POLICY EXERCISES

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FOREWORD

For many years, scientists and decision makers have been aware that scientific knowledge is only poorly transferred from the area of its origin in the field or laboratory to the area in which it is required in political and social arenas. IIASA and its Biosphere Dynamics Project have been committed to the study of alternatives to normal scientific reports and publications as a form of communication. The main interest by Ferenc Toth and his co-workers (especially Peter N. Duinker and William C. Clark) is to identify useful policy options for coping with the consequences of environmental change. Their approach has been to write a set of "future histories" and in the process to examine alternative paths of development. Briefly, a future history is a record, developed by a group of workers, that looks back to the present from a specified future time. The record includes (a) trends of indicators and phenomena relevant to the problem at hand, (b) policy initiatives that would have been taken in response to expected trends, and (c) expectations of policy consequences and realized social results. The process of preparing to write future histories should enable an "ordering of nightmares" related to the expected environmental changes. A comparison of several completed ones should permit an evaluation of what policy thrusts to pursue in the real world.

For this purpose, Toth and his co-workers have used the "policy exercise" concept to generate the future histories. As developed for the Biosphere Dynamics Project, a policy exercise consists of a structured workshop, including both the exercise and the required preparations, and evaluation. The basic objective of the participants is to arrive at the established time-horizon for the future history with a sustainable, desirable, intact "world," complete with documentation on how this was achieved (with internal consistency). The Research Report that follows describes much of the reasoning that underlies the approach. It documents a valuable and transferrable aspect of the Biosphere Dynamics Project research plan.

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POLICY EXERCISES

Objectives and Design Elements

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Methods to synthesize and assess scientific information for use in policymaking range from large models to expert committees, from scenario-driven free-form gaming sessions to fast and simple model-building workshops. Each approach has its own merits and shortcomings. However, they have often proved to be ineffective for management-oriented studies involving long periods (30 to 100 years) and large areas (from multinational to continental to global scales). Therefore, there is room for new tools that complement existing methods in policy analysis. The *policy exercise* approach has been designed and tested to overcome some of the inadequacies of earlier methods to address complex issues in a policy context.

The direct motivation to develop a new approach came from a wide-scope, complex international research program looking at long-term, large-scale interactions between socioeconomic development and the natural environment (Clark, 1986). Searching for possible methods to synthesize scientific knowledge for use in

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AUTHOR'S NOTE: *This article is the first of two describing the policy exercise approach based on Toth (1986; 1988a). The second article will address issues related to the procedures and implementation of the approach. I am indebted to William C. Clark for his intellectual and moral support throughout my work in developing the Policy Exercises. Peter Duinker played a leading role in the first implementations. Comments on earlier versions of the article by Alan Coote, Jan Klabbers, Rafal Serafin, Allen Solomon, and Nick Sonntag are gratefully acknowledged.*

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policymaking in the context of this study, Garry Brewer (1986) evaluated current methods and practices in policy analysis. He concluded that a new approach is required to serve these objectives. He outlined one such approach, which he called a *policy exercise* and suggested that it "finds its procedural roots in scenario based, free-form games" (p. 469). Brewer noted that "it is as much artistic as it is scientific in its style and means, a characteristic that in no way denigrates the activity" (p. 470). In his commentary on Brewer's essay, Nicholas Sonntag drew attention to a different approach called Adaptive Environmental Assessment and Management (AEAM) (see Holling, 1978) and suggested that "the next step is to take the best features of the two approaches and develop a hybrid" (Sonntag, 1986: 475).

These guidelines set the criteria for formulating the policy exercise approach, but they did not provide operational procedures. Both approaches are correct in noting that we need to "develop a hybrid" (Sonntag) and that it "must employ many different methods" (Brewer). It will be easy to see from the following discussion of policy exercise that besides the suggested methods we have integrated ideas from operational gaming (see, for example, Greenblat and Duke, 1981), elements of scenario writing and analysis, methods from sociology and social psychology (questionnaire, interview, observation, and small group interactions), techniques of negotiations analysis, small and simple computer models as applied in decision-support systems, and large and sophisticated models to facilitate integration and ensure consistency throughout the process. Beyond these borrowings, entirely new techniques and procedures have been devised to enhance the enterprise. An important feature of the policy exercise is that it is an "open" methodology: It can and should integrate methods, models, techniques, and indeed anything useful from the actual field to which it is applied.

OBJECTIVES AND PARTICIPANTS

Brewer (1986: 468) described a policy exercise as "a deliberate procedure in which goals and objectives are systematically clarified

and strategic alternatives are invented and evaluated in terms of the values at stake. The exercise is a preparatory activity for effective participation in official decision processes; its outcomes are *not* official decisions."

A policy exercise is a flexibly structured process designed as an interface between academics and policymakers. Its function is to synthesize and assess knowledge accumulated in several relevant fields of science for policy purposes in light of complex practical management problems. It is carried out in one or more periods of joint work involving scientists, policymakers, and support staff. A period consists of three phases (preparations, workshops, evaluation) and can be repeated several times. At the heart of the process are scenario writing of "future histories" and scenario analysis via the interactive formulation and testing of alternative policies that respond to challenges in the scenarios. These scenario-based activities take place in an organizational setting reflecting the institutional features of the problem at hand. They are enhanced by a series of complementary activities.

The primary goals of the policy exercise approach are

- to synthesize complex and incomplete bodies of scientific information for use in policymaking,
- to test applicability and enhance actual use of scientific knowledge for policy formulation, and
- to get fresh insights and new perspectives from the policy side for future research.

It was apparent from the beginning of the design work that many individuals and research groups face similar problems when trying to pursue a synoptic perspective to identify, analyze, and solve practical management problems. However, the case studies that were used to implement and test the policy exercise procedure were sufficiently different to require modifications of the same framework. These requirements directed us to create a general approach, a collection of tools that can and must be restructured to best serve the purposes of a particular application. Therefore, the policy exercise approach can be considered as a frame containing sets of tools with a flexible structure and the know-how for assembling a

carefully chosen subset of those elements for a specific application.

An appropriately individualized version of the policy exercise approach might be considered for use in studies in which a channel or forum is needed for communication between scientists and policymakers who are addressing ill-structured, complex issues in a situation characterized by

- no single or ultimate decision-making authority,
- many actors and stakeholders operating independently,
- many conflicting interests, and
- strong influence from "external" effects outside the decision makers' area of control or influence.

The situation addressed by a policy exercise also has problems in the data available to support analysis. Typically,

- part of the scientific knowledge is solid but not easily available; it is scattered in the literature, or encrypted in complex models,
- other parts are uncertain but, unfortunately, important; and
- some parts are missing because no one on the research side realized they were important for policy formulation.

PARTICIPANTS

At least two people are required to start organizing a policy exercise, a chair and a coordinator. The chair should be an acknowledged scientist with a good overview of the subject matter and good reputation in the policymaking community. The first task is to develop a conceptual framework for the policy exercise, define the key disciplines that could contribute to it, and to engage experts from those fields. The coordinator is a person familiar with the methodology, preferably with experience in the background methods drawn on by the policy exercise. The coordinator's responsibilities include all the organizational issues and possible modification of the base procedure in order best to serve the objectives of a particular exercise.

In developing the conceptual framework, the chair would define three to five disciplines of critical importance to the subject and invite participation of one expert from each field. Also, it has to be

clarified at this stage who are the most important actors, influentials, and stakeholders on the policy side. Two to three representatives from this community should also be involved. These 7 to 10 people (including the chair and coordinator) are called the *core group.*

The core group would invite experts from other areas to contribute to one or more tasks in the preparation work (e.g., scenario writing, state-of-the art review, manuals), and would recruit other members of the control team and policy teams for the workshop. In general, preparing the workshop would require continuous, although not full-time, involvement of all the core group. Most members of the core group would also become members of the control team at the workshop. Their responsibilities at this second phase will be described later. As the core group is clarifying and bounding the problem, they have to explore the nature of the institutional setting in which the issues are dealt with in real life. What are the organizations where actual policies are formulated, how are they influenced by other institutions, what is the hierarchical structure connecting them to each other? Are there any pressure or interest groups influencing policymaking directly or indirectly? Is there any sort of organization providing coordination or having the power to give commands? Only after the institutional structure is clear will it be possible to identify which institutions will be represented at the policy exercise and what form that representation should take. The next step is to find the people to be invited as representing the relevant institutions.

