

Working Effectively at the Interface of Forest Science and Forest Policy

Guidance for Scientists and Research Organizations

*Richard W. Guldin, John A. Parrotta,
and Eeva Hellström*

*IUFRO Task Force on the
Forest Science-Policy Interface*



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Union Internationale des Instituts de Recherche Forestière
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*Supported by:
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Working Effectively at the Interface of Forest Science and Forest Policy

Richard W. Guldin, John A. Parrotta, Eeva Hellström

Introduction

In 1998, the International Union of Forest Research Organizations (IUFRO) established a Task Force on the Forest Science-Policy Interface. The goal of the Task Force is to identify strategies and mechanisms for improving communication between forest scientists and policy-makers to ensure that sound science is considered in the formulation of forest policies and on-the-ground forest management practices. The Task Force worked towards the goal in a two-step process:

- Three regional workshops were held to gather case studies describing instances where new knowledge and technologies from research influenced policy deliberations. The workshops focused on the Americas (Costa Rica: 2001), the Asia-Pacific region (India: 2002), and the Europe, Africa and the Middle East regions (Denmark: 2003). Results have been published in three special issues of international journals and are available on the IUFRO website¹.
- A final workshop was held in June 2004 in Switzerland that brought together leading researchers and forest policy experts to synthesize findings from the case studies and identify recurring themes. The recurring themes were refined into guidelines for scientists, research teams, and leaders of research organizations. The full report from this workshop is also available on the IUFRO website.

Purpose of the Guidelines

Society is the ultimate beneficiary of forestry research. But to generate value for society, research results must be used by someone — policy-makers, forestry practitioners, landowners, educators, other researchers. The science-policy interface is all about utilizing scientific knowledge more effectively. Often, research is planned and conducted before giving adequate thought to exactly how the results will be transformed into usable information. The purpose of these guidelines is to provide advice to researchers and research leaders on how to plan, conduct, and organize research activities so that results can more quickly and easily be transformed into usable information for problem-solving and policy-making. Although not all research is focused on policy-relevant questions, we believe that following the advice in this report can increase the impact of research on forest policy and improve the practice of forestry, thereby creating more value more quickly for society from forestry research.

¹ *Revista Forestal Centroamericana* No. 37, 2002; *Forest Policy and Economics*, Volume 5, Issue 4, December 2003; the *Scandinavian Journal of Forest Research*, Volume 19, Supplement No. 4, August 2004. <http://www.iufro.org/science/task-forces/sciencepolicy-interface/>

The Guidelines

The guidelines fall into four major categories:

- Focusing research on questions that are relevant to policy issues;
- Conducting research in a communicative and collaborative manner;
- Understanding, serving and engaging in policy processes; and
- Creating organizational capacity and culture that enables and encourages work at the science-policy interface

Although the guidelines may appear self-evident and not new, we believe that there are many situations where these principles are not currently being followed. As a result, some research has little or no impact on problems or policies and some research institutions lack vigor, have limited reputations, and lack the necessary resources to fulfill their missions. Although these guidelines may appear simple, we believe that if they are taken to heart and applied diligently, science will create greater impact and more value for research clients, reinvigorate research, improve reputations of research institutions and individual scientists, and garner the resources needed to make a difference locally, nationally, and globally.

We also note that these guidelines represent primarily the views of the scientific community from our vantage point on the science side of the forest science-policy interface. Although there may be things that policy-makers can also do to improve the flow of information across the science-policy interface, those things are not the focus of these guidelines.



Participants of the Workshop of the IUFRO Task Force on the Forest Science-Policy Interface held in Birmensdorf, Switzerland, 2004

In conducting research, researchers should address questions that are relevant to policy issues

Many of the problems of most interest to policy-makers are complex, embracing broader environmental and socio-economic issues that should be addressed through interdisciplinary² and cross-sector research. If scientists want to have an impact on policy, they must carefully assess what research is relevant. As an example, if rural poverty reduction is a critical policy issue, then what may be needed is additional understanding of the role of forests and how they might be managed to increase their socio-economic contributions to rural communities. This will require a blend of biological, social, and economic research skills. Picking research questions that are relevant to the most pressing policy issues helps build interest and support for the research. Syntheses of case studies suggest 6 specific guidelines.

Focus on Values & Needs

- 1. People's values³ about forests should be considered in planning, conducting, and implementing research as well as in policy-making.**

There is no substitute for scientists and policy-makers having a clear understanding about the value that people place on forests and how they are protected, managed, and used. Researchers who invest effort to become culturally aware and sensitive to alternative value systems and who understand the depth of feeling that people have for forests have been more successful in seeing their results influence policy and be implemented on the ground.

The impetus for revising or implementing new forest policies typically arises from one of two situations. Either public values change or forest conditions change in ways detrimental to the current values the public holds about their forests. In either case, un-

derstanding the values which different segments of the public hold regarding forests is central to planning and conducting research to inform the policy change process. A related point is that scientific information is rarely the primary driver of policy change. Rather, scientific information is, at best, information that illuminates the fact that values are changing or that forest conditions are changing. Science may also shed light on how risks or uncertainties previously accepted by policy makers are changing, or that new options for mitigating changes detrimental to current values have been discovered. The role of new scientific information is primarily reshaping the foundation for dialogue about policies — a second-order effect on policy development — rather than forcing policy change.

Many of the case studies evaluated by the Task Force highlighted the roles that cultural dimensions of societies and communities played in creating and shaping public attitudes about forests. When cultural dimensions were recognized and built into the scientific hypotheses and the alternative treatments to be tested, research results were more relevant and credible in the community and provided a stronger foundation for policy-making than when the cultural dimensions were ignored. This is particularly the case in regions where people are highly dependent on forests to meet daily subsistence needs and/or provide jobs and incomes. Forest researchers and policy-makers who are sensitive to the cultural dimensions and subsistence needs of forest residents and other forest-dependent communities when planning and implementing management plans will have more success than those who overlook these realities. Indeed, scientists or policy-makers who are insensitive to these needs are often seen as arrogant and their proposals are typically ignored. Local communities are very perceptive about what facets of the forest are important to their quality of life. Often, though, those facets are not neatly summarized for researchers' use. Thus, studies of how communities use forests and the benefits they derive from them can be as important as studies of new protection or management or use activities.

² For the purposes of this document, “interdisciplinary” research refers to the deliberate, targeted collaboration of individuals whose skills represent different disciplines.

³ The word “value” is used here in a generic and all-encompassing sense. Although it includes economic value, it is not limited to that. Also included in the concept of values are things such as contributions of forests to people's quality of life and emotional or spiritual well-being. Forests create value for people in many different ways — both tangible and intangible. Understanding the multiple dimensions of value that forests create for different people is central to this first guideline.

2. A clear focus on needs enhances the effectiveness of forest research and its influence on policy-makers.

Policy-makers respond more readily to research that affects their constituents' or clients' needs — values that are unsatisfied or at risk of being lost. Scientists who integrate high priority constituent or client needs into their research will improve the likelihood that the research results will be useful for making policy. Research carried out with a clear focus on meeting the needs of end-users (e.g., land-holders, forest managers, communities) will have the greatest chance of influencing policy-makers.

