

# Working Paper

**Testing the "Policy Exercise" in Studies of  
Europe's Forest Sector: Methodological  
Reflections on a Bittersweet Experience**

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May 1993



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## FOREWORD

The objectives of the IIASA Forest Study were:

- To gain an objective view of potential future developments of the forest resources of Europe.
- To build a number of alternative and consistent scenarios about potential future developments and their effects on the forest sector, international trade and society in general.
- To illustrate the effects of;
  - (a) Forest decline caused by air pollutants,
  - (b) Existing and changed silvicultural strategies, and
  - (c) Expansion of the forest landbase.
- To identify meaningful policy options, including institutional, technological, and research/monitoring responses that should be pursued to deal with these effects.

This working paper describes the Policy-Exercise concept which was employed in the study in the attempts to identify meaningful policy options.

## **ABSTRACT**

This report presents the Policy-Exercise concept developed by Brewer (1986), among others. The overall objectives of this Policy-Exercise are;

- to foster communication and mutual understanding,
- to synthesize policy-relevant information, and
- to discover alternatives for the future.

The different methodological Policy-Exercise concepts tested by the Forest Study and the lessons learned are described in this paper.

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## 1. INTRODUCTION

The so-called new forest decline that is being observed in almost all countries of Europe (Kairiukstis et al., 1987; Nilsson and Duinker, 1987) was a major concern in the 1980s, and continues to be one. Although the phenomenon is more than a century old, the simultaneous appearance recently of outwardly visible stress symptoms in trees in many areas of Europe and North America has raised the issue to one of great apparent significance. There is widespread concern within the scientific, industrial, labour, economic, regulatory, and public sectors of European society that a continuation of recent trends in forest decline may lead to a plethora of undesirable consequences, including for example: upsets in trade patterns for wood products, leading to wide fluctuations in prices of both raw materials and finished products; increased costs for silviculture and forest protection (e.g., due to increased incidence of insect outbreaks); loss of recreationally significant forests; loss of the protective functions of forests with respect to soil and water, especially in montane regions; and many others.

While the scope of the phenomenon is international, the scale of each instance of decline is local to regional (sub-national). This stems mainly from two sets of factors: (a) the forests themselves are different from region to region (because of ecological and silvicultural differences), making them differentially susceptible to air pollution and other stressors, and (b) the spectrum of air pollutants and their concentrations and deposition rates differ from region to region. Thus, while strategies to combat undesirable impacts of forest decline must be fitted appropriately to the local or regional scales, the strategies must be set firmly in a context of the international arena to take account of, for example, trans-boundary air pollution, and trade in raw materials for processing.

Most of those who recognize the gravity of the problem are calling for immediate mitigative actions. However, it is clear that actions taken in one country for its own benefit may undesirably affect other countries (e.g., import tariffs), and that actions taken by one sector of Europe's economy may undesirably affect other sectors (e.g., reduced capital investments affecting labour and employment). Thus, there is a strong call for international and intersectoral cooperation in any efforts to combat the expected consequences of continued forest decline in Europe.

There is, in relative terms, a considerable body of knowledge on what actions should be pursued on a local (stand) scale in response to decline to achieve local objectives. However, the systems whose future is of most concern are not local systems - they are regional (e.g., forest-management units administered by governments or companies), national (e.g., national economies), and international (e.g., European Economic Community) systems. Therefore, those who are faced with the design and implementation of solutions to the problem of forest decline must grapple with the difficulties of coordinating local actions to achieve regional goals, regional actions to achieve national goals, and national actions to achieve international goals. This is a central dilemma of management - "think global, act local".

The same kind of difficulty arises when considering the temporal dimensions of forest decline. Forests are, in relative terms, slowly evolving systems. Actions taken in forests over the past several centuries have given rise to the forests in Europe today. As well, actions taken over the next decade will play a large part in determining the nature of the forests and forest economy several decades into the future. Therefore, those who would design and implement solutions to the problem of forest decline must face the difficulties of coordinating actions for the near term to achieve longer-term objectives for the systems under management. This is another central dilemma of management - "think long-term, act now".

A third dilemma of trying to cope with the forest-decline problem in a broad-scale, long-term context is that the arrays of affected persons and of decision-makers are extremely broad, heterogeneous, and very difficult to bound. If the repercussions of continued forest decline become as far-reaching as the partial list above suggests, then the number of societal parties and sectors that would want to be involved in the design and implementation of solutions is large. In this dilemma, the challenge is to find ways of accommodating fairly the myriad of competing interests, of various strengths, in the search for equitable problem resolution.

The Forest Study of the IIASA Biosphere Dynamics Project was one of the broadest studies of its kind on the subject of forest decline. In this paper, we summarize the general approach being taken in the study, and highlight the means by which we had planned to address the policy dimensions of the forest-decline problem. Thus, following a brief description of the Forest Study, we introduce the "policy-exercise" approach to policy analysis. Subsequently, we recount our experiences in testing the approach over a two-year period, giving details on what we did and what we accomplished and learned in each test. Finally, we reflect on an improved design for further policy-exercise workshops, and on the general future of policy exercises.

## **2. THE FOREST STUDY**

The Forest Study began early in 1986 with the following objectives (Nilsson, 1986):

1. to gain an objective view of the future development of forest decline attributed to air pollution and of the effects of this decline on the forest sector, international trade, and society in general;
2. to build a number of alternative and consistent scenarios about the future decline and its effects; and
3. to identify meaningful policy options, including institutional, technological and research/monitoring responses, that should be pursued to deal with these effects.

The geographic focus of the study was on Europe. However, it was necessary for us to take account of trends within, surprises from, and reactions of the major timber-producing regions of the world - many of these regions are linked to Europe through, for example, timber and wood-products trade. The temporal focus of the study has been on the next few decades, as an appropriate horizon for industrial and social planning. Nevertheless, account has been taken of a much longer future with respect especially to wood-supply scenarios.

The first objective above was pursued with the aid of a matrix-type simulation model (Sallnäs 1990; Nilsson et al., 1992). The model generates projections of wood volume over time by country, species group, and age. To reach the second objective, it was not enough simply to project alternative configurations for the forest-resource inventories of most European countries. We also gathered information on a variety of related topics to permit building more comprehensive scenarios. These related topics included, for example, possible trade and price effects of forest decline, potential future demand for forest products, the role of silviculture in forest decline, improved monitoring systems for registering the extent of decline, recreational consequences of decline, and others (e.g., Nilsson and Duinker, 1988; Stoklasa and Duinker, 1988; Nilsson, 1988; 1989).

## **2.1 Policy-Exercise Workshops**

The Forest Study has tried to provide useful knowledge with which, and an environment in which, policy-makers in the forest sector of European society could explore in a systematic way what strategic policy alternatives might be used to deal with continued forest decline. Because policy formulation is about the future, because futures are uncertain and full of surprises, and because forest decline may be a long-term future problem, it is necessary for policy-makers and policy analysts to engage in a process of scenario building and evaluation. This can be conceived as a process of posing plausible (and interesting) courses for the future of forests and the forest sector in Europe, evaluating their implications, posing strategies for dealing with undesirable elements of the posed futures, and evaluating the consequences of those strategies.

