Public processes in sustainable forest management for the Arrow Forest District

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Abstract

This extension note is the third in a series of eight that describes a set of tools and processes developed to support sustainable forest management planning and its pilot application in the Arrow Timber Supply Area (TSA). It summarizes the main public involvement processes used to obtain input to the Arrow Innovative Forest Practices Agreement (IFPA) Sustainability Project, contributing to the development and evaluation of criteria and indicators of sustainable forest management (SFM). This early public input guided the selection of criteria and indicators for the SFM pilot basecase analysis in the Lemon Landscape Unit.

Sustainable forest management must be sustainable in a social sense and should incorporate public values. This extension note describes and evaluates several methods for involving the public in forest management planning. A standard mail survey was used to gather public perception data across a large geographic area (the former Arrow Forest District and the adjacent community of Nelson). Based on a systematic analysis of stakeholders in the IFPA area, a more focussed multi-criteria analysis (MCA) process was used to investigate stakeholder priorities and preferences for forest management scenarios at the landscape unit level. Although directed at different purposes and levels of detail, the survey and MCA processes identified some similar public values across a range of stakeholders. Both methods offer some advantages over more common public involvement processes used in British Columbia. To incorporate a broad range of public opinion, the use of multiple methods of evaluating public values is suggested in decision-making processes at various scales.

KEYWORDS: *decision support, multi-criteria assessment, public consultation, public opinion survey, public participation, social sustainability, social values, stakeholder analysis.*

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Introduction

Sustainable forest management includes the concept of social sustainability, in which people are considered an integral part of the ecosystem, and their values are included in planning processes (Koch and Kennedy 1991; Galindo-Leal and Bunnell 1995; Kimmins 1995; Carrow 1999; Sheppard 2003). It also involves outcomes certification guidelines (e.g., Canadian Standards Association 2003), which require effective public participation and have become increasingly important to forest companies for maintaining access to global markets. Including the public in the planning process also has practical advantages, such as the ability to gain access to local knowledge and to increase public understanding and support for forest management (Sheppard and Achiam 2004). However, public participation in land use planning has met with mixed success over the past decade in British Columbia and elsewhere in Canada (Hamersley Chambers and Beckley 2003), often leading to low public satisfaction with (and unwillingness to participate in) the processes concerned (Forest Practices Board 2000). Typical problems have included long and contested processes that favour certain lobbies while marginalizing other values. Testing of alternative public participation approaches is clearly needed. With the diversity of geography, resources, and issues in British Columbia,

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no single planning process can be expected to meet the needs of every situation.

For the Arrow Innovative Forest Practices Agreement (IFPA) Sustainability Project (see sidebar), the University of British Columbia research team drew on experiences from other jurisdictions to design and test a suite of public participation approaches. These approaches used three separate, but related, techniques.

1. A forest district-wide mail survey of public values related to forest management.
2. A forest district-wide stakeholder analysis to document and categorize community and interest groups.
3. A multi-criteria analysis (MCA) of management scenarios at the landscape unit level.

Such a combination of techniques allows various stakeholder interests to be heard and incorporated in

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The IFPA Sustainability Project

The Arrow Innovative Forestry Practices Agreement (IFPA) was established as a co-operative effort between the five licensees* in the Arrow Timber Supply Area (see Figure 1, Extension Note 1) and the B.C. Ministry of Forests' Nelson Forest Region. The Sustainability Project was an important initiative of the Arrow IFPA that partnered forest practitioners and academic researchers to develop a comprehensive approach to planning and implementing sustainable forest management.

The result of this work has been the Sustainable Forest Management Framework, which is now being used by Canfor* to guide certification and

sustainable forest management planning in their British Columbia operations. For further background, refer to: *http://www.sfmportal.com*

Disclaimer

The ideas presented in this extension note form part of a project (outlined in a series of eight notes) that was initiated to develop a system for evaluating management options under a criteria and indicators framework. These ideas do not represent real management options for the Lemon Landscape Unit, or the Arrow TSA, although they could form the basis of such options.

