The World Health Organization was established in 1948 as a specialized agency of the United Nations serving as the directing and coordinating authority for international health matters and public health. One of WHO's constitutional functions is to provide objective and reliable information and advice in the field of human health, a responsibility that it fulfills in part through its extensive programme of publications.

The Organization seeks through its publications to support national health strategies and address the most pressing public health concerns of populations around the world. To respond to the needs of Member States at all levels of development, WHO publishes practical manuals, handbooks and training material for specific categories of health workers; internationally applicable guidelines and standards; reviews and analyses of health policies, programmes and research; and state-of-the-art consensus reports that offer technical advice and recommendations for decision-makers. These books are closely tied to the Organization's priority activities, encompassing disease prevention and control, the development of equitable health systems based on primary health care, and health promotion for individuals and communities. Progress towards better health for all also demands the global dissemination and exchange of information that draws on the knowledge and experience of all WHO's Member countries and the collaboration of world leaders in public health and the biomedical sciences.

To ensure the widest possible availability of authoritative information and guidance on health matters, WHO secures the broad international distribution of its publications and encourages their translation and adaptation. By helping to promote and protect health and prevent and control disease throughout the world, WHO's books contribute to achieving the Organization's principal objective—the attainment by all people of the highest possible level of health.
Health futures
A handbook for health professionals

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World Health Organization
Geneva
1999
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Martha J. Garrett, formerly Deputy Director of the Institute of 21st Century Studies, Arlington, VA, USA, has assisted teams in a number of countries with their analyses of alternative futures. She began working with health futures in 1993 and now teaches research design in the international health degree programme at Uppsala University, Sweden. Dr Garrett has studied computer modelling and information technology and holds a PhD in zoology from the University of North Carolina at Chapel Hill.
Awareness of the future has increased markedly over the last 30 years, and it is widely recognized that a long-term perspective is essential in all aspects of national policy-making and planning. Nevertheless, formal analysis of the future remains a low priority for most national decision-makers, in the health sector as in others, for a multitude of reasons, including the lack of a comprehensive handbook on health futures.

The need for such a handbook was discussed during the international consultation on health futures in support of health for all convened by WHO in 1993. The participants recommended that, to promote and support health-futures activities, WHO should publish a handbook on health futures for use by health professionals in Member States. The present handbook has been prepared in response to that recommendation, and is particularly important at the present time, when health indicators remain discouraging in many countries and new threats to health are emerging. Renewing a commitment to health for all is essential under these conditions, as is the development of more effective strategies, policies, and programmes for achieving that goal. This book is intended to encourage and facilitate this process.

The handbook is designed primarily to support the execution of futures activities in the health sector and also to serve as a general reference in the field of futures and health futures, and in training. The core target readers are health professionals with no or limited previous experience of the concepts and techniques of futures studies, employed in the public sector at the national or regional level, and working in developing countries or under other circumstances where resources for futures work may be severely limited. The main emphasis has therefore been on fundamental futures concepts and methods, and the use of futures in an official setting rather than in the private sector. Most of the methods described require no special technological support, although computer-based methods are also included. While some of them may already be familiar to most health planners, the construction of visions and of other alternative future scenarios will not be and is therefore discussed in depth.
In this handbook reference is frequently made to health-futures projects carried out by a futures team with a leader and an advisory committee. While it may often be the choice of a health administration to undertake the study of health futures in this way, it is possible and sometimes preferable to choose a different approach.

Most countries periodically analyse health policy and formulate plans as a means of clarifying the objectives, organizational approaches and resource requirements of national health programmes over a forthcoming medium-term period. In health-situation analysis, policy formulation and programme planning, a number of the methods described in this handbook may well be applicable without creating a special health-futures project. In fact, a number of the methods described here will be familiar to most health planners, including time-series regression, linear and dynamic modelling, the use of expert opinion within Delphi panels, the nominal group method, cross-impact analysis and cost-benefit analysis, to mention a few. Perhaps the key new feature of health-futures work is the construction of visions and alternative future scenarios which are discussed in depth in this handbook. It is also possible for these methods to be used within routine health planning. Thus, ministries are encouraged to consider using these methods even if it is not possible to establish a special health-futures project.

On the other hand, some ministries may find it useful or necessary to sponsor more formal studies in order to carry out more extensive analysis of one or more particular aspects of the health situation or system. Such studies might be contracted out to appropriate institutions or groups outside the ministry. This handbook describes a variety of project approaches that can also support such more intensive study requirements.

Chapter 1 (An introduction to futures) provides background information, including philosophy and terminology. Alternative definitions of scenarios are discussed, as are the many different purposes for which futures exercises can be done.

Chapter 2 (Interviews with leaders of futures projects) is a set of question-and-answer conversations with people responsible for a variety of national health-futures activities. These people are imaginary, but their stories are based on the experiences of real futures teams and reflect accurately the challenges of doing a futures exercise at the national level, as well as the advantages and disadvantages of different approaches.

The points made in Chapter 2 are analysed more fully in Chapter 3 (Implementation of futures work), which deals with the practical aspects of setting up and carrying out a futures exercise, including legal establishment, organizational structure, funding, evaluation, and the factors that promote the effectiveness of futures projects.
Chapter 4 (Common components) describes the units of which futures projects are typically constructed, and outlines one way in which these components could be combined. This design is provided to help to clarify the relationships among the components, not as a recommended "best" way to do a futures project. Numerous other designs, both hypothetical and historical, can be found in Chapter 5 (Alternative designs).

Chapter 6 (Methods and tools) contains a survey of techniques and devices applicable to futures work, guidelines for selecting the most appropriate ones in a particular case, and suggestions as to the application of various methods to specific steps in a futures exercise. The ways in which the tools can be used singly and in combination in ongoing policy-making and planning activities are also described.

While many of the examples given in Chapters 1–6 are health related, most of the material applies equally well to other sectors. In contrast, Chapter 7 (Application of futures techniques to health) focuses specifically on health and health care, and discusses the relevance of futures approaches to health policy-making and planning, especially at the national level. Examples are given of health-futures projects and programmes from around the world, together with other designs that could be employed in health-futures activities carried out for various purposes.

Chapter 8 (Printed and on-line information resources) describes how bibliographical information relevant to health-futures research can be identified and accessed, and advice is given on the design of effective information searches.

Chapter 9 (Directory) lists relevant organizations, networks, training programmes, funders, and sources of published materials. Addresses and telephone and fax numbers are given for each listing.

A glossary of terms is also provided. This is followed by Annex 1 on drawing up a budget and seeking funding.

Some guidance on the way that this handbook should be used would seem to be necessary since it is assumed that many readers will be newcomers to the field participating in a health-futures project within the public sector. Such projects are usually undertaken by a team with a designated leader. If the project is a large one, the work may be overseen by a board of directors consisting of representatives of sponsoring institutions and financial donors. The guidelines that follow are based on the assumption that the project has this type of organizational structure and that the team and directors wish to use this handbook as a key source of reference in planning and executing their health-futures project.

It is important that both the team leader and the head of the board of directors are thoroughly familiar with all the chapters in the handbook and are prepared to discuss them with the team and the board.
Teams should begin their work by reading Chapter 1 (An introduction to futures) and discussing its implications for their work. Even those team members with extensive experience of futures research should read this chapter in order to avoid erroneous assumptions about the philosophy or terminology on which the handbook is based. The team should then read and discuss Chapters 4 (Common components), 5 (Alternative designs), and 7 (Application of futures techniques to health) before making basic decisions about the project design. Once the design has been determined, the team should refer to Chapter 6 (Methods and tools) to identify and select techniques appropriate to that design. The section on criteria for tool selection should be especially helpful at this point.

When teams are ready to begin collecting information for their project, they should go through Chapter 8 (Printed and on-line information resources) to get ideas about potentially useful background materials. Depending on the circumstances, it may be advisable for the team to include an information expert who will be responsible for acquiring published and computer-based information. If so, this chapter will be of primary interest to that person.

If a board of directors is responsible for the establishment and execution of the project, the members of that board should read Chapters 1–5, paying special attention to Chapter 3 (Implementation of futures work). If the board expects to discuss the choice of tools with the team, they should read Chapter 6 (Methods and tools), and especially the sections on tool selection and application. The board should also be aware of the contents of Chapter 9 (Directory) so that the information given there can be used as need be, e.g. in fund-raising and to make contact with futures organizations.

When this handbook was first discussed at the 1993 international consultation on health futures, participants from several countries stressed the need for it to be totally inclusive, i.e. for all the information needed to do a health-futures project to be included. Access to printed literature is restricted in many countries, so that handbooks that mention an essential method or concept and then refer readers to other sources for details are of limited utility. This has been taken into account as far as possible in the preparation of this handbook, and the essential information needed in a variety of health-futures projects has been included, and many commonly used futures tools have been explained in sufficient detail to allow their reconstruction and application.

Nevertheless, since the futures field draws on the techniques of so many disciplines, it has not been possible to describe fully all the methods used. Most of those that are only partially covered by the text, however, such as surveys and statistical analysis, are widely used in other kinds of research conducted within the health sector. It has therefore been assumed that
individuals with appropriate experience of these methods can be found to participate in projects. Similarly, no attempt has been made to cover in detail issues related to health and health care, since it is assumed that all teams carrying out health-futures activities will include knowledgeable health professionals.
Acknowledgements

The financial support of the Swedish International Development Cooperation Agency is gratefully acknowledged. The author also thanks Dr H.R. Hapsara, former Director, Division of Health Situation and Trend Assessment WHO, Geneva, Switzerland, who has long been interested in health futures and who made valuable suggestions concerning the handbook’s design and contents. Dr S.A. Sapia, former Chief, Strengthening Country Health Information, WHO, Geneva, Switzerland, and Dr S.A. Orzeszyna, Strengthening Country Health Information, WHO, Geneva, Switzerland, who were responsible for the management of the project and provided steadfast support and excellent advice. Other WHO staff members, including Ms A. Brands, Miss A. Chaouachi, Mr H. Dixon, Miss N.J. Hampele, and Mr P. Pachner, were quick to provide assistance when needed, which was greatly appreciated. Additional support was provided by the professional and support staff at the WHO Regional Office for South-East Asia and the offices of the WHO representatives in Sri Lanka and Thailand, while special thanks are due to the members of the Health-futures Core Group at the Regional Office.

The librarians of WHO, Geneva, Switzerland, have been extremely helpful, as have those of the medical libraries at Uppsala University and Gothenburg University in Sweden.

The draft version of this handbook went through an international review process in which numerous people participated. Special thanks are due to the seven people who devoted 2 days to an intensive working meeting on the draft in October 1995, including Dr S.A. Sapia, Dr S.A. Orzeszyna, and Ms A. Brands, WHO, Geneva, Switzerland; Ms C. Puentes-Markides, Pan American Health Organization, Washington, DC, USA; Mr R. Schreuder, Foundation for Future Health Scenarios, Zoetermeer, the Netherlands; Professor T. Tsubo, Tokai University, Tokyo, Japan; and Dr H. Zollner, WHO Regional Office for Europe, Copenhagen, Denmark.

The following also participated in the review process in various ways: Dr K. Barnard, Nordic School of Public Health, Gothenburg, Sweden; Dr C.
ACKNOWLEDGEMENTS

Bezold, Institute for Alternative Futures, Alexandria, VA, USA; Dr G. Dahlgren, Health Secretariat, Swedish International Development Cooperation Agency, Stockholm; Ms A. Gardner, University of Hawaii, Honolulu, HI, USA; Dr T. Hancock, Kleinburg, Ontario, Canada; Ms C.M. Longmire, WHO Regional Office for South-East Asia, New Delhi, India; Dr J. Nelson, Rollins School of Public Health, Emory University, Atlanta, GA, USA; Dr D. Nicholson, Cambridge Health Futures, Cambridge, England; Dr M. Rusnak, Director National Centre for Health Promotion, Bratislava, Slovakia; Dr W. Schultz, University of Hawaii, Honolulu, HI, USA; Dr A. Suwadono, National Institute of Health Research and Development, Jakarta, Indonesia; Ms A. Wadwongtham, Ministry of Public Health, Bangkok, Thailand; and Dr M.J. Wysocki, WHO Regional Office for South-East Asia, New Delhi, India.

Ms A. Taket, South Bank University, deserves special mention since she both served as a reviewer and edited the report on the 1993 international consultation on health futures in support of health for all, which served as one of the resource documents for this handbook.

The handbook and its contents were discussed at the 1993 international consultation in Geneva and at the 1994 and 1995 meetings of the International Health Futures Network, and many participants offered helpful suggestions. Many of the persons mentioned above were actively involved in these useful discussions, as were the following: Dr J. Bryant, The Aga Khan University, Karachi, Pakistan; Dr J. Essien, Rollins School of Public Health, Emory University, Atlanta, GA, USA; Mr J. Flower, The Change Project, Larkspur, CA, USA; Dr A. Franks, University of Leeds, Leeds, England; Dr G. Garland, GRADE, Lima, Peru; Dr S. Guricci, School of Public Health, University of Indonesia, Jakarta, Indonesia; Mr P. Hadridge, Anglia and Oxford Regional Health Authority, Milton Keynes, England; Dr R. Jahnke, Health Action, Santa Barbara, CA, USA; Ms K. Johnson, Healthcare Forum, San Francisco, CA, USA; Mr J. Latoff, Rollins School of Public Health, Emory University, Atlanta, GA, USA; Dr M. Lobo, The Aga Khan University, Karachi, Pakistan; Dr I. Okazaki, Tokai University, Tokyo, Japan; Professor A. Onishi, Soka University, Tokyo, Japan; Dr A. Sánchez Viesca, School of Public Health, Autonomous National University, Managua, Nicaragua; Dr D. Sevier, Naval Postgraduate School, Monterey, CA, USA; Dr K. Siregard, School of Public Health, University of Indonesia, Jakarta, Indonesia; Dr S. Sumantri, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia; and Dr Y. Watanabe, Institute of Health Systems Development, Tokyo, Japan.

Many other ideas have arrived via mail, e-mail, fax, and telephone from people working in futures and public health around the world. Those who have made such long-distance contributions have included Dr P. Bishop, Studies of the Future Program, University of Houston at Clear Lake,
Houston, TX, USA; Professor J. Dator, University of Hawaii, Honolulu, HI, USA; Ms M. Lawson, WHO Regional Office for Europe, Copenhagen, Denmark; Dr B. Lloyd, South Bank University, London, England; Mr P. Moll, Clearinghouse for Applied Futures, Wuppertal, Germany; Dr F. Roubelat, Conservatoire National des Arts et Métiers, Paris, France; Dr R. Slaughter, Futures Study Centre, Kew, Victoria, Australia; Professor P. Spies, Institute for Futures Research, Bellville, South Africa; and Associate Professor T. Stevenson, World Futures Studies Federation, Brisbane, Queensland, Australia.

Some handbook sections have drawn on health-futures work already completed in various countries, and acknowledgements are due to Dr A. Suwandono, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia; Professor T. Tsubo and Dr Y. Watanabe, Institute of Health Systems Development, Tokai University, Tokyo, Japan; Mr R. Schreuder and his colleagues at the Foundation for Future Health Scenarios, Zoetermeer, the Netherlands; Angel Sánchez Viesca, School of Public Health, Autonomous National University, Managua Nicaragua; Dr Abu Bakar Suleiman and the project team of the National Health Plan Study, Kuala Lumpur, Malaysia; and Mr M. Longley, Dr C. Riley, and Dr M. Warner, Welsh Health Planning Forum, Cardiff, Wales.

Several design ideas contained in the handbook arose during discussions at national ministries of health in Asia. Special thanks are due to Dr N. Nakawattananukool, Health Planning and Policy Bureau, Ministry of Public Health, Bangkok, Thailand, and U Aung Kyaing, Department of Planning and Statistics, Ministry of Health, Yangon, Myanmar.

The author was formerly associated with the Institute for 21st Century Studies, Arlington, VA, USA (now the Millennium Institute) and during that time began developing and writing about some of the concepts that appear in this book. However, the ideas expressed here do not necessarily reflect the Institute's current philosophy or policies. The key role of the Institute and its director, Dr G.O. Barney, in promoting multisectoral "21st century" studies is respectfully acknowledged, as are the important contributions of the groups that have carried out such studies in dozens of countries all over the world.

Finally, the author thanks Claes and Daniel Granqvist, her husband and stepson, for their patience and support during the preparation of this handbook.
An introduction to futures

1.1 What does “futures” mean?

Futures research has been going on for 50 years, and health-futures activities have already been carried out in some countries for over a decade. Nevertheless, the “futures” approach is still unfamiliar to most health professionals. This introductory chapter will therefore explain what the term means and what its relevance is to the public sector.

The futures approach is not a substitute for long-term planning, strategic management and policy-making, though it can support and complement these processes, but rather an anticipatory discipline closely related to them. Over the years, the futures approach has exchanged ideas and techniques with them, as well as with political and social science, economics, policy studies, computer modelling, human ecology, sustainable development, organizational learning, systems thinking, decision theory, and game theory.

However, academic disciplines have traditionally been clearly separated from one another so that these exchanges and the resulting shared interests have not always been acknowledged or even recognized. Readers who work in the public sector but have had little or no exposure to futures ideas will probably discover that many futures concepts and methods are familiar, although possibly known by other names. The overlap between futures and other anticipatory disciplines makes it difficult to define the limits of futures and also raises the question, “Why use futures at all?” The answer is that the futures approach provides a richer set of ideas about the future and tools for exploring the future than can be found in the individual disciplines on which it has drawn, and also has its own unique contributions to make.

The futures approach is not meant to replace the established anticipatory and decision-making processes used by governments and other institutions, nor is it intended to be a substitute for planning, strategic management, and policy formulation. Applied appropriately, however, the futures approach can support, strengthen, and complement these activities, e.g. by identifying previously unrecognized factors affecting a sector, providing a better understanding of how a system functions, and tracing the longer-term and cross-sectoral effects of policies.
Furthermore, the futures approach can serve purposes for which neither planning nor policy-making is intended or for which they are insufficient by themselves. It provides mechanisms for facilitating change and stimulating new ways of thinking, allows participation in decision-making, draws people and institutions together to work cooperatively towards a common desired future, and can be used effectively to test options, re-examine priorities, and renew strategies.

The following five aspects that distinguish futures from other anticipatory approaches deserve special mention:

- **Breadth of coverage.** Planning within a sector is usually focused more or less completely on that sector, strategic planning takes account of the major outside factors that may influence intrasectoral trends, but the futures approach goes a step further. It typically considers a much wider field than would be addressed in a planning or policy exercise, including other sectors, international aspects, and even factors that do not yet exist or are just emerging.

- **Attention to underlying causes.** The futures approach involves looking beyond surface patterns, such as trends in various sectors, to discover the underlying factors and interactions that cause these patterns.

- **Different questions.** Futures projects often answer questions other than those addressed in planning and policy-making. Rather than asking "What can we do to meet needs, given our current resources?", a futures exercise is more likely to ask "What is our desired future for this sector?" The question "What is the most likely future we should plan for?" may be posed, but so too might the question "What are some unlikely futures that might nevertheless happen, and that we should be prepared for?"

- **Sources of information.** The information sources used in futures work include some that are seldom used in other anticipatory processes. Official information systems and formal databases may be used in futures work, but so too may interviews with a small group of carefully selected individuals, public opinion gathered through surveys or open meetings, and ideas gleaned by scanning the popular media and the academic literature.

- **Time perspective.** Futures research differs from policy-making and planning in how far into the future it sets its sights. The time perspective of a futures exercise is usually at least 10 years, frequently 20 or 30 years, and sometimes even longer.

This last characteristic, the extended perspective of the futures approach, is often misunderstood and is a major cause of scepticism about the worth and validity of futures work. Why look 30 years into the future, when current
problems are so urgent? And how accurate are forecasts likely to be, when they cover such a long period? These questions reflect a basic misunderstanding about the philosophy and purpose of futures work. Futures activities look far into the future not in order to predict or plan over that period but to elucidate the long-term consequences of current policies and strategies. A primary reason for doing futures exercises and studies is therefore to improve the way in which current problems are handled, often by elucidating how various policies and strategies might affect trends over extended periods of time and across sectoral boundaries. The extended time perspective of futures work is necessary to discover delayed effects that would not be obvious in an analysis covering only the next 5 or 10 years. A 20- or 30-year time span can put today’s problems and challenges into a different perspective, showing some issues to be more or less important than they currently seem. The extended time frame can also point to kinds of information that will be most useful in planning and policy-making in the future but which should be collected now.

Because of the differences between futures and other anticipatory methods, integrating the futures approach into ongoing policy-making and planning yields many benefits. Preparations for the future are more likely to be effective if they are based on more than a single image of that future. Most institutions work on the assumption that the future will be as described in their plans, yet history shows that it is, in fact, very seldom what we expect it to be. The inevitable result is that management can easily become a long series of reactions to “unexpected” crises—crises that could actually have been anticipated if more than a single future had been considered. Incorporating a futures perspective into policy-making and planning can change this pattern, making an institution better prepared for a wider range of future contingencies and thereby improving its performance and ability to fulfill its mandate.

