

Increasing partnerships between scientists and forest managers: Lessons from an ongoing interdisciplinary project in Québec

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Adaptive management presupposes stronger links between scientists and forest managers in order to adapt research processes and findings to production activities. Partnerships between these two groups are starting to emerge in the forest sector in Québec. However, local forest managers have not always had the occasion in the past to contribute to research processes. Moreover, scientists have not always had the opportunity to harmonize all their respective research projects at the local level. This research project was thus aimed at establishing a link between local forest managers and scientists in order to direct research projects towards local needs and concerns. The purpose of establishing this contact between local forest managers and scientists was to create opportunities for inter-disciplinary research projects. This experiment demonstrated that the roles and attitudes of scientists and forest managers still need to evolve in order to increase the chances for successful partnerships between these two groups. On the one hand, forest managers need to view research (1) as part of their daily activities and (2) as bringing benefit in the long-term. On the other hand scientists must (1) invest time in understanding what the forest managers are doing and (2) consider forest managers as equal partners with useful knowledge and skills in developing the research questions and protocols.

Key words: adaptive management, interdisciplinary research, collaborative learning, sustainable forestry

L'aménagement adaptatif présuppose des relations plus étroites entre les chercheurs et les aménagistes forestiers de façon à adapter les processus de recherche et les constations aux activités de production. Des partenariats entre ces deux groupes commencent à émerger dans le secteur forestier du Québec. Toutefois, les aménagistes forestiers locaux n'ont pas toujours eu l'occasion par le passé de contribuer aux processus de recherche. De plus, les chercheurs n'ont pas souvent eu l'opportunité d'harmoniser tous leurs projets respectifs de recherche au niveau local. Ce projet de recherche visait donc à établir un lien entre les aménagistes forestiers locaux et les chercheurs de façon à diriger les projets de recherche vers les besoins et les intérêts locaux. L'objectif de la mise en place de ce contact entre les aménagistes forestiers et les chercheurs était de créer des opportunités pour des projets de recherche interdisciplinaires. L'expérience a démontré que les rôles et les attitudes chercheurs et des aménagistes forestiers doivent encore évoluer de façon à accroître les chances de succès des partenariats entre ces deux groupes. D'un côté, les aménagistes forestiers doivent concevoir la recherche comme étant (1) une partie de leurs activités quotidiennes et (2) une source de bénéfices à long terme. De l'autre côté, les chercheurs doivent (1) investir du temps pour comprendre ce que font les aménagistes forestiers et (2) considérer les aménagistes forestiers comme étant des partenaires égaux détenant des connaissances et des habiletés utiles dans le développement des questions et des protocoles de recherche.

Mots-clés : aménagement adaptatif, recherche interdisciplinaire, apprentissage en collaboration, foresterie durable

Introduction

Forest managers who wish to certify their work according to a sustainable forest management standard must address several new issues in their planning, such as the maintenance of biodiversity, the restoration of ecosystems, and public participation. Forest managers must also continue to deal with the never-ending issues regarding forest regeneration and mitigation of the impacts of logging activities on the environment.

Forest certification provides a new incentive for managers to work beyond the expectations of traditional forestry practices and thus to improve current practices. However, forest managers' organizations do not have all the expertise required to fully respond to many of the issues regarding environmental protection and social interaction. Thus, the forest certification issue has created a new interest among forest managers with

respect to research in the forestry field. Furthermore, many of the new management systems currently being implemented in the forestry sector are based on the principle of continuous improvement. According to this approach, current practices should be modified when new, pertinent information becomes available to the manager.

Scientists from a wide variety of fields can be helpful to forest managers seeking to improve their forest management practices. Formal contacts between scientists and forest managers have already been established in Québec. For example, an initiative led by the Québec Forest Research Council has contributed to identifying research priorities for forest users at the provincial level. This initiative was developed to direct research towards issues faced by most forest managers and other users. However, this initiative took place at the provincial level whereas forest managers must deal with concerns at the Forest Management Unit level.

More examples of direct partnerships between scientists and forest managers are still needed in order to address local issues and to create models on which other such interactions can be based. In that context, relationships between these two groups still need to evolve.