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* The Arrow Forest Licensee Group was comprised of Slocan Forest Products, Kalesnikoff Lumber, Atco Lumber, Riverside Forest Products, and Bell Pole. In 2004, Slocan Forest Products Ltd. was acquired by Canadian Forest Products Ltd.

planning at both the strategic and tactical levels (see Extension Note 1).

The [former] Arrow Forest District[1] contained a rich diversity of cultural values, reflected in its colourful history and the wide range of stakeholders and public interest groups with concerns about the forest environment. In 2001, records indicated that there were approximately 22 000 households in the District, a primarily rural and mountainous area with several small towns (Statistics Canada 2001). The community includes First Nations, farmers, forestry workers and mill employees, trappers and miners, tourism providers, water licence holders, and other residents and businesses. The area is also the focus of considerable recreation activity from local users and visitors. Environmental interests range from local nature groups to wilderness advocacy organizations with a provincial or national profile. The nearby regional centre of Nelson with nearly 4000 households (Statistics Canada 2001), though outside the District, exerts a strong influence on the community as a source of jobs, resources, and visitors. The Arrow Forest District had a history of public dissent over natural resource management issues, particularly in the Slocan Valley. Here, public participation processes have often had limited success, partly because of the strongly held opposing beliefs among stakeholders and participation methods that allowed grandstanding and domination by more organized groups. Forestry activities have been met with blockades, protests, and angry scenes in public meetings. At the outset of this project, we were informed by various stakeholders that the local communities suffered from "burn-out" due to the many previous attempts to conduct public processes on contentious issues. The area, therefore, represented a challenging testing ground for new approaches to public participation.

The following sections briefly outline the three public involvement techniques tested in this project—

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two that describe methods of obtaining public input (surveys and participatory MCA), and one that outlines a procedure for documenting and categorizing key stakeholders (stakeholder analysis).

Mail Survey (Arrow Forest District)

Survey Methods

A mail-out survey was conducted to better understand the resource management priorities of residents in the [former] Arrow Forest District and the adjacent community of Nelson and to test a potential routine management tool for monitoring public opinion. Surveys provide a method of reaching a cross-section of the public that may never otherwise feel included in forest management issues, and who therefore represent some of the silent majority (Hamersley Chambers and Beckley 2003). Nevertheless, any voluntary survey remains influenced by the interests and motivations of those who choose to participate. Other survey goals were to gain in-depth knowledge about local concerns and familiarity with particular forest management issues relevant to sustainability criteria and indicators (C&I), and to guide further research and extension activities.

The questionnaire was presented as an eight-page booklet with six sections on forest management issues in the Arrow Forest District. Two thousand surveys were mailed out in April 2000 to a random selection of Arrow Forest District and Nelson residents (selected from telephone directories), with follow-up mail-outs. A total of 357 survey responses were received by September 1, 2000 (the survey end date), representing a return rate of about 18%. This represents a lower return rate than is desirable, due most likely to the size and depth of the questionnaire and limited follow-up, though project constraints did not allow any investigation of non-response bias (i.e., difference in opinions between respondents and non-respondents). The participant sample did, however, represent 1.4% of the population of the Arrow Forest District and the city of Nelson, and provided an adequate sample for statistical analysis based on a typical 5% margin of error at a 95% confidence level.

Questionnaire respondents represented all age groups, although the majority of respondents (97%) were 31 years of age or older, and 73% of respondents

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[1] After April 1, 2003, the Arrow Forest District in the Nelson Forest Region was amalgamated with the Boundary Forest District to form the Arrow Boundary Forest District in the new Southern Interior Forest Region. See: *http://www.for.gov.bc.ca/mof/maps/regdis/nDAB.htm*

were male: the bias toward older people and male respondents is not uncommon with such survey questionnaires, and is a known limitation of this sampling technique (Robson *et al.* 2000). Comparison with census data indicated a somewhat higher proportion of respondents with occupations in the resource sector, although the survey results (discussed below) did not suggest a heavy bias towards pro-timber attitudes. A large proportion of respondents (43%) reported that they had never attended a public meeting during the 5 years preceding the survey, suggesting that these were, in fact, voices not normally heard in public processes.