Such an approach is increasingly relevant today because the world is changing very rapidly. Exponential trends of various sorts can be traced in many sectors and the rate of change is growing ever faster. Traditional methods of planning are not designed to function under such conditions. A 5-year plan will be successful only if the conditions expected when the plan was made actually prevail, but this is becoming increasingly unlikely. The futures approach provides a mechanism whereby planning can be done in a rapidly changing world, by widening the range of futures that are anticipated, providing early warning of potential future threats and opportunities, and allowing institutions to rehearse their responses to different future situations.

Better plans and more flexible strategies capable of handling a diversity of trends and events are not the only benefits of a futures perspective. Institutions that incorporate the futures approach into their regular policy-making and planning processes are likely to develop an increased ability to adapt, a
greater sensitivity to what is actually happening in the world, and an enhanced capacity to respond quickly to changing conditions. In other words, futures work promotes organizational learning because projections from the present into the future very often challenge the mental models of people in the institution, forcing them to examine and reconsider the assumptions on which institutional policies, plans, and strategies are based.

Finally, the futures approach has a role to play in motivating action. When conditions are difficult and something must be done to improve the situation, the sheer magnitude of the current problems can be psychologically overwhelming. People know that steps must be taken, yet feel that there is no point in trying. Neither policy-making nor planning are designed to handle this challenge, but the futures approach is. By carrying out certain kinds of futures projects, people can identify the future that they want and mobilize action for achieving that envisioned future. In summary, incorporating a futures approach into policy-making and planning can increase preparedness, promote organizational learning, break a pattern of habitual "crisis management", and motivate action.

Futures projects can be powerful complements to policy formulation and planning in any sector and can serve a variety of different purposes. They can be carried out to prepare an institution or a government for a range of possible futures through forecasts of trends and the construction of probable scenarios. Others can be done to improve foresight by presenting clear images of futures that are less probable, yet still possible, and which should also be anticipated. Some activities can be designed to help people clarify their vision of how they want the future to be, so that they can begin working towards that preferred future, while others can be used to support policy-making and planning by tracing into the future the possible outcomes of different policy decisions. As the rest of this chapter will clarify, all these purposes are both valid and possible.

1.2 The challenge: learning to construct a project

In the late 1980s, an international agency held a workshop on national futures studies for participants from about 20 countries. The workshop staff, all experienced professionals, presented a series of lectures that together described a wide range of techniques used in futures work. At the end of the week, one of the participants, a professor at a leading university, commented, "I've now attended five workshops on national futures studies, and I certainly know all the methods. But I still don't know how to do futures work!"

His comment was understandable. The futures field has no established, widely accepted rules about how work should be done, and actual activities
are highly individual in character, carried out for different purposes and involving both different designs and different methods. The organizers of futures training courses and authors of futures handbooks have sometimes attempted to solve this problem by outlining what they considered the "best" way to do a futures project—a small preselected set of designs or even a single design. Others have focused instead on components commonly found in futures activities or on specific tools. None of these approaches suffices. In order to construct a futures project, people must understand certain fundamentals analogous to the different aspects of building a physical structure. These fundamentals include:

- The suitability of different constructions for different purposes (warehouses for storage, homes to live in, clinics to provide health care, etc.).
- The use of common components in construction (electrical wiring, masonry, roofing, etc.).
- The arrangement of components in various designs (e.g. the arrangement of the components mentioned above, as shown in blueprints for different types of buildings).
- The tools available and the functions that each fulfils (hammers for knocking in and pulling out nails, saws for cutting wood and other materials, drills for making holes, etc.).

Once people become familiar with these fundamentals, they can make quite complex constructions. This does not mean that they must adopt a complicated design, or use all possible components or every available tool each time they build something. The requisite knowledge is there, if and when it is needed. Even more importantly, once the fundamentals are understood, even simple constructions can be built well.

People who read futures handbooks or attend futures training programmes usually do so because they want to learn how to do futures work—how to design and construct projects of various sorts—but what they learn may be the equivalent of electrical wiring or masonry. Or they may be taught to build one standard building, for which the blueprint and one set of tools are provided, but not how to build other kinds of buildings. Or, worst of all, their training may consist only of an introduction to a tool box.

The need for a comprehensive introduction to all the fundamentals has been kept in mind in the preparation of this handbook. Chapter 4 (Common components) contains an outline of a hypothetical project, but is used to illustrate how common components can be arranged to form a design, and is not intended as a blueprint for how every futures activity should be carried out. Chapter 5 (Alternative designs) gives numerous examples of other approaches suitable for many different purposes and circumstances, and ranging from short exercises to ongoing programmes.
1.3 Terminology

Before more substantial matters are addressed, a few comments on terminology are necessary. The word “futures”, in the plural, is generally used to encompass the whole futures field. “Futures studies” and “futures research” are also commonly used, but these terms are sometimes defined in such a way as to signify particular kinds of futures work. One popular scheme divides the futures approach into futures research (predictions, economic and technical forecasts, etc.), futures studies (scenario writing, futures issues, etc.) and the futures movement (networking, alternative lifestyles, imaging and empowerment workshops, and so on (1). Although these divisions may seem reasonable they are far from being universally accepted, and dozens of other schemes have been proposed.

The dispute about labels for the whole futures field and its various functional subdivisions was addressed almost 20 years ago by Cornish in his book *The study of the future* (2). The relevant chapter, “A field in search of a name”, begins with a sentence that sums up the problem very neatly: “Futurists do not know what to call their subject”. The chapter lists many terms that could be used to embrace all aspects of the futures approach, including futurology, prognostics, futuribles, futurics, futures analysis, and futuristics, the last being Cornish’s own favourite. But Cornish also reported that a poll of World Futures Society members indicated that “futures studies” and “futures research” were their first and second choices for terms describing what they do. Today, the international futures community continues to use these terms in a broad sense. This is reflected, for example, in the widespread inclusion of “futures studies” and “futures research” in the names of organizations and institutions doing every possible kind of futures work.

Throughout this handbook, terms such as study, activity, research, exercise, and project are used primarily in their broad, nonrestrictive sense to mean any type of futures work. Within this handbook, too, futures work will be referred to by a variety of terms, including futures projects, futures activities, futures exercises, futures studies, futures research, and so forth. All these labels will be used in their non-restrictive senses, i.e. to mean simply some kind of futures-oriented work. The term “futures programmes” will generally be used to refer to permanent activities concerned with handling ongoing futures research.

1.4 Scenarios: images of the future

The study of futures is a complex and diverse field. A search through several issues of the international English-language journal *Futures* may yield an analysis of political strategies, a description of a vision of a sustainable society, a projection of international military relations based on advanced
mathematical techniques, a computer-based forecast of the economic sector, a report on a Delphi exercise (a method of obtaining the consensus opinion of a group of experts; see section 6.2.4) about possible trends in education, and even a piece of science fiction. Nor is the confusion likely to be dispersed by delving deeper into the literature. Reading a dozen books about the futures approach will probably strengthen newcomers’ impressions that the futures field lacks not only a standard terminology, but also a core philosophy, standard methods, and a common purpose. The situation facing people trying to understand the futures approach is described below (3):

What a maze the futures field must seem to outsiders! If, out of curiosity, they come to one of our professional meetings, what a struggle they must have reconciling economic forecasting, global computer studies, science fiction writing... and corporate strategic management programmes. How frustrating it must be for them, trying to fit game theory, trend extrapolation, technological assessment, imaging workshops, and cross-impact matrices into one coherent whole... Think of the further confusion they must suffer if they decide to explore the futures literature... How baffled they must experience, trying to follow the arguments about normative versus objective, expert versus participatory, quantitative versus qualitative.

A closer examination may not be the best way to obtain a clearer picture. It may be better to take a few steps back, look at the whole field, and then ask, "What is the underlying pattern? What do these activities have in common?" One point that becomes clear from this bird's eye view is the central importance of scenarios—images of the future. Again, terminology varies, and many definitions are restrictive in some regard. Scenarios are sometimes defined as explorations of alternative futures, descriptions of future situations and the events leading up to them, outlines of conceivable states given certain assumptions, and so on. In this handbook, the term will be used in its most general sense, i.e. to mean an expressed image of the future, whether desirable or feared, likely or unlikely.

Not every futures project, however, involves the creation of a scenario. Some involve only trend analysis, the identification of emerging events, or the consideration of actors' strategies, the aim being not to build an image of the future but to identify factors that may influence that future. Such exercises often lay a foundation for scenario construction at a later date. Yet other futures studies begin with pre-existing scenarios and consider their implications for policy and planning. Nevertheless, most futures exercises result in
the building of one or more scenarios of various sorts. This central importance of scenarios is not surprising. How can the future be considered, discussed, analysed, and debated, how can policies be formulated to change it, how can actions be planned to shape it, if it cannot be imagined?

The future is often depicted as a cone of possibilities (see Fig. 1). The present is represented as a single point. Radiating from it are all the futures that might happen, which fan out to form a cone rather than a tube, since the diversity of possible futures increases in proportion to the distance from the present. A cross-section of the cone at any future time covers all the possible futures at that time, some of which are probable, while others are possible but unlikely (wild cards). A few are desirable; many are undesirable. One future is the one that can be extrapolated from current trends, another is the future that is considered “most likely”. This is normally not the extrapolated future but one that takes into consideration highly probable future events. When people do futures work, they may focus on just one of these futures, or they may consider two, three, or even more.

Some examples of scenario types and the labels given to them are presented in Box 1. These are not exclusive—it is possible for a scenario to belong to more than one category. As the list shows, there are some major terminological problems. Many people working in the futures field have

Figure 1. The future as a cone of possibilities

![Diagram of future as a cone of possibilities]

- Present and extrapolated future
- Wild-card futures
- Most likely future
- Desired future
- Other probable futures
Box 1. **Scenario types and labels**

- Scenarios of futures considered to be "most likely" (expected scenarios, environmental scenarios, reference scenarios, most probable scenarios, probable scenarios, predictions, projections, forecasts, trend scenarios).

- Scenarios depicting futures which are believable, which might happen (feasible scenarios, plausible scenarios, probable scenarios, possible scenarios, exploratory scenarios, alternative scenarios).

- Scenarios that describe futures based on extrapolations from the present (extrapolation scenarios, baseline scenarios, trend scenarios).

- Scenarios of futures other than the expected or extrapolated ones (exploratory scenarios, alternative scenarios, contrasted scenarios).

- Scenarios describing unlikely or impossible futures (wild-card scenarios).

- Scenarios that depict futures resulting from various combinations of both likely and unlikely events, as well as both desirable and undesirable happenings (mixed scenarios).

- Scenarios that describe futures which differ from the expected ones because of interference by policies or by other means (strategic scenarios, alternative scenarios).

- Scenarios of wished-for futures (desired scenarios, preferable scenarios, alternative scenarios, horizon scenarios, utopian scenarios, visions).

- Scenarios of futures that are both wished-for and feasible (visions).

- Scenarios depicting futures that may happen, as opposed to futures that are desired (exploratory scenarios).

- Scenarios of highly negative futures (dystopian scenarios).

- Scenarios that describe a final future situation, a snapshot of the future (situational scenarios, end-point scenarios).

- Scenarios of events leading to a final situation (developmental scenarios, strategic scenarios, interim scenarios).

- Scenarios depicting the future based on certain distinctive sets of assumptions (scenarios named after the assumptions on which they are based, such as the great leap forward, stagnation, international integration, hard times, sustainability, transformation, and so on).

- Scenarios that focus on different aspects of the future (sectoral scenarios, multisectoral scenarios, macroenvironmental scenarios, institutional scenarios, etc.).
proposed definitions and classification systems for scenarios, and these seldom agree (2, 4–10).

Thus "trend scenario" may refer to a scenario of the most likely future, or to a future that is a direct extrapolation from the present, sometimes defined as a highly unlikely future. "Alternative scenarios" may be all the scenarios of a possible future, only scenarios other than the expected one, or only scenarios of desired futures. Some texts say that "visions" must be feasible; others argue that their probability is irrelevant.

And so on—scenario nomenclature is far from settled and will probably remain so for many years, until a taxonomic system evolves that can adequately distinguish between all the ways in which human beings imagine the future. In the meantime, every piece of futures work must include a clear explanation of what the authors mean when they refer to different scenario types.

But why do so many scenario types exist? And why should a single futures exercise involve the creation of more than a single scenario? The diversity of scenario types and the presence of multiple scenarios in a single futures project are the result of certain differences in approach, which will be discussed in the following sections, namely:

- Differences in perceptions of the future.
- Differences in opinions about where values fit into futures work.
- Differences in focus.
- Differences in ideas about the application of the results to policy-making, planning, and programmes.

1.5 Perceptions of the future

For many reasons—personalities, philosophies, cultures, and professional interests and experiences—human beings have widely different opinions about the nature of the future, including its predictability, its rate of change, and its desirability. Thus some people see the future as predictable because they believe that it is largely determined by processes that are already in play. In contrast, some people conceive of the future as something that is "not yet written". There is no single "future", they assert; there are always multiple possible "futures".

Between these two points of view lie others, in which the future is perceived in terms of probabilities and possibilities. Tied to these perceptions about predictability are others regarding the rate of change that will characterize the future. Some individuals believe that past, present, and future will form a smooth continuum. Some see the future as bringing gradual but
distinct change over an extended period of time. Yet others are convinced that the future will be dramatically different in almost every aspect of life. Even within these categories, people can disagree on the desirability of the futures that they foresee. One person may anticipate a particular future and judge it to be desirable, while another may expect the same future but see it as negative. These and other attitudes towards the future have been described as follows (12):

[People involved with futures] are a curious blend ... cautious and starry-eyed optimists; fatalistic and realistic pessimists; ... cornucopians (who see a horn of plenty for all), and catastrophists (who see crisis upon crisis); utopians and their opposite, dystopians; ... extrapolationists (who view the future as a continuation of past-to-present trends), transitionists (who anticipate slow, significant change over generations or centuries) and transformationists (who forecast rapid, dramatic, traumatic, revolutionary change).

1.6 Values

Opinions on the proper place of values in futures work also differ, and personalities, philosophies, cultures, and even religious convictions again help to shape the viewpoints.

Some people argue that the most useful approach is an objective one that provides an unbiased overview of possibilities. In their view, images of the future are best constructed without the injection of values and opinions. Judgements about what is desirable should be made after the scenarios are completed, and possibly not by those who create them, but by those who will use them in decision-making. In a national study, for example, judgements may be the responsibility of policy-makers, stake-holder groups, or the country's citizens.

On the other hand, it is also possible to argue for normative futures work. Advocates of this approach believe that a futures exercise is valid only if it points to a desired future. They argue that judgements about what is desirable must be made before any scenario can be constructed, and the values on which the scenario is based must be indicated.

It is sometimes said that objective futures projects result in maps showing the many ways that a society may develop, while normative ones provide signposts directing them towards specific goals. In the debate about values, as in those about predictability, gradations exist between these two alternatives.
It should be emphasized here that a futures project is not “value free” because an objective approach to scenario building is adopted. Values are integral to all futures work. The question is when they should be introduced. In a “normative” project, in which the scenarios are images of desired futures, values must necessarily be identified before or during scenario construction. In an “objective” project, on the other hand, specific scenarios are constructed, not because they are desirable, but because they are probable, or provide foresight, or reflect important options. Values then come into the picture after the scenarios are completed, during the evaluation and application processes.

1.7 Focus

When a group looks towards the future, they must focus on a particular level. They may decide to concentrate on the macroenvironment, i.e. on everything that is happening external to their own institution and to the sector of concern. This may involve the consideration of developments in other sectors or an analysis of the international political and economic situation. The group may choose instead to keep their sights on the sector with which they are primarily concerned—health, education, agriculture, natural resources, the economy, or whatever. Or they may focus on an institution, organization, neighbourhood, or other entity. This may be, e.g. the corporation or agency for which the group works, or the town in which they live. What focus a group chooses inevitably affects the kind of questions that they ask and the kind of scenarios that they construct. A futures team that looks at the macroenvironment will probably ask “What is likely to happen in the world that we should be prepared for?” rather than “What do we want to happen in the world?” because they feel that their power to influence macrotrends is limited. On the other hand, if they focus on the sector of which they are a part, their attitude is likely to be less passive. They will see the sector as something in which they themselves play a role. Their goal in doing a futures project will be to understand the sector better, to develop a more acute sense of what might happen within it, to anticipate the dangers and opportunities that will result, and to foresee points at which decisions and actions could significantly affect trends. This may also be a group’s goal if their focus is on an organization, neighbourhood, or other entity of which they are a part. They may then even choose to take a strongly proactive stance, doing a futures project to identify the future that they prefer and then taking the necessary steps to bring it into being.

Futures projects can also be designed so that the focus shifts from one level to another. This is a common approach when a series of related futures projects are carried out sequentially. For example, the first exercise
may produce scenarios of the macroenvironment, the second, scenarios of the specific sector, and the third, scenarios of the institution's own future.

1.8 Application to policy-making, planning, and programmes

Almost all futures work is connected in some way with policies, plans, or practical actions. Serious consideration of the future is pointless unless it leads to new attitudes, better policies, more effective plans, new ways of doing things, or new solutions to old problems. This is true regardless of whether the focus of the work is a country, an institution, or a community.

There are a number of ways in which a futures project can be related and applied to ongoing activities, and the way that is chosen will influence the type of scenarios constructed. One possibility is a direct approach. The people doing the project ask the question "How would different policies affect the future?" and then construct their scenarios on the basis of those alternative policies.

But this is not the only possibility. Another approach is to create scenarios of several plausible futures and then, during the evaluation phase of the work, assess the effectiveness of different policies with each scenario. Or a group may choose to build an image of a desired future and then determine what policy decisions and practical actions would be required for that future to be achieved. Examples of how futures can be linked to ongoing processes are provided throughout this handbook, especially in Chapters 2 (Interviews with leaders of futures projects), 5 (Alternative designs), and 7 (Application of futures techniques to health).

1.9 General purposes and scenario choice

It is now possible to return to the questions of why there are so many different types of scenario and why futures activities usually involve the creation of more than one scenario. As explained above, in every futures activity, the people involved have opinions about four issues, namely, the nature of the future, and especially its predictability; the proper place for values in futures work; the appropriate level on which to focus; and how the connection should be made between the results of the project and planning and policy-making processes. The opinions which the group holds on these issues will determine the general purpose of their project, and the general purpose will determine the choice of scenarios.

The classification of general purposes, like the classification of scenarios, is problematic and has resulted in numerous taxonomies. No existing taxonomic scheme covers all cases, none is universally accepted, and many
contradict each other. In this handbook, although it is recognized that the divisions are arbitrary and do not even cover all possibilities, general purposes are divided into five categories, as follows:

- **Prediction**: describing what one aspect of the future is expected to be.
- **Forecasting**: describing several feasible or plausible futures of fairly high degrees of probability.
- **Foresight**: looking at a wider range of possible futures, among which may be probable and improbable ones, desirable and undesirable ones, "mixed" futures, and ones reflecting major trends or events.
- **Envisioning**: imagining one or more desirable futures.
- **Testing options**: determining futures likely to result from alternative policy choices and other options.

These five different purposes can be illustrated by five hypothetical futures projects. Imagine five teams of researchers, all living in the same country and all creating scenarios that touch in some way on the country’s future health. The teams differ, however, in their conceptions of the future, in their stances regarding normative and objective approaches to scenario building, and in their ideas about how to link their work to policy-making and planning. As a result, they do their projects for different purposes, and create different sorts of scenarios.

**Team 1** works in the bureau of census and deals with demographic phenomena relevant to health, including population growth, changes in age structure, immigration, and urbanization. The team members believe that demographic patterns and trends can be foretold with some accuracy as long as sufficient data are available. They carry out an objective study for the purpose of predicting what they see as the most likely demographic future, in order to provide a basis for policy-making and planning that will also be applicable to the health sector.

**Team 2** is located in an academic foundation that does research on long-term economic patterns and their effects on social well-being, including health. They see the economic future as being largely determined by processes already in play, but not wholly predictable. For them, the future is not a single line, but a cone of possibilities. Their goal is to identify a number of probable and believable futures so that strategic planning and policy-making can take them into consideration. Like team 1, they also do an objective study, but rather than making a single prediction, they forecast several feasible futures and assign a probability to each.

**Team 3** is an epidemiological task force at a school of public health within the national university. Because of the many forces currently affecting the national epidemiological pattern—climate change, regional conflicts, the
re-emergence of old diseases, and the chance of new epidemics—the team members see the future as being fairly unpredictable and likely to involve some rapid and dramatic changes. Their goal is to improve institutional foresight and encourage a readiness to deal with a range of different future situations. They consequently generate not only scenarios of plausible epidemiological futures, but also several unlikely “wild-card scenarios”. The inclusion of the wild-card scenarios in their work emphasizes that the improbable does happen and should be anticipated.

Team 4 works in a nongovernmental organization oriented towards the improvement of public health at the community level. The team members are interested primarily in what could be, and believe that human beings, organizations, and societies can bring about a desired future if sufficiently motivated. The current likelihood of that future is irrelevant to them, since their goal is to create an image towards which they and others can strive. Their work therefore involves envisioning, i.e. creating a scenario of a desired health future.

Team 5 consists of officials in the ministry of health primarily concerned with health-care systems. Like teams 3 and 4, they construct alternative scenarios. These scenarios all assume the same “most likely” future with regard to trends and events in the national situation, health status, demography, and epidemiology, but they differ from each other because, within this assumed framework, each projects the consequences of a different set of policies about health care. In other words, they test the options.