Sometimes the needs will be related to solving specific problems, which may lead to some specific applied research or perhaps even basic research if fundamental relationships are not yet well established. Sometimes the needs may be related to understanding better what the problem really is, which may lead to research that is more conceptual or strategic than tactical. In some cases, the needs may even be related to improving policy processes, which may lead to research on policy making or decision support systems. The point is that clearly understanding and focusing on the needs will enhance research effectiveness and influence.

Conduct Interdisciplinary Research

3. Research that is both interdisciplinary and integrative is needed to understand and deal with complex forest resource management issues.

Forest science is inherently interdisciplinary, requiring a range of scientific disciplines to fully consider all the ecological, social, and economic dimensions of issues. This is particularly important in regions where people depend heavily on forests and their goods and services for their subsistence, livelihood, and security. Interdisciplinary research is also important in identifying and conceptualizing policy questions. Research is integrative when it blends information from several disciplines to create broader or deeper understanding than is possible from any single discipline. Numerous case studies dealing with issues at landscape (i.e., watershed) scales highlighted the importance of integrative research.

Funding bodies are increasingly requiring interdisciplinary, integrative approaches to forest research. In light of the worldwide downward trend in the numbers of people being trained in forest science, an emerging challenge for forest science organizations is to balance the need to train scientists who are well-rounded, having a basic knowledge of many facets of forests and forestry, against the need to develop the in-depth expertise needed in specific fields to understand the complexity of the issues facing the forestry community today. Some breadth of knowledge and some detailed knowledge are both needed for research teams to be effective in dealing with complex forest resource management issues.

There are two pathways to gain the necessary breadth and depth of knowledge. One is to first gain some breadth of knowledge, and then obtain additional detailed training in a specific field of science. This is the traditional approach offered by universities. The second pathway is to bring together specialists in various fields and, over time, give them the cross-disciplinary training needed to broaden their knowledge and enable them to work more effectively together. This pathway is taken less frequently. The case studies suggest that the traditional pathway may not always be the best pathway, or the one that allows research institutions the most agility or flexibility in tackling new problems or issues as they emerge.

To enhance the effectiveness of the second pathway to interdisciplinary research, research organizations may need to introduce on-the-job training in teamwork and career-broadening training in various scientific disciplines to boost the ability of teams of scientists, each from a different discipline, to work together more effectively. During academic training in specific disciplines, some introduction to working in teams may need to be added to curricula. Innovations in teaching teamwork and integrative science are beginning to emerge in natural resources programs around the world. Research organizations may also need to adapt their structures and reward systems to promote interdisciplinary and integrative work. For instance, the organization might move from individual performance evaluations to team evaluations or from individual awards for outstanding performance to team awards.

4. Researchers should assess the impacts of a policy option in light of the values and needs of the different parties with an interest — a stake — in the policy decision. A thorough impact assessment will usually require a suite of different scientific disciplines.

In evaluating the potential impact of a policy option, researchers should consider possible conflicting objectives, values, and needs of people and organizations with an interest in the policy decision⁴. For instance, different groups may use a forest for different purposes (e.g., gathering mushrooms and watching birds) and the proposed policy may affect the different users differently. Different interest groups may have varying degrees of influence with policy-makers (e.g., hunters who buy hunting licenses may have more influence than bird watchers who don't pay license fees). Local interests who depend on a particular forest may experience different economic or social impacts of a policy decision than other interests who are concerned about all forests in a region or nation.

The challenge for the researcher and policy analyst is to identify the potential impacts of a policy option in all of their dimensions. A thorough assessment of potential impacts typically requires several different disciplines drawn from the fields of ecology, economics, and social science. The best assessments occur when scientists from several disciplines work together on an assessment (interdisciplinary team) to produce a single report rather than work independently to produce a set of separate reports. The case studies illustrated that the impacts on various interests and their values and motivations usually emerge in a richer and fuller way with interdisciplinary teams conducting the impact analysis than with independent disciplinary analyses, especially in the case of competing objectives.

5. Researchers should consider the role of science in policy implementation as well as in policy definition and development.

Too often, research is only used to help define an issue or develop an appropriate response. Often overlooked is the important role that research can play in

shaping the implementation of policy decisions. Specifically, research can help design protocols for monitoring and evaluating policy implementation. Is the policy having the intended effect? Are the impacts being created those that were expected? Are the risks that were identified being mitigated effectively? If monitoring shows that the policy is not having the desired effect or that impacts are different than what were expected, then the monitoring information can help policy-makers adapt the policy to overcome the unanticipated consequences. An interdisciplinary team should be involved in designing monitoring protocols and evaluating monitoring information.

Over time, a succession of policies may be implemented to deal with complex issues. The case studies showed that from time to time, it is important to bring together a team of researchers and policy analysts to review the cumulative effect of the policies. Two kinds of benefits emerge from periodic policy reviews. First, because complex natural resource issues sometimes require a series of policy decisions to finally resolve them, the overall efficiency and cost-effectiveness of the multiple decisions can only be fully evaluated through a cumulative analysis. Sometimes, the review may demonstrate the policy was fine, but implementation was flawed. Or the opposite may be found — implementation worked as planned, but the policy was flawed. Second, the results can help researchers model the response of complex systems to a sequence of policy changes. Such models can provide useful feedback to the development of future policies and implementation arrangements.

Look to the Future

6. Scientists should anticipate relevant issues and be prepared to contribute research and information to policy discussions even though data may be incomplete or political awareness may be lacking.

One of the foremost concerns of policy-makers is being surprised by an unexpected natural resource issue or problem. What often causes the most consternation is the element of being surprised by the unexpected. This is especially true when policy-makers are politicians or political appointees.

⁴ People and groups with an interest in a decision are sometimes called “stakeholders.” Their interest arises from the fact that the policy decision may affect values or needs important to them — both as gains or losses.

An excellent technique for avoiding unexpected surprises regarding natural resource issues is a type of policy research called “futuring” or “foresighting.” The process of futuring provides research institutions and policy-makers with a way to work together to identify potential or emerging issues before they unfold unexpectedly. Through futuring, researchers and policy-makers work together to consider recent trends in both quantitative information, such as demographic and technological changes, and qualitative information, such as shifts in tastes and values. Models of both quantitative and qualitative information can be developed to help inform futuring activities, using techniques appropriate to the data and under the assumption that current trends will continue into the future (an assumption always worth testing as part of the modelling exercise). It is important that the design of futuring activities be deliberately broad and includes many disciplines. Through thoughtful outreach to experts in distant fields, insights into the potential interactions of seemingly disparate events may provide a rich context for considering alternative futures and identifying potential natural resource issues. Futuring in a group usually results in richer, more useful information than only consulting a few “experts”. Futuring together with policy-makers is an excellent way to build political awareness and reduce surprises.