Thus, while the study has had a technical component to provide high quality, useful information for policy purposes, it also has had a policy component intended to provide an environment in which policy-makers can use the technical information in an exploration of strategic policy options. It is by no means clear what is the range of feasible strategic policy alternatives for coping with possible long-term consequences of continued forest decline, nor what forms of intersectoral and international cooperation could lead to an agreeable sharing of costs and benefits related to the decline. To address these knowledge deficiencies, the policy component of the study centered around a series of "policy-exercise" workshops attended by policy-makers and analysts from governments, industries, and international organizations related to the forest sector in Europe and elsewhere. The main objective of such exercises, described in detail below, was to derive lessons for policy strategy with respect to the European forest-decline problem.

## **2.2 Background to Policy Exercises**

The "policy exercise", a flexibly structured approach for facilitating the interface between policy people and scientists, has been under development in the Biosphere Dynamics Project since 1984 to address some of the inadequacies of strictly analytical approaches (e.g., big simulation models) and simple aggregation approaches (e.g., expert committees) for synthesizing large amounts of data and knowledge and coming to grips with uncertain, risky futures. Papers by Brewer (1986), Clark (1986) and Sonntag (1986) documented the intellectual foundations for the concept, and Toth (1986) proposed an operational framework. Briefly, the objectives of a policy exercise are:

1. to foster communication and mutual learning through effective face-to-face communications;
2. to synthesize policy-relevant and useful information through integration of disparate sets of formal and informal knowledge; and
3. to discover the implications of alternative, plausible futures through structured exploration of scenarios.

A policy exercise consists of preparation, interaction, and evaluation phases. The workshop is the interaction phase when policy-makers and analysts generate future histories concerning the forest-decline problem. A future history is a record, looking back to the present from a specified future time, of (a) trends of indicators and phenomena relevant to the problem at



hand, (b) policy initiatives taken in response to expected trends, and (c) expectations of policy consequences vs. realized policy consequences. Several procedures were devised whereby policy-makers could contribute realistic policy dimensions to the desired future histories. In one of them, policy-makers would respond to a specific long-term scenario (prepared by analysts under guidance from policy-makers) with policy proposals for a short period, say a decade. The analysts revise and update the scenario with the assumption that those policies were implemented. Policy-makers then propose policies for the next time period in the scenario, and the interaction continues in this way until the final time period (agreed upon in advance, say three or four decades) is reached. The final scenario is thus the future history that, when compared with other histories similarly prepared, should provide the basis for effective evaluation of policy strategies. Such an evaluation begins at the workshop, following the generation of future histories, and continues afterwards as the policy-makers and analysts reflect on the exercise in their home surroundings.

The preparation phase prior to the workshop is critical. For those preparing background information and basic scenarios, and designing the workshop interactions, advice is needed from the policy-makers on the dimensions of the substantive content that should be included. Workshop designers need to discover from policy-makers what information (and in what form) they would find interesting, stimulating and useful. In turn, the policy-makers need to know in advance from analysts what information can be provided, and what details about policy strategy are needed for analysts to generate scenarios that have sufficient policy realism. In addition to exchanges of documentation for review and comments, personal interviews should be conducted between the core team of investigators and the participants in advance of the workshop.

The results of our policy exercises were to be mainly two-fold:

1. Participants would have the experience of systematically exploring the future of the European forest sector with their policy peers and a group of leading analysts and experts, and hopefully would find the experience useful in pursuing policy strategies in their own institutions.
2. The study team would take the results of the workshops and the subsequent evaluations, combine them with other relevant findings of the study, and publish, among other things, a concise document for wide readership within the policy community.

There are several reasons for using the policy-exercise approach to exploring the future of the forest-decline problem and possible strategic responses:

1. A policy exercise can be an effective and efficient means for policy-makers to generate realistic and interesting alternative scenarios (future histories) by exercising their policy-making roles with a fast-acting, pseudo-real-world (a "control team" of scientists and society representatives). The control-team concept permits effective exploitation of the strengths of quantitative forecasting tools, expert opinion, and speculation about future societal behaviour.
2. By engaging a wide array of policy-makers, analysts and futurists in structured interaction, the exercise permits an indepth exploration of the multiple assumptions, multiple perspectives and surprising nature of the interactions between economic development, the forests and forest economic sector, society in general, and the environment.

3. Preparing for the interaction phase (i.e., the workshop) will force very careful and attentive consideration of what is important in the policy-making arena.
4. Comparison of several documented future histories will facilitate insights into the implications of alternative management strategies that the forest sector might pursue in a rather incompletely known, surprising, and contextually rich real world.

Within the methodological work of the Biosphere Dynamics Project, development of the policy-exercise approach was a major activity, and involved elaboration and testing of operational protocols (e.g., Toth, 1986; 1988a; 1988b). Among the many other activities were two major case studies initiated in 1986 to serve as mechanisms for integration and as testing grounds for the concepts and results of other Project studies. One such case study was the Forest Study, a sectoral study of environment-development interactions. The relationships between the policy-exercise work and the case studies were as follows: (a) the policy-exercise developments were to provide the major tool for the case studies for drawing technical materials together into policy-relevant information, and for providing a creative atmosphere for policy people and analysts to explore potentially useful policy strategies, and (b) the case studies were to provide the necessary testing grounds for the policy-exercise protocols. As we will see later, our experiences with policy exercises in the Forest Study were more or less only testing grounds for the protocols, and did not make major headway toward substantive policy results for the Forest Study.

### **2.3 Summary of a Basic Protocol for a Policy-Exercise Workshop**

Before delving into the details of our several policy-exercise test workshops, it will be useful to present a structural layout of what happens (or is supposed to happen!) in a policy-exercise workshop. This of course can be read from Toth (1986; 1988a; 1988b) as one version, but here we present another way of looking at the process, derived mainly from notes we prepared in advance of our last workshop test.

One way of viewing the policy-exercise workshop is as a scenario processor. In this view, a goal of the policy exercise is to generate policy lessons through (a) working policy realism into "policy-vacuous" scenarios, and (b) comparing several "policy-rich" scenarios in the search for meaningful policy options. Thus, the policy exercise begins with the generation or collection of raw materials for scenario construction, and the writing of scenarios (i.e., stories of how the future of the subject of interest might unfold given a set of explicit assumptions about the future behaviour of the natural and social worlds) that are essentially void of policy adaptation. These scenarios are prepared by analysts in advance of policy-exercise workshops, although they may be checked over by the policy participants to ensure consistency and acceptance as plausible and interesting materials to work with at the workshop. The workshop then is charged with rebuilding scenario(s) into stories that contain real-world kinds of policy adaptation to new circumstances, including quite unpredictable (surprising) events and twists of fate. A set of scenarios thus processed, if sufficiently different from one another and sufficiently rich in details of cause-effect relationships among policies and resource behaviour, can be fruitfully compared to reveal sensible policy strategies for the real-world problem that the policy exercise is supposed to be addressing.

We described the workshop process of building policy-rich scenarios to the participants in our test workshops in the following way. The analysts present a policy-poor scenario to the policy participants in advance of the workshop. The scenario is essentially a summary of trends and

events (for each topic to be addressed) in the recent past, the present (in our case 1990, just to remove the participants from the immediacies of their real life) and the future. For events and trends the analysts think might occur in future decades, they construct either single "most-likely" projections, or "likely" high and "likely" low trends within which the actual trend as the future unfolds will "likely" fall. These projections ignore possible surprises and usually assume rather static policy and social behaviour.