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Objective of the Research Project

The first objective of this research project was to establish a link between forest managers and scientists in order to direct research projects towards needs and concerns that could be applied to local forest management. A second objective was to improve forest managers' understanding and skills regarding the process of doing research. Collaboration between these two groups is necessary to create an understanding of the needs and interests of both researchers and foresters and to create a foundation for continued and future interactions that will be beneficial to both groups. Finally, a third objective was to create new opportunities for interdisciplinary research and information transfer.

This experiment is part of a larger research project on public involvement in forest management that took place in the Haute-Mauricie Region, Quebec, Canada (Côté *et al.* 2000). It also comprises a large effort by researchers from different ecological fields such as biodiversity, landscape ecology, ecological modelling, forest regeneration, forest soil and limnology to work together to develop different ecological indicators and tools (Kneeshaw *et al.* 2000a, b). These indicators can then be used within simulation tools to test a number of different scenarios (Kneeshaw *et al.* 2000c).

The Approach: Interdisciplinarity and Adaptive Management

Promoters of ecosystem management believe that it is impossible to understand the complexity of the natural environment by using only experimental approaches based on the positivist/reductionist paradigm (Holling 1995). Ecosystem management aims to adapt forestry practices to natural processes and the social environment. While forestry based on the positivist paradigm focuses on outputs from the forest, the main concern of ecosystem management is maintaining ecosystem composition, structure and function within the natural variability (Grumbine 1997). The implementation of ecosystem management practices supposes the respect of several principles, including an interdisciplinary and an adaptive approach (Messier and Kneeshaw 1999).

First, the approach intended to foster interdisciplinary research by increasing the collaboration between specialists and the integration of concepts from different fields (Kapinski and Samson 1972, Valade 1999). The approach aimed to create an original culture of thoughts from the distinctive cultures that characterize the different disciplines (Bauer 1990). In other words, the approach aimed to bridge different fields by creating a physical place for developing a dialogue between specialists. Thus, specialists from a variety of biophysical and socio-cultural disciplines were invited to participate in the project in order to develop innovative answers and avenues to address complex issues faced by forest managers – avenues that one specialist alone would not have been able to formulate.

Second, the approach aimed to foster adaptive management by increasing partnerships between forest managers and scientists at a local level. Ongoing learning needs to be an integral part of the work of accomplished ecosystem managers. The forest is too complex an environment for any individual or group of individuals to assume that they have all of the necessary and best available information. Moreover, forestry is more than a simple applied science. Contemporary forest management has a lot to do with social sciences, economic,

politics, anthropology, and psychology as well as a wide range of ecological and physical sciences. Thus, every forester has a lot to learn from others and professionals need to accept that inputs from other fields will be useful to their work.

Adaptive management is a systematic approach to improving management and accommodating change by learning from the outcome of management interventions (Taylor *et al.* 1997 cited in Kessler 1999). In other words, adaptive management is a continuous experiment whereby the incorporation of the results of previous actions allows managers to remain flexible and to adapt to uncertainty (Shindler and Stell 1996, Grumbine 1997, Smith *et al.* 1998). Furthermore, the development of new knowledge concerning ecosystem functioning, new techniques or equipment for managing the forest, new products and new expectations from society must continuously be addressed and integrated into past management (e.g., Erdle 1998). Thus, a dialogue between scientists and forest managers must be sustained.

The challenge is to change the mental paradigms of forest managers (Messier and Kneeshaw 1999). Decision-making is particularly difficult when decisions have indirect, delayed, non-linear and multiple feedback effects. Adaptive management can help the decision-maker by creating opportunities to share ideas, increasing interactions between several actors and improving continuous collaboration and learning through field experience. In order to be helpful, research should address production processes. In this way, changes and improvements to current practices would always be possible. Production would not have to wait for new research results, obtained in a distant and closed environment, since research would be directly connected to the reality of production.

Adaptive management is not management by trial and error. It is a rigorous approach to management whereby management activities are treated as opportunities for generating information about systems in which those activities are taking place (Kessler 1999). Adaptive management presupposes close collaboration between scientists and forest managers in defining problems, generating and testing solutions, and evaluating outcomes.