The control team is a group of experts and policy analysts who play a key role at the scenario analysis workshop. They evaluate the policies submitted by the policy teams, assess their consequences, and modify the scenarios and the "state of the world" accordingly.

The policy teams consist of policymakers who were identified by the core group as key actors in the subject area of the policy exercise: company CEOs, senior policy advisers, and representatives of interest and pressure groups. They provide the principal policy input to the exercise as well as being the most important clients.

The first review by the core group should reveal whether competition among companies, regions, or nations is centrally important to the question. If so, or in case there is very low level or

no coordination at all among the actors, several policy teams would be organized representing this structure. If, however, the opposite is the case, the workshop can be organized around one control and one policy team.

The *facilitator* runs the policy exercise workshop. Special skills are required to keep the process moving, to create an atmosphere in which hard work, creative thinking, and fun are present all the time. The facilitator should have some experience at running operational games or facilitating workshops. Basic knowledge in the subject matter of the policy exercise is clearly an advantage.

Support staff may be necessary depending on the nature of the problem at hand. Their tasks might include compiling and modifying computer models, collecting data, preparing visual aids in the preparatory phase, quantifying and implementing the computer policies formulated by policy teams, helping control and policy teams to use support tools at the workshop, and preparing the necessary comparisons, sensitivity analyses, and reports in the evaluation phase.

BUILDING ELEMENTS: GAMED SCENARIOS

The substantive centerpiece of a policy exercise is scenario development and analysis. Scenarios provide the framework in which issues from various fields affecting the practical problem on the table are integrated and bounded and in which specific policy options are tested during the interactive phase. In this part, I will briefly describe six different versions of scenarios that could be used.

First, a general remark. In case of each scenario type there is a short intermediate period connecting "today" with the starting period of the scenario horizon. The importance of this period is to remove participants from the heat of current events and debates and help them focus on problems in the scenarios. A short history would describe what had happened in the meantime, that is, how we got to the initial state of the system described in the scenario.

In interactive phases of scenario analysis, the scenario horizon is divided into 3 to 5 equal time intervals called periods. The set of

steps policy and control teams go through to complete processing in one period is called a round. The length of the overall time horizon depends on the nature of the problem and the specific purposes of a particular exercise. Similarly, the resolution of time intervals is established by a carefully chosen time constant, for example the length of an investment cycle, a characteristic lead-time in the system.

TYPE 1 SCENARIOS

In a Type 1 scenario, the initial scenario describes projections for the whole scenario horizon. These are, however, forecasts only and not actual events. They are expert judgments in forms such as: "Here are some of the opinions, the best we could get. Some experts warn us that such-and-such might happen, with a chance of x percent. Others tell us, however, that different and more serious problems are possible, and the chance is y percent." In short, participants face in this scenario type, just as in real life, a set of partially or completely contradictory expert projections. They have to formulate their policies in the light of an uncertain future, a situation they know very well.

The interactive process is then the following. Participants formulate and submit their policies for the first period to the control team. The control team will update the scenario (state of the world at the end of the first period, expert judgments for the rest of the time horizon) based on forecast events in the original scenario and the estimated consequences of participants' moves. These steps are repeated several times until the end of the time horizon is reached (Figure 1).

Based on the experiments conducted so far, Type 1 scenarios appear to be a useful version for many applications. First, the trends and events projected in the original scenario help focus attention on a few specific problems. Complexity can be gradually increased in consecutive scenarios. Second, the surprise or external shocks introduced by the control team can be made plausible with this version. Third, there is a clear feedback from policies implemented by participants to the updated state of the system and the new projections of the future. Fourth, special emphasis is given

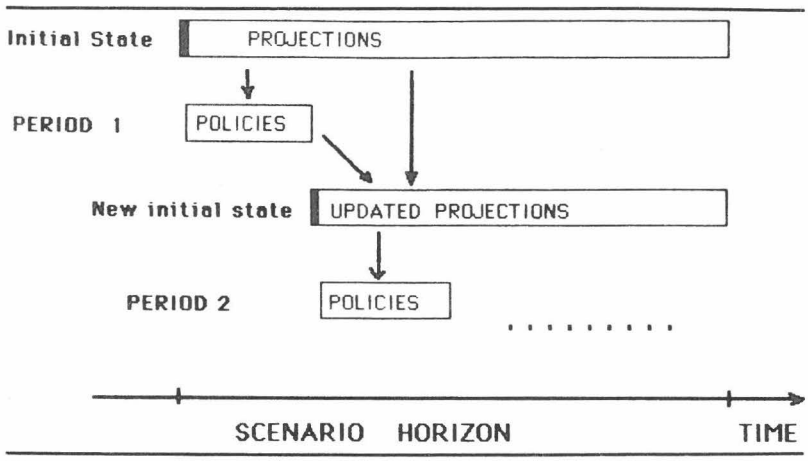

Figure 1: Type 1 Scenarios

to resilience in this approach. It is not sufficient to prepare for one possible shock in the future; policy options offering the maximum reasonable flexibility and adaptation chances should be explored.

TYPE 2 SCENARIOS

These scenarios provide a history of past events and a detailed description on the initial state of the system. Since future development through the scenario will largely depend on participants' moves, it is not possible to prepare a detailed scenario for the whole scenario horizon in advance. Scenario writers, however, should define at least two to three basic directions in which the system could evolve and develop alternative "shadow" scenarios for the two or three or more periods based on them. If they can successfully define a "high probability" and two extreme moves then it will be easier for the control team to use an appropriate combination when they evaluate participants' moves at the interactive exercise.

The interactive features of Type 2 scenarios are similar to those of Type 1, but the perspectives and especially the information about possible future developments provided to participants is different (Figure 2). The emphasis in this case is more on a detailed description of the state of the world at the beginning of each time step. The projections that are so important to policy formulation in

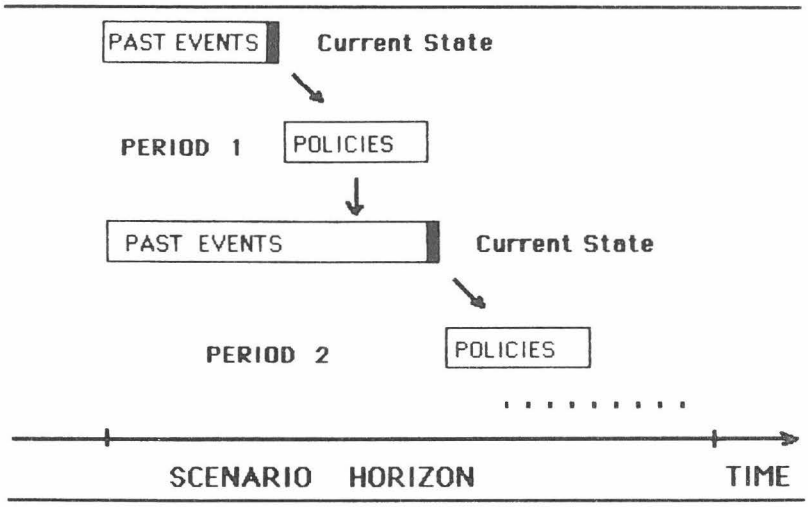

Figure 2: Type 2 Scenarios

case of Type 1 are not revealed in this case at all. However, detailed historical data are made available, and some of the "surprise events" can be hidden in these data.

This scenario type helps investigate the trade-offs between short-term and long-term optimization and draws attention to the importance of looking beyond the immediate boundaries of one's field of action. It might identify at what time scale that trade-off takes place. This type might offer exciting lessons on how expectations about the future are based on past data and the current state and how policies built on these expectations relate to actual developments. It would also help policy and control teams to evaluate current policies or trends.

TYPE 3 SCENARIOS

This scenario describes a "future history" of events and policies that have been implemented during the first half of the overall time horizon and have resulted in a crisis. Participants are asked to manage this crisis in the role of policymakers of a future generation (Figure 3).