Survey Results

General results from the first survey section (section 1 of 6) are illustrated in Figure 1. Section 1 asked respondents for opinions on various resource values and resource management priorities in the Arrow Forest District. Values and priorities included cultural and historical values, ecosystem health and biodiversity, jobs, non-timber products, recreation and tourism opportunities, safety concerns, timber supply, visual quality, and water use. Brief definitions were included for each topic area. For each resource value, respondents were asked to use a five-point Likert scale (where 1 is low and 5 is high) to rate:

- importance of the topic, from "not important" to "very important";
- satisfaction with management of the topic, from "not at all satisfied" to "very satisfied"; and

- knowledge of the topic, from "little/no knowledge" to "very knowledgeable."

Respondents on average attached relatively high importance to most values, but expressed a clear hierarchy in the perceived importance of certain resource values. Water (average of 4.64) and ecosystem health (average of 4.48) were of significantly greater importance (statistically) than the other values; cultural and historic values (average of 3.56) and non-timber products (3.53) were of lesser importance. Standard deviations for importance responses ranged from 0.90 for water to 1.28 for cultural and historical values; this means that there was fairly little variation around the mean in responses for water, and slightly more variation for cultural and historic values. The resulting hierarchy of importance can be used to guide land managers in applying limited resources toward areas of greatest public concern (based not on a vocal minority, but on representation from a broader cross-section of the community). Issues of water, ecosystem health, and biodiversity undoubtedly need to be addressed as high priorities in decision making, and future planning efforts must clearly specify linkages with these topics.

Respondents' overall satisfaction with the management of forest resources was moderate, and was generally lower than either the knowledge of, or the importance placed on, various values. Satisfaction responses were not statistically correlated with either resource importance or knowledge, but provide a baseline for monitoring general public satisfaction with SFM. The
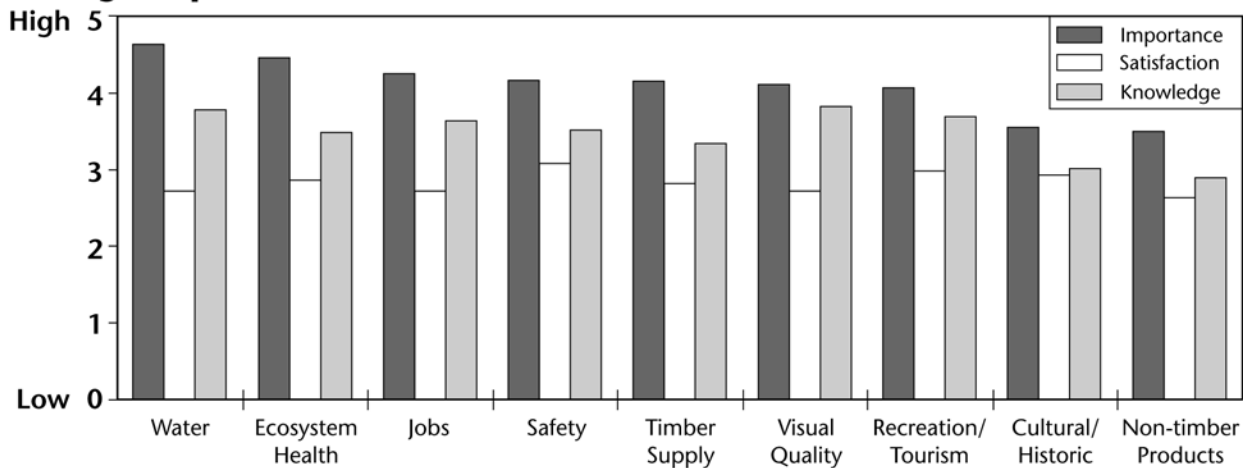

FIGURE 1. Mean survey responses on importance, satisfaction, and knowledge in relation to various resource values (shown in order of importance).

lowest levels of satisfaction were with non-timber products, jobs, water, and visual quality (with average scores ranging from 2.63 to 2.73). As shown in Figure 1, the largest discrepancy between satisfaction and importance for various resource values occurred with water.