The case studies highlighted several instances where researchers identified potential problems before they emerged as full-fledged issues. The threat of invasive alien species, both plants and animals, is a prime example. Researchers and research organizations that are skilled in futuring tend to be seen as more relevant and responsive to policy-makers and often enjoy better public support. Three key elements to winning that support are: (1) periodically re-evaluating potential future issues; (2) remaining aware of what is known about each issue — even though the current data may be incomplete; and (3) investing modest sums in research on issues that have not yet emerged as problems to build some minimal capacity, fill critical data gaps, and position the policy-maker and research organization to respond quickly if the issue emerges.

Conduct research in a communicative and collaborative manner

Each researcher and leader of a research institution should be prepared to convince a skeptical world that their results have contributed to a better society. That takes solid information and solid communications skills. Researchers are information and knowledge brokers, communicating inside and outside their institutions. Research institutions are information and knowledge managers, creating and disseminating corporate messages based on the sum of their researchers’ findings. Networks and partnerships — both of institutions and of individuals — can enhance effective communication across the science-policy interface. To communicate effectively, scientists and research organizations need to consider several strategic and tactical questions and be clear about their relative roles as individual and institutional communicators. Syntheses of case studies suggest 10 specific guidelines.

Communicate Effectively, Often, and Through Multiple Channels

- 1. Researchers and research institutions need to be able to communicate clearly and effectively with policy-makers and stakeholders. Communication should be well-timed and should take place on a regular basis. Communication strategies should focus on targeting the messages and communication methods to the audience.**

Communication is critical to creating, building, and maintaining the interest of policy-makers in scientific results. To be effective, communication needs to be personal, frequent, and occur in multiple forms to multiple audiences. The challenge of communicating scientific results is that results need to be translated into words and proposals that are relevant and understandable to lay people, including most resource managers and policy-makers. The results must be clearly linked to the audience’s values and needs. The message must be brief.

Preparing and participating in effective communication activities takes time. Institutions can use professional public relations staff to help prepare and deliver the key messages, saving time for researchers. Nonetheless, in many cases scientists will need to be personally involved in communicating directly with media or other stakeholders because they add to the credibility of the message. Therefore, it is often helpful for scientists to receive specialized communications and public relations training.⁵ To be an effective communicator, a scientist must understand the dynamics of various settings and how to most effectively get a message across in each one.

Prepare carefully for media interviews. Use videotaped rehearsals to provide immediate feedback to scientists. Reducing key messages to the desired “sound-bites” is hard work. Use unexpected questions, some phrased in a deliberately hostile manner, to help researchers prepare for possible scenarios. Never go into an interview unprepared.

Communication must be a two-way flow of information. Being open and receptive to feedback from policy-makers and their constituents is vital to a scientist’s ability to work at the science-policy interface. Sometimes, the scientist is misinformed or uninformed about the key elements of the policy issue or key values of constituents. Effective, active listening skills are crucial to a scientist’s success.

Choosing the right setting for communicating research results to policy-makers is particularly important. Discussions of the case studies highlighted the fact that getting policy makers “out to the field” is a very effective way to communicate directly with them for several reasons. First, seeing results in the field helps a policy-maker to visualize the effects and outcomes of management options. Demonstration forests have been exceptionally useful in many countries and cultures as part of long-term forest policy communications strategies. Second, taking the policy-maker to the field helps to focus their attention on the topic. The many distractions that normally exist in the office are left behind. Third, never underestimate the value of the time in transit as an informal communications opportunity. The social camaraderie that is built by

getting to know each other builds relationships and relationships build trust. So the scientist or policy-maker who hops into the field vehicle in the morning and promptly goes to sleep on the drive out to the field has missed one of the best opportunities for dialogue and trust-building. Dialogue in small groups while traveling is a networking approach to influencing policy.

2. Partnerships among scientists, policy-makers and stakeholders are effective venues for communication.

The effectiveness of forest resource management systems and policies is enhanced through formal partnerships. Those same partnerships among research institutions, government agencies, NGOs, and stakeholders — both individuals and communities — can be used to improve the effectiveness of communications. Therefore, when designing and initiating research or resource management partnerships, pay particular attention to creating communications channels and setting clear expectations about how information will be shared among the partners. Remember that in addition to being important recipients of information, stakeholders can also be effective as intermediaries to pass scientific information on to policy-makers. Sometimes, a stakeholder may have better access to or more influence with a policy-maker than the researcher or other partners. Finally, remember that any partnership has a political component. Safeguards to avoid unintended politicization of research activities, results, or personnel should be included in the formal partnership arrangements.

Members of the media can be especially influential emissaries for communicating scientific information. Creating long-term partnerships can be quite useful — both to the journalist and the scientist. But bear in mind that journalists have specific needs, such as the need to report independently as they see a story. For the partnership to be productive, both parties should clarify what their needs are.

Policy-makers and members of the media are interested primarily in what impact the research results will have on the ground, to people who are directly

⁵ Different media—print, radio, television—require different approaches and skills. Researchers who are expected to conduct interviews using these different media should receive specialized training. For example, before sending a researcher to conduct their first television interview, they should have some specialized training in working with television interviewers.

affected, and to society as a whole. Therefore, researchers need to transform their research results into a story, carefully framing the story to address these interests. To encourage media coverage, keep the story simple, personal, dramatic, and symbolic.⁶ A simple story is one where the complexity of an issue is distilled to a sharp focus on only the key element. A personal story is one that explains the impact of the research result or policy proposal on a particular person (e.g., a forest landowner, a forest visitor; a “face” for a photo). A dramatic story is one that appeals to the readers’ or listeners’ interests. A symbolic story is one where the reader/listener can associate the individual who is highlighted with a larger portion of society who will all be similarly impacted or a larger social value (e.g., social equity, justice, civil rights). Stories lacking one or more of these elements⁷ usually won’t get reported.

3. Informal channels can be effective ways to inform policy.

Where possible and appropriate, researchers should develop informal channels to communicate with policy-makers—a wide personal network of contacts. The nature of such channels and how they can be used effectively will depend on the socio-political context. In some cases it may be possible to develop a personal relationship with a policy-maker, while in other cases it might be more effective to rely on an intermediary who has the ear of a key policy-maker. Because personnel changes occur frequently both inside and outside government, it is important for researchers to build networks of diverse contacts and use those networks responsibly.

Stories are often very effective when communicated informally too. The same attributes that make a story appealing to the media pull them along through informal communications channels. Sometimes, a couple of good stories, told simply and offered anecdotally, can be more effecting at shaping listener opinion than reams of statistical data or dry research reports or journal articles. Researchers who were effective story-tellers were among the best communicators in our task force workshops.

4. Researchers should stay abreast of the current thinking and composition of key stakeholders and groups who may influence policy.

Scientists have a role in identifying and understanding the stakeholder community that is interested in and influenced by an area of policy. Because both situations and values are continually changing, staying abreast of how the stakeholder community is changing requires continual attention too. Depending on the issue, stakeholders may include groups of people that, on their face, differ considerably from one another yet upon closer examination share common values. Sometimes, changes in laws or results of elections can empower new stakeholders not previously involved in an issue, or vice versa.