It must be obvious from the scenario that each step and policy

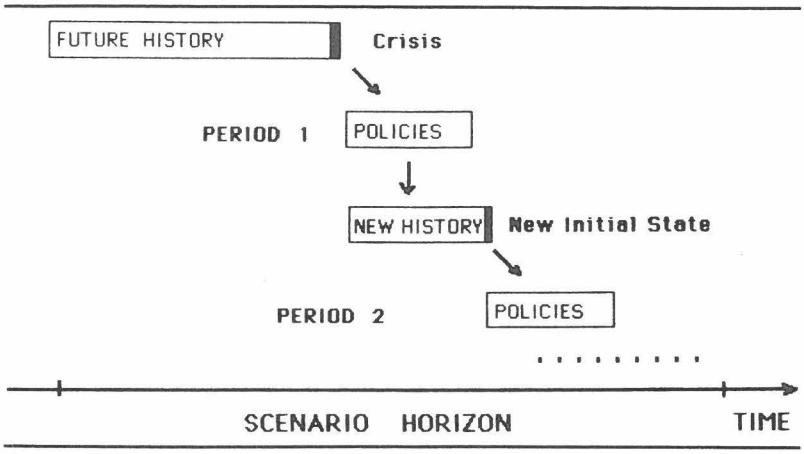

Figure 3: Type 3 Scenarios

implemented in the past was reasonable and justified, in the light of then-current information, and that their consequences were plausible. This illustrates that no stupid mismanagement, natural disaster, or catastrophic event is necessary in order for a crisis to arise.

Principal lessons from this scenario type are likely to be related to the issues of intergenerational heritage: how our current actions will determine the state of the world and possibilities for actions for future generations. Type 3 scenarios illustrate how one particular decision limits the range of actions and predetermines the next decision, leading to a situation in which no policy is a good policy. Although training crisis managers is not a primary goal of policy exercises, the lessons about pitfalls of crisis management (e.g., the possibility of solving one problem and creating half a dozen more serious ones) might prove useful.

TYPE 4 SCENARIOS

There is no explicit sequence of events in this case. Instead, the scenario provides a detailed description of the "state of the world" (possibly a surprising one) at a specific time in the second half of the overall time horizon without specifying the historical path of

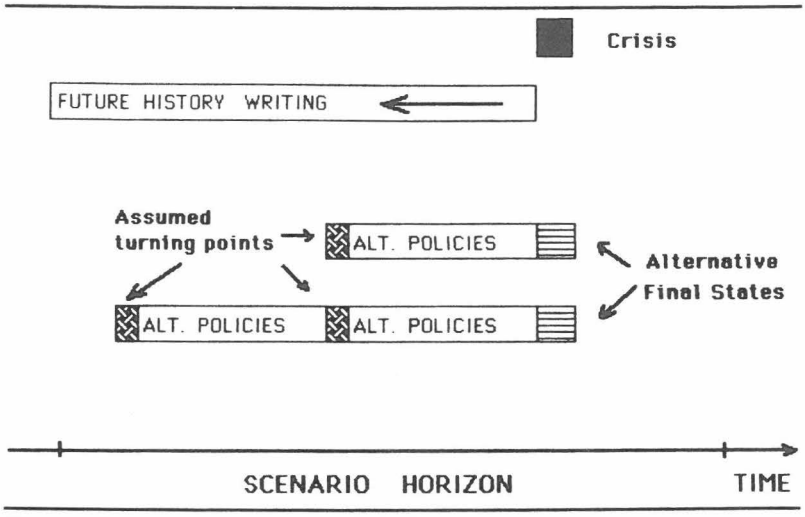

Figure 4: Type 4 Scenarios

getting there. Participants are then requested to write the scenario: what they think has led to that state, a logical and plausible story of events and management actions. They should signpost the turning points and assumed policies that have resulted in the given situation. This means they have both to invent policies and to assess their consequences up to the described situation (Figure 4). In addition, they should develop alternative policies that could have been applied and assess what results those would have provided. It is like playing chess with the possibility of taking back one or more moves and guessing again how the opponent would respond to different moves.

The importance of developing robust policies (i.e., robust to unexpected events in the future) is most apparent when working with Type 4 scenarios. A policy that would have been successful only if some "external event" had not happened is obviously not a successful policy. Getting policy people to create scenarios, to write their own versions of the future, should provide us valuable insights on what their major concerns are, what kind of future development they are most worried about, what their perception is about the limits of their own range of action. Type 4 procedures might also help us to explore kinds and sources of future surprises.

TYPE 5 SCENARIOS

Type 5 scenarios present one detailed, internally consistent sequence of events as a complete history for the whole scenario horizon. The history explains the major trends in the background socioeconomic development, outlines major policy directions pursued by key actors, and provides a detailed history of system indicators. These are all presented in the form of a "future history" looking back at the scenario horizon from its endpoint and addressing all the issues in the scenario as historians would with "real" past history.

There might be two different perspectives taken when preparing Type 5 scenarios, depending on the particular purpose of the interactive session. The first possibility is to present a "conventional-wisdom" kind of future that most participants would easily accept and ask them to "improve" it by suggesting policy initiatives within the scenario horizon that would result in a "better" outcome, better according to an explicitly defined set of criteria. The second possibility is to present a "surprise-rich" future that is a sequence of events that most participants would find surprising but not impossible to be read in a history published in the year marking the end of the scenario horizon.

The interactive processing of Type 5 scenarios consists of systematically rewriting these future histories in several rounds (Figure 5). Policy-team members suggest alternative policy directions to be introduced at any point or for any period of the scenario horizon. This is followed by a joint assessment of how the alternative policies they suggested complement or contradict each other. The result is a new, modified future history. Participants then make a new iteration on the same time interval (that is, the whole scenario horizon). The new initial scenario can either be the original scenario or the "improved" future history produced in the previous round.

Making several iterations over the same time horizon offers several advantages. First, doing so gives a deeper insight into the properties of the system and the relationships governing interactions of policies formulated by the teams. Second, doing so may provide a better understanding of how surprises affect those policies and

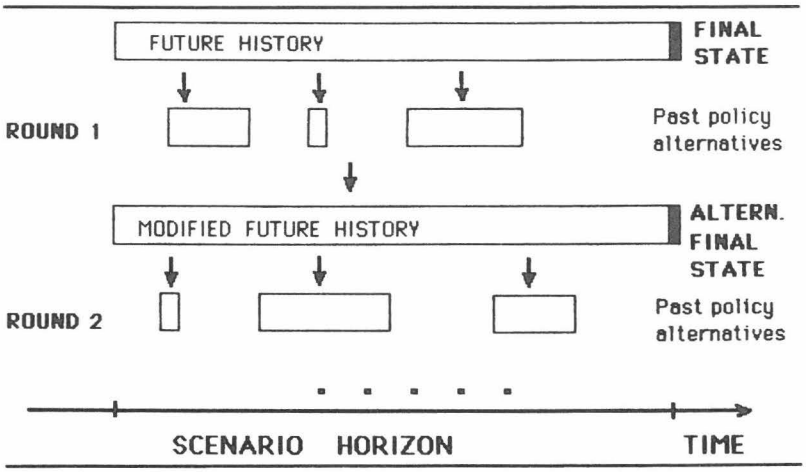

Figure 5: Type 5 Scenarios

might lead to clarifying properties of policy options that are robust with respect to those surprises. Third, participants may try to adapt what they just learned in the previous iterations when formulating moves in the next cycle. Thus several policy options suggested by each participant as well as cumulated outcomes of various combinations can be explored and assessed.

TYPE 6 SCENARIOS

A Type 6 scenario is a detailed elaboration of a future path, assuming that current trends and management practices continue. The events at various future points incorporated in the scenario represent the "conventional wisdom" for the "most likely" pattern for the future. A Type 6 scenario can be devised as a written history; however, a dynamic simulation model is particularly useful.

The task for participants in a Type 6 scenario session is to manage the system in a "real-time" mode (Figure 6). This means that the elapsed time in the scenario and the real time in the meeting room are predetermined, for example, 5 years' scenario time being equal to 30 to 60 minutes in real time. Participants receive a report on the current values of key indicators regularly, and they can introduce changes in any policy variable driving the system that

belongs to their mandates. The control team introduces those changes into the system immediately, but the "scenario clock" will not be stopped while participants are formulating their interventions. It might be useful, however, to suspend the process for short conferences either at predetermined time points or when the control team and the facilitators feel that participants are getting lost and the system is getting out of control.

Type 6 scenarios seem to be especially useful when the issues for the exercise can be bounded in a relatively simple, easily comprehendible and manageable system. The choice of indicators is crucial to provide the necessary "early warning" for timely action. This kind of exercise might illuminate the importance of identifying undesirable tendencies in the system behavior early enough to take countermeasures rather than drastic interventions that affect other components of the system and create more problems than they solve.

Depending on the specific goals of the exercise and participants' interest, the core group may design repeated runs with the same baseline scenario. This would make Type 6 sessions more similar to Type 5 exercises. However, Type 6 scenarios unfold in "real-time" mode, requiring quick responses from participants, whereas Type 5 scenarios require an autopsy of a historical past, and participants know the complete story from the beginning to end.