Respondents' overall knowledge of resource values was highest for visual and recreation values, and weakly linked to importance (i.e., the more knowledge someone has on a subject, the more important it becomes; conversely, if people feel a subject is important, they will seek out related information). Monitoring of knowledge levels indicates where education and communication efforts might be targeted (e.g., cultural/historical values, non-timber products) to improve general public awareness; it may also indicate whether past education and communication efforts have been successful.

The results of the survey (documented more fully in Meitner *et al.* 2001) were used to develop hypothetical forest management scenarios and C&I for the MCA process (described below). Similar future survey efforts should be kept short and simple to maximize response rate. To determine how well the survey respondents represented the full range of stakeholders, results should be segmented by different types of respondents as categorized in the stakeholder analysis (described next).

Stakeholder Analysis (Arrow Timber Supply Area)

Analysis Methods

Often, key segments of society are not represented in planning processes. A systematic stakeholder analysis, designed to identify and profile stakeholder types, ensures that all interests in a defined forest area are considered within planning processes and in sustainable forest management decision making (International Institute for Environment and Development 2002). In this study (described in more depth in Pearce *et al.* 2003), we first identified the types of data that would be needed for designing stakeholder involvement processes to support decision making in the Arrow Timber Supply Area (TSA), which roughly approximates the [former] Arrow Forest District. Three main categories of information were identified.

1. Resource interests: Which groups and individuals are interested in what values and where within the study area, together with the degree to which their interests would be affected by planning decisions.

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2. History with planning processes: Whether there was any previous history, level of expertise, and level of influence in previous processes.
3. Contact information: Names, mailing addresses, phone, and email addresses.

It quickly became clear that a rather large, complex database would be needed in a range of different formats to facilitate swift access to this data (e.g., address labels, statistical summaries, and reports). A Microsoft® ACCESS database was developed with a simple coding approach to standardize data entry and facilitate generation of reports.

To identify the actual stakeholder data needed for the Arrow TSA, we first listed the resource values within the TSA, and identified potential organizations and individuals who might have interests related to these resources; in some cases, we were able to record the number of stakeholders in each category. The degree to which each individual or group would potentially be affected was classified on the basis of the possible impacts of sustainable forest management activities on their uses and interests. Examples of impact types considered included direct physical effects, economic effects, quality-of-life effects, effects on resource users and tenure holders, effects on existence values, or no effects. Contact information was then gathered from various sources, including forest companies, government agency consultation processes, listings and maps of a wide range of land-based tenures, local government and community listings, other process participant lists, and fieldwork to obtain recreation user information. Both First Nation and non-First Nation communities were included in the analysis, although the special status of Aboriginal groups is acknowledged (Stevenson and Webb 2003). Data was entered in the database, and information requiring clarification was confirmed through interviews.

Prior participatory experience and influence of stakeholders is likely to affect the type of involvement

process selected. The following two characteristics were used to classify stakeholder types.

- The involvement and role of each individual and group in past forestry-related planning processes, based on past records and interviews.
- The influence of the stakeholders on comparable decision-making processes, based on the role of the stakeholder in the process (e.g., elected official or statutory decision maker responsible for the final decision, government or industry process leaders, Public Advisory Group member, etc.), and actions taken during previous planning processes.

Analysis Results

The information compiled was used to define appropriate stakeholder groups and public input processes for sustainable forest management planning in the Lemon Landscape Unit study (tactical level). This approach to stakeholder analysis revealed the following interesting points on the types of stakeholders who tend to be heard and those who do not:

- Listings of property owners were not included in any previous processes, and local government was able to provide them to the project only if this information was not made public.
- Information on trapping tenures is not generally available publicly for safety reasons; again this information had to be retained in a specific database that would not be publicly available.
- Community organizations, including recreation and economic development groups, were not included in existing land-based process listings. Tourists and visitors are particularly difficult to represent directly as stakeholders in local public processes.