These five hypothetical exercises are certainly not the only possibilities, nor are they meant to indicate that certain kinds of institutions always do particular sorts of futures studies. They are described here solely to demonstrate the variety of general purposes that can exist in futures work, even in the same sector and the same country.

As the examples given above illustrate, there is—or should be—a close connection between purpose and scenario type. Different purposes can only be achieved through the construction of specific scenarios. For example, a futures project carried out for the purpose of envisioning can only achieve that purpose through the creation of a scenario depicting a desired future. A foresight-oriented exercise fulfills its function only if it includes a range of scenarios, including some unlikely ones. A predictive study demands the creation of a “most likely future” scenario. A project done to test options must involve the creation of scenarios reflecting those choices. Thus, as long as the purpose of a project—prediction, forecasting, foresight, envisioning, or testing options—is clear, a rational basis exists for deciding what kind of scenarios to construct.
1.10 Styles of approach

Studies that are done for similar purposes may resemble each other. There are thus two different styles of approach, as follows:

- A "hard approach" in which the work is objective in nature, is carried out by experts, is based on technical and computerized methods, and is designed to create a product.
- A "soft approach" in which the work is normative and widely participatory, the methods used are mainly non-technical in character, and the design is process-oriented and based on something like envisioning workshops.

Futures meetings are sometimes the scene of debates about the comparative value of these "hard" and "soft" approaches. Researchers who do the more technical and analytical futures studies criticize the soft approaches, saying that they ignore realities that must be taken into account if policy formulation and planning are to be done well. Adherents of the soft approach respond by asserting that hard studies ignore central issues, do not allow public participation, and are done by researchers who are mesmerized by computer models and databases.

The hard approach has its strengths. Work based on a hard approach often provides a solid and scientific foundation for decision-making and ties directly into existing policy and planning processes. Technically based analyses can be extremely effective at uncovering important relationships between factors and identifying points at which intervention is most effective. They can play an important role by challenging assumptions and promoting a deeper understanding of how a sector or system actually works.

The soft approach also has much to recommend it. Because they seldom require elaborate equipment, costly software, or large databases, soft-approach activities are possible on quite limited budgets. Their impact can be impressive—they promote organizational and social learning, tap creative potentials, and catalyse action. Participants in such projects become fired with enthusiasm and willing to work together on common causes. Also, and very importantly, soft studies often address serious social issues such as insecurity, inequity, alienation, and polarization.

One point in this debate deserves special attention. Including some technical research that requires advanced training does not exclude the possibility of wider public participation in a futures project. It is true that certain kinds of futures work require special expertise and must be carried out by people with particular professional experience, but this does not prevent public involvement in other aspects of the activity, including the identification of societal goals and values and the envisioning of desired futures. In
realities, the soft-hard dichotomy breaks down, and “mixed” approaches combining hard and soft features are often adopted.

Thus a project may incorporate both statistical analysis and computer modelling (“hard” techniques) and creativity exercises and guided imagery (“soft” methods). Sometimes a hard approach is adopted during certain project components, while others are handled using soft methods. Neither the people who do futures work nor the activities that they carry out can be assigned to simple categories. In summary, both hard and soft approaches have their advantages, and a single project can, and often does, incorporate both of them.

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CHAPTER 2

Interviews with leaders of futures projects

The people interviewed in this chapter are imaginary. Hypothetical characters are used rather widely in futures work, appearing frequently in "future histories" and scenarios, one example being the characters profiled in the Norwegian futures book Scenarier 2000 (1).

Although the individuals are fictional, the processes they describe are characteristic of many real futures projects. Readers wanting to learn more about the experiences of futures teams should turn to sources such as the international journal Futures, which often publishes reports on futures projects, and to Studies for the 21st century (2), which describes the implementation and results of several dozen such projects.

2.1 In-house project at the ministry of health about essential public health functions

**General purpose:** testing options.

**Specific objective:** to determine the essential public health functions to which the ministry of health should give highest priority during the coming decade.

**Scope:** the country.

**Sectors covered:** health and health care.

**Time perspective:** 10 years.

**Type of scenario:** a baseline scenario of a "most-likely" future plus alternative scenarios based on different policy decisions within the ministry.

**Length of exercise:** 5 weeks.

**Organizational structure:** a committee of three plus a working group of 18 people.

Application: formulation of the national health plan.

Person interviewed: a 36-year-old statistician who is chief of the health information unit in the ministry of health and was a member of the project committee.

Q: Would you please describe your country and the current health situation?
A: Our country is going through a major upheaval in most sectors, including health. The centralized system of previous years has been largely dismantled, but the market system that is supposed to replace it is not yet fully functional. As a result, many aspects of public health are being neglected. The situation is quite grim. Physicians in hospitals are only earning the equivalent of US$20 per month, there are shortages in medical supplies, and many public-health activities that were formerly financed by the government have been terminated because of a lack of funding.

Q: Why did you decide to do a futures exercise?
A: The idea arose when the ministry of health began work on the national health plan for the next 5 years. Those of us who were on the planning committee realized that we simply could not plan as we used to. In fact, we could not even assume that the ministry and the public-health sector would still be carrying out the same functions 5 years from now. And the budget situation made it essential that we set priorities and select the role that the ministry should play. So a couple of us who had read about health-futures work suggested that a very rapid in-house futures exercise should be carried out to show the potential impacts of these choices. The result of the exercise could then be fed into the national planning process.

Q: But the national health plan only covers a 5-year period. Why did you choose a longer time perspective for the exercise, if you were intending to use the results in formulating the plan?
A: One of the major concepts underlying futures work is that the long-term effects of policies and programmes are not necessarily the same as those seen in the short term, so “looking” further into the future leads to better decision-making. In this case, looking a decade ahead would help us to create policies that would protect and promote public health during the next 5 years but would not result in catastrophe later on.
Q: How was the exercise organized?
A: It was simple and straightforward. Three of us who were interested in the futures approach were named as the project committee and responsible for carrying out the work and delivering the product. The terms of reference were set out in a single page. We three then contacted the departments within the ministry, and each department found one or two people who were willing to be members of the working group. I want to emphasize that we were all volunteers. We did not want people to be pressured into doing this project on top of their already heavy workloads. So everyone in the working group was someone who really wanted to be there.

Q: So you had no board of directors, advisory board, or outside sponsors?
A: No, we thought that for a quick project of this sort, nothing like that was necessary, and an overcomplicated organizational structure would just slow us down.

Q: About how long did the project take?
A: I can tell you exactly. We were able to hand in our report to the national planning committee 5 weeks after we were appointed. The three of us who were responsible got started immediately, even before the working group was organized. During the first 2 weeks we each spent a few hours a day on the preparatory work. During the third and fourth week we held the working sessions with the group. During the fifth week we analysed and wrote up the results.

Q: What did the preparatory work involve?
A: The most important part of the preparation was finding information about current trends and using this to write a background document, which we photocopied and distributed to people in the working group. This document laid the groundwork for the construction of the baseline scenario. It was very short and very rough, but it gave a picture of current trends outside the health sector but affecting health—the economy, the food situation, population changes, the state of the environment, and so on.

Q: What were your information sources?
A: Anything we could find! We asked departments within the ministry to provide any materials that they had available, and this request yielded information about trends in several key areas, including population and environment. We also went through publications from sources such as WHO and other United Nations agencies.
Q: Did you do any other preparatory work?
A: Well, we did spend a bit of time going through some publications about futures work and refreshing our memories about methods of brainstorming, consensus building, and scenario construction.

Q: What happened in the working sessions?
A: The first one was devoted to constructing the baseline scenario of how the national situation might evolve over the next 10 years. We did this in a very simple way. The working group had received the background document and had a chance to read it. When we got together we addressed the question “If the current trends described in the handout continue, what do you think will happen to the country over the next decade?” We said that, of course, all kinds of things could happen in the future that would affect the trends, but for the purpose of the exercise, we would all have to assume that the current trends would continue.

Q: Did they agree?
A: All but a few, one of whom eventually agreed, but a couple of others argued for a while, then got up and left. We had expected this, so we weren’t surprised.

Q: What did the remaining group do during the first session?
A: We had 18 people after the dissenters left, and we divided these into groups of six persons each. The three of us in charge served as group facilitators. The groups used brainstorming to imagine the consequences of current trends continuing and interacting with each other, and the ideas were noted on blackboards. Then we took a break, and we facilitators went through the three lists and consolidated them into one. We then cleaned all the blackboards and wrote up this new list on one of them. When the working group came back after the break, we asked them to “vote” by placing a tick against every idea they agreed with. We then noted which ideas had received the most support. This wasn’t too difficult, since about a quarter of them had lots of ticks.

Q: What did you do with the results?
A: The next day we three plus a couple of volunteers from the group built a baseline scenario that integrated the ideas that had been generated and selected at the session. The result was a description of the national situation over the next decade. Like our background document it was short and very sketchy, but it still provided a vivid image of what the future might be like. The document was distributed to the working group so that they could read it and think about it before the next session.
Q: And what did you do at that session?
A: That one was devoted to identifying essential public health functions and potential deliverers of those functions. Our thinking was like this: we have an idea of the problems the decade might hold, including ones affecting public health. The next step must be to clarify what might be done to protect public health under these circumstances and what institutions might be involved.

Q: Did you continue to use the same small-group process?
A: Yes, in two sets of rounds. The first resulted in a list of essential public health functions for the decade. The second resulted in a list of the “actors” that might be involved in the fulfillment of those functions—the ministry, of course, but also schools of public health, foundations, citizen groups, international organizations, and so on.

Q: What happened between this session and the final one?
A: Our purpose was to test different options, in this case, different decisions by the ministry about which public health functions would be given top priority. So before the final session, we three plus some volunteers from the working group sat down and considered the critical public health functions that had been proposed in the second session and sorted these into assumption sets. One set, for example, assumed that the ministry would give highest priority to regulating the emerging private health-care system, ensuring personnel development within health care, and setting and monitoring standards for hospitals. The second set assumed that the ministry would give top priority to the monitoring of health status, the provision of primary health care to those still outside the private health-care system, and cooperation with the ministry of the environment on serious environmental threats to health, and so on. We had four different combinations, each reflecting different priorities for the next decade.

Q: And then you had your final working session?
A: Yes, we called the working group together for a final meeting. We began by reminding the group of the fundamental conditions described in the baseline scenario. We also reminded them of the primary public health functions they themselves had identified and of the actors that might fulfill those functions. And then we sketched for them the four assumption sets. In every instance, we pointed out, it was assumed that whatever functions weren’t covered by the ministry would be left to the other actors to handle. Part of their work was deciding how well this arrangement would function. If the ministry discontinued epidemiological surveillance, for example, what other institution might step in and play that role?
Q: How was that session organized?
A: We took each case and imagined what the consequences might be, how the other actors might respond, what the impact would be on public health if the ministry chose that particular set of priorities. The results had to be comparable with each other, so that the general conditions defined by the baseline scenario had to be assumed in all cases. In addition, we specified certain elements that had to be described. These included, for example, life expectancy, health status, disease profile, percentage of the population receiving primary health care, and so on.

Q: Did you do this work in small groups as before?
A: No, we sat together in a single circle this time. This worked because everyone had become familiar with the method and understood the ground rules for brainstorming. This was an especially good session. Members of the working group had lots of ideas and opinions about how the other actors would handle functions not covered by the ministry and what would happen if certain functions weren't covered at all. Once all the ideas based on one assumption set had been generated and written on the blackboard, we voted to select those to be included in that scenario. Then we moved on to the next, and so on until all four had been handled.

Q: How did the project end?
A: When the final working session was over, we had the raw material for four scenarios, each based on a different set of priorities. We three sat down and wrote up rough versions, and then a member of the working group who was our best writer took over and polished them up for us.

Q: What form did the final product take?
A: It was a short report, describing how we'd done the work, explaining the rationale behind the design, and outlining the baseline scenario and the four alternative scenarios. In effect, the report said, "If the future develops according to current trends, and if the ministry gives top priority to public-health functions A, B, and C, we can imagine that the consequences would be as follows... On the other hand, if the ministry focuses on functions D, E, and F, the result may be as follows..." and so on.

Q: How was the report used?
A: It was submitted to the committee responsible for the national health plan and was extensively discussed by them. They evaluated the different scenarios in terms of equity, disease burden, health gains, protection of the most vulnerable groups, and so forth. This evaluation process was not as
rigorous as I would have liked, but at least there was serious consideration of
the implications. In the end, the committee decided to recommend that the
ministry should focus on a combination of public-health functions from two
of the scenarios, and this decision was reflected in the proposed national
health plan, which has now been adopted.

Q: Are you satisfied with the results of the exercise?
A: Not completely. As I said, I would have preferred a more thorough
evaluation process. And I would not have chosen exactly the same set of
functions as those selected by the committee. Also, as I've said several times,
all the products were necessarily brief, incomplete, and unpolished. Still, the
project was very useful. With so many changes in our national situation, we
simply couldn't do national health planning the way we used to. This project
at least gave us some insight into new ways of planning and helped us
somewhat in clarifying our priorities. Also, and very importantly, it has led
to some efforts to improve communication with the other "actors" identified
during the exercise.

2.2 Envisioning desired health-futures scenarios for different
regions of the country

General purpose: envisioning.
Specific objective: to develop regional visions of a healthier future and
encourage widespread commitment to those visions.
Scope: the five national regions.
Sectors covered: health and sectors impacting on health.
Time perspective: 15 years.
Type of scenario: preferred future.
Length of exercise: 1 year from initiation to publication of products.
Organizational structure: a national coordinating committee, five re-
gional teams, and an honorary advisory committee.
Products: a book and five regional brochures.
Application: setting health priorities at the regional level.
Person interviewed: the 62-year-old health professional who works in
the department of health development at the ministry of health and
served as the project coordinator.
Q: How does your country differ from that described in the first interview?
A: We are also in a crisis, but of a different sort. Like some other developing countries, we are going through a prolonged epidemiological transition. We still face the same health problems as we have faced for many decades, but on top of these there are now HIV/AIDS and some other new contagious diseases. Industrial and agricultural development and urbanization have taken place without adequate concern for the environment and for public health. So we are also experiencing increased levels of cancer, cardiovascular diseases, all the health problems associated with development. The tobacco companies are campaigning heavily to increase sales, and we are seeing the results in our health centers. The economic situation is still not good, and the public services cannot meet the basic needs of the entire population.

Q: Why, with so many problems demanding immediate solution, was a futures exercise considered relevant or justifiable?
A: With many problems and limited resources, the big question is always about setting priorities. And the only way to set those priorities fairly is to look at the big picture. To put it another way, there must be a vision on which to base policies and plans.

Q: So the objective of the exercise was to develop such visions at the regional level?
A: Yes, we were beginning to decentralize health development and planning, and our colleagues at the regional level indicated that, with so many demands on resources, setting priorities was difficult. Conflicts between some regional offices and the local health authorities were becoming more common, and many people felt that these could only be resolved if consensus could be reached about health goals at the regional level.

Q: How were you involved in getting the project started?
A: Although we in the ministry were well aware that the regional offices needed extra support, we were uncertain about how to proceed. But I had been reading about futures and envisioning and realized their possible application to the situation. I talked to some colleagues about the idea, and things started happening.

Q: How was the project established?
A: This was a government activity, carried out by the ministry of health in collaboration with the regional health offices. But the participatory base was a broad one. In other words, this was an official activity involving grass-roots participation.
Q: Did you have other sponsors?
A: We sought and got assistance from sources both inside and outside the country. The office of the WHO country representative provided technical assistance, and we received a grant from a donor agency. An international company operating on a large scale in our country also provided some support. Ideally, we would have liked to fund the work only from sources within the country, so that there wouldn’t be any question about outside influence, but that just wasn’t possible in our case.

Q: What was the basic organizational structure?
A: We didn’t have a team and a board like many futures projects do. Instead, we had a coordinating committee consisting of some people from the ministry plus the leaders of the teams at the five regional health offices who were responsible for the regional visions. This coordinating committee made the basic decisions about how the overall project would be run, raised the funds, kept an eye on the work as it progressed, and arranged for the publication of the book that included the five regional visions. No one worked on the project full-time; we met occasionally and did the work when it was needed.

Q: So the entire formal organization consisted of the coordinating committee plus the five regional teams?
A: We also had an honorary advisory committee of influential people from all over the country—from educational institutions, religious organizations, the media, grass-roots groups, and so on. Their role was to help to publicize the project, encourage people to participate, and promote commitment to the visions.

Q: Who else was involved in shaping the visions?
A: Literally thousands of people took part in the various participatory activities.

Q: How were these activities arranged?
A: First of all, since the building of the visions was an official government activity, we wanted government workers to feel a sense of ownership. So everyone connected with the regional governments was encouraged to contribute to the regional vision. Each agency decided itself how to gather ideas and opinions from its employees.

Q: What about more general public participation?
A: Each region had a campaign on the radio, on television and in the newspapers, aimed at encouraging people to send in descriptions of their
own visions of a healthy region. People could mail these directly to the regional team or leave them at the local health offices, which bundled them up and forwarded them. Schools, civic organizations, churches, trade unions, and so on also joined in. And many people did respond. Children often sent in pictures they'd drawn, and some of these were used as illustrations in the book we published at the end of the project.

Q: What else did you do at the local level?
A: We organized envisioning workshops at selected sites in each of the five national regions. Luckily, there were several people at the ministry of health who had been involved in the "healthy cities" project, which uses envisioning as one of its tools, and they knew how to do envisioning. They went out with members of the regional teams and ran 1-day community workshops that generated local visions.

Q: How many workshops were organized?
A: We did 25, which meant five per national region. The communities were picked with care to reflect the regional population in both ethnic and socio-economic terms and to include communities of different size.

Q: Integrating all these different inputs must have been a challenge! How did you handle it?
A: Yes, it was a challenge, especially since each regional team received much more material than had been anticipated. But things were made easier by our agreement that there was no reason to quantify the ideas, to count how often a particular idea had been proposed as part of a regional vision. Each team did attempt, however, to identify each unique suggestion, which meant going through massive amounts of paper and making notes about all the different ideas. Then they sat down together with these notes and constructed a "model" of a future healthy region. I don't mean a computer model, just a diagram indicating the elements that would make up such a future. This didn't require any advanced technology, just a big blackboard. The result was a schematic outline consisting of several dozen key themes.

Q: Was it really necessary to have so much public input? Couldn't the teams at the regional offices have designed regional visions on their own?
A: Undoubtedly, but the participatory activities got people involved and committed to the vision, which was one of our objectives. What good is a vision that no one believes in? Also, although most of the ideas that came out of the participatory activities were identical to ones the regional offices
would have come up with, there were dozens of contributed ideas, maybe even hundreds, that were unique.

Q: Could you give an example?
A: Well, this is one that struck many of us because we simply had not given much thought to it before. Participants in many of the community workshops wanted printed material relevant to all aspects of health and health care available in their own languages. At the moment, almost all health information is published in our official national language, not just official reports but also things like the instructions that come with medication and even with rehydration salts. But about 8% of our population doesn’t speak that language. For these people, an essential part of their vision of a healthy future was access to health information in their own language.

Q: Was most of the material sent in directly by individuals actually useful?
A: Yes and no. Again, the most important thing was the participation. I’m sure that all the people who described a vision in which their community has a safe water supply felt empowered when they saw this feature included in the final regional vision. But many letters were complaints about current conditions. People would write about problems they had in getting an appointment at the local clinic, or a rash they had developed after pesticide was spilled in a nearby field. They were so involved with the health problems of today, it was hard for them to even imagine a better, healthier future. On the other hand, the ideas coming out of the community workshops really were strongly oriented towards the future. The envisioning process made a difference.

Q: What did the visions look like?
A: They were quite similar to each other in certain ways. They all pictured a future that was peaceful, friendly, with plenty of food, clean water and air, education for everyone, adequate housing and sanitation, good access to primary care. There were also some strong regional characteristics reflecting differences in culture, economic situation, degree of urbanization, and so forth. Anyone reading the visions could see that each area had its own distinctive concerns about health that the regional health authorities would need to respond to.

Q: How were the final visions distributed?
A: Each regional team submitted their “models” to us in written form. We then hired a writer, an editor, and an artist to put together a book that
included all five visions in an attractive and interesting format that included text and illustrations. We found a publisher that was able to print it quickly and at a reasonable cost. It was done as a paperback in order to keep the price down so that more people could afford it. Five brochures were also produced from the book, each presenting a single vision, and these were widely distributed by the regional offices that had generated them.

Q: Did you do anything else to call attention to the results?
A: Yes, actually we had quite a good publicity campaign, with articles in national and regional newspapers and magazines, interviews on the radio, on television and so on. In addition, we made a special effort to spread the message within the professional public-health community throughout the country, since we felt strongly that everyone working in public health should be aware of the vision that the public had of future health. So some of us who had been involved gave talks at various professional meetings, wrote articles for the national medical and nursing journals and newsletters, and talked with classes at the national school of public health.

Q: Do you feel that the purpose of the project was achieved?
A: Definitely. The project is beginning to have an impact on regional policies and programmes. Priorities have been reconsidered and there is greater cooperation between the regional and district health offices. The visions are often referred to in the designing of health projects. We realize, of course, that visioning is a first step, that much more work must be done to turn the visions into realities. But this project has been an essential first step.