DESIGN ELEMENTS: ROLES, RULES, AND PROCEDURES

The policy exercise workshop offers a simulated, "artificial" working environment for its participants. There are two contradicting concerns when organizers of the exercise formulate this environment:

- It should remove participants from their daily, routine, problem-solving tasks and the related organizational/bureaucratic structures and help them focus on longer-term, wider-perspective strategic issues; but at the same time
- it should preserve basic features of the "real-life" position and institutional constraints; otherwise, the exercise becomes irrelevant

to participants' real problems, rendering the outcomes of the exercise nearly useless.

These criteria for creating the context and operating environment for the exercise will be valid for formulating the roles to be played by the participants, their objectives in the context of the exercise, and the rules regulating their interactions in the exercise.

ROLES

Devising appropriate roles for the participants involves the geographical and jurisdictional areas to be included, as well as the particular interests to be represented and the mandates attached to each role in the exercise. Roles should approximate the participants' actual job responsibilities, and only top level policymakers from each sector should take part in the workshop part of an exercise. Participation of trusted deputies in the preparation phase, however, might be very useful.

When initiators of a policy exercise define the problem area they want to investigate, they first search for people whose positions and mandates are relevant to making strategic decisions related to the issues. It is not possible to "invent" role descriptions for participants. Instead, the core group has to analyze real-life roles, including goals that people in those positions want to reach, mandates they have the authority to fulfill, indicators of performance, and personal rewards and losses depending on performance.

The next step is to distill this information and to formulate the roles for the exercises. The role descriptions must be sent to participants for comments and criticism. By the time the workshop commences, the participants must clearly understand their simulated roles, the related objectives, mandates that they have the power to carry out, and the policy instruments they can use.

An important goal for the policy exercise approach is to encourage innovative thinking, pursue nonconventional approaches, and test new ideas. "What-if" questions, therefore, are crucial to the exercises. In the context of roles this means that participants may want to try operating in a different role in some sessions or in some parts of sessions. These "experiments" might

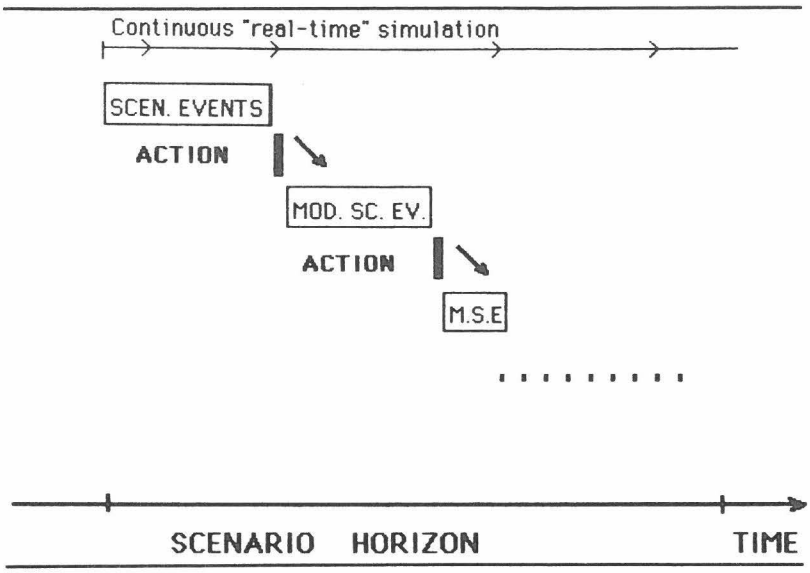

Figure 6: Type 6 Scenarios

provide useful insights on shortcomings and inadequacies of present decision-making structures and procedures. However, the "temporary" changes in the roles and procedures must be made explicit and public to all participants to avoid confusion.

The enforcement of a rigid role description on participants by the core group would prevent learning anything about institutional aspects and decision-making mechanisms for the real issues. If participants are worrying about what they are allowed to do within their assigned roles and they keep comparing them to their real-life mandates, they are wasting their time with irrelevant and artificially created problems. Instead, they should compare their real-life roles, adequately represented in the game, to how things might differ if they could act, interfere, and access information, as they test these possibilities in the exercise. These principles should be reflected by the goals and rewards/losses attached to each role in the exercise.

RULES

Rules governing the processes in the interactive scenario-analysis session cover both the formal (procedural) aspects as well as the

content side of the exercise. They are developed in the preparation phase together with the role specifications, procedural design, and content formulation.

Formal rules of the exercise govern actions of each of the participants, their interactions in the course of the exercise, and the sequence of events they follow in various sessions. Most of these formal rules are specified either as part of the role descriptions or in the procedural outlines characteristic of each scenario session.

Rules related to the content of the exercise include mandates of the control team in scenario updates and the related, explicitly defined principles of the behavior of the system investigated. There are two sources of such information: the analysis carried out by the core group in the preparation phase with input from participants, and the technical articles commissioned by the core group and written by invited experts as background information for the exercise.

The rules established for the exercise must be relevant to reality, and this relevance must be realized by participants. Parallel to revealing and analyzing real-life roles of participants, guidelines for reconstructing "exercise reality" will also be acquired. Failing to do so would result in adapting and analyzing policies that do not offer any lessons. It is easy to see that if, for example, market clearance and equilibrium prices are assumed and implemented as a rule in the exercise, whereas in reality cartel prices prevail or there is a single leader setting the price, the exercise offers nothing to learn.

Participants, of course, may ask to assume a different system or different rules to compare advantages and shortcomings of a number of alternatives. These usually temporary changes in the rules must be clear to each participant and must be recorded for analysis in the evaluation phase. The "default" setup should always reflect the real-life properties of the system, and organizers should allow for change if participants so request and agree.

PROCEDURES

In the workshop phase of a policy exercise the actual procedures are largely determined by steps of the interactive scenario-analysis sessions. There are, however, a number of general considerations

required to create a smooth, productive working environment for those sessions. The objectives here are

(1) to simulate realistic sequences of decisions and feedbacks. There are several aspects to this "realism." First, the exercise operates in a drastically reduced time frame compared to actual decision making. In real life, decision makers might have several weeks or even months to make a strategic decision. In the exercise they have, at best, an hour to do so. Second, the decision-making dynamics are likely to be different, as there are no assistant staff members available to help prepare decisions.
(2) to provide time for reflective assessment of policies. The more cycles of policy formulation and policy assessment that are designed, the less time is available for each cycle. Providing a support person for each policy team to handle models, spreadsheets, databases, and other support tools gives more time for participants to deal with substantive issues. Organizing parallel activities prevents different subgroups from waiting while others complete their tasks. All participants must be actively involved at all times.
(3) to make the policy/decision cycles include the long term but be short enough that feedback responses are relevant to the available policy options. In most cases there is a characteristic time constant related to strategic decisions in the sector investigated. This is usually related to investments in fixed assets: Once it is decided to invest and build a plant, the capital is committed no matter what happens shortly after the decision was made. Adaptive policies would require shorter cycles, but this contradicts the next objective,
(4) to provide sufficient time, opportunity, and means for all participants (control and policy teams) to share information (perspectives, values, beliefs, facts). There are ample opportunities designed for information sharing in the workshop. The policy formulation requires and assumes intense interactions and discussions among participants. The policy assessment phase is a structured discussion among the policy teams and the control team. Finally, the debriefing provides the most general and open forum for comments and discussions on all the events.

SCENARIOS

The scenarios serve as the initial focus and starting point for participants; hence a well-conceived scenario is essential for a

successful policy exercise. The core group must provide a concise but manageable package of information and should clearly separate the scenario from the background technical material. Both the level of detail and the actual content of the scenarios must be carefully considered and tailored to the backgrounds and interests of participants. For participants to respond to a given scenario, they must first believe that the events it describes are indeed possible. Participants will not waste their time designing policies to cope with an absurd situation. Credibility can best be achieved through internal consistency and adequate substantiation.

MODELS AND SUPPORTING DATA

Formal models are useful in the exercise to

- ensure that the scenarios are internally consistent;
- generate, quickly and efficiently, background information and figures requested by the participants; and
- update the scenarios rapidly and systematically.

Potential drawbacks to using models are that they tend to be restrictive, and lack those elements of surprise that the policy exercise concept is intended to capture. Nonetheless, models may be very helpful when used in conjunction with the control team of experts.