Methodology

A project was developed through the Canadian Sustainable Forest Management Network (SFMN) in order to increase interactions between researchers and forest managers and to increase the integration of different research projects on a defined forest area. This project involved 12 researchers and their respective students from the Université du Québec à Montréal, the Université Laval, the Université de Montréal, the Direction de la Recherche Forestière (MNRQ) and the Canadian Forest Service (Centre de Foresterie des Laurentides), as well as employees of the forest management department of Smurfit-Stone's mill located in the municipality of La Tuque, in Quebec.

Smurfit-Stone, a Chicago-based corporation, owns a 372 000-hectare forest in the Haute-Mauricie region of Quebec, Canada. This private forest has been used for the last seven decades to supply their paperboard mill located in La Tuque, a municipality of about 13 000 inhabitants, and sawmills of the Haute-Mauricie and Lac-Saint-Jean regions. Historically, the company has allowed several groups to use this territory for purposes other than timber activities, such as fishing, hunting, snowmobile riding, and summer cottage rental. Fur-

thermore, the Attikamekw First Nation, which already uses the area for several activities, has intensified its land claim for this territory in recent years. In 1998, Smurfit-Stone initiated the revision of its long-term forest management plan for this area. During the same period, they also worked toward the implementation of an environmental management system for their forest operations with respect to the ISO 14001 standard.

The following activities were organized within the development of our large inter-disciplinary research project to create opportunities for scientists and forest managers to discuss their respective concerns and expectations. A research project proposal was first developed mainly among researchers in order to define a common vision for the integration of several research projects from different fields in forestry into one global project and to submit a proposal to the SFMN. In order to facilitate this work, a round table was set up to create a formal link between the scientists involved in this initiative. Members of that round table met six times during the years 1997 and 1999, while sub-groups working on different themes met more regularly. Another round table was also set up, when funding from the SFMN was secured, in order to create a formal link between scientists and the forest managers involved in this initiative. Members of that round table met four times during the years 1998 and 1999. As the research project evolved, more and more direct contacts were established between researchers and between the forest managers and researchers. These contacts should have helped to share concerns, ideas, and data and modify some objectives. It should also have helped to develop new research partnerships. Field tours to the Smurfit-Stone Inc. private forest were organized for researchers in order to observe some of the forest activities carried out by the company and, finally, seminars were organized to present and discuss result findings with the forest managers.

Results and Discussion

A better interaction between forest managers and researchers, and among researchers themselves, is needed in order to obtain practical research results that address the practical issues faced by forest managers in their daily activities (Lautenschlager 1999). The experiment conducted in Haute-Mauricie contributed to identify complex issues faced by practitioners and scientists in the implementation of the *not so simple* ideas of adaptive management and interdisciplinarity. Thus, several findings and lessons can be derived from this case study:

Linking scientists with forest managers

Scientists are not used to popularizing their work for non-academic audiences. Words such as biodiversity, sustainable forest management, forest ecological integrity, forest conservation, environmental impact and public participation mean different things to different people. The forest managers and the scientists involved had problems of mutual understanding with definitions and some of the concepts because their realities were often totally different. For example, some researchers involved in this project had difficulty in presenting their findings in a way that was useful and meaningful to the forest managers, primarily because they knew little about the issues faced by the practitioners in their daily activities. Furthermore, researchers were often more interested in discussing their method-

ologies, while forest managers wanted to hear mainly about the implementation of the results in their daily activities. Similarly, forest managers were less concerned with variability in the detail of ecological processes, but were more interested in knowing about the general patterns that would be useful to the operational planning at the stand level.

Besides, scientists continue to view forest managers as data providers. This experiment and the interviews conducted with the forest managers showed that the forest managers were more satisfied when they took an active role in the definition and implementation of a research project. For instance, the forest managers were able to draft some research projects with the scientists by being more closely involved in the research process, rather than just seeing the final results. Moreover, the forest managers were more satisfied when they noticed the presence of the researchers near La Tuque.