2.3 A study to improve foresight regarding future threats to health

General purpose: foresight.

Specific objective: to stimulate debate and increase foresight within the public health community regarding future threats to health.

Scope: the country, within a larger international and global framework.

Sectors covered: health, health care, plus sectors affecting them.

Time perspective: 30 years.

Type of scenarios: eight "wild-card" scenarios.

Length of exercise: 4 months for scenario construction plus 2 months for creation of products.
Organizational structure: board of directors plus a team.

Product: official report plus a "future history" book.

Application: determining how agencies dealing with emergencies can be better prepared for unexpected crises.

Person interviewed: a 46-year-old physician who is a researcher at the national institute for health development and research and served as group leader for the study.

Q: How would you describe your country and its health situation?
A: Our country is well into a demographic and epidemiological transition. The survival rate of small children is much better than it was a decade ago, and the birth rate has dropped quite sharply. We still have many diseases associated with underdevelopment, but chronic disorders, the so-called diseases of development, are becoming increasingly important. Because of the physical geography of our country, we also have many deaths due to natural disasters.

Q: How did the idea of doing this futures project develop?
A: The idea of a futures approach was in the air for several years before we started the work. I remember sitting in a committee meeting at the ministry of health where we were supposed to be discussing policies in some area, and the designated time frame was just 5 years. We were supposed to be thinking about possibilities and problems within that period. But after a while, the discussion shifted. People around the table were asking, "But what about 15 or 20 years down the road?" The next day I was at another meeting at the national school of public health, and the discussion shifted in exactly the same way, but this time the questions were framed in terms of "What if...?" These questions were being raised, too, in informal discussions.

Q: So what was the catalyst for this particular project?
A: It was the interest of three people that got things going. One was my boss at the national institute for health development and research. Another was a rather high official dealing with civil defence issues. The third was a professor of agriculture and nutrition at the national school of public health. These three were all involved professionally in emergency preparedness, and they all felt that the system was inadequate and short-sighted. So they began talking about how it might be improved and came up with the idea of using the futures approach to stimulate new thinking about preparedness.
Q: So they just initiated a study on their own?
A: No, all three were in rather powerful positions, but they needed to muster broader political support before they could get the project going.

Q: How did they do this?
A: By organizing some informal meetings to discuss the possibility of a futures project on emergency preparedness. I was involved with the first one, which included maybe a dozen people from the institute and the ministry of health. A few people were sceptical about the idea, but most of us found it exciting. Several other meetings of this sort were held with people from other government agencies, the school of public health, civil defence, and so on. The declared purpose of these meetings was to determine whether there would be adequate support for the project. In retrospect, I can see that having these meetings actually helped to build up that support.

Q: And then?
A: Theoretically, the next step involved laying an organizational foundation for the study. The three people who had dreamt up the concept plus three others became members of a board of directors. The board then appointed the team itself, of which I was made leader. There were nine of us all together. I was assigned to the project quarter-time for its duration; the other team members devoted between 4 and 8 hours per week to it.

Q: Why do you say that laying the organizational foundation was "theoretically" the next step?
A: When you read our official report, it sounds as if the whole organization came into being automatically. Actually, it took almost a day of behind-the-scene negotiations. Because of the way that the project idea had developed, there was considerable ambiguity about how it should be set up. Who should be the official sponsor or sponsors? Where would the funding come from? Who would have the right to appoint the team? In other words, there were lots of questions about ownership.

Q: But these issues were eventually resolved?
A: Yes, the final decision was that the project would be established within the national school of public health. Financing was shared to prevent too heavy a burden being placed on any single sponsor. The ministry of health, the ministry for the environment, the civil defence agency, and a private foundation each covered a part of the cost.
Q: What kind of study design did you use?
A: Basically, we constructed eight scenarios describing future situations in which the public health is seriously threatened in some way.

Q: What assumptions were used for the scenarios? Did you focus on the most probable threats?
A: No, we knew that the most probable threats were already being considered in emergency preparedness programmes. We have floods in some regions of the country every year, for example, and those programmes provide the framework for handling these floods and their health consequences. The point of this exercise was to improve our overall preparedness by stretching our imaginations. So we selected threats that were judged as having a low probability, but that would be extremely serious if they did occur. The scenarios were all of the sort known as “wild cards”.

Q: Can you give some examples?
A: One of the scenarios had to do with an epidemic of a new and unknown disease arising in our region and spreading across our borders, one involved a fungal blight wiping out our primary staple crop, one was based on a major earthquake in a densely populated region that has not had a serious quake in recent history, one had to do with global warming and a significant rise in sea level, and so forth.

Q: But couldn’t you have served the same purpose by creating a single dystopian or “doomsday” scenario?
A: A doomsday scenario can be effective in shaking people out of complacency, but we didn’t think one would be appropriate for this project. How could anyone take seriously an image of the future in which a large number of highly unlikely things all happen at the same time? Nor could we see that it would improve emergency preparedness. As one person put it when we discussed the possibility of doing such a scenario “What’s the point of our being prepared for a situation where there’s simply nothing we can do?”

Q: What methods did you use in your work?
A: Mostly methods to encourage creative thinking and generate new ideas. And we used these both in sessions involving just the team and in sessions with some selected groups. We also did a Delphi exercise and carried out some in-depth interviews with selected individuals to solicit other ideas.

Q: Why did you choose such a long time perspective?
A: We did that solely to encourage people to be imaginative. What we really wanted the project to do was improve foresight so that we could better
meet public-health emergencies in both the long and the short term. But when people think about the short term, it is very difficult for them to imagine unlikely events. Something prevents us from imagining disasters that might happen today or tomorrow. But if we project far into the future, it becomes much easier to imagine such threats.

Q: How were the study results presented?
A: There was an official report to the participating institutions, giving details about methods and so on. But as I said earlier, our intention was to get the groups involved with emergency preparedness thinking in new ways. So we also wrote an adaptation in which the scenarios were presented as “future history”. We had help with this from a professional writer, and the result was extremely good. It’s serious of course, but also entertaining. In addition to distributing copies to all relevant agencies, we also sold copies through commercial book-sellers, and it has sold much better than we anticipated.

Q: Did you make any policy recommendations?
A: Yes, and these were included in the official report. We didn’t go into great detail, but we did make general recommendations about how preparations for the various kinds of crises depicted in the scenarios could be improved.

Q: What has been the outcome of the project?
A: Most agencies concerned with national emergency preparedness have given serious consideration to the scenarios and are beginning to take some appropriate steps. Perhaps even more importantly, efforts are being made to improve communication and coordination among these agencies, a need that was clear in all the scenarios.

2.4 A project to analyse the effects of policies in other sectors on future health

General purpose: testing options.

Specific objective: to elucidate the effects of policy decisions in other sectors on future national health.

Scope: the country.

Sectors covered: health and sectors affecting health.

Time perspective: approximately 20 years.
Type of scenarios: based on different policy directions.

Length of project: ongoing; has been under way for 2 years.

Organizational structure: a team and a board of directors.

Product: a series of reports distributed to policy-makers, scientific articles published in international journals, and a book aimed at the public.

Application: by policy-makers in decision-making about policies and programmes.

Person interviewed: the 39-year-old leader of the national health-futures group, who is also an associate professor at the national school of public health.

Q: What is your country's health situation?
A: We are in fairly good shape right now, but with worrying problems looming on the horizon. Until recently our economy was centrally planned. We weren't rich, but all basic needs were met, and we had a fairly good health-care system. Our situation changed several years ago. We are now going through a reform process in all areas, including the health sector. The transitional period has been one of confusion, and there have been lapses in public-health measures, including sanitation programmes and vaccination campaigns. So although most of our health problems are the same as 5 years ago, we are also burdened with epidemics of diseases that hadn't been a serious threat here for many decades.

Q: How was your team established?
A: I have been personally interested in futures for a long time, and in my doctoral research I applied various futures methodologies to certain public health issues. I did a small Delphi project about possible interventions to decrease tobacco smoking, for example. Then certain events in the country gave me the idea of doing this project on how other sectors might affect future health. I talked to colleagues here and at other universities, in research institutes, in government agencies, wherever I could find interest, and we set up the project.

Q: So you basically organized yourselves, rather than being appointed by a board?
A: Yes, and that has been the source of problems, although it has also been good in some ways. Perhaps the greatest advantage is that we have been free to do exactly what we wanted. Most of us involved with the project have
been friends since our student days. When we get together to work, the air is charged with excitement. We are all enthusiastic and really believe in what we’re doing. I somehow doubt that it would have been like this if we had been hired to do the work, and a board of directors was making the real decisions.

Q: Does this mean that the project has no board of directors?
A: There is a board of directors, but the team—chose them, rather than the other way round. We sat down and thought about who had sufficient power to help us in our work and would be sympathetic to what we were doing. Then we approached these people, and some of them agreed to serve as board members. They arrange for us to meet other top people and the fact that we have been backed by people with such high reputations has helped with funding. But there has never been any question that the team controls the study. A colleague of mine in another country says this is a classic case of “the tail wagging the dog”. We don’t have that expression in our language, but I agree it’s a perfect description of how we are organized.

Q: What are the drawbacks of this arrangement?
A: The board members are not as committed to the work as they are in some futures projects, which is not surprising. The amount of time and energy they are willing to devote is quite limited. So we don’t benefit a great deal from their experience and wisdom. When I read about futures activities where senior people on the board sit with the younger team members and really get involved with the substance of the work, I’m envious, even though I understand why our board is not so engaged.

Q: What was it that gave you the idea of doing a national project?
A: As I said, I was already interested in the futures field. And at some point it struck me that a futures project looking at connections between health and other sectors would be a good way to address some of the problems the country has been experiencing.

Q: What kind of problems?
A: Well, here is one example. Soon after the new government came into power, funding was cut for water projects. The decision was made on the basis of a cost–benefit analysis that really did not take into account all the benefits of a clean, safe, and reliable water supply. We in public health were astounded and protested, arguing that the logic behind the analysis was flawed, but were unable to convince the decision-makers who controlled the budget. We were concerned that, if the quality of the water supply was not
maintained, we would see the return of waterborne illnesses, and this is exactly what happened.

Q: But how was the project meant to address such problems?
A: Our reasoning was that errors in judgement occur under all forms of government. No matter what the political or economic system of the country, each ministry focuses on the concerns of its own particular sector. Our idea was that a group outside the government could carry out an integration process, and show how policy decisions in every sector affected other sectors. We also wanted to encourage serious consideration of policies other than those currently in fashion. In the case of our own country, we saw that some old policies that were really rather good were thrown out just because they were initiated by the old regime. We wanted to encourage what we thought was a more reasonable approach, in which policies would be evaluated on their own merits, rather than on their political associations.

Q: What kind of scenarios have you built?
A: So far they've all been based on different policy frameworks, for the reason just given. There have been problems with this, because almost every policy we could imagine has been taken up and championed by one political party or another. So when our scenarios have indicated that certain policies on the environment, or housing, or agriculture would adversely affect public health, we have been accused of attacking party X or Y, which has proposed just those policies. Staying aloof from the political struggle has proved impossible. And the party that dominates the current coalition government is especially convinced that we are against them.

Q: How did this happen?
A: Our plan was to do six different scenarios based on different policy sets and show how health status would be affected under each. We decided for practical reasons to do one scenario at a time; and our first one was based on current government policies. We distributed copies of the draft scenario report to about 50 people, asking for criticisms and suggestions about how the design could be improved. These drafts were supposed to be kept confidential, but someone gave a copy to the press, and consequently we “went public” much sooner than we had anticipated. The scenario described a quite mixed situation, with some aspects of health improving in the future, but others becoming much worse. Because of these negative aspects, we were quickly labelled as “anti-government”. The scenarios we've done since have similarly mixed outcomes, but somehow the label has stuck. It is unfortunate. If all the scenarios had been published at the same time, I think it would
have been clear that we are really trying to present as objective results as we can, in the interest of improving policy-making and governance.

Q: How much attention and what kind of reviews has your work received?
A: The project has received extremely positive comments from other public-health professionals and people working in health futures, not only in the country but also at the international level. The first four scenarios have now been completed, and articles we have written describing the method and results have been published in two international refereed journals. We have also been approached by a good publishing company that is interested in putting out a book containing all the scenarios. They think it will sell well because there has been so much discussion about the study in the press, mostly in the form of various parties defending policies that we have indicated will hurt public health. So maybe we shall have an impact in the long run. We wanted to persuade national policy-makers to take the scenarios seriously, to reconsider their policies, and in that I think we have failed. But if the general public becomes involved and is willing to become informed on these issues, then maybe the policy-makers will start listening too.

Q: Does it concern you that the public doesn’t usually read futures reports, even controversial ones?
A: No, because our reports have been rather unusual. We wanted to depict health impacts in a way that most people could understand and that would “bring the lessons home” by linking the national picture to the local one. So we have included devices like “future history” stories, depicting what life would be like for people living under the various scenarios. We’ve used colourful graphs rather than numerical tables. And we’ve made good use of maps, which can be very powerful tools. Imagine that the pattern of a certain disease is shown by a series of maps, with the darkness of the colour indicating the incidence. If people see that, under certain policy assumptions, their community becomes darker and darker in each successive map, it catches their interest, I can tell you!

Q: What about the future of health-futures work in your country?
A: I’m quite hopeful that eventually the government will start making use of futures to better anticipate the complex impacts of policies. The problems aren’t going to go away, and planning for them becomes increasingly difficult as the rate of change continues to increase. Sooner or later, many people are going to recognize the advantages of looking farther ahead. I know I’ve complained about all the problems we’ve had with this project, but actually
we've found the work to be very exciting and we plan to continue being involved with futures activities. We are fairly young—I'm the oldest member of the team, and I'm not yet 40 years old. As we continue with our careers, many of us will be moving up into positions where we can do more to promote a longer-term, futures-oriented perspective in decision-making, in the health sector, among others. This is already happening. I've just been selected as the deputy chairman of my department, and another member of the team has just been named as the assistant director of a leading research institute in another part of the country that specializes in environmental health problems. Maybe 10 years from now there will be another national health-futures project under way, and this time we will be the board of directors!

2.5 A permanent national health-futures programme

General purpose: forecasting.

Specific objective: to provide scenarios that can support policy-making and planning.

Scope: various, ranging from the national to the local level.

Sectors covered: health and health care.

Time perspective: various, from 10 to 30 years.

Type of scenarios: various, including feasible and strategic.

Length of project: ongoing programme with projects of various lengths.

Organizational structure: a board of directors for the entire programme; a committee for each project.

Products: reports published as books.

Applications: various, but always used somehow in policy-making and planning.

Person interviewed: 53-year-old director of the national health-futures foundation that has carried out dozens of health-futures projects.

Q: What are the characteristics of your country and its health status?
A: We are a small industrialized country, with a high population density and a high standard of living. Mortality among children is very low, and the birth rate has been at the replacement level for many years. Our epidemiological profile is dominated by chronic diseases such as cancer, diabetes,
cardiovascular diseases, and rheumatism. Our health-care system is excellent.

Q: Why then did you feel you needed a health-futures programme?
A: Those of us who set up the foundation—the first director plus myself and a dozen or so other people—saw that things are always changing, and that the health-care system cannot respond adequately unless there is adequate anticipation. So about 15 years ago we established a foundation that could organize various futures studies oriented towards health and health care. The idea was not to do a single exercise or project, but to have ongoing research in the field. I can honestly say that one reason our national health-care system is so good today is because this foundation has been working for 15 years to improve it.

Q: How are you organized?
A: We are a private research foundation with a small permanent staff. We have a board of directors, consisting of 18 top people, most of them connected with the health-care sector in various ways. Their role is to oversee the work of the foundation, decide what projects will be taken on, help generate support, and so on. We have some grants, but most of our financial support comes from fees charged for the various projects, which are commissioned by the ministry of health, corporations in the health-care sector, and other clients. For example, we have recently done a project for several major health insurance companies.

Q: How are the projects managed?
A: The work is overseen by the foundation, but the actual research is done externally. Once a project has been identified as needed, we establish an outside committee that is responsible for getting the research done, the scenarios constructed, and the final report published. The committee members are chosen on the basis of the contributions they can make as individuals, not as representatives of their departments or agencies. We always try to get the top experts. The work also involves an appropriate research centre, usually at a university. The project work may be done primarily at that centre, but the committee members themselves are very much involved in the study design, the drawing of conclusions, and the writing of the reports.

Q: What kind of scenarios are typically constructed in these projects?
A: A variety of types, depending on the project. Sometimes the aim is to produce a single prediction of a most likely future. For example, we might produce a scenario of this sort describing expected disease patterns in a locality. At other times, we produce several scenarios reflecting a range
of plausible futures. And, increasingly, we are doing strategic scenarios, which trace how we can get from an existing situation to some future desired state.

Q: You mentioned reports. These are the end-products of the work?
A: Yes, the outcomes of the research, including the scenarios themselves, are scholarly reports. The end-products are always of extremely high quality, and all of them have been published by a leading academic publisher. Whenever possible, two versions are published, one in our national language and one in English for international distribution.

Q: Do the studies include any participatory activities?
A: Yes, they do, although not broad public participation. When a committee has constructed their scenarios, we usually organize a conference where these can be presented and discussed. Some conferences are by invitation only, others are open to everyone who is interested. When the committee prepares the final report, feedback from the conference participants is taken into consideration.

Q: What about ties to the policy-making process?
A: These are handled in a number of ways. The reports do not recommend any of the scenarios. Readers are left to draw their own conclusions. But the committees do make recommendations to the clients on the basis of the scenarios. These generally take the form of “It appears that no matter which scenario develops, there will probably be an increased need for . . .”, or “The scenarios indicate that, under Scenario C, the ministry should be prepared . . .”, and so on.

Q: How else are policy-makers reached?
A: We try to keep them constantly involved and updated. There are policy-makers on the foundation’s board of directors, a few have served on committees, they are regularly invited to our conferences, they receive executive summaries of all the scenarios, and so on.

Q: What about the private sector, academics, and others?
A: The same answer applies. We are in touch all the time with faculty members at the schools of public health, with people at the pharmaceutical companies, with the leaders of the organizations for physicians and other health professionals, and so on. One of the many roles for the foundation staff is to maintain the network so as to catalyse debate and the exchange of information.
Q: I gather that the projects involve much more technological support—computers, models, etc.—than many other health-futures projects. Is this correct?
A: Yes, we have an excellent national database and many professional analysts and modellers available, and we make use of them in many projects. Some of the work involves fairly standard projections, trend analyses, and so on, but some of the modelling that has been done for the projects has been extremely sophisticated. One model identifies the most effective points of intervention for improving public health. Another forecasts the need for various kinds of health care at hospitals and clinics.

Q: Have you had any political problems?
A: Not if you mean interference from the government. Although we have done much work for the ministry of health, they have never tried to tell us what the outcomes of the research should be. But we have had another kind of problem that you might call political. Because we have worked so much with the government—not just the ministry of health, but also with many regional and local health authorities—we have been looked upon by some of the other stake-holders as being tied to the government. This has sometimes made it difficult to gain the confidence of other bodies with which we would like to work, such as the professional organizations and the pharmaceutical corporations.

Q: Why are you interested in working with these bodies?
A: Our work often shows that there is a need for change and that most stake-holders are willing to move towards a new system. But resistance from just one organization or institution can hold up the process, even bring it to a halt. In working with hospitals, for example, we see that the future will require physicians to be trained in new ways and to play new roles in health care. Unfortunately, our national organization for physicians is doing very little to prepare for these developments. We think that it would be good for all parties if they were actively involved in the process of shaping and directing the change. One mechanism for their involvement would be participation in a project on the future of the medical professions, for example.

Q: What is the biggest problem you've faced?
A: I would say conflicts between professionals in different disciplines. When we set up the project committees, we included people from whatever disciplines were relevant. This led not only to interesting combinations of people, which was good, but also to communication problems. There are always misunderstandings arising from specialized vocabulary, but the most serious problems have resulted from the different perspectives of the various
disciplines. They work it out eventually, but it takes time. There doesn’t seem to be any way to avoid this, although we’ve noticed that it helps to involve people who have worked on multidisciplinary projects before.

Q: Some futures teams have to deal with some scepticism on the part of policy-makers and the public about the validity of futures work. Have you experienced any of this scepticism?

A: Hardly any, and the credit for that should go to the first director. During the 1960s there was a period when “futuristics” and “futurology” were quite popular in this country, but they lacked a sound intellectual foundation and fell into disrepute. So the concept of futures was definitely not accepted here 15 years ago, and the first director was insistent that we had to be very careful. The name of the foundation did not even include the word futures. And, at the beginning, we never mentioned futures studies or futures research, because we knew people would react negatively. Instead, we emphasized how policy-making could be strengthened through “an examination of possible alternatives”. No one argued with that. As the years progressed, and our work became known and respected, we gradually began introducing the vocabulary of futures work. Today, the foundation’s reputation is very strong, and both the former director and I sit on many important national committees. Now when we talk about futures projects and scenarios and forecasts, no one looks surprised or uncomfortable, but it took almost 15 years to get people used to the idea.

