biophysical level (ex. the nature of the soils and the climate) as on a socioeconomic level (ex. *savoir-faire* as a result of a long ancestral tradition, the perfectionist personality of the inhabitants, etc.). These traits confer to the product a uniqueness that can be exploited in a commercial context.

Biography

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Robbie graduated from the *Université de Moncton, campus Edmundston's Faculté de Foresterie* in 1993. Since then he has worked in the forestry sector, including the ten years he spent working with industry as a supervisor of forest operations, as a purchaser of round wood and as the director of a sawmill. In 2004, he joined the *Faculté de foresterie* at the UMCE, specifically the *Forêt expérimentale* as a technology transfer officer. His duties have also included recruiting, organizing summer camps, managing the *Forêt expérimentale* and working on the project on enhancing and developing sugar bush resources in New Brunswick.

Chantal Levesque, Vice-présidente, Érablière de la Montagne Verte

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Agroforestry with a First Nations Flavour

Natacha Sirois, Instructor, Centre of excellence in agricultural and biotechnological sciences

With the help of the First Nations Forestry Program, various First Nations communities have benefited from funds to help them manage their forested land base. It is with this in mind that the economic development officer of the Maliseet community of Madawaska approached the *Centre of excellence in agricultural and biotechnological sciences (CESAB)* in January 2005. The CESAB is part of the network of community colleges in NB and since the fall of 2004, it offers a specialized bachelor's degree in agroforestry in partnership with the *Faculté de foresterie de l'Université de Moncton, campus d'Edmundston*.

The objectives that were initially proposed were to conduct a forest inventory in a sugar bush in order to start a sugaring operation as well as to inventory the forest mushrooms found on the entire land area of the Reserve. Since the start of the project in 2005, we have reviewed our objectives, our approach and expanded our horizons: experimenting with agroforestry!

This presentation will include an overview of the projects conducted during the summers of 2005 and 2006 on woodlots on the Maliseet Reserve of Madawaska, including an inventory of forest mushrooms, site preparation for cultivation in sugar bushes (ginseng (*Panax quinquefolius* L.), wild ginger (*Asarum canadense*), and mushroom production on logs), as well as planting ginseng and ginger in the fall of 2006.

Biography

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Natacha Sirois graduated from the undergraduate forestry program of the *Faculté de Foresterie* of the *Université de Moncton, campus d'Edmundston* in 1999. She is currently completing training as an adult educator at the *Université de Moncton*, as well as having started a master's degree in forestry sciences at the *Université Laval*. Her research project deals with forest genome.

Her work as a liaison officer at the *Faculté de Foresterie de l'UMCE* between 1999 and 2002 led to an interest in teaching. In 2003, she started teaching in the agriculture program of the *Centre of excellence in agricultural and biotechnological sciences (CESAB)*, which is part of the New Brunswick Community College, in Grand Falls. As of two years ago, she teaches agroforestry, among other subjects.

Richard Wallace, Madawaska Maliseet First Nation

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Mushroom Production on Logs

Richard O'Breham, Mycoflor Inc.

The production of mushrooms on logs fits nicely in the development of an agroforestry farm. When combined with pre-commercial cutting operations, it can help the landowner profit from less commercial hardwood species like poplar, birch and pin cherry.

The trees can be felled during the fall right up to the spring. Healthy trees that are free of injury (contamination) are cut into 1 m long logs with a diameter of 15 cm. These logs must have a high water content (80 %) as the growth of the mycelium ceases when the water content dips below 50%.

The inoculation techniques are grouped into two general categories:

- Using a bulk mildew deposit: some mildew is deposited in bulk on split logs or in wide grooves cut into the logs
- Using a plug: a pre-inoculated plug or some mildew that has already developed on woodchips is inserted into a drilled hole which is then sealed up with paraffin.