In addition, local needs cannot always be translated into research proposals. For example, the need for better information about the wildlife potential of the area is more pertinent to forest survey planning than to ecological research. Nevertheless, it is still an important issue for local stakeholders. Moreover, scientists have expertise that could be useful to forest users even though this communication process may not result in formal research projects. Characterisation of wildlife potential and facilitation of a public involvement process are two examples of areas where scientists were useful in that respect.

Improving the forest managers' understanding of research

The second aim of this project was to improve the forest managers' understanding and skills regarding the process of doing research. The adaptive management approach supposes that research will be linked to forest management planning and monitoring of operations. By being involved in research projects, the forest managers should understand the conditions that research protocols must respect and then redefine or question them, and propose solutions for improving these research protocols. This research initiative was more or less the first time that forest managers had been involved in such a large research project linked directly to sustainable forest management. In this case study, forest managers had difficulty making distinctions between scientists and consultants. They tended to view academic researchers as consultants who can produce workable tools in a short period of time. Forest managers wanted immediate answers to their complex questions related to biodiversity and ecological indicators. However, the process of doing research takes time before a research question is identified and an answer is found. This aspect raises an important question: to what extent should researchers be considered consultants?

Furthermore, forest researchers are interested in understanding ecological and social processes and thus their results may require profound changes in the way that forestry is undertaken in order to ensure the maintenance of certain processes, habitats etc. Researchers are also interested in establishing methods to evaluate biodiversity or ecosystem functioning and their approaches (unlike a consultant) may not fit existing databases. Research is thus useful in long-term planning objectives that are a key part of the adaptive management process. At the same time, researchers are often reluctant to propose policy decisions due to the variability inherent in these systems and due to the scientific tradition that requires the

acknowledgement of alternative pathways of lesser probability. Franklin (1995) stated, however, that scientists must be willing to participate in decision-making processes as they, in many cases, hold knowledge that is key to undertaking the best and most informed decision at the time. If scientists are not willing to participate, then others will make decisions in their absence.

In addition, forest managers have developed their own understanding in ecology and silviculture regarding a specific forest area due to years of experience in working with these systems. Forest managers can sometimes predict the reaction of an ecosystem to silvicultural treatments without necessarily being able to explain the process or mechanisms involved. This valuable knowledge will be useful to scientists in asking pertinent questions and in the process of developing hypotheses, if we consider an hypothesis as a tentative answer to a phenomenon. Forest managers could thus be involved at the stage of developing hypotheses for research projects.

Fostering interdisciplinary research

The final aim of this project was to foster inter-disciplinary research projects. Here again, several lessons can be derived from the experiment.

Scientists involved in this project were not used to working in teams with other researchers. It was difficult to integrate research projects in different fields into one overall project. Initially, work was an aggregation of projects in which scientists each pursued their own objectives without integrating their research into the projects of their colleagues. As time continued, researchers from different fields became more accustomed to working with each other and with the different concerns and techniques developed in the various fields. Moreover, communication was not easy since it was often difficult to reach individuals involved in the project by means of e-mail and telephone calls due to the different habits of the individuals involved in responding to different communication media. It also took time to determine those researchers that were willing to devote the time and energy to this type of integrative project. It is often easier to remain within a disciplinary field than to embark on a multi-disciplinary project. Methods of evaluating researchers' involvement in such projects needs also to be re-assessed as more time is often required to produce a truly cohesive multi-disciplinary work. Researchers involved in such a process must devote time and energy to learning about fields beyond their own. In the current system of tenureship and funding, such investments are only poorly recognized.

Forest managers' needs and concerns are often not included from the outset in research questions. Preliminary research work is needed to more precisely define the need and direction of further research. For example, in this case several scientists were waiting for the results from a project aiming to define forest users' needs and concerns regarding forest management of the area. Social scientists should begin their work early in order to provide data to scientists from other fields according to the issues raised by local forest users. Similarly, in our project scientists developing computer scenario tools were waiting for SFM indicators to be developed by researchers developing biophysical indicators before starting their part of the project.