In groups or singly, depending on the specific roles assigned, the policy participants examine the scenario and formulate policy strategies they would adopt if they were actual policy-makers confronted with the situation painted in the scenario (in some cases they may actually be those very policy-makers, but more often they will be playing roles or simply advising what they think the real policy-makers would do). Facilitators document these policy intentions, and transmit them to the forest-sector analysts who then imagine that the present is now some year in the (real) future, say the year 2000, and "update" the world by rewriting the period in question as a history in accordance with the policy "moves", the starting conditions at the beginning of the period, and the dynamics of the biophysical and socio-economic systems of interest. Then, new high and low projections for the indicators being examined are prepared to "bracket" the likely future trends and events. The updated scenario is returned to the policy participants, who again examine its details and elaborate policy strategies for the next period into the future. This process is repeated until the final horizon of the scenario is reached. Once the workshop is over, the analysts have a set of policy-rich scenario updates with which they can write a cohesive future history, which essentially is a synthetic record of the main events, trends and policies over a several- decade period, taking special note of (a) apparent effectiveness or ineffectiveness of specific policies, and (b) what forces or surprises influenced the effectiveness of policies.

With this introduction, plus the more detailed descriptions by Toth (1986; 1988a; 1988b), we can now proceed to a discussion of the substance of our several policy-exercise test workshops in the Forest Study.

### **3. POLICY-EXERCISE WORKSHOPS IN THE FOREST STUDY**

We organized and held 5 policy-exercise workshops in the Forest Study. The evolution of our testing started with a large group of students playing policy-participant roles, then reverted to very small groups of experienced policy people, continued with another try with a large group of students, and ended with a large group of experienced policy people. Below, we describe each event in terms of what our objectives were, who the participants were, what we did, and what our successes, failures and major lessons were.

#### **3.1 Workshop No. 1 - Students as Policy Participants**

##### **3.1.1 Objectives**

The main objectives of our first experimental run of the policy-exercise protocol at IIASA were to test the mechanics of the workshop version, to see how the various types of scenario processing would work, and to estimate time constraints on various elements of the protocol (Toth, 1986; 1988a 1988b; all the notes below on this set of tests are based on these references).

### **3.1.2 Participants**

To simulate policy participants in a so-called "real" policy exercise, we made use of nine students involved in IIASA's annual Young Scientists' Summer Program (YSSP). Most of these YSSPers were already involved in forestry research for the summer, being responsible for assembling national forest-resources databases for the Forest Study's timber assessment. One of us served as the main forest-sector analyst, with assistance from several members of the YSSP policy-exercise working group. Another one of us was the main facilitator, with assistance from members of the working group and invited observers.

### **3.1.3 What We Did**

The workshop was set up a series of morning sessions spread out over two weeks. The intention was to engage in scenario processing each morning, with the working-group members and observers evaluating each session and modifying plans for the next sessions. The intention was also to engage in a significant amount of preparation in advance of the workshop, both on methodological matters and on scenario and role content. As it turned out, methodological matters received the lion's share of our attention, and content was rather skimpy.

During each scenario-processing session, policy participants were assigned to one of three regions (East Europe, Nordic Europe, and the rest of West Europe - later, we assigned participants to deal with policies of only one country in each of these regions (Czechoslovakia, Sweden and FRG, respectively)), thus forming three regional policy teams of three members each. Each team member assumed a specific policy-making role, one of either government forest-resources ministry, forest-products industry, or the environmental lobby. The scenarios were in this case extremely brief, and we expected to be able to process three rounds (from policy participants to analysts and back) well within a day. As it turned out, we engaged the YSSPers for only about half the sessions originally planned, and spent much of the remaining time during the two weeks redesigning the workshop protocol.

### **3.1.4 Successes, Failures, and Lessons**

It has been said that learning occurs when reality and expectation diverge. When the reality is something one has planned, then its divergence from expectation is often rightly considered a failure (except as a learning experience!). Our first test runs confirmed that we should have followed more closely the protocol that had already been formulated (i.e., Toth, 1986), because they showed us what definitely does not work well! It is unfortunate that we so often need experience with failure in our learning, rather than being able to learn from the experiences of others who have trodden similar ground before us. We knew that preparation was critical, that detail in scenario content would be necessary, and that efficient gaming with scenarios requires professional facilitation and much skill and enthusiasm on the part of all participants. Yet we went ahead without most of these, and learned the obvious. However, we look positively at the experience, because the workshop caused a group of highly motivated methodologists to be drawn together, and many superb ideas on how to organize and run such workshops better emerged during the evaluation discussions. We refer the reader to Toth (1988a; 1988b) for detailed discussions on what was learned from this set of tests.

## **3.2 Workshop No. 2 - One "Real" Policy Participant, and One Analyst**

Based on our first tests, we were led to experiment further with the policy-exercise protocol in a radically different way in two respects: (a) we decided to scale down the size of the group to the extreme of working with only one policy participant; and (b) we decided to engage someone with extensive forest-policy experience in that role.

### **3.2.1 Objectives**

Our objectives here were to test and explore the workshop dynamics when (a) there is only one analyst and policy participant, but both are actually professionals in these roles; and (b) the scenario is more narrowly bounded and richer in detail. We also wanted to get feedback on the content and style of information presentation in a more detailed scenario. Finally, we wanted to give a key person in our Forest-Study Advisory Committee some first-hand experience with a procedure we intended to ask all members of the Committee to participate in later.

### **3.2.2 Participants**

For our first test with an experienced policy person, we engaged a former company president in Sweden who had also been Director of the Swedish Forest Service as our policy participant. We three served as analysts and facilitators.

### **3.2.3 What We Did**

We asked our policy-maker to imagine that he were again president of the forest-products firm he once led, and that he formulate policy for the firm over a few ten-year intervals into the future. We needed to know what kind of organization he would be making policy for, which essentially would tell us what kinds of decisions he can (and will need to) make, and what kinds of resources he has available to implement his decisions. This information was provided in the form of several information brochures from the firm, including a recent annual report.

We also needed to know what kinds of information the policy-maker would like to use (in the scenario) as a basis for his determination of future directions for the firm. We determined that the scenario should cover the following subjects:

1. demand (consumption) for forest products - a set of projections of consumption of newsprint, writing papers, other papers, sawnwood, and panels;
2. timber fellings - projections of supply of raw materials for the forest-products industry in the form of harvest volumes;
3. industrial production capacity - a set of projections of capacity to make the products covered by the demand forecasts above;
4. rates of forest decline - a set of indications of how continued or new forest decline would alter timber fellings, to be calculated on the basis of our research; and
5. threats and opportunities - a set of events that could lead to abrupt changes in the structure of the forests or the forest industry.

We determined that the trends of demand, supply of raw material, and industrial production capacity should begin in 1980 and move forward by ten- year intervals, with 1990 as the present. Thus, in the initial scenario there would be a ten-year historical period (1980-1990), and a period of ten or more years of projection (1990-2000+), in each trend. Separate projections would be made for Nordic Europe (Sweden, Norway, Finland), the rest of West Europe, and East Europe (excluding the Soviet Union). In addition, separate projections would be made for several countries of special interest to the Swedish forest-products industry, namely, Sweden, France, FRG, UK, Portugal, and USSR (where possible). The scenario would also need a section outlining performance of the company. A performance profile, including a few key financial indicators, a summary of industrial facilities, and a summary of wood supply, was developed.

We prepared a set of preliminary notes for early planning of the workshop, and then later a set of briefing notes for the policy-maker's use in getting ready for the workshop. The policy-maker's reactions to the notes were shared with us the day before the workshop.

We jointly generated a list of topics that encompass many of the policy dimensions for a forest-products-company president. The list also showed in very general terms how the policy-maker could implement policies in each area, and in what facet of the scenario updates we would use the provided information about policy. Finally, we prepared a list of possible threats and opportunities from which we could draw candidates for inclusion in the basic scenario and its updates.