Popular grass-roots initiatives and movements have been very effective mechanisms for forest policy reform and forest landscape rehabilitation in many countries, notably in India and Korea. Researchers should seek ways of working with initiatives and movements to provide appropriate technical assistance commensurate with their needs.

5. Each communication opportunity is also an opportunity to receive feedback from clients about the usefulness and importance of research results. Good communicators are good listeners.

Effective communication is always two-way communication. Whenever a message is shared, look for feedback. Feedback comes in several different forms. Verbal feedback is the most common type. But sometimes, verbal feedback is filtered or stifled. The respondent may not feel comfortable telling you how they really feel about your message. Reading non-verbal feedback can provide additional insights into how your message was received, even when verbal feedback is not forthcoming. Changes in body position, gestures, and facial features can provide useful feedback that is sometimes more accurate and insightful as to true feelings than verbal feedback. Good communicators can read non-verbal body language of their audience effectively.

⁶ Bob Behn. 2005. *Driving Government Performance*. Cambridge Massachusetts: Kennedy School of Government, Harvard University.

⁷ Stories that lack an element usually have the opposite characteristic. For example, stories that are complex and hard to describe in a few words are not simple. Stories that don’t affect specific individuals are impersonal. Stories that don’t appeal to an important human interest or value are not dramatic. Stories that are not connected symbol-ically to a larger group or larger value lack symbolism.

Feedback may be relatively quick and direct, or it may take longer and be delivered indirectly. Be alert to the possibility of a delayed response, especially when the immediate response seems noncommittal. Sometimes the audience needs time to digest your message and think through its ramifications for them. Only afterwards may they be prepared to share feedback with you. Sometimes, feedback will be relayed indirectly to you through intermediaries. Often, those intermediaries may be peers (which also tells you something about the extent of your network), but they may also be your superiors or occasionally, politicians who have been contacted by constituents. Indirect feedback is valuable not only because of the content of the message that is received; it is also valuable as a way of understanding the communication networks of your audience. The pathway back can reveal linkages and connections that you were previously unaware of and also the strength or intensity of the relationship. Consider using those pathways for future messages to keep all parties “in the loop.” Often, when a message is conveyed back indirectly, it is useful to reconnect with the original listener to confirm that you’ve received the feedback and its content. Content can get altered, sometimes slightly, sometimes significantly, if a feedback message passes through several intermediaries.

Keep records of the feedback received from various sources — notes of personal communications, letters received, newspaper articles and editorials, transcripts of radio or television stories, and reports and personal editorials (web “blogs”) on internet websites. Public relations experts can do content analyses of feedback and identify the most salient points for different stakeholders. Results of content analyses can help one improve the content and delivery mechanism for future communications. The ability to discuss the types of feedback being received from different stakeholders can also be an important part of policy deliberations.

Synthesize Knowledge and Identify Values Ascribed to Science

- 6. Traditional knowledge has an important role to play in both policy and science of sustainable forest management. Scientists have a role in bridging the gap that exists between traditional knowledge and modern forest science.**

Traditional ecological knowledge⁸ (TEK), generally ignored or undervalued by policy-makers, can be a key to fostering sustainable forest management. Research organizations and scientists can play an important role by working at the interface between traditional and modern forest-related knowledge, engaging traditional and local communities in collaborative research that addresses the needs of these communities, by working together to develop sound management practices based on local knowledge and modern science, and in helping to communicate the resulting approaches (tools) to community members, policy-makers, and relevant government agencies.

Indigenous communities in particular may be reluctant or skeptical about sharing TEK with researchers for many reasons, including cultural norms and/or religious beliefs, and concerns over intellectual property rights. At issue may be the degree to which and the circumstances under which TEK can be shared with or used by people outside the indigenous community. These are often very delicate issues and should be discussed with great sensitivity, seriousness and respect for the views and wishes of the holders and users of TEK. If such knowledge is shared with a researcher, then it must be handled respectfully and accorded appropriate protection. Great harm can be done to research and relationships by failing to respect the community’s cultural norms, religious beliefs, and intellectual property rights. Research institutions may need to fashion special agreements protecting the rights and interests of indigenous peoples in knowledge they use to create unique values for their communities.

⁸ *Traditional ecological knowledge*: “a cumulative body of knowledge, practice and belief, handed down through generations by cultural transmission and evolving by adaptive processes, about the relationship between living beings (including humans) with one another and with their environment” from Berkes *et al.* (*Ecological Applications* 10(5): 1251-1262).

7. **Researchers should be aware of the values that people—both influential individuals and communities—ascribe to science and the scientific process, because these values are important determinants of whether science is seen as credible and a useful basis for improving the quality of policies.**

Science should reflect the breadth of public values. If hypotheses are too narrow or one-sided, if they do not include or respect TEK or community values, then the public will not accept the results or policies based on those results. When implementing the scientific method in studies that have direct implications for forest resource management by local communities, scientists should seek the participation of local communities in designing their research. Further, scientists should take positive steps to honor and respect the community's views throughout the research process and even into the policy making process. This requires scientists to have a cultural and political astuteness for working with people from different backgrounds and cultures and an understanding of how to incorporate the views and values of outside parties into the scientific process. By turning participants into stakeholders, the credibility of science and the scientific method is enhanced.

Create Partnerships

8. **Partnerships are critical to enhance effective communication among scientists, policy-makers and the public. Collaboration is an especially effective way to build trust and influence policy.**

To work effectively in the science-policy interface, scientists must understand the interests of policy-makers and their constituents. When scientists establish a level of trust with the policy maker and their constituents that their interests are fully and completely understood and that the impacts of proposed policy options on their interests are accurately displayed, then the scientist's information is better received. Collaboration—working together on resolving issues—builds trust and promotes shared learning. The higher the level of trust that exists, the

smoother the interactions at the science-policy interface. The most complex forest policy issues take considerable time to solve. The longer-term commitment inherent in collaboration builds the trust needed to sustain a focus on complex forest policy issues.

9. **Networks are important. It is very difficult to do research that will have a bearing on policy by working alone. Strategic partners are needed.**

Communication and coordination among scientists engaged in research related to specific policy-relevant topics are important to build broad-based support for a policy innovation. When several scientists, who are working on different studies focused on the same issue, all draw similar conclusions from their data, their conclusions will be more convincing to policy-makers and stakeholders. For example, issues alleged to have a broad spatial impact will require studies throughout the potentially affected zone to test the idea that impacts are widespread. Likewise, potential solutions to wide-spread issues need to be tested in different parts of the affected zone to evaluate their efficacy. Networks—both informal as well as formal ones—that bring scientists from different institutions together to work on the same problem are particularly important for finding solutions and developing policies for widespread problems.

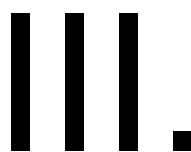
Complex problems are unusually difficult to resolve. Often, they must be broken down into component parts and a strategy developed for solving the various components and then integrating the results. It is often difficult for a single research institution to bring all the skills needed to solve all of the pieces of complex problems. Therefore, the strategy developed will usually benefit from the skills and resources of several different research institutions, perhaps foreign as well as domestic. When building strategic partnerships across institutions to address complex problems, it is often good to formally document the strategy developed, including the responsible parties for each component and the shared responsibilities for working at the science-policy interface. Do not forget to document intentions regarding sharing credit and any intellectual property that may arise from

research success. Documenting these arrangements at the beginning can avoid misunderstandings later.