Even though several problems were identified in the current research project regarding partnerships, the project did contribute to the development of new relationships between

researchers and forest managers. The project also helped to identify the following conditions that should be respected in order to obtain better results in future research partnerships

- The specific needs and expectations of both forest managers and researchers should be identified and translated into clear research objectives at the outset of the development of the research project. Forest managers need also to understand the difference between the work that researchers perform and the services offered by consultants in terms both of time required and results delivered.
- The selection of scientists to be involved should be based on their capacity and willingness to be part of a team and to learn about the practical problems facing the forest managers.
- Scientists should be willing to initiate original research projects that address issues raised by local stakeholders and not try to fit all of the local needs into existing research objectives. At the same time, scientists need to learn to communicate their research findings to directly address forest management issues. This is often done by interacting in the field with forest managers (Scoones *et al.* 1999).
- The research team should discuss and agree on the appropriate integration pattern, i.e., how all the different research projects should be related, before the study is undertaken. Scientists should exchange information on portions of their own respective projects. In our experience, integration only occurred after the different research projects had already been initiated, when it really should have come first. This being said, it was not always obvious at the beginning of the project which steps would be easily achievable, how different people would interact, how issues and research findings would evolve over time and in some cases to concurrently develop steps that would be related at a later time. It should not be presumed at the outset that integration could be begun immediately without time being required for the different partners to get used to working together. This human element is important and cannot be understated. Continued support for such collaborative efforts is required to ensure that this momentum is not lost.
- A time frame to conduct new research projects and address issues raised by local stakeholders should be developed and communicated in order to avoid misguided expectations. Transparency and communication are keys to the success of any operation involving the integrative work of different partners.
- Local stakeholders should contribute to the research project by sharing their own expertise and understanding of the issues of concern with scientists. Forest managers should not only be data providers. Forest managers, local stakeholders and scientists all hold the key to future solutions. Dialogue is critical in that context. In this experiment, forest managers were better satisfied when research projects were developed as a joint venture. A clear and long-term commitment needs also to be made to forest research to ensure that it will provide the future solutions that will be needed. Forest companies need to allocate time, as well as money, to ensure that research is integrated into forest management activities. Adding the task of communicating with researchers to forestry staff that have full-time commitments to other parts of the operation does little to ensure a constructive dialogue between researchers and for-

est companies. Similarly, scientists should be willing to spend time learning about the operational constraints and on-the-ground concerns of the forest managers.

- Scientists should use plain language in their communications with local stakeholders and be willing to "commit themselves" in making recommendations based on incomplete data. Managers should also understand that these recommendations may change as new data and evidence emerge from the research.

Conclusion

We are at an early stage of adaptive management in Quebec. We are still at the step of building bridges between scientists and forest managers and finding practical ways to help these two groups work together. This project contributes to developing a communication network between several individuals from several organizations. Contacts between individuals working in different forestry fields demonstrated the importance of increasing the integration of different projects, although the experiment showed that it is not an easy exercise.

Forest managers will need to be considered as equal partners in the process of doing research. In the past, scientists have used forest managers primarily as data providers. The field experience of forest managers was not sufficiently recognised and considered in the design and the implementation of research projects. Second, research needs to become part of the forest managers' daily activities. Research is currently viewed by forest managers as an activity outside their job description or of little value to day-to-day operations. In other words, forest activities must become a continuous experiment in which both scientists and forest managers work together to improve the understanding of forest ecosystems and their management.

In addition, scientists from different disciplines will need to increase their interaction in their work. They have not always had the opportunity to harmonize all their respective research projects at the local level and models for this type of interaction are lacking. Scientists tend to work on different but related projects without necessarily linking their research to the projects of their colleagues. For instance, specialists in ecology, economic, sociology, and management usually work independently on issues regarding the same forest area, although these issues are highly connected. Control of the spruce budworm pest and multi-purpose forest management are examples where a better integration of scientists' expertise from different fields is needed. Often, forest managers or policy decision-makers are left to put together the different messages that they receive from researchers. In a fast-paced society, this may lead to a less than effectual transfer of scientific knowledge into application.

This article should be viewed as a progress report on a much longer-term project. The experiment is still continuing with the researchers and forest managers involved in the current initiative and with new forest managers (e.g., Abitibi-Consolidated Inc.) and researchers who believe in this approach for the future. However, a greater number of social scientists should be involved in this kind of project in the future in order to help improve interactions among the various groups.

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