The interaction phase of our policy exercise began with the policy-maker formulating policy for 1990-2000 in response to an initial scenario where 1990 was the present. We then examined the policy "move" and updated the scenario by providing an historical account of the decade 1990-2000 and revising the forecasts for the periods beyond 2000. Meanwhile, one of us discussed both process and content matters with the policy-maker. He then received the updated scenario, and was to consider the year 2000 to be the present and formulate new policies for the decade 2000-2010. Once these had been recorded, we determined an outline for an update of the scenario to 2010 = present. Unfortunately, there was no time for a third round of policy move followed by scenario update, so we concluded the exercise with preparation of a "future history" which looked back over the recent history of the European forest sector in general, and the firm in particular, from the year 2010.

### **3.2.4 Successes, Failures, and Lessons**

We learned a great deal from this exercise. While the earlier test workshops left many of the participants with empty feelings about policy exercises, this one gave us great enthusiasm. Below are some observations we made as we evaluated the workshop soon after it was over.

1. If roles are to be played by policy participants, rather than having them represent themselves and their own jobs, then the participants need to be experienced in policy formulation and implementation. This became clear from a comparison of the exercise in which students playing policy roles were essentially unable to formulate usable policies, with this exercise in which a former company president gave us excellent indications of how he would steer the company through the challenges in the scenario. However, it is unfair to place the blame for the shortcomings in the earlier workshop only on participant inexperience - clearly, other factors such as insufficient substantive preparation for all participants, and difficulties with rapid professional use of the English language, were also important here.

2. While the policy exercise is one step along the gradient from scenarios having unrealistically static policy assumptions (from analysts) built in, to scenarios where policy-makers have injected real-time, real-life policy considerations, there is still a problem when policies are being formulated for periods of time of 5-10 years - policy-makers want to see some real-world performance within the period. This is probably best handled as individual cases arise, with the policy-maker giving a decision rule to the facilitator (e.g., if energy prices remain below X, then I will install a paper plant in mid-period), and the control team determining the outcome of the rule.
3. The present was really in the late 1980s. 1990 was so close to the present that our policy-maker was already thinking about the decade after, but far enough away that present performance of his system could be left out of mind. However, in subsequent rounds of a policy exercise where the rounds are some 5-10 years long, while the scenario processing requires policy-makers to imagine that the year at the beginning of any round is the present, in fact it is very difficult to do so, and future periods would be viewed from the real present. It is necessary to try to accommodate this very understandable problem with (a) clever scenario writing in the control-team updates, and (b) adequate preparation and briefing of the policy participants.
4. Efficiency in scenario updating is essential. There is much for the control team to do if it is to be effective, so background preparation and rapid tools (e.g., computerized tables and simulation models) are vital.
5. Real policy-makers have their own expectations about how the future is most likely to unfold. Therefore, they are likely to ignore a single forecast for any particular item in a scenario if it differs from the expectations in their minds. Ways to handle this are (a) provide no forecasts, or (b) provide multiple forecasts. In general, it would enhance policy exercises if thinking about and evaluation of various alternative futures were left for policy participants rather than having the scenario present only one possible future. Also, good explanations need to be provided when surprises and off-trend fluctuations are presented in scenarios.
6. Despite activities in the preparation phase that elicit from the policy-makers what indicators they want to see in the scenario so they can formulate policy, and that elicit from the analysts what policy information they need to update the scenario, there is still a risk that the two sets of information are not well connected, so that the policy-makers are actually formulating policy according to some unrevealed rules in their heads, and the analysts are updating according to their prior plans and some interesting surprises they decide to inject. It is necessary for organizers to spend a great deal of time in preparation to try to get the best match between the systems the policy-makers are driving, and the systems for which we have concern with respect to long-term, broad-scale development- environment interactions. In this specific case, it was one forest- products firm nestled into the context of European markets and forest decline. The positions of the firm and the "problem" on time and space scales, especially the space scale, were far apart. It would be interesting (but perhaps not very illuminating!) if a firm were to be successful in its policies for business survival (in the scenarios) regardless how bad forest decline became throughout Europe.
7. In the event that we engage policy-type people who do not consider themselves true policy-makers, but are in contact with policy-makers in a way that makes them policy influencers (e.g., as advisors, lobbyists, information providers), we should ask them either

(a) in which directions would they like to see policies go, (b) in which directions would they push policy-makers, or (c) in which directions they would expect policies to go.

8. This test exercise included a full bounding cycle. Our preparatory activities resulted in a very smooth information flow following a pattern of (a) defining issues, (b) identifying key actors, (c) decomposing issues from various perspectives, (d) defining indicators of system performance, (e) defining policy variables, (f) sorting out how to aggregate individual policies up to actions at the level of the larger system of interest, and (g) determining how to link system response to the actual policies proposed. As a comparison, the trial exercises with our YSSPers lacked this cycle completely for several reasons (thus, the students did not know what information they needed (indicators), what their possible range of actions could be (i.e., policy variables), etc).
9. For policy-makers representing companies or national agencies, rather detailed information (i.e., disaggregated information) is best. As a rule of thumb, a scenario information package should contain too much rather than too little information, as most policy people are able to select very efficiently the data they need to take into consideration.
10. Policy people often prefer numbers rather than pictorial representations of data. Graphs should be used only when it makes comparisons easier.
11. The exercise showed that the policy-maker--analyst interface can work with the type of scenario procedure we used. We should not forget, however, that this experiment was based on the simplest possible interaction (one policy participant, one analyst, two facilitators). In particular, there were:
  - no group dynamics on the policy side (i.e., several policy participants discussing and reacting to the scenario, negotiating possible joint actions, sharing their views on various items in the scenario, etc.);
  - no group dynamics on the analyst side (i.e., several analysts assessing possible consequences of the policy moves, experts from different fields providing input to the exercise from their own perspectives, etc.); and
  - limited interactions between policy participant and analyst (i.e., our policy participant did not call upon the analyst to provide further details or background related to the scenario in the policy formulation phase, nor did he ask for explanation of the scenario updates; our analyst did not ask for clarification of the policy moves).

### **3.3 Workshop No. 3 - Small Group of Forest-policy Analysts**

The mini-workshop we held gave us much enthusiasm for continuing with this scale of testing, so we tried a similar event soon after.

#### **3.3.1 Objectives**

Our objectives here were to continue the testing we had begun with the previous exercise with one policy participant and one analyst. We wanted to try a new twist on the scenario procedure, again getting feedback on content and style in the scenario. In addition, this gave us opportunity to get feedback from two experienced analysts on various aspects of the



protocol. Finally, we wanted more practice in scenario building and workshop interactions, and more insight into the kinds of policy considerations we should factor into our later work when we engage larger groups of policy people.

### **3.3.2 Participants**

For this test, we invited two forest-sector analysts with the secretariat of the ECE Timber Committee to serve as our policy participants. The three of us played the same roles as in the previous mini- workshop.