Activities in the preparation phase should include asking the participants what kind of information they want included in the scenarios and what they want available on an "upon-request" basis. Input from a large number of participants is likely to provide a good coverage of the necessary data for the core group to make available for the exercise.

INDICATORS AND THE ACCOUNTING SYSTEM

When carrying out the process that bounds the issues for the exercise, participants are specifically asked what system attributes they are most interested in and what future statistics they would look at first, if these were available. All the other system components and parameters are then structured around these key

indicators. The policy actions are linked to these indicators, and the system is updated by tracing impacts of all internal and external processes through these indicators.

PERFORMANCE EVALUATION

We began this section by providing guidelines for formulating exercise roles and indicating how they can be linked to real-life positions of participants. Although performance evaluation of the individuals or teams participating is not as important as it would be in the context of a simulation game, in most cases it is illuminating to examine how participants or teams perform with respect to evaluation criteria set forth by the core group. Of course, there are no points to win or lose, as there are no winners or losers in the gaming sense. The ultimate criterion for success by participants is whether the ordeal has been worth the time and effort of each. Their real reward is the satisfaction of creating and contributing, and their real loss is the failure to do so. Thus the performance evaluation scheme should help mobilize participants to work toward the common objectives they share with the organizers. In other words, the first criterion to gain rewards is a creative and cooperative attitude, whereas inventing "successful" policies has only secondary importance.

CONCLUSIONS

In this article I have outlined the need and initial concept for a new approach in policy analysis, the *policy exercise*. The procedural roots of the approach are found in operational games, the Adaptive Environmental Assessment and Management approach, and the scenario-based free-form games. The main objective of policy exercises is to provide a flexibly structured interface between scientist and policymakers for their joint synthesis and assessment of relevant scientific information for policy purposes. The centerpiece of the exercise is a series of interactive scenario analysis sessions. Six basic scenario types were presented as building elements for the exercise. The design elements for policy exercises

include roles, rules, procedures, scenario formulation, models and supporting data, indicators, and performance evaluation.

The policy exercise approach is more than just a collection of these elements. It also includes the principles and techniques of organizing an appropriate selection of elements into an operational framework to serve the objectives of specific applications. These procedures and related issues of implementation are presented in a companion article (Toth, 1988b).

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POLICY EXERCISES

Procedures and Implementation

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The concept, objectives, building elements, and design specifications of the policy exercise approach were presented in a companion paper (Toth, 1988b). The policy exercise was defined as a flexibly structured process designed as an interface between academics and policymakers. Its function is to synthesize and assess knowledge accumulated in several relevant fields of science for policy purposes in light of complex practical management problems. It is carried out in one or more periods of joint work involving scientists, policymakers, and support staff.

A policy exercise is carried out in three phases. In the preparations phase, a small team called the *core group* identifies and invites participants; it collects, organizes, and distributes relevant information. The workshop is the centerpiece of the exercise. It engages a number of senior policymakers and experts to work through one or more scenario sessions by formulating and evaluating strategic policy alternatives in the context of a game. The workshop is followed by an evaluation phase, in which

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AUTHOR'S NOTE: *This article is the second of two describing the policy exercise approach based on Toth (1986; 1988a). The first article presented the concept, objectives, building elements, and design specifications. I am indebted to William C. Clark for his intellectual and moral support throughout my work in developing the policy exercises. Peter Duinker played a leading role in the first implementations. Comments on earlier versions of the article by Alan Coote, Jan Klabbers, Rafal Serafin, Allen Solomon, and Nick Sonntag are gratefully acknowledged.*

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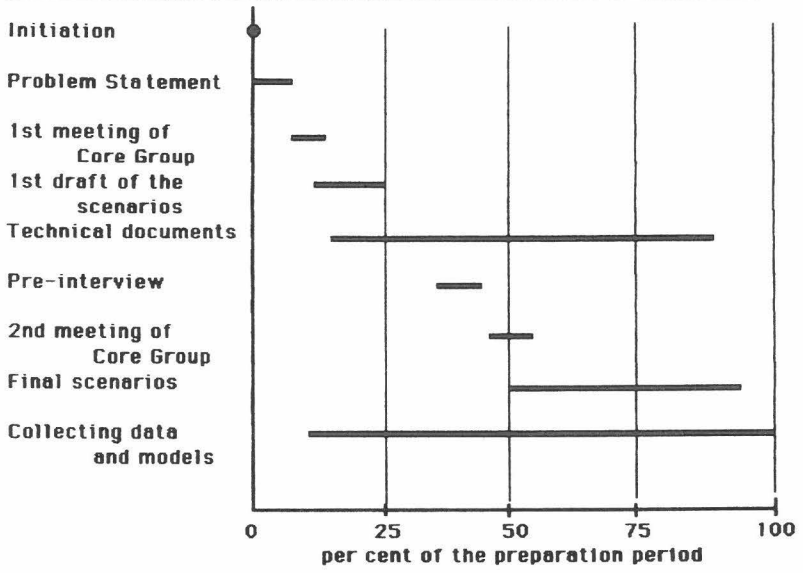

Figure 1: Activities in the Preparation Phase

the core group synthesizes and analyzes the outcome of the workshop; then it prepares the documents of the exercise for wider distribution.

PREPARATIONS

The preparation phase of the policy exercise usually takes 3 to 10 months, depending on the nature of the problem and the staff and resources available. (See Figure 1 for an overview of the steps in this phase.) The experiments we have conducted so far taught us one important lesson: It is not worthwhile saving time and effort in the preparation phase, especially when acquiring input and feedback from participants. The core group should rely on their contribution in inventing roles, formulating rules of the game, and scenario writing. Although it is not possible to "fine-tune" an exercise, as would be the rule for simulation games, serious confusions can be prevented by careful preparations. There is no redundancy planned when inviting a group of people

to the workshop; thus the whole exercise can be jeopardized when some of them realize that it is not what they expected and become uninterested or even hostile. If this occurs in the preparation phase, these participants can probably be replaced without much difficulty. Those involved in several months of preparatory work will have confidence, become committed and feel that the exercise is their project. Several rounds of comments, criticism, and feedback are necessary to achieve such commitment, provoked, for example, by questionnaires, requests for comments, and preliminary interviews. The exercise's manual, sent out to participants in small installments, must really be an evolving document reflecting this iterative process.

PROBLEM DEFINITION

The first document to be created in a policy exercise is the problem statement. Formulating this document has three purposes. First, to define at the very beginning what the problem is that will be investigated through the policy exercise, why it is interesting, why doing a policy exercise seems to be a good approach, and what is the expected outcome or product. The second purpose of the problem statement is to create a guideline, a frame of reference that will help focus on the original issues. The third purpose is to provide a basis for evaluation both in terms of usefulness of the policy exercise approach to address the problems at hand and for a critical assessment of how that particular cycle was organized, prepared, and implemented. In this respect, functions of the problem statement are similar to those of the concept report in developing an operational game (see Duke, 1981: 59). Setting evaluation criteria at the very beginning will facilitate implementation throughout the process. The problem statement is prepared by the chair and the coordinator.

FIRST MEETING OF THE CORE GROUP

Based on the problem statement, the chair and the coordinator have to select the 3 to 5 most important disciplines with respect to the issues in the policy exercise and to invite participation of the

best experts available in each field. Together with the chair, the coordinator, and the representatives of stake-holders, they will become the core group responsible for the high quality of scientific inputs to the exercise.

Bounding the problem starts in the problem statement. The composition of the core group makes this statement more explicit. This process is completed when members of the core group first meet for 2 to 3 days. Their major task is to prepare a comprehensive survey in the critical areas outlined in the problem statement. They review the most important past efforts in the problem area and prepare a critical appraisal of what has been achieved. They summarize the issues in which there exists a consensus and those characterized by major differences in opinion. If there is a "conventional wisdom," they describe it. Finally, they seek to identify the major sources of differences, and to show how these relate to the scientific uncertainties in the relevant fields of research.

The next set of questions addressed by the state-of-the-art review relates to institutional and organizational aspects. Who are the key interest-holders and actors? Is there any formal coordination among them? If so, at what level of authority, and with what source of legitimacy?

Finally, the review needs to have a look at the methods applied in previous efforts: What are they? Which ones could be integrated and used as support tools in preparation or at the workshop? Are there any computer models or data bases that can be used directly or could be modified for use in the policy exercise?