The main species of mushrooms used in this type of production are:

- Oyster mushrooms (*Pleurotus ostreatus*)
- Shiitake (*Lentinus edodes*)
- Lion's mane (*Hericium erinaceus*)
- Judas's ear (*Auricularia auricula*)
- Reishi (*Ganoderma lucidum*)

The logs can be left in the forest or kept in greenhouses. The mushrooms can be sold fresh, in a dehydrated state, or transformed in one of many ways.

Mushroom production can last for several years; however, most of the production will take place in the spring and/or the fall. Growing mushrooms on wood fiber leads to non-negligible financial rewards and also introduces novel foods to the consumers and improves their general health.

Biography

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Mr. Richard O'Breham holds a science degree (B.Sc.) and owns a 200-acre farm in Stanstead in the Eastern townships where he mostly produces ginseng (in a forest setting), goldenseal, mushrooms, berries and other small fruit (on 12 acres): sea buckthorns, blueberries, hazelnuts, raspberries, honeysuckle (with edible fruit), grapes, and blackcurrants. He is also the president of Mycoflor Inc. that specializes in selling fruit-bearing shrubs, mushroom mildew and non-treated seeds of non-hybrid vegetables, herbs, medicinal plants and flowers, all through catalogue orders. From 2000-2006 he was the president of the *Table filière des plantes médicinales biologiques du Québec*. He has also presided over the *Association des producteurs d'argousiers* du Québec in 2003.





Session 3 and 4

Agroforestry Serving the Environment & Agroforestry Serving New Markets



From left to right: Kris Sullivan, Brent Stanley, Luc Duchesne and Sabrina Ellsworth.

Shelterbelt Establishment for Livestock Buildings in the Maritimes

Sabrina Ellsworth, Demonstration Coordinator, ASRP

The Canadian Pork Council in collaboration with the Atlantic Swine Research Partnership (ASRP) received funding in 2005 through Greencover Canada for a shelterbelt education and demonstration program. The objective of the program is to raise awareness of the benefits of shelterbelts planted adjacent to livestock buildings. There are several reasons for installing shelterbelts around livestock buildings: odour mitigation, reduction in heating and cooling costs, control of snow accumulation, aesthetics, biodiversity, secondary farm income and carbon sequestration. There are some potentially negative aspects to shelterbelts that must be considered. These include: loss of cultivated land, loss of view, increased daytime temperature, increased pest, increased odour close to the barn, and the time required to maintain the shelterbelt. Through this program, the ASRP has provided training to 15 extension personnel on all aspects of shelterbelt design and maintenance. As part of training, shelterbelts have been established on 2 demonstration sites in each maritime province. A plastic mulch applicator, a brush mower and basic soil preparation, tree planting and maintenance equipment have been purchased and are available to producers.

Biography

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Sabrina Ellsworth was born and raised in Corner Brook, Newfoundland. She moved to Truro to attend the Nova Scotia Agricultural College where she received a BSc with a degree in Animal Science in 2002. She then went on to complete an MSc in 2005. Since then, Sabrina worked as a demonstration coordinator with the NS Soil and Crop Improvement Association and with the Atlantic Swine Research Partnership.

Riparian Zone Restoration in the Kennebecassis Watershed

Brent Stanley, Project Manager, KWRC

The Kennebecassis Watershed Restoration Committee (KWRC) is a non-profit organization whose mission is to restore the aquatic environment of the Kennebecassis River Watershed to historical conditions for fish and other aquatic and terrestrial life. The Committee's goals are met through strategic habitat restoration, educational and advisory initiatives, and promoting public awareness and participation in the restoration of the Kennebecassis River Watershed.

The KWRC has been orchestrating and implementing restoration activities within the Kennebecassis Watershed since 1994. The initiative began with a comprehensive habitat assessment identifying concerns throughout the watershed. Based on the findings from this assessment, a prioritized list of impacted sites was compiled for the watershed to provide a clear direction could be set for restoration efforts by the committee. Trout Creek was identified as one of the most heavily impacted of the significant tributaries to the Kennebecassis River and was of suitable size to provide an excellent test bed for restoration efforts. The smaller size of Trout Creek enabled the group to refine stream enhancement techniques, promote public participation and initiate an education and information campaign. The development of a stakeholder group for Trout Creek and the promotion of Best Management Practices (BMP's) and other educational initiatives for the community have heightened awareness of water quality and aquatic health issues for the area.