### **3.3.3 What We Did**

Since our policy participants considered themselves to be information providers and analysts in the service of policy-makers, we set up the interactions as follows. The policy participants had played key roles in preparing the latest in a series of European Timber Trends Studies - the latest was "European Timber Trends and Prospects to 2000 and Beyond", or ETTS IV (ECE/FAO, 1986). ETTS IV contains some discussion on the policy implications of its findings, and the Timber Committee secretariat had drafted a policy-implications paper for discussion at a joint meeting of the Committee and European Forestry Commission. As a "scenario", we produced in advance of the exercise a specialized executive summary of ETTS V (1996). At the workshop, our policy participants were asked to structure a policy-implications discussion paper for consideration at the 1997 joint meeting of the Committee and the Commission. Then we produced the same kind of summary for ETTS VI (2006), with the policy people responding with another policy- implications paper. The policy people searched for policy directions in our evolving scenario, and we searched for interesting and possible directions for the scenario in their synopsis of important policy thrusts.

### **3.3.4 Successes, Failures, and Lessons**

This workshop gave us much to think about regarding the preparation, organization and running of future workshops. We made two major mistakes: (a) we failed to prepare our policy participants and ourselves adequately, and (b) we chose a style of scenario that encouraged all of us to think in general rather than specific terms.

Our assembly of the ETTS V summary, the basic starting scenario, was undertaken mainly during the day before the workshop (on a train, no less!), and was finished, in very rough form, only hours prior to the meeting. Once our policy participants had read and digested the material, we facilitators/analysts had to (a) probe the policy participants for indications of the content of their 1996 policy-implications paper, (b) write the text for that paper, and (c) structure and write the summary for ETTS VI (year 2006). This last item did not need to wait, in toto, for the first two to have occurred. We knew that we could have prepared most of the ETTS-VI summary beforehand, and modified it with consideration for the policy-implications paper of ETTS V. However, we did not prepare it in advance, and this, along with some logistical problems (e.g., only one micro-computer for two facilitators working with both text and tables to be updated), led to our generating a low-quality summary of ETTS VI.

In the two previous workshops, we had crafted entirely "new" scenario documents, having no direct connection with any other literature. As well, we had asked participants to imagine they were actually policy-makers, and to give us details of what they would do (i.e., what policies they would put in place and implement) if faced with the situation and challenges posed in the scenarios. In this workshop, we asked two policy analysts to permit us to take over one

aspect of their work (i.e., summarize the state of the forest sector and various forecasts of its future), while they were to retain and exercise another important aspect (i.e., drawing the policy implications of the technical information). We believe that a policy exercise such as these we have been running are most successful when both sides (i.e., policy people and analysts) can consider concrete and specific materials. One of the downfalls of the first exercise with students (see above) was that the scenarios and role descriptions were very general, and thus the policy "moves" could only be rather general (and thus largely empty). With our first mini-workshop, we moved to the other end of the spectrum and worked with a specific company and a quite detailed scenario, to our considerable satisfaction. In the case of this workshop we had the opportunity to work with specific materials, but our policy participants were to develop generalized policy-implications statements. We believe that the chances for substantive insights to be forthcoming from such a workshop are rather low when either of the two parties is expected to pursue rather general thinking.

### **3.4 Workshop No. 4 - Students Again as Policy Participants**

We managed to get another opportunity to have students participate in a policy-exercise workshop playing policy roles. This workshop took place in Uppsala, Sweden.

#### **3.4.1 Objectives**

We set out to accomplish here what the previous two workshops could not accomplish with such small numbers of participants. Thus, our objective was mainly to test the workshop protocol where several groups were formulating policy at once, much along the lines of what Toth (1986) had in mind in first formulating the workshop approach to policy exercises. Of course, this workshop would also give us invaluable practice in managing group dynamics and in scenario updating.

#### **3.4.2 Participants**

For this exercise, we enlisted the participation of the senior undergraduate class of forest-products-marketing students at the College of Forestry, Swedish University of Agricultural Sciences in Uppsala. The students, numbering some fifteen, were in their last of five years of study, and already had an excellent grasp of forestry and the forest industry throughout Europe. On the facilitation and analytical side, the three of us again fulfilled these roles.

#### **3.4.3 What We Did**

We decided to allocate the students to four groups (of 3-4 participants each), three of which would play policy roles related to specific countries within the European Economic Community (EEC) (i.e., United Kingdom (UK), Federal Republic of Germany (FRG), and France), and one of which would represent the EEC itself. We asked the students to investigate, and prepare themselves to play, roles of top policy-makers in the financial world (e.g., Finance Minister, or head of a bankers' association), the government side of forestry and the forest-products industry (e.g., Minister of Forests, head of a forestry commission), the industry side of forestry and the forest-products industry (e.g., head of a national industrial association, a company president), and the realm of environmental interests (e.g., head of a large environmental interest group, Minister of Environment). The EEC group decided to work as a team and

cover all aspects of EEC jurisdiction related to the subject matter of the exercise, but all three country groups chose and investigated specific policy-maker roles.

The workshop was set up to cover two full days, including a half-day session of briefing for the students, and final preparation and distribution of the scenario (in this case, with a present year of 1990 and including a fairly detailed look at possible futures of the European forest sector, highlighting the EEC and the outlooks for UK, FRG, and France). Interactions among and within the student groups were intense throughout most of the remaining 1.5 days. To begin, with the scenario already in hand, students met in country groups to discuss their reactions to the scenario and what they might intend to propose as policies for the period 1990 to 2000. Then, they regrouped according to policy role (e.g., all the environmental-interest policy-makers got together) to share perspectives among countries. Finally, they regrouped again into country groups to formulate and document their policy moves. This interaction cycle lasted some 2.5-3.0 hours.

The three of us then prepared a scenario update to year 2000 as present, which we gave to the students some hours later. The students then repeated their morning cycle, returning their policy moves for the period 2000-2010 after several hours. We updated the scenario to 2010 as present, and got the students to engage in one more round of policy discussion and moves formulation. We ended the workshop with a one-hour debriefing session during which we asked students to evaluate both the performance of their jurisdictions in the scenario, and the workshop process we had used to put policy realism into the scenario.

#### **3.4.4 Successes, Failures, and Lessons**

For the most part, in this workshop everything just seemed to go right. We had given the students no more than about a week to prepare their roles, and despite one or two complaints that this was not enough time (one student even said two days would have been enough!), they had done an outstanding job. And contrary to our expectation that we were going to witness the same kinds of problems here that we had in our tests with students previously, this group provided an excellent simulation of what we felt would happen in such a workshop with a group of real policy-makers. For example, with the students at IIASA, there were clearly language difficulties (both exercises were conducted in English), but in Uppsala the students had no trouble expressing themselves well in English, and used Swedish in their small-group discussions (this was something we could not encourage at the IIASA student workshops, because each participant had a different mother tongue when it was not English). As another example, we expected the students to falter because of their lack of experience in thinking about policy formulation. This clearly happened in the previous tests with students, but in this case the students were quite able to think creatively in policy terms and to simulate policy-making behaviour with some credibility.

The two kinds of discussion groups clearly was a desirable feature of the interactions. The students profited much from being able to share their insights not only among their "countrymen", but also among their "peers" from other areas.

We discovered finally how much time would be required to update scenarios (of the text and tables type) properly in such a workshop. We had come to Uppsala with more of an idea of what the first update would look like (i.e., to 2000 as present), and it took the three of us only the few hours we had allocated for it. However, the update to 2010 as present was much less designed in advance, and this consumed about twice as much time as the previous update. Fortunately, we had a period extending from late afternoon until the next morning during which

to accomplish this update task, and we subsequently decided to organize our next policy-exercise workshop with this feature of extended time for updates built in.