The database can be used at both the tactical level and at the (strategic) management unit or TSA level. It is available to planners in the Arrow TSA to convene groups for planning processes; the publishable portions of the database are also available to decision makers to better understand the stakeholders in an area. The analysis can be used, for example, to identify experienced stakeholder representatives who might lead or facilitate certain public processes, as well as affected stakeholders who have not previously been involved in planning, who may need assistance with capacity building, or who might not otherwise have influence over the process.

Multi-criteria Analysis (Lemon Landscape Unit)

Methods

The participatory form of MCA of forest management scenarios integrates the results of scenario modelling and expert evaluation with stakeholder input to assign resource value priorities and explore various trade-offs (Brown *et al.* 2001). The Lemon Landscape Unit was selected as the geographic area on which to test the MCA process, as it represented a range of issues in the Slocan Valley and had suitable data available. For more details on the methods and results, see Sheppard and Meitner (2005).

Resource planning in the Slocan Valley has often been marked by confrontational public processes dominated by a limited range of interest groups. We, therefore, decided that a more comprehensive set of separate focus groups could be more effective in seeking public input for the MCA project. Different public involvement formats may be appropriate in other situations. Based on the results of the stakeholder analysis, nine focus groups with shared interests in the Lemon Landscape Unit were formed and met with separately throughout the study (November 2001– February 2002). The groups consisted of property owners, water users, community development interests, local government, provincial government, recreation, environment, forestry, commercial tourism, and other users (mining, trapping). Attempts were made to contact First Nation representatives in the area, but we were unable to establish a feasible mechanism for participation within the timescale of the study. The nine stakeholder groups ranged in size from four to eight members, with a total of 47 participants.

A set of draft C&I was presented to each focus group. These were based on the C&I developed by the Sustainability Project team (see Extension Note 2) and tailored to the local level. Focus group participants

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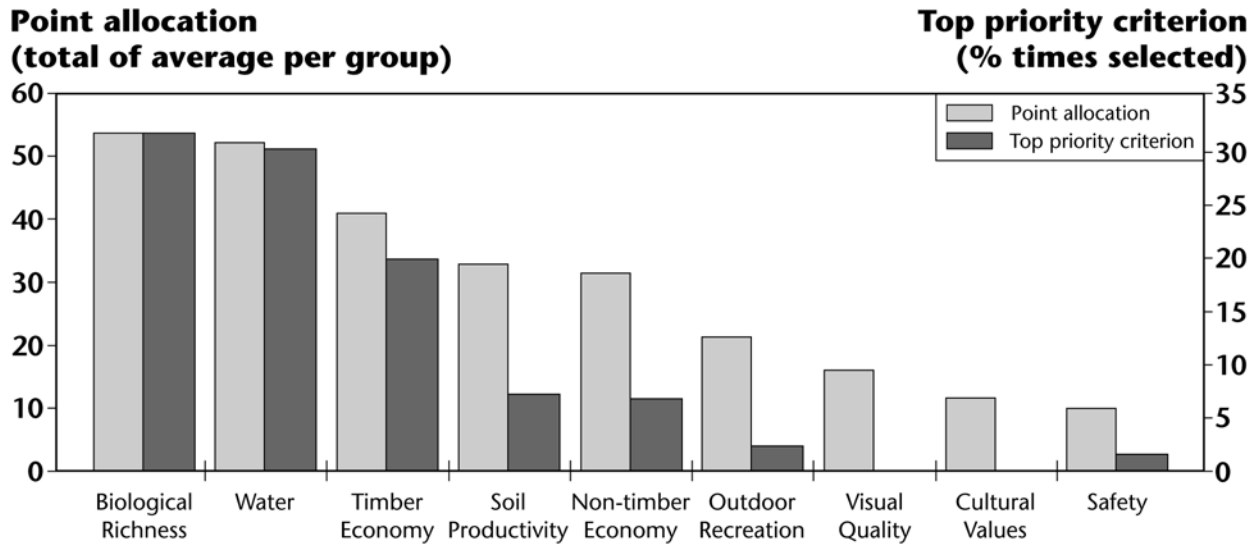
**Point allocation
(total of average per group)**

**Top priority criterion
(% times selected)**

FIGURE 2. Overall priorities of Lemon Landscape Unit stakeholders for sustainability criteria (weighted by points allocated across criteria and by top priority ranking).

reviewed nine criteria (and associated indicators): biological richness, forest/soil productivity, timber economic values, non-timber economic values, water supply, recreation, visual quality, cultural resources, and worker/visitor safety. Stakeholder comments were used to further refine the definition of some C&I.