10. **Identify and clarify the domains for which policies are relevant.**

It is important for scientists and researchers to understand more about the policy arena in which their research results might be used, including what kind of policy organizations exist (e.g., governmental, NGO, industry, etc.), what their policy focus is, who the key policy-makers are, and whether and how they may exercise or yield their power in the policy-making arena. In finding answers to these questions, keep track of who the constituents or clients are for each policy organization or policy-maker. Seek to understand their values and what values may help distinguish one policy group from another. With greater understanding of the policy arena, scientists can identify relevant policy domains where research may be important or needed, who the constituents or clients are for them, and what the salient values⁹ of particular clients may be.

Just as networks are important assets in defining strategies for attacking complex research problems, networks of policy organizations are important assets in defining potential policy solutions to the issues. By understanding more about policy domains and the groups active in them, researchers can also identify other relevant policy domains and establish and/or tap into cross-sector policy networks. A researcher or research institution that is well connected to both research networks and policy networks is able to be more influential than one whose network of contacts is smaller or more isolated.



Understand, serve and engage in policy processes

In democratic systems key interactions between policy-makers and stakeholders and their constituents take place in the context of the political process. Researchers should pay attention to how the political process influences policy-making and how science can contribute to the political process. Researchers should keep in mind that science is only one source of information used by politicians and stakeholders. Syntheses of case studies suggest 7 guidelines.

Understand Policy Processes

1. Scientists who understand the policy process and how it differs from the scientific method will be more effective at the science-policy interface.

To be successful in their engagement in the policy arena, scientists must become proficient in both the scientific and the policy processes. Most researchers are well trained in the scientific method, particularly that branch of the method that is well founded in their scientific discipline. Just as the scientific method has some key tenets or “rules of the game” that help to bring credibility to the research results, the policy making process also has some key tenets that help assure that policies are sound, efficient, and don’t impose unintended burdens on constituents. By becoming more familiar with these rules and the roles that researchers and scientists can play, they are better able to contribute to the policy-making process. Understanding the policy process depends on ongoing engagement because the rules, roles, and values evolve over time, just as does the cumulative understanding of the scientific state-of-the-art.

⁹ A salient value may be one that makes a certain policy organization very unique. It may also be one that two disparate policy organizations share in common or in direct opposition; creating the possibilities of alliances for or against a potential policy. Indeed, the power of such alliances may even extend to who gets the resources to conduct research on an issue or whose results are given credence as a basis for developing policies.

Many countries are trying to make policy processes more transparent. The research community should take advantage of this development. At the international level, there are several venues that offer opportunities for forest scientist involvement (e.g., IUFRO, United Nations Forum on Forest (UNFF), the Convention on Biological Diversity (CBD), and the Collaborative Partnership on Forests). However, it should be recognized that policy processes are not uniform and can deviate from rules and mandates. Researchers should be flexible and should be prepared to engage in the policy-making process if an unexpected opportunity to provide information arises.

2. Researchers should conduct policy research and evaluate policies and their implementation.

Policy research, including organizational issues and policy impact assessment, can help researchers and their institutions enhance their contributions to the development of sound forest policies and improved forest resource management and utilization. Forest policy research can be both retrospective and prospective. Retrospective policy research looks back at the development of current or previous policies, the assumptions that were made, and then compares them to the events that actually occurred. For example, if a certain forest policy was implemented to reduce illegal logging, have events since the policy was implemented resulted in a reduction in illegal logging. Prospective policy research is forward looking. It evaluates policy options for dealing with a particular issue, often in terms of the positives (pros) and negatives (cons), by projecting how each option might affect the situation at hand. Often, the implementation arrangements for a policy option can be as important to the set of pros and cons as the policy itself. In short, how a policy is implemented can be as influential on sustainable forest management as what the proposed policy is.

Serve Policy Processes

3. Researchers should promote understanding of the value of science in guiding policy decisions. They should serve policy processes by producing synthesized information, defining the role of scientists when involved in the policy process, and providing advice on how to improve policy-making.

Know your target audience to select an outreach method and tailor the message so it appeals to the audience. Policy-makers are often attempting to deal with a large number of issues simultaneously. Rarely do they have the time or the luxury of learning a great many facts and all the facets of an issue. So all the facts and facets of an issue must be condensed to a vital few points and simple, straightforward messages about them prepared. Policy staff normally does this hard work of condensation and preparation; they are typically very astute politically and understand community values and social aspects of issues very well. What they may lack is an understanding and appreciation of the scientific information. Scientists who are both good listeners and good presenters are needed. Listening is the important — often-overlooked — first step for scientists. Scientists need to listen carefully to the policy-makers' and their staff members' descriptions of the issue, for in that description lie kernels of wisdom about what values are influencing the policy process and what perceptions — accurate or not — exist. Only after listening carefully can the scientist begin to assemble the information pertinent to the policy decision and organize it into a simple, concise presentation for policy staff, which is often the primary audience.

A second important role for researchers and research organizations is helping to evaluate ongoing policy processes and advising policy-makers on how to improve the policy-making process. Examples include evaluating the openness of the policy process and the effectiveness of the communications strategies employed, retrospectively examining whether the environmental, economic, or social impacts forecast prior to the project actually occurred, and providing advice on improving public participation and impact assessment procedures for future processes.

4. **The values that people ascribe to science and the scientific process are important. How scientific results are disseminated is a key part of influencing policy. While peer review is a necessary precursor to effective information dissemination, it is not sufficient. Targeted, tailored, translations of results must be prepared to reach policy-makers.**

Because of the breadth and diversity of stakeholder groups affected by forest policy, it is essential to develop and follow a communication strategy that will meet the particular challenges and needs of each stakeholder group. One size does not fit all. Researchers should develop interpersonal channels to communicate with policy-makers. The nature of such channels and how they can be used effectively will depend on the socio-political context. For instance, in some cases it might be beneficial to develop personal relations with a policy-maker. In other cases, it might be more effective to rely on an intermediary who has the ear of a key policy-maker. Due to the realities of political power changes and their effect on government staffs, it is often very important to build networks of diverse contacts and use those networks responsibly. In addition to informal interpersonal interactions, websites, e-mail lists and list servers (e.g., CIFOR's POLEX) can offer informal mechanisms to provide information to policy-makers.

Engage in Policy Processes

5. **Increase mutual understanding of the role of scientists in policy making processes; be aware of the boundaries between "informing" and "advocating".**

Some scientists misunderstand their role in the policy process. Their role is **not** to become an advocate for a particular viewpoint. Becoming an advocate usually has a negative effect on the credibility of a scientist's results, because advocacy is equated to being biased in favor of the particular viewpoint. Advocacy is best left to others. Instead, researchers should focus on informing policy-makers about policy options and the impacts of those options. Research institutions have a role to play in working with their

scientists to establish clear guidelines on the roles individual scientists can play in policy processes. Scientists should be clear about the guidelines they use and the role they play, so that a mutual understanding exists between scientists, policy-makers and stakeholders about the role the scientist plays in a particular policy process.