The debriefing session with the students at the end of the workshop yielded the following major criticisms of the exercise:

1. The links among policy decisions, actions taken, and results achieved were not transparent. Students would have liked to see how their policy moves got translated into actions and effects, or otherwise strong justification in the event we (analysts/facilitators) had decided to make their policy implementation ineffective.
2. The bounds for the simulation and scenario seemed at times too broad. For example, one student found it unpalatable that there could be occasions when the Finance Minister could choose to spend huge amounts on national defense and nothing on forest and forest-products-industry development. Our response was that this is indeed an honest reflection of the real world. However, such possibilities should be pursued with extreme care in such an exercise, since their implementation probably adds little to the learning process, and gives high chance of frustration for the policy participants.
3. Objectives for the exercise were not as clear as they might have been, and some objectives were not met at all. For example, one student felt that the objective of understanding institutional interactions in forestry problems was not attained.

Overall, the students appeared quite stimulated throughout the workshop, and praised the exercise as one in which they learned much. This positive feedback and laud gave us the courage to begin preparing for a workshop in which senior people would serve as forest-sector analysts and policy-makers in the same kind of scenario work.

### **3.5 Workshop No. 5 - Members of the Forest-Study Advisory Committee, and Others**

We wanted one more test of the workshop protocol before using the policy-exercise approach to generate substantive policy-level findings for the Forest Study. That test took place at IIASA.

#### **3.5.1 Objectives**

Our objectives were:

1. to test the workshop version of the policy-exercise approach with a larger group of more senior participants both in policy and analytical roles;
2. to get professional feedback on the workshop protocol to policy exercises, and on the policy-exercise approach itself; and
3. to expose members of our Advisory Committee and close collaborators with the Study to the kind of procedure we wanted to engage them in later in our search for policy ideas for dealing with the long-term consequences of forest decline in Europe (aiming with their help to build a more efficient and effective process).

### **3.5.2 Participants**

There were essentially three groups of participants in this workshop:

1. policy participants (numbering eight), who were drawn mainly from our Advisory Committee;
2. analysts (numbering about four or five), some of whom were our colleagues at IIASA, and others of whom were close collaborators with the study; and
3. facilitators (numbering six), comprising mainly our methodological colleagues at IIASA and elsewhere.

The distinction between analysts and facilitators may need clarification. By analyst we mean someone whose role was to write the original scenario, to determine the effects of the policy moves on the scenario world, and to prepare scenario updates. Facilitators had as their main function to elicit policy moves from the policy participants and scenario updates from the analysts, in addition to communications and coordination roles. All of us who served primarily as facilitators also played modest analytical roles. Two participants who were primarily analysts also played facilitation roles.

### **3.5.3 What We Did**

The initial scenario was prepared in advance of the workshop. We got started late the first day with a briefing session for all participants, at which time everyone received a copy of the scenario (again, with 1990 as the present, and with a series of outlooks for a variety of aspects of the European forest sector) for perusal before the first session the next day.

The roles of the policy participants were established as follows. Rather than have policy participants assume roles they normally play in their home surroundings (only two of them were actual policy-makers anyway - the rest were policy researchers of one type or another), or assume policy-maker roles that we would assign them (this would have required more preparation than we could afford), we asked them to tell us, in their policy moves, what they thought policy-makers in a designated geographic area and designated sub-sector would do in response to the challenges posed in the scenario. We divided Europe into three regions - Nordic Europe, the rest of West Europe, and East Europe; and we assigned each policy participant to consider policy in one of (a) government forestry, (b) forest-products industry, and (c) environmental considerations, in one region. One of our policy participants had to consider policy in two sub-sectors in one region because we had only eight participants for nine roles.

The scenario work was planned to occur by the same procedure for each of three days. Briefly, the morning was to be devoted to generating and documenting the policy moves, and the afternoon and evening were to be devoted to updating the scenario. So to begin in the morning, the policy participants were given some time to (re)read the scenario, and then regional discussion groups were formed (as in the Uppsala exercise). Subsequently, sub-sector discussion groups were formed, after which there was opportunity again to discuss policy matters regionally. Finally, each policy participant was asked to deliver policy proposals, in one-to-one discussion, to a facilitator. We chose to try having a match of one facilitator for each policy participant in an effort to (a) draw the most from each policy participant under intense questioning from the facilitator, something which cannot be done in

group format, and (b) obtain consistency in the reporting of policy moves through use of standard forms to be filled in for each policy topic. While this approach may not be efficient in terms of facilitation, it certainly was expected to be (and was) effective.

After lunch, the analysts and facilitators got together to examine the policy moves and begin structuring the update. Because of the size of the team undertaking updating work, and the cause-effect nature of the topics being considered, it was necessary for some analysts (and topics) to await the update outcome of others (for example, general economic development had to be updated before demand for forest products could be updated). Add to this the format we used for scenario presentation (i.e., text, tables, and graphs), and we were faced with a logistical problem where the finishing touches could only be put on the scenario updates quite late into the night! However, we had anticipated this, and there was still enough time to do the kind of job we expected to do before the policy participants arrived in the morning for the next round. As it turns out, we aborted the scenario processing after two rounds rather than going the full three, because we had already reached our objectives with two rounds, and the participants were tiring of the repetitive format. Therefore, we concluded the workshop on the morning after the second full day of scenario processing with a review of inconsistencies in the scenario, and a detailed evaluation of the procedures used in the workshop.

#### **3.5.4 Successes, Failures, and Lessons**

By all accounts, this exercise was an unqualified success as a strong test for policy-exercise workshops in the Forest Study. Thus, we concluded that we had tested sufficiently at this point to proceed with the organization of workshops whose main aim is to move us towards policy lessons regarding forest decline and its long-term consequences in Europe. The methodological lessons from this test workshop were derived in separate final discussions with both the policy participants, and the facilitators and analysts.

We were advised to focus policy participation on policy advisors rather than on top policy-makers. The former are often likely to be freer thinkers in the sense that they are usually do not have to keep foremost in mind the need to survive the next government election or corporate board meeting, and thus can permit themselves the luxury of in-depth analysis of difficult long-term policy problems. On the other hand, top policy-makers can bring the exact reality of decision-making to the workshop table, and some participants insisted it was better to invite these people (allowing them to deputize the policy-exercise tasks to advisors, if they so choose). But perhaps it is not whether participants are actual policy-makers or policy advisors that is important, but how much influence they wield in policy circles that counts; we should be after participants who are indeed influential. Someone also felt that country-wise representation for such high-profile problems as forest decline is important, although we are hard-pressed to determine how to do this with more than 25 countries to account for in Europe, and with advice from other participants that a total of some 20 participants makes for a manageable group at such a workshop.

Some participants felt that we should have engaged them in a scoping meeting well before the workshop, so that they could help determine the information content and style of presentation of the scenarios, and so that they could have a keen sense of what the scenario would be about long in advance of the main workshop(s).

For such an intense workshop, and for even shorter ones of some 2.0-2.5 days, participants need to be very well prepared, particularly by sending out materials that are to be used at the

workshop. For example, at the workshop we all used a common set of notes to remind us what are the major sets of actions that could be taken by some 7-8 major groups of "actors" in the forest sector; such notes would have been very profitably placed in the hands of the policy participants well before the workshop.

The suggestion was made to incorporate a one-day warm-up period before seriously getting into scenario work. This was seen as an effective means to get participants ready for more efficient scenario processing. We are not convinced that there is time for such an event when most participants can hardly spend the 2.5 days required for the workshop proper itself.

We got mixed reactions about the kinds of information that should be presented in the scenarios used at such exercises. On one hand, some participants suggested that widely divergent forecasts are not so useful, and that we might even consider giving single forecasts. On the other hand, other participants stressed that multiple futures for such uncertain phenomena as those discussed in the workshop are indispensable.