References


CHAPTER 3

Implementation of futures work

Although reports on futures activities typically give detailed descriptions of designs and products, the question of how the project was established and carried out often receives scant attention, as does the question of how similar projects might be made more effective.

This chapter therefore outlines some basic considerations regarding these matters that groups doing futures work should keep in mind. Section 3.1 deals with certain basic activities—legal establishment, preparation of terms of reference, establishing a timetable, developing an organizational structure, communication and meetings, and project evaluation. Section 3.2 discusses general measures that seem to improve the effectiveness of futures activities, such as appropriate sponsorship arrangements and balanced attention to both technical matters and group processes. For information on drawing up a budget and seeking funding, see Annex 1.

3.1 Basic activities

3.1.1 Legal establishment

Futures activities have been carried out successfully at the national level under many different legal arrangements. Some have been done within governments, some in universities or research foundations, and yet others within entities created specifically for the purpose of futures work. One national project has been done by a university in cooperation with a ministry and an international nongovernmental organization; another has been carried out by a presidential commission. National-level futures exercises have even been done within private corporations. There are many possible arrangements. What is crucial is that the work has some kind of legal basis, some institutional foundation that gives it legitimacy and stability.

Futures projects are frequently carried out inside a single institution, such as a ministry, and are done as part of the ordinary work of the staff. "Legal establishment" may then involve nothing more complicated than gaining approval for the work through standard in-house procedures.
Legal establishment becomes more problematic if a number of agencies or institutions are significantly involved in the work, when a variety of solutions are possible. Probably the most common is for the legal and institutional base to be provided by one of the participating entities or by a major financial sponsor. Another option is co-ownership of the work by the participating and sponsoring bodies. In such collaborative arrangements, it is important that the parties agree about their respective rights and responsibilities and that the agreement is included in the terms of reference and/or formalized by a contract or letter of agreement.

Sometimes a new institution, organization, or foundation may be created specifically to handle a futures project. Such a procedure is normally expensive and time-consuming, and is worth while only if the project will take many years to complete or if it is planned as part of an ongoing, permanent futures programme.

3.1.2 Terms of reference

Whatever the legal basis, any national-level futures project should be based on written terms of reference. Their exact form will be determined in part by standard institutional guidelines, but they should specify why the project is being done and how the work will be carried out and used. Items that should be considered for inclusion in the terms of reference are given in Box 2. The most problematic items on the list will probably be those specific to futures work. Two of them will be considered here, namely, scope and time perspective. The remainder are discussed in subsequent chapters, which groups should study before preparing the terms of reference.

Scope refers to the geographical-political unit, the functional system, and/or the institutional entity being studied. A futures project examining the future health of a country has that country as its scope. Other projects may focus on the national health-care system, personnel training in health care, the ministry of health, or the pharmaceutical industry. Determining the scope is usually quite simple, but care should be taken to define it accurately. For a health-futures activity, answers might be required to the following questions about the scope of the work:

- Will the project simply look at the country as a whole, or will special attention be given to specific regions, regional differences, or certain population groups?
- If the country is strongly influenced by conditions in surrounding countries, will the futures of the whole region be considered?
- Will global trends affecting the country be examined?
• If there is a possibility of the country splitting up, will the work consider only the united country or also the new states that might arise later? (Unlikely as it may seem, a futures project has been done in a country that was in the process of splitting up.)
• If there is a possibility of the country joining a larger political union, will the work include consideration of that larger entity?

There are also questions that must be answered regarding the time perspective of the work. How far into the future will the study look—10 years ahead, 20, 30? If the time perspective is too short, the result is usually a plan rather

Box 2. Checklist of basic items for the terms of reference

Decisions about some of these items may be left to the group carrying out the work; if so, that arrangement should be specified in the terms of reference.

• Sector(s) to be covered.
• Basic issue(s) to be addressed.
• Geographical or institutional scope.
• Time perspective.
• General purpose.
• Specific objectives.
• Overall design.
• Type of scenarios to be constructed.
• Basis for scenario evaluation.
• Product(s).
• Intended application of the product(s).
• Target users.
• Sponsoring institution(s).
• Other funders.
• Rights and responsibilities of sponsors and other funders.
• Organizational structure.
• Timetable.
• Means of project evaluation.
• Estimated cost and sources of funding (detailed budget to be prepared separately).
than a futures project, if it is too long, many people may have trouble understanding and identifying with the scenarios and taking them seriously, since they will be unable to imagine so far into the future.

The time-frame established in the terms of reference must be long enough to reveal long-term effects or to allow people to imagine a future that is different from today.

In projects aimed at describing possible futures, the ideal time-frame will be one long enough to reveal long-term effects of trends, policies, and actions, particularly those caused by feedbacks between sectors. In activities designed to depict unlikely futures, the time perspective must be sufficiently long so that people can believe that the situation could be different from what it is today. The same is true if the aim is to develop images of desired futures. A period of between 15 and 30 years often satisfies these requirements.

There is frequently psychological pressure on futures teams to shorten the time perspective of their work. Thus when the Welsh Health Planning Forum set up its "Health and social care 2010" project, the intention was to look some 18 years into the future, to the year 2010. But when a test run was made in which participants were asked to respond to a scenario set in that year, many were unable to do so, saying that it was too far outside their experience and imagination. It was therefore decided to place the scenario in the year 2002 (1). Similarly, the exercise done in Nicaragua on the future of the health-care system initially had a time-frame reaching to the year 2025, but when a national meeting was convened to build a scenario, it was restricted to the year 2005 (2).

The preference for shorter time-frames seems to be particularly common when project participants have backgrounds in planning and are accustomed to thinking within such a time-frame. Another important factor may be the incorrect assumption that the purpose of all futures work is prediction, a misconception that has already been addressed in Chapter 1 (An introduction to futures). Since uncertainty increases as the time perspective extends, a group concerned about "accuracy" will feel more comfortable with a short time-frame. If the only purpose of their work is to predict a single "most likely" future, then a short time-frame is preferable and, indeed, mandatory, but since most futures work is done for forecasting, foresight, or envisioning, rather than for prediction, a longer time-frame is normally both appropriate and necessary.

If the time perspective is an extended one, it may be a good idea for the project to involve not only end-state scenarios, but also developmental scenarios set at intervals of 5 or 10 years. This can be handled in one of two ways. One technique is to build a scenario (or several scenarios) set 5 years in the future, then 10 years hence, and so on. This is appropriate, for example,
if scenarios are being created on the basis of different policy assumptions—if we adopt this policy, here is what might happen in 5 years; here is what the situation could be after 10 years; and so forth.

An alternative, and one that is especially suitable if the scenarios are describing desired futures, is to “jump” far into the future and then work backwards to the present. The first scenario is therefore set many years hence and describes a highly desirable situation. The next scenario is set at some time previous to the final one and says, in effect, if we want to reach the final scenario on schedule, then we will need to realize this scenario by this time. The next scenario moves even closer to the present and again depicts what conditions would have to be fulfilled at that point. This technique, which is called backcasting (see section 5.5.15), can be quite effective in handling a study with a long-term perspective.

3.1.3 Timetable

Even a small futures exercise requires a timetable of some kind, and one is essential in longer-term projects lasting months or even years and involving many people. Keeping a national futures project on schedule can be a challenge, and such activities have sometimes taken considerably longer than anticipated.

One major reason why futures projects can fall behind schedule is that the groups doing them become side-tracked by the new tools that they discover as the work progresses. Although these may have potential value for the activity, time spent in exploring and applying them must be limited to what is reasonable if deadlines are to be met. A futures activity may also fall behind schedule because the team invests an inappropriate amount of time in the collection of information, the construction of a database, and the analysis of data.

Adherence to a timetable can be encouraged by dividing the work into subunits. The exercise is thus carried out in a series of scenario-generating loops, each one more refined than the previous one. Information on multiple-loop designs is provided in Chapter 5 (Alternative designs). Each loop has a deadline; each results in a tangible product; each ends in a symbolic way that brings the activity to a close and initiates the next stage. Besides facilitating adherence to a schedule, a multiple-loop approach has other benefits. The initial loops serve as quick trial runs, providing the team with some practice in futures work and helping them to refine the project design.

A multiple-loop approach can also be appropriate when a team wants to do a futures activity immediately, but financial or personnel limitations make an in-depth project impossible for the time being. Carrying out a first and even a second loop under such circumstances encourages a team to
develop an anticipatory perspective, gives them experience of methods, and lays the groundwork for a more detailed loop at a later date, when the necessary personnel and financing are available.

3.1.4 Organizational structure

Future activities may be initiated by one inspired individual, but the enthusiasm of one person is not enough to guarantee the completion of the work. Successful future projects are almost always carried out by groups. The nature of the specific enterprise will determine how many people should be involved, what roles they should play, and how they should be organized. The organizational structure should be as simple as possible and should be rationally based on the functions that must be performed.

Some future activities, especially exercises done within a single agency, require only a minimal structure. Everyone involved with the project may then be members of a team of somewhere between half a dozen and a dozen people, one person being designated as the leader or chairperson. Together, the members of this team plan the activity, raise the funds, design and carry out the actual work, generate the products, and ensure that the results are applied.

Somewhat larger projects, especially those involving several institutions, may require a slightly more complex structure. The participating institutions then usually name a board of directors with primary responsibility for the activity and authority to decide how it is carried out. The board establishes the project, writes the terms of reference, and then selects a team leader to hire a team and carry out the work. Not uncommonly, the team leader is one of the board members.

Simple, straightforward organizational arrangements of this sort have many advantages. Keeping the number of people and committees to a minimum avoids confusion and saves time. The division of responsibilities is clear, communication is straightforward, and the project is not delayed by an initial period devoted solely to setting up the organizational structure.

However, in unusual circumstances, such as permanent future research programmes or complex projects that last a long time, it may be appropriate for the organizational structure to include not only a team and a board of directors, but also an advisory committee and a committee of experts. However, since elaborate arrangements can take a considerable time that could otherwise be spent on the real work, they should be avoided unless actually needed.

In any future activity, regardless of its complexity, the team is the core group that carries out the basic work and creates the product. Future studies have been carried out by teams of many different sorts; there is no "stan-
standard" composition. An effective team working on a single sector such as health will certainly include people knowledgeable about that sector. Consideration should also be given to including professionals who have expertise on the main factors influencing the sector. In a health-futures project, these might include specialists in demography, economics, sociology, and environmental science.

The futures methods described in this handbook may also be used in processes aimed at producing new health policies, programmes or projects. The task of the working groups may then be to produce a broad range of products, not all of which will require futures methods. Under these conditions, team members must obviously be chosen to represent all the units participating in such processes.

Since most futures studies deal with the future of human institutions, societies, and systems, teams usually benefit by the inclusion of people trained in various social science disciplines. It is appropriate, for example, to include political scientists, historians, anthropologists, and geographers in teams doing health-futures projects. Outside these general guidelines, the make-up of the team should be determined by the purpose of the work and the specific circumstances under which it is being carried out. In a project aimed at encouraging communities to create visions of healthy futures and to produce a book about them, appropriate team members might include people experienced in envisioning and guided imagery exercises, small-group facilitators, writers and graphic artists who can translate the visions into stories and illustrations, and so forth, but in one done to produce mathematically based projections of likely futures, people with other sorts of experience and expertise would obviously be needed. The checklist in Box 3 provides some ideas about the questions that should be considered when a team is being established.

A question often asked is whether senior staff members of an organization should be included on a futures team. Some futures teams working on national projects have included top-level officials, even government ministers. The major advantage of such an arrangement is that it helps to guarantee that the study and its products will be given due attention. On the other hand, people in the highest-level posts may be unable to devote much time to the work, so that a team consisting solely of top policy-makers may function only with difficulty.

In futures projects done within official agencies and other hierarchical institutions, the most senior person serving on the team often acts as the team leader, although someone else may also be selected for the position. The team leader should be an active professional with proven competence as a leader and manager. Previous experience in futures work is not necessary, but enthusiasm for it is desirable. In official settings, it helps if this enthusiasm is
Box 3. **Questions to be considered in establishing a team for a project**

- How long is the project expected to take?
- What is a realistic team size considering the work that will have to be done?
- How much time will the team members need to devote to the project?
- Is it necessary for any team member, including the team leader, to work on the project full time?
- Is a mix of full-time and part-time members feasible?
- Is it possible to divide the work so that each component is covered by a subgroup of the team?
- What financial arrangements can be made to ensure that the regular duties of team members are performed while they are working on the project?
- Are qualified people available and willing to take over these duties on a temporary basis?
- Are senior staff willing and/or interested in serving on the team as full-time or part-time members?
- Will the team members do most of their work as a group or separately? (This may be important if potential team members are widely scattered geographically.)
- What sectoral expertise should be represented on the team?
- What disciplines or subdisciplines should be represented?
- What specific skills will be needed?
- Should different departments within the institution be represented on the team? (Applicable if the work is being done in a single institution.
- Should all participating institutions be represented on the team? Do the participating institutions require such an arrangement? (Applicable if the work involves more than one institution)
- Are there any legal requirements regarding equal opportunity for different groups, including men and women, that must be considered in determining the team composition?
- Do any of the potential financial sponsors have requirements about team composition in projects that they fund?

directed towards using futures in a practical way to support policy-making and planning. Finally, the team leader must not be committed in advance to a particular design or set of tools, since these can only be chosen rationally after the project purpose and objectives have been selected.
The phenomenon of “champions” deserves mention here. In the history of futures work, a significant number of projects have been closely associated with particular individuals. In extreme cases, one person has conceived the study, convinced sponsors, raised funds, hired and trained a team, directed the research, and written the final report. These champions are almost always charismatic and determined people, and they often succeed in their efforts. One drawback of this style of leadership is that the work becomes totally identified with the leader and is therefore likely to collapse if circumstances remove that person from the scene. This can occur, for example, when there are shifts in political power or even structural changes within institutions. Another drawback is that project results may not be widely used, since few people have a sense of ownership of the activity and are committed to the application of its results. This does not mean that a charismatic individual should not be chosen as team leader, but rather that, regardless of who the team leader may be, the project should be designed and carried out as a cooperative effort involving many people.

If the team is the only organizational structure established, it will be responsible for all aspects of the project. If the structure includes a board of directors, the team is responsible for carrying out the project, but the board is responsible for the legal, financial, and managerial aspects. This group will probably consist of representatives of the participating institutions. If the project receives financial support from bodies outside these institutions, the major funders may also be represented on the board. Certain individuals may also be included on their personal merits, but the board should not be purely honorary in character.

All board members should be committed to the project, be willing to devote time to it, and be in a position to provide meaningful assistance of some sort. When the project is being established, the board is responsible for handling the legal arrangements, defining the purpose and scope of the study, drawing up a budget and raising funds, agreeing on a schedule and planning products, the initial planning of implementation, hiring or appointing a leader for the team, and making basic decisions about its composition. As the work progresses, members of the board should assist by making contacts with decision-makers and stake-holders, cooperating on plans for application, and arranging publicity.

In some cases, a national futures activity may require a committee of experts as back-up for the team. Specialists of many different kinds can be included, e.g. computer technicians and modellers, experts on various sectors, and people with experience in specific futures methods. It may sometimes be necessary to pay for expert advice, but experts may be willing to provide at least limited assistance on a voluntary basis if they know that a project has a small budget and that the work is being done in the general
public interest. To ensure a smooth working relationship between the team and the experts, it helps to have written agreements defining the kind of assistance that the experts are willing to provide, the number of hours that they are willing to work, and the team member with whom they will work.

Additional expertise can also be obtained by hiring consultants. Any consultant hired to assist with a project should understand the purpose and objectives of the work and have the background and competence to meet a specific need. This statement applies generally, but the nature of futures work makes it particularly important. As mentioned in Chapter 1 (An introduction to futures), the philosophies of people involved in futures work vary tremendously, as do the approaches with which they are familiar. If a project is aimed at forecasting feasible futures and help is needed in scenario construction, a consultant who specializes in envisioning workshops will not be the appropriate person. If the project is designed to produce a vision of a desired future, a consultant who works primarily in econometric projections will not be a good choice.

A national futures project may also have an advisory committee. Such a body allows the participation of a large number of interested persons, concerned institutions, and other stake-holders that cannot be represented on the board of directors. Members of an advisory committee have no decision-making authority but can offer suggestions and ideas, and may help the team and board to make contacts and assist with publicity. In national futures activities where the future of a whole population is being considered, it may be politically desirable for the committee to reflect that population in terms of sex, geography, ethnicity, and even age. Suggested potential members of an advisory committee for a national health project are given in Box 4.

3.1.5 Communication and meetings

Communication is necessary in any group activity, and is particularly important in futures work, where conflicting perspectives and differences in terminology can easily lead to misunderstandings. Communication among the people involved in a futures activity is essential at all times, not only to avoid these problems, but also to keep everyone informed about the project and committed to it. If the work is being overseen by a board of directors, the team leader should communicate regularly with the person chairing the board and should speak occasionally to the whole board. If the project has an advisory committee, that body should receive periodic updates on the progress of the work.

The team leader should hold regular informational meetings with the whole team to give them an update on the progress of the project together with information on practical matters. In addition, the team leader should
have occasional personal discussions with all team members. A major reason for these meetings and discussions is to ensure that the work remains directed towards its purpose and objective, that it is carried out according to the selected design, and that it proceeds on schedule. Regular contacts also provide opportunities for disputes to be resolved, for moral support to be given, and for ideas and news to be shared.

Box 4. *Potential members of an advisory board*¹

- Officials from the ministry of health.
- Officials from other government ministries and agencies, whose mandate is related in some way to health (population, development, food and drugs, etc.).
- Officials from divisional or provincial health offices.
- The WHO country representative.
- Technical staff from the WHO regional office.
- Health officials from neighbouring countries, especially if the subject of the project has international implications.
- Presidents, deans, and other officials of public health institutes and medical and nursing schools.
- Representatives of national and international foundations concerned with health and related issues.
- Directors and other high officials within health insurance companies, pharmaceutical corporations, health-care companies, and other parts of the health-care sector.
- Representatives of national associations of physicians, nurses, and other groups of health professionals.
- Professional researchers in the futures field.
- Specialists in different aspects of health.
- Political, religious, and educational leaders.
- Well-respected public personalities, including authors, artists, and performers.
- Reporters, broadcasters, publishers, and other professionals in the print and electronic media.
- Representatives of semigovernmental and nongovernmental organizations, particularly those oriented towards matters related to health.
- Individual donors and representatives of funders not represented on the board of directors.

*¹ These persons would be appropriate for the advisory board of a major health-futures activity at the national level.
There should also be regular meetings to carry out specific tasks and to generate specific products relevant to the overall project. These may best be called working sessions to distinguish them from informational meetings. An early session might be devoted to a first loop in a multi-loop design, as mentioned in section 3.1.3, and result in a simple outline of the study design. After some preliminary work has been completed, other working sessions might be organized to carry out various project components, as described in Chapter 4 (Common components).

The participants in a working session may be limited to the core team or may include outside experts or whatever other group is appropriate to the purpose of the session and the issue to be addressed. If those involved are already fairly familiar with the futures approach it may be sufficient to allow only 1 day for it. However, extra time may be needed if the participants have no idea what the approach is about, if they hold conflicting views about appropriate purposes for futures work, or if they are accustomed to only one kind of futures activity and will now embark on a different sort. Under these circumstances, it may be necessary to schedule a working session that lasts at least 2 days. In order to prevent interruptions, sessions of more than a few hours may be held away from wherever the group normally works.

In general, working sessions should be highly participatory, and lectures should be kept to a minimum. A facilitator explains the task to be performed and then hands it over to the team. If there are many participants, it is often a good idea to divide them up into small groups. Depending on the purpose of the session, these groups may then all be given the same assignment, e.g. brainstorming (see section 6.2.5) possible solutions to a specific problem, or they may have different responsibilities. For example, four groups in a working session called to analyse an institution's position within the public-health sector might consider a so-called SWOT analysis, in which its strengths and weaknesses are identified, together with the opportunities and threats (challenges) that it faces. Participants in a session on population might be divided into five groups to look at the issue from the social, technological, environmental, ecological, and political points of view.

In order to encourage full participation and stimulate creative thinking, techniques like quality circles (see section 6.2.11) and brainstorming (see section 6.2.5) are often employed in small-group work. Various devices are commonly used to make sure that all of the participants' ideas are captured. One way is to record ideas, as they are expressed, on flip charts or on large sheets of paper that can be attached to the walls. It is also advisable to have rapporteurs who are not participants to record every suggestion that is made. Microcomputer software packages designed for this purpose may be helpful but are not essential. Once the small groups complete their assign-
ments, the participants reconvene to share and discuss their ideas and reach some kind of conclusion.

In projects carried out in official settings, a working session that generates a product applicable to ongoing planning and policy-making is often more useful than a process-oriented workshop. However, such a workshop may be appropriate during the execution of some futures projects. Workshops have a long history in the futures field; perhaps the best known are the visioning workshops promoted by Jungk (3), Boulding (4) and Ziegler (5). The guided imagery process used in these workshops is described in section 6.2.25. In the health-futures area, visioning workshops have been associated with the healthy communities movement (6). Their function is to help the participants to recognize and express their own personal visions of a desired future and to empower them to take action. Futures workshops are also sometimes organized to get people involved in the launching of futures projects (7). Both visioning and other types of futures workshops can often be completed in a day or two, sometimes in just a few hours.