6. **Researchers who decide to engage in policy processes should be aware of the associated risks and trade-offs in order to successfully operate in the science-policy interface.**

Scientists who have been successful at seeing their research results influence policy are often strongly motivated by a desire to "make a difference." This outlook increases their willingness to engage in the debate that surrounds policy issues. A key challenge is how to engage in a way that simultaneously retains the scientist's credibility and reputation in the scientific community as well as makes a positive contribution to the policy process. A key aspect of scientific credibility is scientific independence, that is, the ability to present one's research results as unbiased and without being perceived as advocating for a particular policy option. The line between presenting facts accurately and advocating a particular policy or action based on those facts is sometimes blurry. Stepping over that line to become, or to be perceived as, an advocate or apologist for a particular policy is detrimental to one's scientific credibility and independence, and can even jeopardize the standing of the scientific community in the eyes of the public. This is among the most noteworthy risks associated with operating at the science-policy interface. There may also be other risks. For example, groups opposed to a particular policy may transfer that opposition to the science and scientist seen as supporting that policy. Or if a policy becomes the subject of litigation, expert witnesses for opponents will do their best to explain why science supporting the policy is insufficient, inappropriate, or invalid. Scientists who have extensive experience at the science-policy interface can provide advice and mentoring on ways of engaging without compromising independence or reputation.

Risk-taking and willingness-to-engage occur not only on the individual level but also the organizational level.

It is difficult to draw conclusions about which organizations provide the most freedom or support for risk-taking and engagement in the policy process. Universities, tend to be more permissive about the involvement of professors in science-policy issues, while public agencies tend to be more sensitive. Industrial firms tend to permit engagement only when it supports their business strategies. Community and interest groups tend to support engagement when it brings publicity and support to their cause. It is more dangerous for an individual to take risks and engage at the science-policy if their employing organization does not sanction or support such activities. Forest research organizations operating at the interface should consider development of codes of ethics, integrity, or conduct that provide additional guidelines for their employees.

Facilitate Relations between Stakeholders and Policy-Makers

7. Scientists can play a role in policy making by facilitating relationships among stakeholders and policy-makers.

Researchers can play an important role in informing policy-makers about the nature of communities and their interests and how the policy options being considered are likely to affect those interests. Scientists can gather information on community needs, values, attitudes and knowledge to help policy-makers better understand the communities with which they are working. Some of this information can be collected from demographic sources, such as census records or economic data. But often the most useful information comes from discussing issues and interests with stakeholders. Stakeholder feedback can be especially valuable in highlighting misperceptions and unanticipated or unforeseen consequences about policy options. Feedback can also help expose gaps in the science and shape the agenda for future science. To hear, understand, and synthesize the feedback, scientists working at the science-policy interface must be excellent listeners.

Sometimes, a key to informing the policy-making process is not just effective listening on the part of the scientist, but rather creating effective opportunities for stakeholders and policy makers to listen to each other. Scientists can help by serving as facilitators of

two-way communication between stakeholders and policy-makers. Being an effective facilitator requires a different set of skills than technical expertise in the sciences. One must be a student of human interactions, group dynamics, and decision-making processes. Further, one must be adept at working with a wide variety of people from different cultures, social classes, and backgrounds. Sometimes these abilities are collectively referred to as “strong people skills.” Skill in dealing with people depends on one’s personality as much as one’s academic knowledge and experience. Skill in building relationships among groups and in working with people from different backgrounds and interests can be taught and learned just like any scientific discipline. Scientists who want to work effectively at the science-policy interface need to understand how to build and manage relationships among multiple parties in addition to their technical expertise.

When engaged in this facilitative role, scientists should take care to preserve their independence and be neutral in their dealings with all stakeholders. The goal of a facilitator is to bring parties together while serving as a neutral broker of the dialogue, not for the facilitator to become a stakeholder in the dialogue.



Central Yemeni Highlands (photo by John Parrotta)

IV. ■ Create organizational capacity and culture that enables and encourages work at the science-policy interface

Science organizations that want to ensure that sound science be considered in the formulation of forest policies should include this objective in their mission and mandate. These institutions should develop the necessary structure to achieve their mission, strive to improve the policy relevancy of their research programs, and their ability to learn from successes and failures and to anticipate and adapt to changing societal needs while maintaining their long-term vision, independence and neutrality. In many, if not most, research institutions, this will require a special effort to improve the capacity of scientists and other staff to engage effectively at the science-policy interface. Syntheses of case studies suggest 7 guidelines.

Improve Capacity to Engage in Policy Processes

- 1. Research institutions should invest in building capacity to deliver/communicate science or science messages. This need is particularly great in developing countries.**

Research organizations in some countries do not currently invest resources in improving their capacity to pursue policy-related research, effectively engaging with stakeholders, and informing policy processes. While discussions at the task force's workshops suggest that further investment in this area is needed in many developed countries if their science organizations are to engage more effectively at the science-policy interface, the need is more acute for research organizations in most developing countries. Research institutions in developed countries have a role and responsibility in providing assistance to help their counterparts in developing countries move faster towards having the capacity to effectively integrate science in policy-making processes.

- 2. Research institutions should create incentive structures to reward researchers and project teams for effectively informing policy processes.**

Research institutions need staff that are interested in and understand policy processes, and that have the skills necessary to work with policy-makers and other stakeholders. Not all scientists may be interested in working at the science-policy interface. Some may be more interested in advancing their scientific careers by writing and publishing scientific papers and transferring results to users. Particularly for young scientists, getting established professionally by completing several research studies after completing their academic degree is most important. Developing proficiency as a researcher and building a reputation as a competent scientist are necessary preconditions to being effective at the science-policy interface. But by mid-career when their scientific credentials are well established, researchers are at the point where becoming active at the science-policy interface can make meaningful contributions both to policy-making and to furthering their scientific careers.

Institutions should foster an institutional culture that encourages scientists and researchers to work at the science-policy interface. Science organizations may need to develop strategies and incentives to encourage scientists — individually or as members of teams — to participate in the policy process. This may require changes in human resources management practices, including adjusting assignments and offering appropriate incentives such as promotions, perquisites, or bonuses for successful support of policy-making.

- 3. Researchers should evaluate the impact of science on policy and policy implementation.**

Scientists want to become involved at the science-policy interface because they believe that they add value to the policy-making process. From time to time, the hypothesis that scientists add value should be tested. Retrospective evaluations of the impact of science on policy-making and policy implementation are essential to test that hypothesis. Due to the complexity and diversity of policy processes it may be difficult to identify cause-and-effect relationships, and therefore determine if an institution or individual

scientists have informed policy as soon as it is made. We have found that evaluating impact becomes easier if some time is allowed to pass between the time that the policy is made or implemented and the evaluation is conducted.