Other suggestions here included the need for:

1. a better Europe-wide, "basic-figures" picture about forest resources and forest decline and its impacts both present and future;
2. a more comprehensive yet compressed quantitative assessment;
3. a broader scenario environment, including factors such as industrial development and the natural environment (e.g., climatic change);
4. division of West Europe into at least two regions, because the region as we defined it was too large and heterogeneous.

There were numerous suggestions for improvements in our ways of presenting information in scenarios. Among these were the following:

1. increased use of visual aids, such as graphs, figures and maps instead of tables;
2. very careful textual guidance for complex tables;
3. addition of columns in tables showing percentage changes over time;
4. better means to recall the content of earlier scenarios, possibly through visual highlighting of changes in the scenario text, and retention of historical data in tables and figures. Much was said in the evaluation session about how we enabled or disabled interactions among participants.

Many made observations that we did not permit enough interaction between policy participants and analysts. Suggestions to overcome this included:

1. more plenary discussions about the scenario and its updates at the beginning of each round, and more such discussions between policy participants and analysts in general;

2. engage the policy participants in the policy-exercise workshop full-time (in our workshop, we scheduled the policy participants to other activities while the scenario updates were being prepared);
3. permit the policy participants to observe the analysts' discussions at the beginning of the scenario-updating process;

There was also much discussion about what made for more efficient scenario processing. Some strongly encouraged us to have personal computers running our several simulation models during and in the policy-move sessions, so that policy participants could explore system responses to policy proposals before finalizing their moves. Others suggested we dispense with updating, and examine policy for the entire time horizon of the scenario, focussing on when specific policies might be implemented. A proposed variation on this theme was to sketch out some full-horizon policy strategies first, and then go back to each decade one by one afterwards. On the other hand, there were participants who felt that updating of the scenarios was an essential feature of our protocol, because it (a) provided the only apparent means of injecting surprise into scenarios, and (b) sequential policy-making and analysis is characteristic of the real world.

There was enough discussion about the use of simulation models that they deserve special mention here. Such quantitative models were seen as important in:

1. scenario development, to show what the range of possible futures might look like;
2. actual workshop proceedings, to help bound scenarios during processing; and
3. after workshops, to check policy moves more thoroughly and to continue policy analyses.

#### **4. SOME BRIEF THOUGHTS ON SUBSTANCE**

We had hoped that our policy-exercise workshop trials, especially the latest workshop, would launch us well along the road to discovering some incisive policy insights in relation to the problems posed by continued forest decline in Europe. After all, one of the highest objectives of the policy exercise in theory is to learn policy lessons that would be probably not be learned through conventional means (e.g., "ordinary" policy workshops, or posing policy-relevant questions to simulation models). However, our initial reactions to the substantive outcomes of the workshops were that there was "nothing new under the sun", that we had seen before all the policy messages and perspectives tabled at the workshops. However, we have since decided that perhaps such workshops are not to be expected to generate the policy lessons themselves, but rather are to provide the raw materials (in the form of policy-rich scenarios) upon which a more firm policy analysis can be based. We see this as being more realistic in terms of expectations of what can be accomplished in meetings of this kind per se.

Thus, we did not hold a policy-exercise workshop in the Forest Study that we consider to be more than a test, and that we could expect to generate the real basis upon which final policy analyses in the Study should rest. As mentioned above, we decided not to hold one with the latter expectations until such time as the Timber Assessment of the Forest Study, until our final test workshop still in preliminary stages of development, and several ancillary models became fully operational in a way that would allow us to build comfortably consistent and plausible scenarios, and to use these models during the workshop for purposes of (a) illustration of policy ramifications for the policy participants, and (b) preparing credible scenario updates.



## **5. CONCLUSIONS FROM OUR TESTS**

In any work on natural-resources and environment policy, the development and use of new approaches and tools can be visualized in at least three stages: (a) development and testing; (b) application in a research-and- development setting; and (c) application in an actual policy-development process. In the Forest Study, both the wood-supply forecasting models and the policy exercises, as new tools, were to have been brought to at least the second stage, with the hope that ultimately they may see use in a real policy process. We succeeded in bringing the forecasting models through the second stage (Nilsson et al., 1992). However, we only got part way through the first stage with the policy exercises because support for continued work in this regard did not materialize in time for the exercises to make proper use of the results of our biophysical simulations. Therefore, we have no forest-policy insights to report from our policy-exercise tests, but only the methodological lessons reported here.

We indeed did meet our methodological objectives with the policy-exercise workshops in the Forest Study. Without doubt, the protocols for undertaking such difficult work need much more testing before they can be said to be safely designed with an inherent bias for success, and as designers and facilitators/analysts we would like to have much more experience before claiming we had a tried and true approach to long-term, broad-scale environmental-policy questions. However, we feel confident now that primarily substantive objectives can be pursued with the policy-exercise approach we refined through experimentation in the Forest Study.

## **6. TWO ADDITIONAL DESIGN OPTIONS FOR POLICY-EXERCISE WORKSHOPS**

Subsequent to our policy-exercise workshop tests, we tried to lay out more effective and efficient designs for such workshops. One proposal calls for a 2.5 day meeting (arguably the longest one could expect busy policy people to spend at such a meeting), to be attended by about 15-20 policy and analytical participants and about 5 facilitators. The meeting would begin in the afternoon of the first (half) day, and concentrate on preparations and briefings, much as we had just done. The second day would be ordered as follows:

1. a short plenary session to begin, just to clear up any matters regarding the scenario;
2. regional group meetings, concentrating on policy formulation;
3. lunch, during which time facilitators and analysts prepare for a scenario-analysis session at which policy participants are observers;
4. scenario-analysis session, with discussion among analysts on the ramifications of the policy moves; and
5. simultaneous debriefing of (evaluation by) the policy participants, and scenario updating by the analysts, the latter extending as long as necessary into the evening.

The policy participants would be given the updated scenario first thing the next day, and the procedure above would be followed until after lunch. Then there would be a short scenario-analysis session, and the rest of the afternoon would be devoted to evaluation of both the scenario content and the workshop process. After the workshop, the analysts would update the scenario once more, write it up as a future history, and circulate it to policy participants for comment.

There are several advantages of this design over our last workshop test. The major one is allowance of the policy participants to follow the various logics of the analysts as the latter discuss how they will translate the policy moves into an updated scenario world. The major drawbacks of this design are that (a) only one and a half full rounds of scenario processing are designed for, making for a relatively near-horizon (i.e., short-term) scenario, or for very large time steps for each round, and (b) still only one scenario can be worked through, and our strong desire is to emerge from one or a series of such workshops with several "gamed" scenarios for detailed analyses.

An alternative 2.5-day design proposal that might overcome some of the difficulties listed above has also been developed. Briefly, on the first (half) day, preparatory and briefing activities would begin in mid-afternoon, and the group would then dine together and listen to a speaker who would be charged with putting the workshop challenge to the group. For the whole of the second day, policy participants would be divided into two groups, each of which would work through a specific scenario independently. The details of how each group would tackle its scenario and deliberations have yet to be fully worked out, but one group would deal with a "manageable problem" scenario, where the problems the sources of which are outside the forest sector are not so severe, and those of which the sources are within the sector (e.g., bad silvicultural practices) dominate. This group and scenario would have a narrower management focus. The other group would deal with a "disaster" scenario where most of the problems are severe, many having their sources primarily outside the forest sector (e.g., air pollution). This group and scenario would have a broader policy focus.