The essential difference between workshops and working sessions lies in their difference in focus. In a workshop, the important outcome is a change in perception and attitude or an increase in understanding or knowledge; there may be a product but it is not of central importance. In a working session, the important outcome is the tangible product, although the participants may change their perceptions and acquire knowledge while creating it. It is because of this difference that working sessions are usually more appropriate than workshops in official settings such as ministries and other national agencies.

### 3.1.6 Project evaluation

After a project has been completed and applied, it should be evaluated and the results communicated to the sponsors. One function of evaluation is to facilitate group learning in order to improve subsequent performance. The process of examining the project helps a team to see what worked, what failed, and what might be done differently next time. The written report on the evaluation provides a record of these lessons, which can be shared with other groups and referred to when other projects are carried out.

If a futures activity has been carried out in an informal setting, the team may be under no legal obligation to do an evaluation and, if the work has been mainly process-oriented, they may feel that one is neither appropriate nor necessary. Nevertheless, an evaluation is strongly recommended—without one, a team can only offer subjective judgments and anecdotal evidence to support their claim that the work was well worth while. A team
within a government agency or formal institution may be required to carry out an evaluation according to a standardized procedure. If necessary, they should supplement this official evaluation with another one to ensure that questions specific to the project are addressed.

Among the items that should be included in project evaluations are: how well the aims and objectives of the work were fulfilled; what problems were encountered; and how the design might have been improved. No two evaluations will be identical, however, since the purpose of each project will partially determine the criteria by which it should be judged. It would not be correct to evaluate a predictive project on how well it prepares an institution for unexpected events, nor an envisioning activity on the basis of its accuracy.

An evaluation should include questions based on the terms of reference. Was the purpose fulfilled? Were the objectives met? Were the budget and timetable adhered to? Were the products generated as planned? Were the resulting products applied as intended? Groups given only vague terms of reference may have some difficulties with evaluation, since unclear purpose, ill-defined objectives, and unspecified plans for application do not provide a basis for measuring success. On the other hand, project evaluation can be greatly facilitated by terms of reference that are clearly worded and sufficiently detailed.

3.2 Factors promoting effectiveness

Some futures activities are undoubtedly effective—the stated purpose is fulfilled, the intended target audience is reached, and the hoped-for impact occurs. Others come to a sad end—the work is abandoned, or is completed but has little or no influence on policy-making, planning, or programmes. Most projects fall somewhere between these two extremes, being effective to some degree, but not as much as was hoped. Although these variations will depend partly on the quality of the intellectual work, other factors clearly play a role, and every group planning the organization of a health-futures activity should therefore give serious consideration to the following:

- The clarity of the terms of reference.
- The involvement of policy-makers and stake-holders.
- The effectiveness of the sponsorship arrangements.
- Early and continual attention to intended applications.
- Networking.
- Appropriate attention to technical matters.
- Appropriate attention to group processes.

The pages that follow explain why these factors are important and give examples showing how they can be handled. It must be emphasized that the
best solutions can only be determined by each group on the basis of the specific situation. Effective approaches will depend, at least to some extent, on the culture and politics of the country where the project is being done and unique features such as the personalities involved.

3.2.1 Clarity of the terms of reference

The terms of reference should be straightforward, unambiguous, and appropriately detailed. The team setting up a futures project and writing the terms of reference may decide that certain details, such as the type of scenarios to be constructed, should be left to the team itself to decide. This is acceptable, as long as it is noted in the terms of reference that the team will be responsible for these decisions. However, the general purpose, the specific objectives, the basic products, and the intended applications must be specified in the terms of reference in order to provide a rational basis for other decisions about the project, including the overall design, the methods used, and the number and type of scenarios created.

Terms of reference can be drawn up in a variety of ways. They are sometimes laid down by decree. When exercises are done within governments, they are often the work of officials in the department or ministry responsible for the study. The terms of reference for futures work carried out in large corporations or research foundations are frequently the choice of someone high in the institution's hierarchical structure. Top-down directives of this sort work well as long as those responsible for them are in close agreement and those hired or appointed to carry out the work accept them. If the people actually doing the work do not understand or agree with the decreed purpose, objectives, and applications, the results of the work may be quite different from what was intended. Such cases are not published in the literature, for obvious reasons, but nevertheless they do occur.

If the project is being done in a non-hierarchical setting, or if there are many opinions about why the work is being done and how it should be applied, it may be preferable to develop the terms of reference by consensus. This requires more time and effort at the outset, but can yield significant benefits by resolving potential disputes before they occur and by engendering a deep commitment to the project. Reaching a consensus may involve the acceptance of multiple, non-conflicting purposes, objectives, and applications.

When the terms of reference are being drafted, it may be helpful to summarize them in a paragraph containing a statement along these lines: "We are doing this work for this reason; we will study this, but not that; we will do the work in this way and in order to generate this product, which will be applied in this context."
The process of writing such a paragraph can in itself help to reveal any ambiguities that may be hidden in the terms of reference themselves. Once written, the paragraph can also be used for in-house communications about the work, news releases, and other situations requiring a short statement about the activity. Some examples of clear, precise summary statements are given in Box 5, all of which refer to hypothetical futures activities done within a ministry of health.

3.2.2 Involvement of policy-makers and stake-holders

Many futures projects involve change of some sort—initiating new practices, altering trends, redirecting priorities, affecting public attitudes, influencing official policies. In ideal situations, the changes sought can be brought about by the group doing the exercise, e.g. when a futures project on a particular issue is carried out by the government agency responsible for that issue. The same applies to futures exercises about the future of institutions, carried out by the institutions themselves. The individuals doing the futures exercise will then probably also be those determining policies and shaping programmes.

The situation is more complicated if the activity is based in one entity, and many of the key decision-makers and stakeholders are located elsewhere. The question is then, "What can be done to ensure that the people who will have to translate the results into policies and practices understand and accept them?" The best solution is to broaden the participation base so that these persons are directly involved.

Key individuals who have been identified as most important to the success of the project are likely to have ongoing responsibilities that make their day-to-day participation in it impossible. They can still be involved in it by inviting them to serve on the board of directors or the advisory committee, if such bodies exist. Service as a board or committee member does not demand a daily investment of time but keeps people in touch with the work. Thus, if a major futures project is carried out jointly by the research unit of a pharmaceutical company and a department within the ministry of health, it would be appropriate for the board of directors to include the top executive within that unit and the head of that department. When the work is completed and the time comes for application, the people in a position to act are already informed and committed.

Groups should resist, however, the temptation to broaden the participatory base by building up a large and complex organizational structure. Every board or committee demands time and attention, and a project may be hampered by an excessively large and complex structure. Consideration should therefore also be given to involving policy-makers and stakeholders
Box 5. **Examples of summary paragraphs from terms of reference**

- Health care may change dramatically during the coming 15 years because of new health-care technologies. The planning department of the ministry of health is carrying out an in-house futures exercise to gather information on possible breakthroughs in both diagnostic and therapeutic technologies, and to examine their implications for the health-care system in the future. The work will involve collaboration with researchers from the academic and corporate sectors and representatives of the public. The product will be a report that can be used within the ministry of health in its own policy-making and planning regarding the use of technologies in health care.

- A number of international reports have recently warned of the effects of global climate change on health, including the spread of diseases into new areas. In response, the ministry of health and the ministry of the environment are collaborating on a project to provide the government with better foresight about how climate change could affect national health during the next 25 years. The work will involve the collection and analysis of existing information on global change and the generation of various scenarios. The product will be a report for use within the two ministries. Within the ministry of health, the report will be used as input into long-term planning for health-care needs.

- Effective health care requires good planning of human resources for health. The current system suffers from a short-term perspective and reacts solely to current personnel needs without looking at the longer-term picture. The ministry of health is collaborating with the national school of public health on a future-oriented study that will examine the consequences of various personnel development policies over the next 20 years. The report generated by the work will be used as a major input into decisions to be made next year about a new national strategy for personnel development.

- The achievement of health for all depends on public participation. Communities must play a larger role in determining their own health, today and in the future. The ministry's department for health promotion is launching an experimental project to encourage such participation in a number of communities. Groups within these communities will produce local visions of a healthy society in the year 2020. The final product will be a book aimed at both the public and local health authorities, describing the exercises and their outcomes and encouraging similar activities throughout the country.

- Since demographic patterns are important determinants of health, departments within the ministry of health frequently make use of current demographic data and short-term demographic projections of various sorts. As part of its overall efforts to introduce a longer-term perspective into policy-making and planning, the ministry is carrying out a forecasting exercise that will generate a range of feasible demographic scenarios 15 years into the future. The resulting report will be used in a wide range of in-house planning processes.
through a variety of participatory processes and events. Suggested ways of involving more people in futures work are given in Box 6. Some of these activities are aimed at members of the general public, since they are the major stake-holders in many health-futures projects.

3.2.3 Effectiveness of sponsorship and funding arrangements

Every futures project must have one or more sponsors. Sponsorship implies the right to determine the purpose of the project, to choose a team, to appoint a board if there is to be one, and to use and benefit from the work. It also involves responsibility for providing space and support services, for finding funding and administering grants, and for ensuring that the work is carried out. Even if a futures project is financed by an external funder such as an international donor agency, there must be a national sponsor that is concerned about the issue that the project addresses, wants the work to be carried out, and is in a position to apply the results.

Sponsorship is a simple matter if the project is to be carried out by a single government unit that takes full responsibility for it. The work can be done by that unit's employees, under its legal auspices, and with funding from its own budget. A wide range of futures exercises can be set up in this way and handled as regular staff work in support of ongoing policy-making and planning.

Some futures activities are more complex, e.g. they may be carried out within an agency but funded in part through international support, cooperative enterprises involving several government agencies, or even more broadly sponsored by government bodies, academic institutions, private corporations, nongovernmental organizations, and even international organizations. Such broad sponsorship arrangements have a variety of advantages:

- If one objective of the project is to influence particular institutions and organizations, they will be more likely to pay attention to its findings if they have sponsored it.
- If access to information or the cooperation of decision-makers within various departments or companies is necessary, wide sponsorship may smooth the way.
- Futures exercises do not have to be expensive, but major projects can nevertheless be financially onerous for the sponsors, and one way to reduce this burden is to share it.
- Numerous sponsors can give a team intellectual freedom, thereby enhancing the impact and reputation of the work.
- Broad sponsorship may be desirable to prevent a project from being
associated with only a single political group or to achieve a balance between different interest groups.

- A sponsorship arrangement that includes partners both from a number of ministries and from institutions and organizations outside the government can help to give a futures project some political protection.

Box 6. *Methods of Increasing Participation in a Futures Project*

- Use radio, television and newspaper campaigns to invite public input.
- Arrange a competition in which many people can participate, such as one in which they are asked to submit ideas for futures projects or write articles or short stories about the future.
- Arrange for input from a selected number of communities through envisioning workshops.
- Involve relevant nongovernmental organizations in one project component.
- Hold a few public seminars about the project.
- Hold a national conference and invite key decision-makers and leaders.
- Conduct seminars about the project for top officials of the relevant government agencies.
- Carry out a Delphi exercise on some issue, and invite national decision-makers and stakeholders to take part in it.
- Do in-depth personal interviews of people in these same categories.
- Include people in these same categories in a committee that handles one aspect of the project.
- Send an informational memorandum about the project to the main educational and research institutions in the field.
- Offer to give seminars about the project at the same institutions.
- Publish a short article about the work in a national professional journal.
- Present papers about the project at national professional meetings.
- Produce and distribute a project newsletter.
- Arrange for stories about the project to be published in the general press and for interviews with team members on radio and television.
- Arrange for computerized on-line conferences or a World Wide Web home-page for the duration of the project if this is possible.
Sponsors should be chosen with care. Efforts should be made to involve organizations and institutions with a demonstrated commitment to promoting the public good. Groups setting up projects should avoid accepting support from potential donors whose involvement could raise serious questions about the objectivity of the study.

As has been noted earlier, sponsors are often represented on the board of directors, but they may be linked to the work through other arrangements. What is essential is that sponsors be kept informed about the progress of the study, whether by board meetings, interim reports to the sponsoring organizations, or other means. Sponsoring institutions sometimes ask the team leader to address their executives, and such requests are not unreasonable. Difficulties can arise, however, if sponsors demand too much in the way of special reports and presentations in return for their financial support. If this happens, an unreasonable amount of time may be spent on public relations work with the sponsors, to the neglect of the project itself.

3.2.4 Early and continual attention to intended application

Application is the means whereby a project is transformed from intellectual exercise into practical effect. It includes any process whereby the target user (the government, the public, corporations, etc.) uses the ideas or knowledge gained during the project. This often involves using the project results and products as inputs into policy-making and planning or as the basis of other projects and programmes.

In the implementation of a futures project, application comes near the end. The information is gathered, the system is analysed, the scenarios are constructed and evaluated, the products are created, and then the results are applied. Nevertheless, it is extremely important to clearly establish the intended applications right from the beginning of the work and to include them in the terms of reference. The intentions of the project team about how and where the results will be applied should then be considered whenever decisions are made about design, scenario type, and product form.

Repeated reference to the intended application is needed in part simply to ensure that the physical outcomes of the project are appropriate. A vision of a desired future, translated into a popular book, is appropriate for certain applications. Several alternative scenarios of plausible futures, described in a formal report with text and graphs, will be appropriate for others.

Just as importantly, keeping the intended applications clearly in mind will help a team to choose the stake-holders who need to be involved in the project while it is still going on, and whose interest and commitment should be captured. In a health-futures exercise on personnel development, the intended application may involve the consideration of alternative strategies
by the institutions responsible for training health-care professionals. If so, these institutions are much more likely to give serious consideration to the project results if they are involved and informed throughout the study process—if not as direct participants, then in some other way. Thus, as long as they are directed towards appropriate stake-holders, all devices for broadening participation are also devices for ensuring effective application once the project is completed (see Box 6).

3.2.5 Networking

Every group doing a national futures project will want to invest its human resources, its funding, and its time effectively, but waste is likely to occur unless it is aware of previous studies and research, existing databases, and available models and other tools. Many of the places where such information can be found are described in Chapter 8, including printed information sources and resources accessible through international computer networks such as the Internet.

However, much time and energy can sometimes be saved by contacting a colleague with expertise and experience in a particular issue and asking for advice. For groups doing a futures project in a particular sector, the primary targets for such networking will be other professionals in that sector and related ones. In the case of a health-futures activity, these will not only be other health professionals—experts in demography, epidemiology and public health, specialists in different branches of medicine, designers of health-care systems, medical technologists, and so forth—but also researchers in fields impacting on health, including development theory, environmental sciences, sociology, economics, etc. Academic directories of various types may be helpful in identifying people who might help, and more information about such directories is given in Chapter 8.

Drawing on pre-existing contacts is an obvious first step, and informal networks within the country and in the region may be even more important than wider international ones. It may be worthwhile to contact appropriate groups by sending someone involved in the project to present a paper about the activity at national professional meetings. In projects aimed at the public, even appropriate coverage in the media (newspapers, magazines, radio, and television) can be a good way to build up a network.

National health-futures teams may also benefit from networking with other groups doing health-futures work of various sorts. One way to make contact is to join the free WHO health-futures bulletin board or to consult the WHO directory of people concerned with strengthening health information, including health monitoring, evaluation, and futures studies. Individuals and teams actively involved in such activities should also contact WHO and
ask to have their names included in the directory. Information on both the bulletin board and the directory is given in Chapter 9 (Directory).

Thought should also be given to joining international futures and health-futures organizations (see Chapter 9). However, the decision deserves careful consideration, and the benefits of joining should be weighed against the cost. If the primary means of communication within an organization is through papers presented at an annual meeting, if the next meeting will not take place until the study is well under way, and if that meeting will be held in a location that makes it unlikely that the group will be able to send a representative, the membership fee may be better spent making contacts in some other way.

3.2.6 Appropriate attention to technical matters

In deciding how time, money, and human resources will be invested during a project, the group concerned should consider how technological tools will be used in the work. Some of the best support available to a project consists of computers, software, information systems, databases, and telecommunication systems. Some of the many ways that a group might use microcomputers in a futures project are shown in Box 7.

Which of these will be relevant in a particular exercise will depend on factors such as the following:

- The purpose, objectives, and intended applications of the project.
- The design of the exercise.
- The specific tools and methods that will be employed.
- The microcomputer hardware and software already available.
- The budget available for supplementing and upgrading hardware and software.
- The telecommunication equipment available for on-line connections.
- The computer expertise available to the project.

Teams wanting to use microcomputers in their futures projects but having limited computer experience themselves should turn first to their own in-house experts for advice. Outside advice can also be sought, although that of consultants who sell computer products should not be accepted without careful consideration. Ideas can also be obtained from catalogues sent out by computer hardware and software companies, from computer magazines, and from books reviewing relevant software, such as Managing a nation: the microcomputer software catalog (8). Groups working in developing countries or in other situations where resources and facilities are limited will also want to look through guides that have been produced with these situations in mind, such as Microcomputers in development: a manager's guide (9).
Box 7. Some ways in which a futures team can use microcomputers

- To handle project management, including work scheduling and budgeting.
- To handle routine word-processing, including the production of letters, memoranda, and in-house reports.
- To do “desk-top publishing” and produce camera-ready copy.
- To generate diagrams, charts, and other graphics etc.
- To prepare masters for overhead transparencies.
- To set up a bibliographical database consisting of references and possibly abstracts for use in the project.
- To set up a numerical database of information relevant to the study.
- To carry out cost-benefit analysis and other simple calculations using electronic spreadsheet software.
- To carry out various statistical and computational processes, including regression analysis.
- To run simulation games relevant to the sector being studied.
- To build a simple simulation model of the sector being studied and use it to test options or make projections.
- To carry out actor analysis and political mapping (see section 6.2.17), cross-impact analysis (see section 6.2.24), and other processes relevant to futures work.
- To record ideas generated through small-group processes.
- To facilitate decision-making, the building of consensus, and evaluation.
- To handle communication, via e-mail, both among team members and between the team and other groups and individuals.
- To make use of on-line databases, including bibliographical indexes and on-line public access catalogues, and to identify and access other on-line resources.
- To carry out an on-line Delphi exercise (see section 6.2.4) and/or to maintain an on-line conference or home page for the duration of the project.

Although every group doing a futures project should make effective use of microcomputers and other technical supports, they should also be aware that this aspect of the work can become distracting, e.g. in conjunction with database construction. Data collection plays an important role in many
projects, and it would certainly be reasonable to construct a computerized database if time and resources allow, but this activity should not be allowed to divert the project from its primary objectives. Computer models may also represent a temptation. An enthusiastic modeller can easily get a whole team interested in model building, sometimes to the detriment of the other work required. If the purchase of a high-technology tool or the construction of an expensive computer model is proposed during a futures project, serious questions should therefore be asked about whether the proposed purchase or activity is actually needed to fulfil the study's purpose and objectives.

Teams should make use of technologies but not be distracted by them from the purpose and objectives of the work. This does not mean, however, that teams should reject out of hand the possibility of including microcomputers, Internet connections, computer models, computerized databases, and software versions of futures tools in their project, but its effectiveness will be greatly enhanced if they maintain a reasonable perspective on these technical aspects of the work.

### 3.2.7 Appropriate attention to group processes

The subjects discussed in this section may seem irrelevant, at least initially, to some readers—particularly those accustomed to working in institutions which have a fixed hierarchical structure, clear guidelines on decision-making, and established lines of communication—and they may not be comfortable subjects for everyone. Professionals whose working life has been devoted to mathematical analysis may find it difficult to believe that creativity exercises can facilitate their work or that interpersonal dynamics within the group can influence the outcome. Nevertheless, when persons from different professional backgrounds have to work together on complex problems overlapping several sectors, it is essential to have processes that help them to leave behind their established ways of thinking, encourage them to imagine new possibilities, and facilitate the development of new dynamics within the group if the project is to be successful.

Bringing about changes—in the way people think, in the way groups act—is one of the primary underlying reasons for doing futures work. What is the point of doing a study unless it brings about change? And where will that change take place, if not in individuals and social groups? The function of catalysing change is most obvious in futures projects based primarily on envisioning or directed towards social and organizational learning or transformational management. In other futures projects, the function of bringing about change may not be so obvious, yet is still an underlying reason for the work even in projects designed to test options, since policies and plans
change when the people who formulate them realize that there are other possibilities.

Futures studies require people to go beyond established ways of perceiving problems and formulating solutions—the catalogue of the Futurist Bookstore run by the World Future Society always lists books about thinking skills, problem solving, and creativity. The relevance of group dynamics to futures work may not be so obvious, but was recognized as important early in the development of the field and led to the creation of the Delphi process (see section 6.2.4), still a widely used futures method. As described by the scientist and writer, Lewis Thomas, Delphi was invented because solving the serious problems of the future requires people to go beyond the stage of being a "committee" (10).

All committees resemble each other and all have typical problems—difficulties in agreeing, failures in communication, and possibly even disruptive behaviour by some of the members—because they are groups of unconnected individuals, each primarily interested in arguing a particular viewpoint. People who set out to do a futures study always begin as a committee and consequently have the same problems. If they move beyond this state, however, their dynamics will be different, and they will work together more effectively. Teams that have done successful futures projects, when asked to identify the essential ingredients in their success, have often mentioned this transformation. Although the change sometimes happens automatically, some teams have recognized its importance and taken active steps to foster it.