Some institutions are beginning to look at how their science is influencing policy. CIFOR, for example, is looking at references made by policy-makers to unpublished manuscripts as an indicator of policy influence. This IUFRO task force has benefited from reviewing the case studies presented at the three regional workshops. Findings emerging from evaluations should be used to develop guidelines to improve future interactions.

Improve Policy Relevancy of Research

4. Scientists and research organizations should develop feedback and other learning mechanisms to continuously improve their relevancy to, and impact on, policy processes.

To positively influence policy-makers, research results must be relevant to current policy issues and framed in ways that policy makers and stakeholders can understand. A critical part of maintaining relevance is obtaining feedback about emerging issues and changes in biophysical, social and economic systems, and using that feedback to guide research priorities and selection of appropriate hypotheses. Successful research organizations and researchers recognize the importance of learning and have developed the capacity to learn. For example, opportunities for researchers and managers to work together to test new research results in ongoing management activities can be very helpful in building trust and confidence and in fine-tuning proposed policies. Trans-boundary institutions and organizations such as CIFOR, CATIE, and IUFRO that foster shared learning and stimulate fresh thinking and innovation help keep science programs fresh and innovative and more responsive and relevant to policy-makers. An important part of innovation in science is the willingness to take risks by advancing new ideas for consideration by policy-makers.

5. Scientific organizations are more influential in policy discussions when they lead flexible and resilient programs that combine a long-term vision with delivering relevant results in the near-term.

To play an effective and constructive role in policy development, scientific organizations must have the capability to anticipate future changes. Scientific organizations must be forward looking. They must be able to provide early alerts about emerging issues and potential changes in resource conditions, economies, and societies, and values. Beyond just signaling that certain changes may occur, scientific organizations must be able to launch studies and generate results far enough in advance to provide the basis for policy responses to the changes before negative impacts become insurmountable.

Flexible and resilient organizations are able to adapt easier to changes in priorities as issues emerge and potential changes are identified. They have a broad array of expertise in their scientific cadre and a strong network of partnerships with other research organizations to augment their in-house talent, both of which contribute to resiliency. They also control their staffing and overhead costs to assure that sufficient operating funds exist to move quickly into new research studies. They also set clear expectations for their researchers that changes in research priorities will occur and rapid responses are necessary. Keeping reasonable operating budgets and creating the expectation that changes in research focus will occur contribute to flexibility.

Scientific organizations that have both a long-term vision and an ability to continuously deliver near-term relevant results are most influential. When an organization can reliably deliver results quickly, but lacks a long-term vision, stakeholders and policy-makers often detect a lack of focus and they sense that the organization is adrift on a windy sea, heading whichever way the wind blows. Those perceptions detract from credibility and trust. In contrast, focusing so intently on long-term objectives that useful results are not delivered in a timely fashion to respond to current issues also makes an organization irrelevant. Both a long-term vision and an ability to deliver results relevant to current issues are essential. An organization must have sufficient long-term vision that

emerging issues and changes in values rarely take it by surprise and that complex issues taking a long time to solve can be studied efficiently. An organization must also have the capacity to respond to contemporary issues through ongoing applied research and development activities. In short, the best scientific organizations are adept at both strategic and tactical issues. Continuing political and financial support also depend on maintaining the right blend of these capabilities.

Maintain Independence and Neutrality

6. To span boundaries between science and policy, forest research institutions that are independent, neutral, and unbiased are more credible.

Organizational structure and independence of the research enterprise has a strong influence on the credibility and standing of forest research in the policy arena. The concept of independence means that the researchers are free to draw whatever conclusions their data suggest and to report their results without being censored or pressured by policy makers to alter their findings. When policy makers direct what the results should be, often to buttress previous policy decisions or predilections, researchers have lost their independence and objectivity. Losing objectivity leads to loss of credibility and trust. Not only are these losses attached to the results of a particular study or the particular researcher who conducted the study, the losses in credibility and trust are attached to the entire research organization employing the individual. Sometimes the standing of science and professionalism in the community also suffers.

There is often a tension within research institutions between the desire to be independent, neutral and unbiased and appearing to be closely associated with certain policy-makers and/or stakeholders as a result of close collaboration on policy issues. Some independence may be lost when a scientist or research institution “owns” and “sells” scientific information to inform policies, and stakeholders may feel that the researcher is not unbiased or neutral. To address this potential loss of independence and neutrality, institutions should try to be transparent about biases and values that play a part in developing their research programs and that may influence research outcomes.

A final word on independence is warranted. Some scientists mistakenly believe that independence means working alone on a problem or issue. Issues today are often too complex for one scientist to attack all alone. A team of scientists composed of people with different scientific backgrounds is usually needed to attack complex problems. Working with research colleagues on a team does not compromise “independence” as we have used the term here. Nor does collaboration with team members from other disciplines compromise the credibility of any team member. If the team has the collective ability to draw conclusions from their body of work free from censorship, pressure, or bias, that team is independent and objective.

7. The values that people—both influential individuals and communities—aspire to science and the scientific process are important determinants of whether science is seen as credible and a useful basis for improving the quality of policies.

Trust and credibility in a researcher and a research institution are the accumulated public and private perceptions of many people over long periods of time. They are slow to accumulate — years and decades — and easy to tear down. Therefore, forest researchers and research administrators as well as forest policy-makers must take special care to conserve and protect trust and credibility. Both groups have special roles. Researchers and research administrators should assure that the whole scientific process is followed. Peer review is the most widely accepted and effective approach for independently validating the credibility and soundness of a study’s findings. Researchers should also avoid becoming advocates for particular policy positions and administrators should rein in researchers who stray over the line and become advocates. Advocacy is inconsistent with objectivity. Policy-makers should limit their influence to calling for research studies and helping to shape the hypotheses to be tested, but should then assume a hands-off position until after the conclusions have been drawn and passed peer review. At that point, the results can be considered, along with other information, as part of the policy development process. Any attempts to interfere with research studies and predetermine what the results should be will inevita-

bly lead to loss of objectivity, and negatively impact the reputation, credibility, and trust of the public in the researcher and their institution, and ultimately the policy-maker too.

Within individual countries, there are steps that the forestry community can take to increase the credibility and trust placed in their forest research institutions. For example, national councils or “roundtables” of forest stakeholders have successfully elevated the standing and prestige of forest research within federal and state governments. Stakeholder groups have also proven effective in providing support and political cover for research and development on institutional arrangements, policy-making structures, and governance issues that the research institutions by themselves may not be able or willing to undertake without this external political support. Members of international scientific networks can help build capacity and support institutions that need reinforcement. Every country’s forest research institutions need to have the trust and credibility of the public and policy-makers to help inform policy-making and implementation.