The restoration efforts on Trout Creek demonstrated that the techniques developed and applied have had a positive impact on the stream's health. The re-establishment of riparian vegetation has provided a buffer for the watercourse, filtering out non point-source pollutants and providing shade to lower water temperatures. Riparian vegetation provides cover for aquatic species, habitat for avian and terrestrial species, and is critical in stabilizing stream banks thus reducing accelerated erosion. Restoration efforts have improved the over-all health of the system thus offering habitat for species associated with the ecosystem. Educational initiatives have provided knowledge for stakeholders to incorporate BMP's into their day to day activities.

In light of the success of the Trout Creek project, the committee has expanded restoration efforts to all tributaries of the Kennebecassis Watershed. We have placed approximately 400 in-stream structures (i.e. digger logs, rock sills, stable fords, etc.), erected more than 27 km of fencing and planted approximately 60,000 seedlings within riparian zones with the full cooperation, participation and in-kind support of the stakeholders of the watershed, particularly the farming community. Community and landowner involvement and awareness are essential components to our projects that will help to ensure the sustainability of the watershed for years to come.

Biography

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After graduating from the Faculty of Forestry and Environmental Management in 1997, Brent immediately started a Masters degree in partnership with the Fundy Model Forest, and Environment Canada, evaluating the effects different forest management activities on stream water quality and discharge. After a couple years as a watershed hydrologist in northern California, Brent returned to New Brunswick to work in the conservation field. He has been the project manager for the Kennebecassis Watershed Restoration Committee for over 5 years.

Bioeconomy, bioproducts and biomass: stick it to the man

Luc C. Duchesne, President and CEO, Forest BioProducts Incorporated

The bioeconomy is expected to replace the current information economy, and will depend heavily on the manufacturing and trade of bioproducts. In practice, bioproducts are all commodities generated by living organisms through the use of technology and biotechnology, as well as non timber forest products. In Canada alone, potential markets for bioproducts are in excess of \$100 billion annually. The bioeconomy should impact most of Canada's economic sectors: energy and transportation, food and agro-food, pharmaceuticals, nutraceuticals, forestry, materials and manufacturing, waste management and a large variety of consumer goods. One of the most significant aspects of the bioeconomy is that it holds promises to wean the Canadian economy from its dependence on fossil fuels as a primary source of energy, as well as platform chemicals in materials and manufacturing. Moreover, the bioeconomy will reduce the environmental impact of economic growth by increasing the use of industrial and urban wastes and developing biodegradable goods. The acceptance of new bioproducts by the marketplace depends heavily on three critical factors: 1) they must be price competitive with the goods which they are aimed to displace; 2) they must offer the same or equivalent versatility as the goods they aim to displace; and 3) they must be culturally acceptable. From the perspective of communities it will be important to promote small scale innovation aimed at creating democratized technologies which will permit communities to expand their economies. Indeed, a "Stick it to the Man" approach is an unexplored means to support communities.

Biography

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Dr. Luc Duchesne is an entrepreneur, a thinker and a scientist fully engaged in the bioeconomy. He has received a PhD from the University of Guelph in 1988, an MSc from the University of Toronto in 1985 and a B. Sc. in Forestry from Laval University in Quebec City in 1983. Since 2004, he has been the President and CEO of forest BioProducts Inc, a firm conducting project development in bioproducts. He was the Chief Business Development officer for DynaMotive Energy Systems Corporation from 2003 to 2004. He was a research scientist for Natural Resources Canada from 1990 to 2003. He has been instrumental in mainstreaming the bioproducts industry, particularly in rural and First Nation communities. He has taught undergraduates and graduates at eight universities as an adjunct professor including the Université de Moncton where he is engaged in setting up an industrial chair in agroforestry. Dr. Duchesne is widely published in a broad range of disciplines such as forest economics, bio-energy, bio-technology, molecular biology, entomology, pathology, microbiology, old-growth forests, fire ecology, and non-timber forest products. He is the author or co-author of 85 book chapters and scientific articles, and has presented numerous lectures in symposia, international and national meetings. Among his many publications he has co-authored the book "Bioproducts from Canada's forests: New partnerships in the Bioeconomy" which has recently been published by Springer.