The review is prepared by the core group and the required number of experts appointed to the task by the core group. At the first meeting of the core group, they should prepare guidelines for scenario development and assign responsibilities to create the first drafts of the scenarios. The guidelines are general ideas on events, internal developments and surprises, and external shocks that might appear in the scenarios.

A set of background "technical" papers will be required for the interactive exercises for use of both control and participant teams. Information in these constitute the "rules of the game"

when participants formulate their policies and the control team evaluates them. (The papers include, for example information about technology and specific issues of importance.) The core group has to commission these papers early in the preparation phase so that they can be sent out to participants before the workshop.

Members of the core group will identify participants to be invited also at this meeting. There are two types of participants, defined according to the roles they play at the workshop. Members of the control team include the experts in the core group and other experts invited to the workshops. Members of the policy teams are policymakers. There are several criteria for selecting the invitees to both groups. Expertise accumulated in the control team should provide a reasonable coverage of all the important areas of interest to the exercise, but the number should not be too high so that the control team grows beyond a manageable size.

The policymakers invited to join the policy teams represent the most important actors from the management/policymaking side. Besides the obvious requirement for high professional skills, invited participants should have a series of personal characteristics that will contribute to the success of the exercise. They should be open-minded to ideas from others, no matter how strange some of these might appear at the first glance. In fact, it is an asset if they are able to come up with original ideas. They should be tolerant and cooperative, ready to work in an environment where face-to-face criticism and open challenge of each other's ideas are basic requirements.

The invitations have to be short and specific. What is the whole exercise about, why have participants been chosen, what would be their responsibilities, and who else was invited? The invitation has to outline the procedures, schedules, time commitment, financial remuneration, and the expected products as well.

PREPARING THE FIRST DRAFTS OF SCENARIOS

Scenarios are the most critical inputs to the workshop. In fact, scenario writing is at least as important to the content of a policy

exercise as the workshop itself. The first draft of the scenarios is prepared by the core group based on the information in the problem statement and the ideas developed at the core group's first meeting. While preparing the first drafts, special emphasis should be given to identifying possible sources and effects of surprises originating within or outside the main area of investigation. Surprises are unexpected trends and events in the scenario that are often missing from the conventional "high probability" scenarios. In a policy exercise scenario, it is not the credibility or plausibility of a particular surprise that is important, but rather the search for policies and strategies that will make the system more resilient to those (and, perhaps) other types of unexpected events as well.

DESIGNING AND SENDING OUT THE LOOSE-LEAF MANUAL

The core group has to be very careful about the amount and content of materials it provides to the participants. Giving them a concise document when they arrive at the workshop is not a solution. The experience of many operational game operators suggests that players do not tend to read carefully even a 6 to 8 page role description, being much too impatient to start the game. Going through the material in the pregame briefing process is also rather ineffective, especially when there are different roles and many rules to learn in a short time.

Another point of consideration here is that the types of policymakers we expect to participate in the policy exercises are unlikely to be able to reserve the amount of time required to go through all the materials at one sitting. If they get the materials in several installments, they are more likely to read them immediately and react when a response is required. This arrangement should also enhance their sense of being deeply involved in the exercise and should make them less likely to cancel their participation, if they run into schedule problems in the course of preparation.

Bearing all these requirements in mind, I propose a loose-leaf manual that is sent out in several installments and is regularly updated during the preparatory phase. The limited amount of reading material policymakers receive at a time makes it possible

for them to read and react to it immediately. By the time they leave home for the workshop they should have the complete collection. The manual will be their main working document throughout the exercises and especially at the workshop.

The first installment of the manual should contain a description of the conceptual framework of the policy exercise, a condensed version of the problem statement, and the first draft of the scenarios. This amounts to approximately 40% of the total material the participants get. As new or revised parts of the manual become available, participants will receive them together with a revised table of contents; they always have an updated manual.

PREINTERVIEW

It has already been emphasized that communication between participants and the core group is very important for the success of a policy exercise. Lively correspondence is a basic requirement, but toward the end of the first half of the preparation phase it is necessary that members of the core group visit participants and discuss the problem on the table in detail. By this time, the central issues and objectives of the policy exercise have to be defined and participants need to be selected. The aim of the preinterviews is to get the first input to the exercise from the participants. Interviewers talk about the subject with them and discover their beliefs, attitudes, and views of the problem. The form of the preinterviews is close to what sociologists call partly structured, standardized interviews.

Ideally, all preinterviews are conducted by one person from the core group. If this is not possible, then interviewers have to discuss the form and content for the preinterviews and prepare a protocol that will be binding for each of them. Participants will tend to focus on the problems of their own region, industry, or business, and there is a delicate balance between extracting from them as much information as possible with respect to the problem as a whole, and becoming preoccupied with problems of one particular party. A good protocol for the interviews will help to

ensure a uniform output without degrading the discussion to a rigid, questionnaire type of information gathering.

The preinterviews take place at the offices of the participants. The minimum time required is 2 to 3 hours each. Given their everyday workload, it is not likely that the type of people we expect to participate in the policy exercise will be able to reserve that much time in a single block. Ideally, the preinterviews take place in two 1 to 1.5 hour sessions with a 2 to 3 hour interval between. This will allow interviewers to go through their notes, check them against the protocol, and direct discussion in the second round, so that the preset goals are reached by the end of the day.

Questions to be discussed in the preinterviews include a short, general overview of the subject; a more detailed discussion of which aspects of the problem are the most important for the interest holders represented by the participant; a discussion of the participant's views about the relationships of these issues to the concerns of other parties in the game; the participant's opinion on the kind of support that is needed from outside to solve some of these problems; and the participant's views on what sort of technical assistance is needed at the workshop (data base, computer models, or decision-making aids, for example).

FINAL PREPARATIONS

Results of the preinterviews and participants' reactions to the first draft of the scenarios are evaluated by the core group at its second meeting. This is the first step in the process of direct preparation for the workshop.

As a result of this evaluation, the core group should be able to decide which scenarios will be used at the workshop, how should they be modified, and which scenario types are most appropriate to present them.

In this preparatory phase for the workshop, several activities are going on simultaneously. As new parts of the workshop material become available, they are immediately sent out to the participants. Members of the core group are collecting data and computer models for use by the participant groups and the

control team at the workshop. A short description and user manual for these models and data bases are also sent out.

THE WORKSHOP

The culminating phase of a policy exercise is the workshop. Although the time and effort devoted to the activities in the preparation phase can vary depending on the subject, each step is essential, and none can be skipped without jeopardizing the success of the whole exercise. There is more flexibility in the actual design and length of the workshop, the number and types of scenarios discussed, the time available to work through one scenario, and the way time is split between policy formulation, control team activities, and floor discussions. In the following sections a workshop will be described in terms we conceive as typical. The four parts (introduction and briefing, scenario sessions, debriefing, and social event) would be standard to any policy exercise workshop.

The workshop would form an intensive and focused 2 to 5 day period of work. A key role is played by the facilitator, who is mainly responsible for matters such as keeping the process moving, coordinating actions of the participant groups and control team, and providing support with logistics. The role and responsibilities of the facilitator are similar to those of a game director in an operational game, but are more difficult because many more unexpected events are likely to occur during a policy exercise workshop.

INTRODUCTION AND BRIEFING

The first day of the workshop starts with an introductory session. Participants introduce themselves and give a short report on the region, company, industry, or interest group they represent. This is followed by the introduction of the control team, whose members tell about both their real-life profession and the responsibility they assume by playing a role at the workshop.