On the third day, the meeting would last only until late lunchtime, and the entire morning would be a plenary session during which presentations would be made by each group, and participants would evaluate the policy strategies put forward and the process used in the workshop. Finally, if desired, the participants could draft a set of recommendations ready for release to the press or other appropriate recipients later the same day.

Several features of the above plan require elaboration. The dinner speaker is critical to energizing the group and stimulating participants to work hard over a 36-hour period and be creative. The parallel scenario work is critical since analysts want more than one scenario to be worked through. Besides, participants are likely to be tired after working intensively through one scenario, and would likely be unable to drop all consideration of a first scenario when confronted with a second in the case of serial scenario processing. Closing the meeting at late mid-day on the third day is critical because busy policy people already begin thinking about their next engagement, assignment, crisis or set of problems by lunch time if they are catching flights home or elsewhere later in the day.

What remains to be worked out in this design is how the analysts will operate at the meeting. If the scenarios are to be processed as at our last workshop, then there will be conflict for the analysts' time if two scenarios need consideration and updating at once. The following options might be considered:

1. abandon the scenario-updating mode of work, and adopt another style where the analysts could hop from one group to the other as needed or desired;
2. synchronize the group work so that the policy-generation work of one coincides with the debriefing work of the other; this way, the analysts are constantly engaged in updating, alternating from one scenario to the other.

## **7. SOME THOUGHTS ON THE FUTURE OF POLICY-EXERCISES**

Just before we ran our last policy-exercise workshop in the Forest Study, investigators in the IIASA study on Future Environments for Europe (Stigliani et al., 1990) organized and held their first such workshop. Immediately following the two workshops, some informal debate about the real merits of policy exercises within the Environment Program prompted us to organize an open seminar in which we would reflect on what we had just been through with each workshop, and what possibilities we thought the future might hold for the policy-exercise concept. Below we summarize the debate and the major conclusions from the seminar.

The debate was sparked by an IIASA research scholar who circulated some ideas about policy exercises that would essentially relegate them to the role of trying to ensure the policy relevance and usefulness of new Environment- Program research projects. Thus, they were seen as an approach to be applied in the beginning of new studies. On the positive side, policy exercises were seen as appropriate for fostering communications between the policy and analytical communities, and for forcing analysts to espouse optimistic views of the long-term future of interactions between economic development and the natural environment. However, on the downside, policy exercises were seen as:

1. unable to permit rapid publication of the results of discussions at workshops;
2. biased towards (a) talkative people, (b) persons with English as a native tongue, and (c) a North-American way of looking at policy problems;
3. overly demanding of analysts' time in preparing for and running policy workshops; and
4. inefficient and ineffective at communicating research results to the rest of the world.

The main messages in our seminar were aimed to address these notions and to argue for continued work on developing and applying the policy-exercise approach in research-and-development programs looking at national and international policy on long-term, broad-scale clashes between development and environment. Regarding the four disadvantages above, we argued that:

1. policy exercises are an approach to policy analysis, and as in all approaches to research that consist of coordinated development and application of a set of research tools and methods, the publication of results must await the moment of drawing conclusions near the end of a research project; for example, one does not normally publish all technical details and difficulties of programming a simulation model, neither just after the model is built nor in the final report of a study using the model, so it would be unreasonable to expect that the discussions at a policy-exercise workshop (the workshop being just one step in a full policy exercise) would be immediately and usefully published;
2. the biases of policy exercises towards talkative people, native- English speakers, and a North-American point of view are all easily combatted with careful design, organization, and facilitation;
3. from the very nature of the lofty objectives that policy exercises are designed for, they must make high demands on the time and energy of their participants, especially designers, facilitators, and analysts; and

4. policy exercises are not meant primarily as vehicles for wide dissemination of research results, but could easily be adapted to make this objective attainable (e.g., through use of media such as television).

We are aware that various forms of policy exercise for natural-resources and environmental problems have been under development and testing recently in both North America and Europe. We hope those explorations and their designers can benefit to some degree from our bittersweet experiences.

## REFERENCES

- Brewer, G.D. 1986. Methods for synthesis: policy exercises. In *Sustainable Development of the Biosphere* (W.C. Clark and R.E. Munn, editors), pp. 455-473. Cambridge University Press, Cambridge, UK.
- Clark, C.W. 1986. Sustainable development of the biosphere: themes for a research program. In *Sustainable Development of the Biosphere* (W.C. Clark and R.E. Munn, editors), pp. 5-48. Cambridge University Press, Cambridge, UK.
- ECE/FAO. 1986. *European Timber Trends and Prospects to the Year 2000 and Beyond*. 2 Volumes. United Nations Economic Commission for Europe, Geneva, and Food and Agriculture Organization of the United Nations, Rome.
- Kairiukstis, L., S. Nilsson, and A. Straszak (editors). 1987. *Forest Decline and Reproduction: Regional and Global Consequences*. Working Paper WP-87-75, International Institute for Applied Systems Analysis, Laxenburg, Austria.
- Nilsson, S. 1986. Development and consequences of forest damage attributed to air pollutants and changes of climate. Study proposal, International Institute for Applied Systems Analysis, Laxenburg, Austria.
- Nilsson, S. 1988. Factors affecting future investments in pulp capacity. Working Paper WP-88-75. International Institute for Applied Systems Analysis, Laxenburg, Austria. 33 pp.
- Nilsson, S. 1989. Future development of the European softwood lumber industry. Working Paper WP-89-11. International Institute for Applied Systems Analysis, Laxenburg, Austria. 46 pp.
- Nilsson, S. and P.N. Duinker. 1987. Extent of forest decline in Europe: a synthesis of survey results. *Environment* 29(9):4-9, 30-31.
- Nilsson, S. and P.N. Duinker (compilers). 1988. *Proceedings: Seminar on Remote Sensing of Forest Decline Attributed to Forest Decline*. Electric Power Research Institute, Palo Alto, California.
- Nilsson, S., Sallnäs, O. and Duinker, P. 1992. *Future Forest Resources of Western and Eastern Europe*. Parthenon Publishing Group Ltd., Casterton Hall, Carnforth, Lancs., U.K. ISBN 1-85070-424-4. 496 pp.
- Sallnäs, O. 1990. A Matrix Growth Model of the Swedish Forest. *Studia Forestalia Swecica*, No. 183.
- Sonntag, N.C. 1986. Commentary. In *Sustainable Development of the Biosphere* (W.C. Clark and R.E. Munn, editors), pp. 473-475. Cambridge University Press, Cambridge, UK.
- Stigliani, W.M., F.M. Brouwer, R.E. Munn, R.W. Shaw and M. Antonovsky. 1990. Future Environments for Europe: Some Implications of Alternative Development Paths. *The Science of the Total Environment* 80:1-102.

- Stoklasa, J. and P.N. Duinker. 1988. Social and Economic Consequences of Forest Decline in Czechoslovakia. Working Paper WP-88-28. International Institute for Applied Systems Analysis, Laxenburg, Austria. 62 pp.
- Toth, F.L. 1986. Practicing the Future: Implementing "the Policy Exercise Concept". WP-86-23, International Institute for Applied Systems Analysis, Laxenburg, Austria.
- Toth, F.L. 1988a. Policy exercises: objectives and design elements. *Simulation & Games* 19:235-255.
- Toth, F.L. 1988b. Policy exercises: procedures and implementation. *Simulation & Games* 19:256-276.