Biofuels Potential

Kris Sullivan, Quality Control, Bio-D Énergie Inc.

Abstract Not Available

Biographie

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Round Table Report



Round Table Report

The provincial symposium “*Agroforestry serving our communities*” was held on November 17th and 18th, 2006, in Edmundston, New Brunswick. This symposium brought together approximately 150 participants, most of them from New Brunswick, but also many from surrounding provinces. The objective was to inform agricultural and woodlot owners about the potentials of agroforestry by showcasing various experiences and practices. All the comments made by participants on the issues facing their farm lands and woodlots, on those practices having the highest development potential, as well as on the means for developing agroforestry, were brought together afterwards during a round table and compiled as follows:

Agriculture and forestry issues

- *Economic issues:* Knowledge of and access to **markets**, as well as the profitability of practices and revenue diversification.
- *Environmental issues:* Achieving overall **sustainable land management** and maximizing **environmental benefits**.
- *Social issues:* The lack of **support** for producers on the part of communities and governments; the availability, the training, and the retention of **qualified employees**; the aspects of sustainable development that also consider **future generations**.
- *Knowledge issues:* The ability to **innovate** and to access technical and scientific **knowledge**.

Agroforestry practices with the best potential

The most promising elements of agroforestry for New Brunswick are:

- Non-timber forest products
- Riparian buffer zones
- Shelterbelts and windbreaks

It should be noted that several people also mentioned the importance of diversifying the types of practices in order to offer a variety of opportunities to land owners.

Actions recommended

Economic and legislative

- Develop support programs and financial incentives, in particular:
 - Offering a tax rebate program
 - Offering a rebate on biofuels
 - Developing or adapting more appropriate grants and subsidies; e.g. a program for ecological goods and services.
- Adapt laws and regulations to allow for the development of agroforestry practices.
- Develop a strategy or a viable economic model in order to plan for and identify the potential impacts of agroforestry.
- Identify and develop markets for agroforestry products and disseminate this information to beneficiaries.

Technical support and information dissemination

- Transfer the information to land owners, but also to decision-makers, organisations, and to the general population. Amongst the various means recommended:
 - Advisory clubs and direct technical support (field help)
 - Information activities, workshops, field trips
 - Technical and scientific data sheets in written and electronic format
 - Demonstration sites on practices and case studies
 - A Regional Agroforestry Information Centre
- Having qualified human resources to transfer the information to land owners.

Know-how and knowledge development

- Carry-out studies at the economic, technical, and scientific levels, in particular on the following aspects:
 - Characterization of lands appropriate for agroforestry
 - Agroforestry approaches, techniques, and procedures
 - Possible returns on investments and profitability
- Clarify agroforestry concepts and develop a consensus on a clear definition.
- Develop knowledge in teams or research groups having a solid link with the private and governmental sectors, and by stimulating entrepreneurship.

Strategic partnerships

- Undertake a planning process with several interested parties (forestry, agriculture, environment) and in conjunction with organisations that are active in this sector (land owner organisations, departments, university). This process could initially lead to the identification of short-term development objectives.
- Foster the establishment of an organisation of producers interested in agroforestry.

Recommendations

Following the discussions and the thoughts expressed around the round table, the main recommendation that came out was to **develop a provincial agroforestry development strategy** in order to ensure the optimization of benefits that can be obtained by communities and to make New Brunswick a **leader** in agroforestry.