Participants bring with them their manuals for the workshop. Since they have been involved in the preparation of these

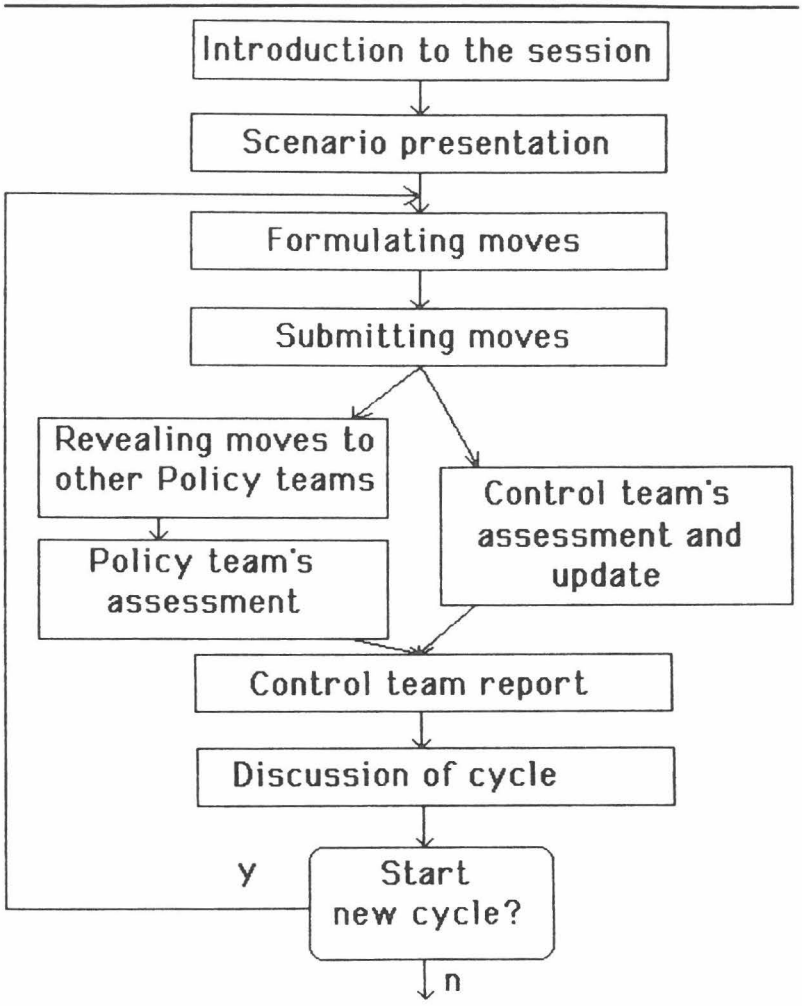

Figure 2: Steps in the Scenario Processing

manuals, there is no need for a long briefing session. Participants have to be informed about the logistics and use of equipment available to them.

SCENARIO SESSIONS

Six types of scenarios were defined and discussed in the previous article. Except for Type 4 scenarios, all the other

scenario types are processed at a policy exercise workshop in an interactive session consisting of at least three consecutive repetitions of a given sequence of procedural steps (Figure 2). The number and type of scenarios actually processed at the workshop depends on the problem and focus of the specific exercise.

1. Introduction to the Session

In the preparation phase, a detailed schedule was sent to the participants specifying the sequence of events and activities at the workshop. In the introduction phase, control team and policy team members can be reminded of the objectives for the next session, the learning goals the teams must reach by the end of the session, and the special characteristics of the session that must be explored. This short session also sets the tone for the rest of the session and creates a good working atmosphere.

2. Scenario Presentation

Scenarios are prepared in several passes, with contributions from the participants in the preparation phase. The revised scenarios are also sent out to team members before the workshop. Participants on the policy teams are asked to developed initial ideas about the policies relevant to their own mandates before they arrive. Thus there is no need to spend time on long scenario presentations or for reading the scenario and clarifying its content.

A quick synopsis of the scenario can be useful as a slide show or a very short presentation. The same charts and figures can be used that are included in the scenario package handed out to the participants. This presentation is certainly not appropriate for making major revisions to the accepted scenarios or for making major shifts in scenario focus, but it is clearly an opportunity to emphasize some of the most important focal points for this particular session.

3. Formulating the Moves

When participants first reach this point (first round in the first scenario session), silence and helplessness usually characterize

participants. This usually disappears as participants become more experienced and individual roles develop for presenting ideas, initiating and moderating discussions within each small group, and so on. The core group must be aware of this potential problem and devise ways to help participants coordinate activities in the policy formulation process. These activities may include explicit assignments in the role descriptions, a suggested sequence participants may wish to follow in tabling their suggestions, or a structured procedure that participants are requested to follow.

Following the initial difficulties of interteam communication, more serious ones are likely to arise as participants get to work. The first is related to the ways they can request help, advice, or clarification about the scenarios. In many cases these are just short, easy-to-answer clarification problems that can be sorted out by a member of the control team and the policy team requesting help. If the control team member feels that the information requested is of general interest, the answer should be repeated for all the teams at the next short discussion (see the following).

The second problem common to this phase of the workshop is related to the ways and forms in which policy teams may communicate with each other. There is no general rule to follow here, as the problem depends to a large extent on the context and specific goals of a particular exercise. Possible arrangements include

- bilateral negotiations at any time with secret or public outcomes,
- multilateral negotiations at any time at the initiative of one of the policy teams also with secret or publicly announced outcomes, and
- miniconferences at preset time points of the policy-formulation phase with preset or flexible duration.

Although an important feature of a policy exercise may be to reveal shared interests and perspectives among participants, it would be a serious mistake to turn a policy exercise workshop into a negotiations game or, even worse, into an effort trying to negotiate "real" treaties among the participants. The policy exercise approach is neither an appropriate nor efficient way to reach these kinds of objectives, although it certainly is aimed at

revealing areas of potential cooperation, agreements, and room for "real" negotiations. In order to make use of this potential, the role descriptions and the exercise protocol must specify all the rules related to intergroup communications in the policy-formulation phase.

Even though formal negotiations among policy teams in this phase are not of primary concern, it might be useful to stop the group's work once or twice in each round for a short time to clarify questions of general interest. This may be better than interrupting the group's work now and then when a question or request from one group is of interest to all the others. These preset short discussions might also help participants structure their decision-making processes in time and formulate moves efficiently.

4. Submitting Moves

Policies formulated in the previous phase are submitted to the control team for assessment and system update. The exact form of this submission might vary from simple written policy statements to more sophisticated computerized forms such as spreadsheets.

5. Revealing Moves to Other Policy Teams

At this point of the scenario-analysis session, two parallel activities take place. The control team is evaluating the submitted moves and preparing the updates on its own, while policy teams reveal their moves to all the other teams and carry out the same assessment.

Ideally, policy teams communicate their moves to each other in the same form as submitted to the control team. This is not only the simplest solution but also provides the same information base for group evaluation that the control team is using. If for any reason this is not appropriate (e.g., teams do not wish to reveal all aspects or elements of their policy intentions to the others), alternative ways need to be devised. One possibility is to issue a short press release or arrange a media appearance. The problem here is that these forms tend to turn into public-relations shows rather than information-sharing opportunities, but in certain cases this might be exactly the goal.

6. Policy Teams' Assessment

The goal we intend to reach with this step is not just to keep the policy teams busy while the control team is preparing the update; rather it provides a basis for comparing and evaluating the differences in the ways a group of experts and a group of policymakers look at the same practical problem and situation. To make this comparison meaningful, the assessments the groups prepare must be compatible with respect both to their final form and the procedures used to produce them. The facilitator has a critical role in moderating this large-group discussion (a difficult task in itself). He should avoid development of a complaint session (this should first happen in the debriefing phase) and should, in general, separate items relevant to a joint evaluation and update from problems that have to be sorted out in the debriefing phase.

The easiest way to carry out the joint policy teams' assessment is to use the same structured process that is suggested for the control team to follow and to produce the same list of system components and indicators for update that the control team will report to the policy teams. Exact congruence is not very likely to occur, though if it were, the policy exercise would teach little regarding differences in the executive's and scientist's perspectives on the issues. Nonetheless, the processes, even if different, must provide comparable outcomes.

7. Control Team Assessment and Update

This step is probably the most critical one in a policy exercise workshop, and, unfortunately, the most difficult one to prepare for. It is critical because participants lose interest if the control team's assessment is not relevant to the policies submitted as moves, or not plausible in terms of what should happen as a result of their actions. This is very difficult to prepare, because the possible range of policy responses developed to a challenging scenario by a set of good teams is immense. Also, it is a major task to comprehend the policy responses in a relatively short time.

To ease some of these difficulties, a set of carefully chosen decision variables and indicators is extremely helpful for sorting

out the quantifiable aspects. Small models can be devised in the preparation phase to check the decision variables for consistency and to make an initial assessment of cumulative impacts.

One arrangement to make the control team work more efficient is to form small subgroups, or to work individually in the first part of this phase to prepare the analysis of moves in the individual fields of expertise. Synthesis can then be carried out in the second part, or, if more appropriate, the aggregation can be formulated in an hierarchical way following the internal logic of the system.

It may also be helpful in some cases to delegate one member from each policy team to join the control team for the assessment. These people clarify the ambiguous items in the submitted moves and they represent the policy team's concerns at the evaluation. This would prevent the control team from misunderstanding policy intentions.