Participants were asked to weight the criteria in the following three ways:

1. by selecting the top priority criterion,
2. by ranking of the criteria in order of importance, and
3. by allocating 30 points freely among the criteria (with more points given to more important criteria).

In the initial rounds of public engagement described here, two alternative forest management scenarios, previously developed by the Sustainability Project team, were used in the MCA process (Sheppard and Meitner 2005). Scenario 1 was based on a set of rules similar to the Forest Practices Code of British Columbia, which was in place in 2001. Scenario 2 used a zoning concept that concentrated timber harvesting in more productive areas on a smaller land base, reserving high-elevation and backcountry areas for wildlife and other values. Modelling and expert evaluations of the scenarios were conducted by the Sustainability Project team, based on C&I similar to those used by the focus groups. To test the role that different group priorities have in favouring potential scenarios, the expert evaluations were combined into a sustainability score (for each criterion and

scenario) to which the focus group weightings could be applied. In addition, the scenarios were presented directly to the focus groups for analysis and discussion, with the aid of computer-generated visualizations of scenarios over time.

Results

All three methods of weighting criteria gave a similar sequence of resource priorities: biological richness first, followed by water supply, timber economic values, forest/ soil productivity, non-timber economic values, recreation, visual quality, cultural resources, and safety. Figure 2 shows the relative rank orderings of the criteria from two of these weighting methods. Since different rating scales were employed for the different methods, no scale is given. Although the latter four values consistently received lower weightings, when combined they still received 25% of the total number of points using the 30-point allocation method.

Analysis of the different focus group weightings demonstrated considerable commonality between groups. Many participants expressed surprise when they saw how closely the priorities and rankings of the criteria matched across groups. Only the weighting method that asked for the top priority criterion led to substantial differences (primarily between Environmental and Forestry groups). For the remaining methods, groups did not allocate weights primarily to the criterion with which they were most closely associated.

The expert evaluations of Scenarios 1 and 2 against C&I showed that timber supply and ungulate winter range would increase under Scenario 2, but that Scenario 1 was more likely to sustain multiple values overall, including water quality. Applying the focus group weightings to these evaluations resulted in all groups appearing to favour Scenario 1; however, differences in management assumptions and methods of assessing sustainability could influence results considerably. Many participants expressed a direct preference for Scenario 1 based on personal knowledge and the information provided, including the scenario visualizations. Suggestions for new or modified scenarios for further analysis were obtained from participants.

Most participants (86%) agreed, or strongly agreed, that this process of landscape unit planning using MCA showed promise as a decision-support tool—in particular, they felt that the focus group format was appropriate for the local circumstances and that it was useful to have explicit C&I against which to evaluate the scenarios. Many also agreed that the weighting exercise was useful. Some participants felt that a better explanation of the expert scenario evaluations would increase credibility. Finally, many commented that the visualizations played an important role in clarifying the scenarios, and that the overall credibility of the process depended on an independent study team and facilitator.

Discussion and Future Directions

The overall similarity between the District-wide survey results and the Lemon Landscape Unit MCA results increases confidence in the validity of the data. The differences that did occur between and within the local stakeholder groups are to be expected, given the different wording of the questions between these two instruments, the local resource issues, and the varying dependency on the resource economy. The results confirm that any one process may not adequately represent all underlying societal values. It is, therefore, important that a suite of methods is employed to ensure broad representation.