*Atlantic Forest, Serro do Mar, São Paulo State, Brazil
(photo by John Parrotta)*

Closing Commentary

In recent years, the forest science community has begun to take advantage of new opportunities to contribute to the development of forest policies aimed at advancing sustainable forest management at local, national, and international levels. The growing emphasis on stakeholder consultation in international policy forums and wide variety of ongoing regional and national forest policy formulation processes present both an opportunity and an obligation for forest scientists and research organizations. Increasingly, scientists and research organizations are being called upon to provide policy-makers and stakeholders with scientifically sound information, both to inform policy discussions and to assess the likely implications of policy options on forest resources and the communities that depend upon them. Ultimately, forest policies affect not only the sustainability of forest ecosystems but also the sustainability of communities and economies that depend on forests.

This guidance document provides practical advice to scientists and research organizations. To address questions that are relevant to policy issues, research should focus on the values that people hold and how forests meet their needs. Interdisciplinary and integrative research are emerging as better ways to respond to the complex issues and associated public values that are prevalent today. To be relevant, research also needs to look to the future and identify issues as they emerge because they are easiest to respond to or mitigate then.

Communicating effectively, often, and through multiple channels to get information to stakeholders and policy-makers in a form they can comprehend and use is increasingly important. Not all forest curricula provide the training needed to prepare forest researchers to communicate effectively in person and through the media, so additional training on-the-job may often be needed. To reach a wide variety of stakeholders with useful information, ways are needed to understand how people’s values about forests influence their thinking and to stay abreast of how people’s values are changing. Another facet of preparing to communicate is the need to synthesize available information — both science and traditional knowledge — to create useful information products tailored to peoples’ cultures and backgrounds. Partnerships and networks

are often critical to enhance communication. Sometimes partners or others in a network can deliver messages more effectively than a researcher or a research institution because the other parties have more credibility or trust with segments of the public or policy-makers.

At an athletic contest, the spectators who sit on the sidelines play a different role than the competitors on the field. Similarly in the science-policy arena, spectators who watch policy being made play a very different role than the scientists, policy-makers, and stakeholders who are actually grappling with the issue. These guidelines are for the scientists who are actually grappling with issues at the science-policy interface. Before getting involved, scientists should take time to understand the policy process. Just as athletes need to know the rules of the game, scientists need to understand the policy playing field, where the boundaries are, and the rules of the policy-making game. Because policy-making is different in different countries and international forums, it is important for scientists to understand the policy process and how they can serve it most effectively before they actually get engaged. Scientists should also expect to become more proficient and learn from their mistakes as they gain experience — policy-making is not an easy game to play. Building good working relationships with policy makers and stakeholders is one of the keys to success.

These guidelines suggest that researchers, in addition to being technically competent and well-respected in their discipline, need to also be culturally aware, great communicators, excellent listeners, politically astute, and always well-connected to an extensive network. These additional skills are often the missing pieces that may inhibit a researcher or a research team from engaging and being successful at the science-policy interface. Research leaders have a key role to play in coaching employees and building teams that reflect this broader skill set. Sometimes consultants, collaborators, or in-house experts with complementary skills can offset what is lacking and improve the chances of success.

Some of these guidelines apply to the individual scientist; others apply to the research institutions that employ scientists. Effective involvement of scientists in policy-making does not happen by chance, nor will it continue without the active support of their research

institution. Effective involvement takes time and energy, and may require tradeoffs between generating more value from research already completed versus doing more new research. However, institutions may benefit in the long run in terms of their credibility and prestige (which often translate into additional funding) when their employees are efficient and effective in the science-policy arena. Thus, it is in the institution's self-interest to improve the capacity of their employees to engage in science-policy work and to create incentives to protect and reward scientists who do so. Work at the science-policy interface provides excellent feedback on issues and public values—two kinds of information that should be used to help improve the strategic agenda of institutions and the programmatic focus of their research programs. But these benefits only accrue when scientists and institutions maintain their independence and neutrality in the policy arena. The loss of independence and neutrality results in an erosion of support, trust, credibility, and prestige. That erosion often occurs much faster than these can be accrued through good work, so institutions and individuals should guard their independence and neutrality very carefully.

One of the challenges for IUFRO is to share its success stories of working across cultures; not only organizational cultures within a country but also organizational and social cultures among many countries. The need to strengthen capacities of forest scientists to work effectively at the forest science-policy interface is one of IUFRO's greatest challenges for the years ahead. IUFRO has more than a century of experience in building transboundary and transorganizational networks of researchers. With the past decade, IUFRO has recognized the importance of providing leadership within the forestry community on modeling the new interdisciplinary research approaches needed to integrate more thoroughly the creation and delivery of science in forms that people and policy-makers can use. Through this task force and through the case studies that have been collected and synthesized, the importance of IUFRO's vision, leadership, and ability to share success stories have been amply demonstrated.

Our fervent hopes are that each reader will find something in these guidelines that can help improve your ability to work successfully at the forest science-policy interface, and that you will share your successes with others through active involvement in IUFRO's networks.

Appendix

Workshop Summaries and List of Case Studies Evaluated by the Task Force

Reports and Publications from Regional Workshops

Electronic copies of the following are available on the IUFRO website: <http://www.iufro.org/science/task-forces/sciencepolicy-interface/>

Turrialba, Costa Rica (2001)

Meeting report & abstracts of presented case studies. See also “Forest Science and Forest Policy in the Americas: Building Bridges to a Sustainable Future” Richard W. Guldin [published in *Forest Policy & Economics* 5(4), 2003]

Chennai, India (2002)

Meeting report, abstracts and full papers of case studies; summary of lessons learned through case studies (Chennai workshop)

Copenhagen, Denmark (2003)

Meeting report, abstracts and Powerpoint presentations of presented case studies. See also “Forest Science and forest policy in Europe, Africa, and the Middle East: Building Bridges to a sustainable future” R.W. Guldin, N. Elers Koch, J. Parrotta, C. Gamborg, & B.J. Thorsen [published in *Scandinavian Journal of Forest Research*, 19(Suppl. 4): 5-13, 2004]

Birmensdorf, Switzerland (2004)

Full workshop report.

Papers Presented at Regional Workshops

October 30-November 1, 2001. Turrialba, Costa Rica

* Papers published in *Forest Policy & Economics* 5(4), 2003.

** Papers published in *Revista Forestal Centroamericana* No. 37, 2002.

* “Poor regulatory capacity limits the ability of science to influence the management of mahogany”—Arthur G. Blundell & Ted Gullison (USA & Canada)

* “Analysis of environmental effects of prospective trade agreements: the forest products ATL as a case study in the science-policy interface” — David J. Brooks (USA)

** “The national process of forest certification as interface for forest research – forest policy and management interactions: the cases of Costa Rica and Guyana” — Bastiaan Louman, José Joaquín Campos, Susanne Schmidt, Roderick Zagt & Padmattie Haripersaud (Costa Rica)

** “Contribución de la investigación en la toma de decisiones en el proceso de concesiones forestales en Petén, Guatemala” — Fernando Carrera & Kees Prins (Costa Rica)

** “Las redes operativas y su papel en la política forestal - experiencias prometedoras en Honduras y Nicaragua” — Glenn Galloway (Costa Rica)

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Discussing natural resource management and agroforestry issues with village community members during the Task Force workshop held in Chennai, India, July 2002 (photo by Don K. Lee)

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