8. Control Team Report

The control team report on the evaluation of policies and system updates should contain

- a short summary of events in the background scenario,
- a short summary of policies pursued by each team in this cycle,
- a more detailed evaluation of how these policies affected each other (whether they amplified or weakened each other's effects),
- an analysis of how the cumulative result of the policies affected the system,
- an indication of how the policies affected trends in the background scenario,
- an update of the key indicators representing the new initial state of the system at the beginning of the next cycle, and
- an updated version of the scenario reflecting changes because of policies implemented in the previous cycle.

The control team report is presented as a mixed written statement and oral presentation by one or several members of the team. The perspective in presenting each item should be that of the policymakers with explanations reflecting the scientists' concerns related to the issues.

9. Discussion of the Policy Assessment and System Update

This is probably the most exciting part of a policy exercise workshop, because the views and perspectives of the policy and analytical representatives on the issues confront each other directly. It is also a difficult part to facilitate, since an efficient forum for communication must be provided for 20 to 30 people. To prevent the discussion from exploding in an unmanageable number of (partly irrelevant) directions, the facilitator should pursue, with reasonable flexibility, the same structural frame that was used to prepare the joint policy team evaluation and the control team assessment and report.

Clear distinction should be made between the discussion phase of each interactive cycle and the debriefing part at the end of the scenario session. The main objective for the discussion phase between two cycles is to give participants a clear understanding of events so far, and to reach an agreement with the control team on the system update and the initial state before the next cycle starts. Any attempt to initiate an overall evaluation of the scenario and policies, or to discuss details of the process of evaluation, should be postponed until the debriefing phase at the end of the scenario session.

A critical task for the facilitator in this phase is to provide equal opportunity for each participant to comment. This tends to be a difficult task even if the participants share the same native language. Many issues for which the policy exercise seems to be a useful tool, however, involve more than one nation and thus some participants must work in a difficult, nonnative-language environment. The facilitator's task is to make sure that all participants can contribute to the joint effort.

10. Starting the Next Cycle

For most scenario types, steps 3 through 9 above will be repeated at least twice in the interactive scenario-analysis sessions. Commonly, the learning value of consecutive cycles increases as participants are more comfortable with the procedural rules, the group dynamics, and the overall working environment of the

exercise. The chairman and facilitator must decide whether and how long to break between cycles.

DEBRIEFING

For most operational games, 40% to 50% of the total exercise product, in terms of learning, communication, and information sharing, is realized by a carefully designed and conducted debriefing session at the end of the interactive phase. The corresponding figure for a policy exercise is probably less. Nonetheless, debriefing is a key procedural element for each type of interactive scenario-analysis session.

Given the severe time constraints under which policy exercise participants are working, an appropriately structured sequence for the debriefing is necessary so that participants can discuss the scenario they just completed. Steps in the debriefing sequence should depart from very specific, detailed aspects of events in the scenario and proceed gradually toward more general issues such as retrospectively identifying potential branch points in the scenario. Debriefing should also include a short "performance evaluation" for each policy team as well as the control team.

Following the last scenario session, all participants come together to discuss and evaluate the policy exercise. Policy-related issues have already been discussed at the end of each scenario session. There is a need, however, to step back and take an overview of the exercise as a whole. In order to structure the discussion, a protocol must be prepared by the control team that reflects on what happened at the scenario sessions and what kinds of issues could be raised in the floor discussions.

Participants should be asked to evaluate what has happened and why, to discuss their ideas on policy formulation, to list alternative policies that could have been suggested, and to predict what might have been the result if their suggestions had been implemented. The next set of questions addresses the relationship between what happened at the workshop and their real problems. How useful was it for them to take part? What did they think would change as a result of what they learned from the exercise?

Finally, participants should be asked to evaluate the process of

organization and implementation of the exercise. Were the information and support they got sufficient? What sort of procedural improvements could they suggest?

RELIEVING GROUP TENSIONS: SOCIAL EVENT

The last part of a policy exercise workshop is informal, but nonetheless important. It may appear rather strange that a social event becomes part of the procedure in a policy-oriented scientific method. The reason is quite simple, however. Although we do not want to create as much anguish, anger, or frustration as some of the social interaction games do (see Greenblat, 1981), it is not difficult to foresee that after from two to five days of intensive small group discussions where challenging each other's ideas is a basic requirement, some participants may feel that they are fed-up with everybody and everything. It is the task of the facilitator and the chair to prevent disputes from getting emotionally overheated in the meeting room. An important function of the debriefing sessions at the end of each scenario session and at the end of the workshop is to sort out the tensions that may be building. Still, if we design a procedure that has a chance of generating any sort of uncomfortable feelings in the participants, then we have to make sure that those feelings are completely relieved on the last day before participants depart.

Once again, the facilitator and the chair have to assume the leading role in creating an atmosphere at this event that would make it easy for the participants to get rid of all possible hard feelings. It is important that they get help and advice from those members of the control team who had observation tasks assigned through the workshop. It is suggested that they meet briefly after the final debriefing session to discuss strategy if there is a need to smooth interpersonal tensions generated in the policy exercise.

EVALUATION AND FOLLOW-UP ACTIVITIES

After the workshop is completed, the core group members have to process all the information generated at the workshop, prepare

the documents of the exercise, and distribute relevant products created by the exercise. These activities are interwoven with a systematic evaluation of the exercise.

The most important product of the exercise is one or more *future histories* looking back at the present from a specified future point of time (the end of the scenario horizon in the interactive sessions) and telling a consistent story of the sequence of events, various trends, and policy interventions as they "happened" at the workshop. The information base for writing the future histories includes the original scenarios and background documents, the repeated policy moves submitted by the participants, the policy assessments and system updates prepared by the control team, and the comments and observations presented at the debriefing by all participants. The first version of the future history is sent out to the participants for review before wider distribution of the material is initiated.

Other activities complementing the preparation of the future histories in the evaluation phase are required to share the lessons with a wider audience. Consistency and sensitivity analyses are used to increase the strength and plausibility of the future history and draw the policy relevant lessons for various groups of actors and stakeholders. Comparative analyses with other projections and scenarios are needed to allocate the future histories generated by the policy exercise in the realm of possible futures.

There is a substantial research component of each policy exercise resulting in specific products like new models and data bases. The core group has to clean up and document these products for distribution.

The first important step of the evaluation phase takes place at the end of the workshop: participants assess the exercise from their own point of view in the debriefing phase. This provides the core team with part of the answer to the question. "How useful was the policy exercise?" Criteria for evaluation, however, are likely to be different for the participant teams and the initiators. Therefore, the core group, together with selected members of the control and participant teams, should stay together for some time after the workshop to review and evaluate the exercise as a whole, to decide whether it would be useful to carry out another round, and if so, to set the guidelines for doing so. Evaluation thus would become, in many cases, an overlapping phase between two exercises.

In the first part of the evaluation phase attention should focus on the usefulness of the exercise. The most important successes and failures should be identified, and the contribution of each activity in the sequence should be diagnosed. Activities of the core group in the preparation phase, and the performance of the control and participant teams at the workshop are also evaluated at this point.

The main question for the second part of evaluation should be whether it would be useful to organize another cycle, and if so, what are the major lessons from the past exercise that should be applied to the future one. In either case, each element of the policy exercise is to be challenged: the procedure itself, scheduling of phases and steps, choice of scenario types, shocks and surprise events in the scenarios, the ways they were presented, the plausibility of the scenarios in general, the relevance of models and data bases, and the performance of members of participant teams, control team, and the facilitator.

The real strength of the policy exercise approach should become more apparent if the exercise is repeated several times with (partly) different groups of participants, using a new set of scenarios, updated models, and new data. It is clear, however, that in many cases the decision to run a new cycle would be affected by many other considerations beyond the pure successes or failures of a previous exercise. This is yet another reason why evaluation and a summary report from the core group to the ex-participants are indispensable parts of a policy exercise.

CONCLUSIONS

In this article I have outlined the principles and techniques of running a policy exercise. The concept, objectives, and the design and building elements of the approach have been introduced in a companion paper (Toth, 1988b).

Three phases have been defined in a policy exercise procedure: preparations, workshop, and evaluation. Activities in the preparations phase include scoping and bounding the issues for the exercise, recruiting the participant, and collecting the relevant information for the workshop. The information is processed at the workshop by a group of policy makers and analysts in the form of

gamed scenario sessions by formulating and evaluating strategic policy alternatives. Results from the workshop are then further analyzed and written up as "future histories" in the evaluation phase.

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