Groups can take specific steps to encourage more creative and diverse ways of thinking and promote effective group dynamics (11, 12). The ideas described below—thinking skills, creativity, awareness of different perspectives, personality style, group problem-solving, and organizational learning—are all North American or European in origin. Groups working in other cultures may find them inappropriate, but may discover others that serve the same purpose.

While attention to group processes may enhance and strengthen a national futures study, groups should be wary of getting carried away by this aspect of the work, especially if its declared purpose is something other than social transformation. Group-process methods can be as addictive as technical methods, and like them should be used appropriately and with a constant eye on the project purpose and objectives.

**Applying different thinking skills**

The fact that an effective futures study will involve some serious thinking is obvious, but the kind of thinking that is needed is not. Some educators and
psychologists classify thought processes as the acquisition of knowledge, comprehension, application, analysis, synthesis, and evaluation (13). Others divide thinking skills into categories such as perception, pattern recognition, consideration of alternatives, acquisition and analysis of information, incorporation of values, understanding of other perspectives, and decision-making (14).

A futures activity is most likely to be successful if all the above-mentioned thinking skills are used. Futures groups that concentrate too much on collecting knowledge in the form of a database are likely to fall short of their goal, as are those that try to go straight to comprehension without collecting any information at all. Success is also unlikely for teams that become bogged down in analysis and never get round to synthesizing and evaluating alternative pictures of the future. Projects will benefit from some attention to this question and from efforts to maintain a balance.

Stimulating creativity

Creativity is also essential to futures work of all sorts. Seeing a possible interaction that might develop between two currently unconnected variables or a relationship that might evolve among formerly unconnected actors requires imagination, as does creating a scenario of the future that is not merely a direct extrapolation from the present situation.

More creative solutions can often be found if a large number of ideas are generated under conditions in which judgement is temporarily suspended. Most professionals find this process difficult, since they feel compelled to judge the value of each idea before they express it. Having been taught to "think before they speak", they have difficulty learning to "speak before they think". They are afraid of looking foolish and of saying something that is in bad taste.

Of course, once ideas have been generated, critical judgement must be used to select those that look most promising, identify the parameters that are most important, and so forth. At this point, most people trained in science or social science will be on familiar ground. It is the first step, in which reason is ignored, that is likely to be the stumbling block.

The technique most widely used in futures work to stimulate creativity is brainstorming, invented by Osborn (15) (see section 6.2.5). Real brainstorming, as opposed to ordinary discussions carried out under the same label, is conducted in accordance with fairly strict guidelines. Numerous elaborations on brainstorming exist, as do various alternative methods, some of which can be used either by groups or single individuals, while others are designed to be used only in a group setting. A number of techniques for promoting creativity are described in Chapter 6 (Methods and tools). Teams wanting more information on creativity in problem-solving should
consult books such as *Conceptual blockbusting: a guide to better ideas*, *Serious creativity*, *101 Creative problem solving techniques*, and *Creative problem solving* (16-19). Which specific method a particular futures team chooses to encourage creativity really does not matter. Many methods have been proved to be effective and are widely used. What is important is to introduce new ways of looking at problems, to help team members to get out of their thinking ruts, and to generate ideas that would not arise from logical thinking.

Creativity exercises are often undervalued, firstly because they are fun and make people laugh, and secondly because their relevance to real-world problem-solving is not always obvious. Especially when used as "warm-ups" for actual problem-solving, they often involve generating unconventional solutions to unlikely problems or imagining consequences of improbable situations. Nevertheless, it is a mistake to dismiss creativity exercises as games or to discount the resulting ideas because they seem "crazy". As Professor J. Dator, Director of the Hawaiian Center for Futures Research and former president of the World Futures Studies Federation, puts it, "Any worthwhile idea about the future looks crazy."

The importance to futures of being able to imagine unlikely events was demonstrated when a futures team went through an exercise to learn more creative thinking. After some practice sessions, the team decided to let loose their imagination on the question of what might happen if their country threatened to stop payments on its foreign debt. One participant protested that there was no point in imagining something that would never happen and stalked out of the room muttering angrily about "stupid games". A few months later, the country did threaten to default on its debts.

**Promoting awareness of different perspectives**

One common problem in many futures projects is that the team includes people of different professional backgrounds and hence with different perspectives on the question being studied. It is, in fact, very important that there should be such a mix. If everyone involved in a project has exactly the same kind of professional background, its view of the future will be very limited. A futures project requires wisdom and insight of many different sorts and can best be done by a team representing at least some variety of disciplines and perspectives, even if the work is focused on a single sector.

The challenge for a mixed team is that its members must learn to talk to each other—or more accurately to listen to each other—across disciplinary or speciality boundaries. The most critical factor in determining whether this happens is the determination of the individual team members to understand each other. Such an attitude is more likely to prevail if the team includes individuals who have worked on successful multidisciplinary projects, or
have been trained in several different fields (e.g. medicine and economics), or in fields that are essentially cross-disciplinary in character, such as geography and anthropology.

The process can also be encouraged by reading about and discussing the phenomenon of paradigms. In fact, the concept of "paradigm awareness" has even become associated with futures work (20). Understanding can also be facilitated by role playing and simulation games—anything that helps team members to recognize and define the assumptions underlying their own and others' perspectives. Computer modelling can also help. People who make an effort to understand each others' perspectives are more likely to succeed in building a model together, while the process of model building can in itself promote that understanding.

**Encouraging tolerance for different styles**

Another impediment to the smooth operation of a futures project is intolerance of those who approach their work in different ways, who have different styles. This attitude can be a real danger in a project of national scope, since people having many different styles will probably be needed if it is to be successful.

Numerous publications are available on psychological style. One which describes a variety of approaches to the topic is *Marching to different drummers* (21). According to Jung's theory of psychological types, everyone's personality can be expressed in terms of the position between the extremes on each of four axes. Thus a person can:

- Be primarily interested in the outer world of objects, people, and activities (E for extrovert) or in the inner world of thoughts, ideas, concepts, and theories (I for introvert).
- Tend to perceive in an experience those things that are real, solid, immediate, and factual (S for sensing) or the underlying meanings, patterns, systems, and possibilities (N for intuitive).
- Prefer to make decisions objectively, based on analysis, the ordering of facts, and the application of logic (T for thinking) or subjectively, using personal values and consideration for others (F for feeling).
- Incline towards making decisions quickly and finally, formulating plans and then following them (J for judging) or towards leaving decisions open for alteration and adapting plans as situations change (P for perceptive).

Each person has a bias towards one of the alternatives within each category. In some people this is a strong preference, while in others it is a mild
tendency. Thus a strong J person will keep closely to a plan even if conditions change dramatically. A strong P person will have trouble following a plan, wanting to reconsider it with every slight change in conditions. Someone near the centre of the J-P continuum will keep to a plan—as long as it is suitable. Of course, everyone is capable of acting out of character at times. Even a strong J individual can have moments of uncertainty; even a strong P individual can act decisively sometimes.

There are great advantages in having many different “types” involved in futures projects. E people will cooperate well with others, communicate easily, and work quickly, while I people will bring great concentration to the study and be able to handle its most complex aspects. S people will be needed to keep track of details and remember pertinent facts, but N people will be just as necessary because they can generate ingenious and imaginative ideas and imagine alternative possibilities. People at the T end of the T-F axis will be useful in analysing information, determining principles, and establishing policies, whereas those at the F end will contribute sensitivity and a concern for human issues. Persons in the P category will add flexibility to organization and decision-making; persons in the J category will ensure that the project is launched and completed.

Awareness of style can help a group doing a project to use its human resources most effectively. A team member who is an S may be excellent at handling detailed numerical data but is probably not the best person to lead brainstorming sessions. A team leader who is an extreme N can be expected to be very creative but will probably need help in dealing with practical matters. Participants who are a strong I/T combination will be inwardly directed and more concerned with policies than persons; they will therefore not be at their best in activities involving direct contact with the public. People who are strong N/Ps never stop having ideas and will have trouble finishing work. Such individuals are fantastic sources of creativity, but their unceasing generation of new possibilities makes it nearly impossible for them to stay on schedule. They are therefore best in some role other than team leader.

A device that can be used to encourage the recognition and appreciation of differences in style is available.

*Problem-solving as a group*

Futures projects always involve myriads of decisions. What will be the scope? What key issues will be addressed? How are the components to be arranged into a design? What kind of information will be collected? Which specific tools will be used? What kind of implementation will be arranged? In some projects, these decisions are made by fiat, the board of directors or the
team leader making a decision and handing it down to the team. There is a strong trend, however, towards participatory decision-making in futures projects. The fundamental argument for this approach is that people work better if they participate in basic decisions about the nature of the project; making decisions together may also foster better group dynamics. It may therefore be advisable to involve the whole group in some decision-making, even if a project is being done in an official setting where top-down decisions are standard.

Devices for group decision-making are of interest to educators, sociologists, psychologists, organizational trainers, and business managers, and both overviews and descriptions of specific methods can be found in the literature of these professions. Probably the most famous technique is the Delphi method (see section 6.2.4). A full Delphi exercise can be time consuming and costly, however, and is usually reserved for major decisions involving outside experts.

For more everyday decisions within a group, simpler techniques are more appropriate. One of the earliest methods developed was the quality circle (see section 6.2.11), originally created within Japanese industry as a means of improving corporate communication and performance, but now widely used in many different contexts. The technique consists of three parts—brainstorming or other creativity-stimulating technique, the expression of concerns and objections, and vote by ballot. The process is repeated until the problem is solved and/or consensus is reached. Chapter 6 (Methods and tools) includes other examples of techniques that can be used in group decision-making.

Group decision-making has its limits; it is simply impractical to do everything by consensus. One team, for example, decided to make all decisions as a team. The result was a series of stalemates over every possible aspect of the project. After several years, during which almost no productive work was done, the main project sponsor brought in foreign consultants, who took over responsibility for decision-making, told each member what to do, and pushed the project through to completion. Such a "solution" is far from ideal, and teams should avoid getting themselves into a situation where it will be needed. The best approach is often a flexible one that recognizes both the value of group participation in decision-making and the practical importance of having someone in charge who can handle most day-to-day decisions and take responsibility for resolving conflicts.

Organizational learning

The processes discussed above—applying thinking skills, stimulating creativity, promoting awareness of different perspectives, encouraging appre-
ciation of different styles, and problem-solving as a group—are all devices for improving the performance of the team itself. Of course, if team members become familiar with these ideas during the course of a project, they will probably retain them and use them in their regular professional roles within the institution. As a result, an institution that does a futures project may receive an unexpected benefit. The project may lead not only to specific products that can be used in institutional policy-making and planning, but the staff members involved in it may also be more effective in their regular roles, thereby strengthening the whole institution.

The carrying out of futures research may also have a more direct impact on the institution, as long as the work is discussed throughout it rather than just among the team members. People who become deeply involved in thinking about the future—often through debates about various scenarios—often end up re-examining their assumptions about how the sector or system actually functions. They become more aware of possibilities, both of things that might happen and of alternative decisions and actions that the institution might take. They develop a sensitivity to slight alterations in the “macroenvironment” that may signal major impending change and are more ready to respond to those signals.

In other words, the carrying out of a futures project can encourage both the individual participants and the whole institution to learn and become more effective. Although the process may happen automatically to some degree, there are ways of promoting it. Arranging for wide discussions of the scenarios within the institution is an obvious step, and introducing a systems perspective on the problem being addressed can also be very effective; a fair amount of the work done on organizational change has promoted systems thinking. Futures teams who want their projects to stimulate new ways of thinking within their organizations should turn to the literature about institutional learning and organizational change for specific ideas (22–31).

References


CHAPTER 4
Common components

4.1 The concept of components

As explained in Chapter 1 (An introduction to futures), many futures activities involve the creation of an image of the future, a scenario. Although not always obvious, the building of these scenarios typically involves the same fundamental components, namely:

- Clarifying the issues.
- Acquiring information.
- Analysing the system.
- Describing the past and present.
- Imagining future trends and events.
- Framing the scenarios.
- Filling in the scenarios.
- Evaluating the scenarios.
- Applying the results.

These common components are presented here, drawing on a wide variety of futures resources (1–20). At the end of the chapter, the integration of the components into a simple design is described. This design is not used in all futures projects, however, and some do not even require all the components. Other designs, including some involving only a few components, are discussed in Chapter 5.

4.2 The common components

4.2.1 Clarifying the issues

When a group starts a futures project, it is important that adequate time is devoted to clarifying the basic issues associated with its subject and selecting those that will be addressed. This process is necessary to ensure that everyone is "on the same track". How quickly this component can be completed will depend on how familiar the participants are with the sector. Obviously,
more time will be required if participants have different professional or sectoral backgrounds.

The terms of reference will usually have narrowed the focus of the work to a specific subsector or topic. If the project is about health, for example, the terms of reference will have specified that the activity will address some aspect of health or health care. This might be alternative health-care systems, essential public health functions, the development of health personnel, preparedness for crises affecting public health, the regulation of pharmaceuticals and medical technologies, possible epidemiological or demographic futures, and so on. Still, the questions will remain, “What are the main issues related to this specific topic, and which of these will we address during the project?” The function of this component is to answer these questions.

Clarifying issues is not the same as identifying the key variables. These are discussed in the next section and are entities that change in value and are important either as inputs or as measures of outcome. Issues, on the other hand, encompass risks, opportunities, concerns, values, and choices. They are the aspects of a topic that are being debated, that demand attention, or that require policy decisions. In demography, for example, key variables include birth rate, death rate, growth rate of the population, percentage of the population in each age cohort, and so on. Examples of issues are family planning, the effect on population growth of education for girls and women, political and religious views on contraceptives, opportunities and problems arising from contraceptive technologies, the challenges of meeting the basic needs of a growing population, demographic transition, migration due to conflict and environmental deterioration, the impact of rapid urbanization on social well-being, and so forth.

Although one function of this component is to ensure a common basis of understanding among team members, there must also be a product, which may be a short memorandum outlining the results, i.e. the issues that have been identified and those that will be given priority during the project. This can be helpful at later stages in settling any questions about the focus of the work.

Dialogue is the primary method by which a group can handle this component of a project. It should be carefully guided so that it stays centred on identifying and selecting issues, rather than veering off into a debate about those issues or the discussion of other matters that will be addressed later in the project. The dialogue may be supported by the sharing of selected written materials that call attention to specific issues. Quick scanning of recent publications may also reveal emerging questions that the team should be aware of. However, it is important that the team does not become bogged down in massive amounts of reading at this preliminary stage.
While a team is carrying out this component, problems may arise either in generating a reasonable list of issues or in reaching agreement about which of the issues to address. If either of these problems arise, it may be useful to use tools designed specifically to facilitate the generation of ideas or to promote the development of consensus. Methods of seeking outside opinion may also be used in identifying issues, pinpointing those to be addressed, or both. Some relevant tools are described in Chapter 6.

4.2.2 Acquiring information

Identifying and gathering together relevant information may form a minor or major part of a futures project, but information of some sort is always needed. Time is often set aside early in the work to identify and collect much of the information that will be needed during the project. However, the process of information gathering usually continues as the work proceeds, particularly through the analytical component.

The kind of information needed in a futures activity varies considerably. Sometimes only quantitative data are useful, but sometimes they play only a minor role compared to qualitative information. Often both types are needed. Facts, statistics, patterns, and trends may be essential information, but so too may opinions, perspectives, hopes, concerns, and motivations. The information gathered—regardless of type of source—should be assembled in a form that can be used within the project and can also be transferred and shared as need be. Products of this component may include a numerical database, a bibliographical one, a collection of books, articles, and other documents, reports on surveys and/or interviews, and so forth.

Because of the wide variation in information needs, the methods used can take many forms. Much of the information will probably be gathered by means of standard methods used in the social sciences and public health, including surveillance, surveys, and interviews. The team will sometimes do at least part of this work themselves as part of their project. Some of the relevant techniques that they might employ are described in Chapter 6 (Methods and tools). Alternatively, the team will make use of data that have already been gathered, e.g. on health status and trends, demographic and epidemiological profiles, and so forth. Some information may be available as statistical databases or stored as printed materials or on-line resources. Guidance on finding printed and on-line information relevant to health-futures projects is provided in Chapter 8.

4.2.3 Analysing the system

In most futures studies involving the construction of scenarios, a major portion of the work is devoted to analysis. The function of this component is
to develop an understanding of the structure and function of the sector and/or system under consideration. The specific activities included in this component will depend on what analysis has already been done, the nature of the system being studied, and the type of scenario that will be constructed.

The first of these points is obvious. If the sector has already been thoroughly analysed during earlier research, this component may consist of reviewing the literature or carrying out interviews with experts in the field in order to gain an overall picture of how the system is structured and how it functions.

The second point is also fairly self-evident. The specific questions asked in the analysis component of a project about the future of pharmaceutical therapies will be quite different from those that would be posed in a project on the development of healthy communities. The analysis required for a futures activity regarding existing and emerging diseases will not be the same as that needed for one on personnel development strategies.

The third point, the influence of scenario type on the analysis, is not so obvious but should become clearer through the examples given in this section. For now, it can be said that the process of “framing” the scenarios, which comes later in the project, requires the selection of certain sets of assumptions. These may be about trends, future events, policies, choices, or actions, and may relate to different aspects of the sector. The information needed for the framing process will be available only if the appropriate questions have been asked during the analytical component. Thus, although the exact nature of the scenarios will not be known until they have been framed and filled in, their general nature must be known at a much earlier stage. This requirement should not cause any problems as long as the purpose and scope of the project have been clearly laid down in the terms of reference and the group has successfully completed the process of identifying the issues that they will address.

All these differences make it impossible to describe “the” way in which analysis should be done. However, the types of activity involved in an individual project might include one or more of the following:

- Determining the structure of the system.
- Identifying which input variables are of key importance.
- Identifying the key actors and analysing their strategies.

In practice it is often difficult to separate these activities, and they are frequently carried out simultaneously. The structure of the system depends on the relationships between variables and among actors. Thus the process of determining the structure of the system automatically provides some information about the variables and the actors, and vice versa.

The variables of the system are all the parameters that change in value, and include both the independent variables that are “inputs” into the system
and the dependent ones that are "outputs". The values of the input variables and their relationships with each other and with the output variables determine the values of the output variables.

The output variables are indicators of the system's status or performance and are central to the scenarios. The input variables considered during the analytical component should be those which are causal, i.e. those which determine the output variables included in the scenarios. Thus, in a health-related futures project, possible output variables might include life expectancy, birth weight, child mortality, maternal mortality, the burden of communicable and noncommunicable diseases, and other health indicators. The input variables would be factors that control and influence these variables, including, e.g. population level and rate of growth, access to clean water and basic sanitation, the nutritional status of the population, socioeconomic conditions, educational and literacy levels, provision for primary health care, individual behaviours affecting health, and many others.

In a futures project on health care, the output measures might include the human resources available within the sector (number of physicians, nurses, midwives and other medical personnel), the available health-care facilities (hospital beds, health-care centres, etc.), the coverage of deliveries by trained personnel, the percentage of infants immunized against target diseases, how well the services provided by the health-care system meet the needs of the population, the flexibility of the system, the cost-effectiveness of the system, how equitable the system is, and similar measures. The input variables could encompass legislation, degree of privatization, personnel planning policies, insurance and other financing schemes, incentives for personnel to work in areas most needing primary care, financial resources spent on health care, and so forth.

Thus, when a team is doing a futures project, the aim is to determine how certain output variables can be maximized, minimized, optimized, or improved. In health-futures projects, the goal is often to determine how certain health gains can be achieved and/or how those gains can be distributed more equitably. In futures projects on health care, the aim is typically to find ways whereby the delivery of services can be maximized, the costs can be minimized, and the capacity of the system to meet the health-care needs of the population can be optimized.

In order to make these judgements about the output variables, however, the team must understand what controls and influences the output variables. This requires an understanding of how the system is structured, how the output variables are linked to the input variables, and what those input variables are. There are often many input variables, but it is not necessary or even advisable to consider all of them during the building of scenarios. What is important is to identify and understand the key causal variables, i.e. those
that have the greatest direct and indirect influence on the behaviour of the system and thus on the output variables.

There is no single way in which the key variables can or should be identified and analysed. The appropriate technique will depend on the purpose of the project and the system being analysed. One approach involves generating a long list of “all” possible variables. Groups might begin such a list on the basis of their own knowledge, supplement it with ideas gleaned from interviews, and use brainstorming (see section 6.2.5) to make sure that none have been missed. This list is then subjected to a selection process in which every variable is evaluated in terms of its influence on the other variables in the system, and these judgements are recorded in a structural analysis matrix. The majority opinion may be accepted or consensus may be sought using a method such as Delphi (see section 6.2.4). The process of generating the list and selecting the key variables may be carried out by the group doing the study or by outside experts.

Other possible approaches include using statistical procedures that analyse the behaviour of a variable in terms of other variables (as in regression analysis), or simulation models—either econometric ones (see p. 172) that describe the function of the whole system in terms of interrelated regressions, or system-dynamics ones (see p. 170) that describe the system as a set of feedback loops between functional elements. Some appropriate tools and techniques for this component are described in Chapter 6.