The combination of a broad random-sample survey at the district scale (strategic level), a systematic stake-holder analysis to identify the public and stake-holders to be represented, and a more targeted community-based process (tactical level) to engage a number of stakeholders representing multiple interests, offers

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promise as a multi-method model for participation in SFM. Some of these techniques have received further testing through implementation by forest companies outside the [former] Arrow Forest District. The mail survey will be administered again to help determine how these results might change over time, and to gauge the perceived success of land managers in achieving SFM. Typical budgets for current surveys undertaken by researchers at the management-unit level are in the $30 000 range, though with considerable variation.

Public processes (e.g., MCA) that consider alternative scenarios seem to be well received by the public and can convey considerable information quickly if they incorporate accurate visualizations of future conditions (Sheppard *et al.* 2004). Ideally, focus group members should be shown a range of potential scenarios, such as:

- a scenario driven by current trends ("business as usual");
- a scenario driven by SFM C&I (Extension Note 4);
- a "natural processes only" scenario that incorporates natural disturbance;
- scenarios with alternative forest practices such as partial cutting; and
- one or more scenarios that model other human activities in the forest, such as private land development, mining, and outdoor recreation.

Since the studies described above were conducted, further rounds of workshops have been undertaken that provide more public input on preferred scenario development and evaluation; analysis of these study results is ongoing.

Techniques, such as the participatory form of MCA which avoid cross-table confrontation, allow each group an equal voice, and do not necessarily set out to achieve consensus, seem effective in contentious areas such as the Slocan Valley. The MCA process is transparent, provides information to stakeholder groups and statutory decision

makers, and supports open and accountable resource management decisions. Compared with common approaches to consultation (such as open houses) and primarily expert-driven forest planning at the landscape level in British Columbia, these methods may incur somewhat higher initial costs in staff time, but promise to effectively streamline decision making and improve long-term public support and understanding for those decisions. In less contentious areas, separate focus groups may not be needed, although the use of the MCA matrix to analyze scenarios systematically should prove useful in other public processes. Further longer-term studies are needed to determine the effectiveness of these methods in a real decision-making situation, and to test their application at different geographic scales.

Other public process techniques, such as Public Advisory Groups or recreation and visitor surveys, also have a role in decision support and should be integrated into a framework of best practices for public participation in SFM. Furthermore, the public and stakeholder involvement techniques described in this extension note add to the toolbox of public participation processes that can be used in planning for sustainable forest management.

Overall messages arising from the public participation study included:

- Triangulation of results from various public involvement techniques is beneficial in widening input and establishing patterns of perception.

- Random sample surveys can reach beyond the more organized stakeholder groups and provide context for extreme opinions sometimes heard in the media.

- Systematic stakeholder analysis should be used to reveal under-represented stakeholder groups not reached by conventional consultation methods and to provide a more solid basis for selection of stakeholder representatives.

- Objective visualizations of alternative scenarios should be more widely used to engage and inform stakeholders.

- Public input to tactical-level planning processes can be both civilized and useful to managers, with tangible results on community priorities.

- Multi-stakeholder processes may yield considerable commonality between diverse groups and favour a balance in resource values.

Multi-stakeholder processes may yield considerable commonality between diverse groups and favour a balance in resource values.

Acknowledgements

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Test Your Knowledge . . .

Arrow IFPA Series: Note 3 of 8 – Public processes in sustainable forest management for the Arrow Forest District

How well can you recall some of the main messages in the preceding extension note?
Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. In the mail survey of Arrow Forest District residents, which two forest values were most important to respondents overall?
    A) cultural/historic values
    B) ecosystem health
    C) jobs
    D) recreation/tourism
    E) water
    F) timber supply
    G) visual quality
    H) safety
    I) non-timber products

2. As part of the stakeholder analysis conducted in the Arrow Forest District, which of the following classifications of stakeholders were used:
    A) place of employment
    B) degree to which interests are affected by forest management activities
    C) education level
    D) past involvement in forest planning activities
    E) potential influence on participating processes
    F) income level

3. In the participatory MCA study conducted in the Slocan Valley, timber economy was rated by participants as the third most important criterion for sustainable forest management, using two different criteria weighting methods.
    A) True
    B) False