This strategy should be developed and implemented within the framework of a close collaboration between various parties interested in the development of agroforestry. The inclusion of the following elements should be considered:

- Clarification of the agroforestry concept and achieving consensus on a clear definition.
- Identifying the economic potential of the main agroforestry practices and market development.
- Reviewing and adapting current programs, laws, and regulations that might have an impact on the development of agroforestry practices.
- Access to useful, current, and relevant information for land owners, as well as for the general population.
- Developing agroforestry knowledge and expertise in New Brunswick.





Appendices



Participants Profile

Principal Occupation of Participants

	<i>Number *</i>	<i>Percentage</i>
Agricultural Producer	13	8 %
Woodlot Owner	27	17 %
Maple syrup Producer	9	6 %
Public Servant	29	19 %
Non-profit Organization	22	14 %
Education & Research	42	27 %
Consultant	11	7 %
News Medium Representative	3	2 %
Other	15	10 %

** The total number is superior to the total number of participants at the workshop because some participants indicated more than one occupation.*

Origins of participants

	<i>Number</i>	<i>Percentage</i>
North West NB	101	65 %
North East NB and Acadian Peninsula	15	10 %
Fredericton and surroundings	10	6 %
Elsewhere in NB	10	6 %
Quebec	13	8 %
Nova Scotia	2	1 %
Prince Edward Island	2	1 %
Elsewhere in Canada	2	1 %

Preferred Language

	<i>Number</i>	<i>Percentage</i>
French	122	79 %
English	24	15 %
Bilingual	9	6 %

Workshop Evaluation

Level of satisfaction of workshop participants

	Very Satisfied		Satisfied		Little Satisfied		Not Satisfied	
	number	%	number	%	number	%	number	%
Overall workshop organisation	40	77%	12	23%	0	0%	0	0%
Quality of the conferences	21	40%	30	58%	1	2%	0	0%
Duration of each conference	24	46%	27	52%	1	2%	0	0%
Number of conferences	27	54%	22	44%	0	0%	1	2%
Usefulness of round table questions	28	56%	19	38%	3	6%	0	0%
How the workshop met your expectations	26	52%	21	42%	3	6%	1	2%
Location (town) of workshop	32	64%	17	34%	1	2%	1	2%
Location (room) of workshop	37	71%	14	27%	1	2%	0	0%

Think this type of event should be held again

Yes	52	98%
No	1	2%

When

1 year	15	71%
2 years	5	24%
5 years	1	5%

Where

Edmundston	12	40%
Moncton or more central	6	20%
Potato Belt	2	7%
Fredericton	1	3%
Acadian Peninsula	1	3%
ITA	1	3%
Elsewhere	2	7%
No preference	5	17%

Period

Fall	12	71%
Winter	1	6%
Spring	1	6%
Summer	1	6%
No preference	2	12%

Preferred theme

▪ Biofuels and bioeconomy	18	31 %
▪ Non-timber forest products	17	29 %
▪ Agroforestry serving agriculture	7	12 %
▪ Practical Aspects	4	7 %
▪ Agroforestry and environment	3	5 %
▪ Innovation and new ideas	2	3 %
▪ Economic issues	2	3 %
▪ Round table	1	2%
▪ Everything	4	7%

Comments

- Good organisation – Congratulations (8 mentions)
- Few links between biofuels and agroforestry (5 mentions)
- Show more what is being done now in agroforestry (3 mentions)
- Field tours (3 mentions)
- Have government representatives present (2 mentions)
- Have more topics (2 mentions)
- Good exchanges and networking (2 mentions)
- Have longer conferences (2 mentions)
- Show practical aspects of agroforestry (2 mentions)
- Less conferences - more time for discussion
- End of banquet abrupt
- Opening remarks too long
- Speakers from Agriculture and Agrifood Canada not adapted
- Talk about intercropping and crop rotation
- Ask producers opinion
- Translation appreciated
- See what is being done elsewhere in the Maritimes
- Other topics : economics, social, programs
- See more links between economic aspects and environment
- Hold regional workshop on specific aspects regarding agroforestry
- Have more information on biofuels
- Good meal
- More information on maple syrup production
- Identify agroforestry objectives and definition
- Develop programs as a follow-up to this initiative