Information about what is going on in a system is much more useful if the agents are identified. “Corporation A is doing this, and ministry B is doing that” is a more helpful statement than “this and that are happening”. It is thus important in a futures project to pay attention not only to the key variables, but also to the key actors—the most significant institutions, corporations, organizations, groups, and individuals within the sector. How can the future of any system be studied if the main agents of change and the motivations behind their behaviour are not known? Analysis of social actors is therefore commonly incorporated into the analysis component of scenario building.

The first step in this activity is identifying the key actors. Possible approaches include carrying out a survey to determine which actors are important in the system, interviewing a small number of knowledgeable people, or drawing up a list of all known actors via brainstorming, and then submitting this list to experts for their opinions about which actors are most influential. System-dynamics modelling can also be used, since it includes the actors as elements in the model and elucidates the influence that each actor has.

The second part of the activity involves analysing the actors that have been identified as being of key importance. This process can be quite complex. Each actor may be analysed in terms of goals, activities, available
resources, limitations, historical behaviour, and criteria for decision-making. How the actors interact, what the possibilities are for conflict and cooperation, and what the balance of power is among them may also be considered. It is appropriate also to ask questions about changes that could occur, including the formation of new relationships and new power balances among both existing actors and new ones. Successful analysis of actors requires adequate and accurate information about them, and such information may be difficult to obtain. If it can be arranged, the involvement of individuals representing social actors can be especially helpful. In a project about health or health care, these people could include officials from health authorities, decision-makers in health-care companies and pharmaceutical corporations, leaders of professional medical organizations, and so forth. Alternatively, experts familiar with the actors and their goals and strategies can be invited to participate in the analysis.

The relevant tools for this step are all drawn from the social sciences—analysis of social actors, political mapping, game theory, role playing and decision-making theory. There are even actor analysis tools specifically designed for futures projects, and groups may devise their own techniques based on such ideas. Some of them are described in Chapter 6 (Methods and tools).

An appropriate product of this component is a document describing how the analysis has been carried out and what results have been obtained. This can serve as one of the background papers for the final project report. If the analysis has involved modelling, the model itself is also one of the component products.

4.2.4 Describing the past and present

Describing the past and present involves producing a history of the system under consideration and a description of its current status. The result provides a basis for the projections that will be carried out when the scenarios are constructed.

This component and the analytical component are mutually supportive. Plots of historical trends and descriptions of current situations are more useful if they focus on the key variables and actors identified during the analysis, while looking at the history and current status of a system can make it easier to understand the structure and function of the system.

The component typically involves the compilation of existing qualitative data collected during the information-gathering component, the plotting of time series and the calculation of statistics as well as the writing of a description of the historical and current situations. Groups experienced in health situation and trend assessment will already be familiar with these activities
and the appropriate methods. It may sometimes be appropriate to use other techniques, including simple devices such as time-space grids (see Chapter 6) or the portrayal of conditions by means of maps, photographs, and other devices.

The product is usually a short report combining text, tables, graphs, and other illustrative material. This provides input into later components and can also stand on its own as a useful basis for related futures projects. The statistical analysis programs into which data have been fed are also a product and can be used to carry out projections during the component which is described next.

4.2.5 Imaging future trends and events

When teams reach this component of a project, they have laid a foundation based on an understanding of the system and knowledge of its past and present status. Now the time has come to begin thinking about the future. The first step is the imaging, not of whole-future scenarios, but rather of future trends and events. One basic activity within this component is the projection of current trends in key variables. Projections can be done using statistical methods of various sorts, including computerized versions. These techniques vary in complexity and sophistication from simple extrapolation of the historical trend in a single variable to models that take into consideration linkages between trends in different variables (see Chapter 6).

Projections of current trends are descriptions of what the future will be like if these trends continue. History tells us, however, that trends are not always continuous. Relationships between variables can change, and events can influence trends and alter their course. This component therefore includes not only the calculation of projections based on historical information, but also the imagining of discontinuities, major new trends, and single events that could have a marked influence on the sector.

These trends and events can be of many sorts. They may be integral to the system or part of the macroenvironment. Some will be beyond control, but it will be possible to influence others through policy and other interventions. They may represent totally unprecedented phenomena or important developments in phenomena that are currently insignificant. What they all have in common is that they will not have been identified as key variables during the analytical component, yet have the potential to influence the future significantly.

In a health-futures project, future trends and events of this sort might include a sudden outbreak of a new disease, a minor health threat that turns into an epidemic, a new concept that causes major alterations in health-care delivery, a technological breakthrough that radically changes the treatment
of a chronic disease, the invention of new chemical processes that will eventually lead to new pharmaceuticals, and so on.

In practical terms, the process involves the generation of a long list of newly emerging phenomena, as well as of possible future trends and events. This can be created by the team or invited experts, using brainstorming and other idea-generation methods, or through interviews with creative thinkers and astute social observers. The identification of emerging phenomena that may become important may involve scanning techniques. Examples of these tools are given in Chapter 6.

The products resulting from this component include any projections carried out on trends in key variables plus the generated list of possible future trends and events.

4.2.6 Framing the scenarios

Whenever an image of the future is created, certain assumptions must be made. The group creating the scenario says "We think the future will look like this, if..." In fact, the assumptions are often expressed as conditional phrases beginning with "if". In health-related studies, such statements might include the following: if health care is privatized; if certain legislation on pharmaceuticals is adopted; if there is a sharp rise in tuberculosis; if a particular strategy is adopted in personnel development; if water quality deteriorates; if urbanization continues at current rates; and so on. Every set of assumed conditions provides a framework for a scenario of the future.

Theoretically, an unlimited number of assumption sets exist, but only some will be appropriate in any one project. To some degree this is a matter of intended application, of how a team is planning to use the project results. For some applications, including the communication of futures ideas to the general public, extremely simple frameworks are acceptable and sometimes even preferable. In many other applications, including policy-making situations, frameworks that oversimplify complex situations are likely to be received with scepticism.

In addition, and very importantly, the framework must be appropriate for the general purpose of the project, the type of scenario to be constructed, and the intended application of the results. This is a matter of common sense, as the following examples show:

- If the purpose is prediction and the team wants to describe a future that is a continuation of the present—with no surprises—the basic assumption is "If current trends continue without any unexpected changes..."
• If the purpose is forecasting and each scenario will represent a future characterized by trends and events of a certain probability, the basic assumption for each scenario must be “If these trends and events, which have these probabilities, do in fact occur . . .”

• If the purpose is foresight, some of the scenarios may be identical with those created in forecasting, but others will be wild cards portraying unlikely yet possible futures. For each of these wild-card scenarios, the assumption must be “If this unlikely but possible event(s) and/or trend(s) occurs . . .”

• If the purpose is envisioning and the team wants to build a scenario of a desired future, the basic assumption must be “If the future is the way we want it to be (or some other designated group wants it to be) . . .”

• If the purpose is testing policy options, and the scenarios will sketch futures that unfold following different policy decisions, each assumption set must begin “If policy X is adopted and implemented . . .”

In most cases, framing the scenarios is not difficult as long as the purpose and objectives of the project are clear and the earlier components have been carried out appropriately so that the “if” statements can be specified to the necessary degree.

For example, if a scenario is based on different policy choices, information must be available on what policies are being, or could be considered. Similarly, if a scenario assumes that historical trends will continue, these projections must have been calculated or generated by means of a computer model. If a scenario is to be built on a desired future framework, information must be available on what is considered desirable. (If the scenario is being built through a visioning session, this information may simply be available in the minds of the participants and not even be expressed until the process of filling in the scenarios begins.)

Sets of probable, possible, or desired events and/or trends other than projections can be identified and selected in a number of ways. One basic approach involves taking the list generated during the previous component and ranking the events according to their probability or desirability. Such ranking is often done by an outside group of experts and may involve a consensus-building technique such as a Delphi. A group of items with a high probability are then combined to form one assumption set, a group with somewhat lower probability are combined to form another assumption set, and so forth.

The same approach—but with ranking based on desirability rather than probability—can be adopted to create an assumption set of positive events and trends for a scenario of a desired future. It is even possible for
assumption sets to be chosen from a generated list of future events and trends solely because they are interesting combinations. This criterion is not commonly used in policy-making and planning but is suitable when scenarios are built in order to stimulate public and political debate and discussion.

In some projects, framing becomes quite complex and involves several steps. For example, a first step might be the assumption that current trends in key variables will continue, and that they will interact with each other in the same way as they do now. In the second step, selected events, trends, or discontinuities that could have an impact on this basic forecast are then added to it, thereby generating frameworks for various contrasting scenarios. As a third step, the frameworks can be ranked according to their probabilities. This particular multi-step approach is called trend-impact analysis (see section 6.2.23) and generates a range of forecasts of different probabilities.

None of the framing techniques described above takes into consideration the influence that the occurrence of one event or trend has on the occurrence of others. It is possible, however, for this influence to be built into the frame through a method called cross-impact analysis (see section 6.2.24). In a cross-impact analysis, the generated list of future events and trends is submitted to a Delphi panel, who judge how much impact each would have on the occurrence of the others. The more sophisticated versions of cross-impact analysis trace the impact of a single event through all its chains of influence. The process thus identifies the events that would have the greatest impact, as well as the other events and trends that they would "set off". The result is clusters of related events and trends that can be ranked by probability, again often through a Delphi. The clusters judged as being probable can be used as frames for forecasts, while less likely ones can be used to build wild-card scenarios. The clusters may also be judged according to their desirability, and the cluster considered to be most desirable can then be used as the basis for a desired future scenario. Yet another alternative is to evaluate the desirability of the clusters, but without any attempt to reach consensus. Several clusters found to be desirable can then serve as frames for several different desired futures.

Finally, mention should be made of a simple and popular approach that involves identifying two key variables that are considered to be driving forces within the system. A simple $2 \times 2$ matrix is constructed, the extreme future conditions anticipated for one of the variables being shown along one axis, while those expected for the other variable are shown along the other. The matrix thus depicts four assumptions about the future of these two key variables or driving forces, and these constitute the frameworks for four
scenarios, which can then be filled in. A variation on this approach focuses on policy choices rather than driving forces.

This technique is well suited to situations where people are being introduced to futures. The entire process of identifying the two key forces and constructing the matrix may take no more than a few minutes, yet the resulting scenarios can provide a vivid illustration of the value of anticipating futures other than the "most likely" one. Because of this, simple matrix framing has become quite common and is sometimes described as "the way to do futures work". However, teams doing futures projects as a complement to policy-making and planning should remember that only scenarios that have been framed and constructed with methodological rigour are likely to be accepted as final inputs into these processes.

Various alternative approaches to framing are shown in Table 1. There are certainly others. Teams must determine the most appropriate way to carry out the process, beginning with the purpose of the work and the type of scenario to be constructed.

### Table 1. Some approaches to framing scenarios

**Example 1.** Mixed frames for increasing foresight. Events and trends are generated, and outside experts judge their probability and desirability. Sets are then selected as frames, each including likely, unlikely, desired, and undesired events and trends. These sets are used to build mixed scenarios to increase foresight. An alternative approach to the same purpose would be to build wild-card scenarios based on events of low probability but high impact.

<table>
<thead>
<tr>
<th>Scenario No.</th>
<th>Event or trend</th>
<th>Probability</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A vaccine is developed for malaria</td>
<td>Low</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>A cure is found for HIV/AIDS</td>
<td>Medium</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>There is an outbreak of Ebola fever</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>There is a dramatic decrease in smoking</td>
<td>Low</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>A famine causes widespread death and malnutrition</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Most primary health care moves to community centres</td>
<td>Medium</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>There is a dramatic increase in condom use</td>
<td>Medium</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis and diphtheria both increase markedly</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Cholera incidence increases in urban areas</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Government bans all sale of tobacco</td>
<td>Low</td>
<td>+</td>
</tr>
</tbody>
</table>
## Example 2.

Selecting frames of different probabilities for forecasting. Scenarios will portray health-care demand resulting from negative trends and events. Each frame consists of items of similar judged probability. Here, frames are selected for three scenarios but, in a real exercise, the list would be longer and more scenarios would be built, although not all events or trends would necessarily be used. Alternative approaches include combining items randomly, then ranking the combinations by probability, and using cross-impact analysis to identify combinations likely to occur together.

<table>
<thead>
<tr>
<th>Scenario No.</th>
<th>Event or trend</th>
<th>Probability</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Healthier exercise habits become widespread</td>
<td>Medium</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Public awareness of good nutrition increases</td>
<td>High</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>There are more deaths due to traffic accidents</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular diseases increase markedly</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>There is a major outbreak of plague</td>
<td>Low</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future event or trend</th>
<th>Probability</th>
<th>Scenario No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>New form(s) of cholera present</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Global warming brings new vector species</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>At least 75% increase in smoking</td>
<td>80</td>
<td>1 (high probability)</td>
</tr>
<tr>
<td>At least three times as many motor vehicles on the roads</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Travellers/tourists bring in new diseases</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>At least one major natural disaster (flood, fire, etc.)</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis cases increase by at least 50%</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Malnutrition in at least 10% of population</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>At least one major chemical spill affecting 50,000 + people</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>At least 30% increase in cardiovascular disease</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Major earthquake hits capital city</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>At least 10% increase in illicit drug use</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Civil strife or other major armed conflict</td>
<td>22</td>
<td>3 (low probability)</td>
</tr>
<tr>
<td>New deadly viral epidemic of HIV/AIDS proportions</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>A 30% or greater increase in mental disorders</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

*Chances per 100 of occurring in the country by a particular year, as judged by a panel of experts.*
Example 3. A simple $2 \times 2$ framing matrix using two important variables. The four frames are determined by combining the extreme conditions that two important variables (driving forces) are expected to reach at some future time. $A$ and $B$ are the calculated or judged extreme future values for variable 1, while $X$ and $Y$ are the corresponding extreme values for variable 2. $AX$, $BX$, $AY$, and $BY$ provide the frames for the scenarios to be built. They can be expressed as: "If variable 1 achieves value $A$, and variable 2 achieves value $X$, then ...", etc. The four frames do not have any assigned probability, but it is assumed that together they cover much of the probable future regarding the two variables. In this example, variable 1 is population size, variable 2 is level of economic development.

<table>
<thead>
<tr>
<th>Extreme values of variable 2</th>
<th>Extreme values of variable 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$A$</td>
</tr>
<tr>
<td></td>
<td>(Highest expected</td>
</tr>
<tr>
<td></td>
<td>population level)</td>
</tr>
<tr>
<td>$X$</td>
<td></td>
</tr>
<tr>
<td>(High economic development)</td>
<td>$AX$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$Y$</td>
<td></td>
</tr>
<tr>
<td>(Low economic development)</td>
<td>$AY$</td>
</tr>
</tbody>
</table>

Example 4. Framing using a baseline scenario plus assumed policy options. In this project, the most probable trends in key variables affecting the sector are first identified. A baseline scenario is constructed on the assumption that the trends in those variables will be the most probable ones. The next frame consists of the original assumption plus the assumption that policy option A is chosen and followed. Alternative scenario A is based on this set. Similarly, the next frame consists of the original assumption plus the assumption that policy option B is adopted. Alternative scenario B is based on this set. The process can be repeated until each policy option is reflected in an alternative frame and scenario.

<table>
<thead>
<tr>
<th>Frame No.</th>
<th>Basic assumption</th>
<th>Additional assumptions</th>
<th>Scenario built</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trends in key variables will be the “most probable” ones</td>
<td>—</td>
<td>Baseline scenario</td>
</tr>
<tr>
<td>2</td>
<td>Assume policy A is adopted</td>
<td></td>
<td>Alternative scenario A</td>
</tr>
<tr>
<td>3</td>
<td>Assume policy B is adopted</td>
<td></td>
<td>Alternative scenario B</td>
</tr>
<tr>
<td>4</td>
<td>Assume policy C is adopted</td>
<td></td>
<td>Alternative scenario C</td>
</tr>
<tr>
<td>5</td>
<td>Assume policy D is adopted</td>
<td></td>
<td>Alternative scenario D</td>
</tr>
</tbody>
</table>
Example 5. Frames based on different strategic approaches. Scenarios are often built to reflect not just different individual policies, but entire alternative strategies. Here, frames are defined for scenarios that will depict health care when three different strategies are adopted.

<table>
<thead>
<tr>
<th>Frame</th>
<th>Planning and control</th>
<th>Development of human resources for health (HRH)</th>
<th>Health-care delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy to be reflected in scenario 1</td>
<td>Centralized at national level, within ministry</td>
<td>Highest priority given to training of physicians</td>
<td>Primarily at urban and regional hospitals</td>
</tr>
<tr>
<td>Strategy to be reflected in scenario 2</td>
<td>Shared between national and regional levels</td>
<td>Balanced development of all HRH categories</td>
<td>Shared between hospitals and community health centres</td>
</tr>
<tr>
<td>Strategy to be reflected in scenario 3</td>
<td>Almost entirely regional, with significant input from local level</td>
<td>Highest priority given to training of midwives and paramedical personnel</td>
<td>Primarily at community health centres, plus significant home care</td>
</tr>
</tbody>
</table>

As the examples in Table 1 illustrate, the methods used in framing vary tremendously, but the product of this component is always the same, namely, one or more sets of assumptions about the future that provide frames for scenarios. The assumptions are usually in the form of written statements but are sometime better expressed in mathematical form or displayed in a grid.

4.2.7 Filling in the scenarios

Once a frame is in place, a scenario can be constructed or filled in. As explained in section 4.2.6, the frame is the set of assumptions about the future, the so-called “if” statements that say “If this trend continues and that event occurs, then . . .” The construction process involves finishing these statements, elaborating what would happen if the assumed conditions actually existed in the future. A scenario is often a narrative description of the future situation, a picture in words of what could happen if the conditions assumed were actually fulfilled. It often includes an explanation of how the future situation came into being, how the interactions of trends, events, and the behaviour of various actors brought the scenario into existence.

The real challenge comes in integrating projections of individual variables so as to produce a coherent and internally consistent scenario. Simple
projections without taking linkages into account can lead to conclusions of questionable validity. Effective integration requires a deep understanding of the entity being studied and an ability to see the whole. All the work put into understanding the system pays off when the actual scenario building takes place.

Because there are so many ways of framing scenarios, there are also many different approaches to the actual construction and many ways in which the “elements” can be selected. This can best be illustrated by some specific examples.

The first example is a futures exercise in which a single desired-future scenario is being constructed in a visioning workshop (see Chapter 6). Since the workshop may last only a day, the initial components are played down or skipped entirely, and the scenario-building process begins with the framing. In this particular case, the frame is the assumption “If our community were a healthy place to live in in the year 2010 ...” It is up to the workshop participants to fill in the scenario, and they may include any kind of elements that they want, anything that they think would contribute to a healthy community. The participants can express their ideas as statements and/or through drawings, and the sum of all the ideas expressed constitutes the scenario. Elements in the vision might include the natural environment, housing, transportation, social conditions, health care, and more. There are no restrictions on the choice of the elements, and this is completely up to the participants creating the vision.

The second example is a single scenario providing a picture of a future that a project team considers to be “most likely”. The scenario frame is the assumption “If current demographic and epidemiological trends continue unchanged, and if there are no surprises, then ...” What elements will go into the scenario to complete the statement? The answer depends on the purpose and objectives of the activity. Consider a project that has been done to provide as accurate an estimation as possible of the future epidemiological profile of the country. Projections have been carried out by the project team using mathematical programs and historical and current data. By the time the team starts to construct the scenario, they already have a numerical description of the future situation, complete with details of the expected incidence and/or prevalence of various diseases and the mortality caused by them. These indicators may be specified by age, sex, socioeconomic status, and region. The first obvious step in scenario building is to turn this numerical information into text and graphs, in order to better convey the realities of life under the projected scenario. “If current trends continue, by the year 2025, over XX% of the population over the age of 45 years will suffer from cardiovascular conditions ...”, and so forth.
Now consider another project, done to test policy options regarding health-care services. The first step in the construction of each scenario would be to describe the future status of these services under one assumed policy, drawing on the analysis and projections carried out during earlier components of the work. The elements included in this description would probably include projected health personnel in various categories, number of hospitals and clinics and their geographical distribution, health insurance and other financing mechanisms, availability of primary, secondary, and tertiary care, and so forth.

Whatever basic text comes out of the first step can then be elaborated in a number of ways. When changes take place in a sector of a system, there may be widespread impacts on many other sectors or systems. One possibility in scenario building is to ask questions about these impacts and incorporate the answers into the scenario. If these changes occur, how would they affect the economic situation? The political situation? Social conditions? Environmental quality? Would these changes influence technological development by encouraging new technologies, or would they have an impact on technological applications?

Another possibility is for the scenario to describe in detail the interactions among causal variables that have led to the final scenario. What social and economic factors have promoted a particular trend? What policy decisions by governments and institutions have been crucial in determining the scenario? What actions by which key actors have been of particular importance? Again, after these questions have been addressed, the answers can be integrated into a "story" describing how the present situation evolves into the particular scenario.

In summary, the scenario can describe:

- The consequences of the assumed conditions within the sector or system of interest (what a community will be like if it is a healthy community, what health care will look like if a certain health-care policy is adopted, etc.).
- The impacts that these conditions and consequences have on other sectors or systems (how a particular epidemiological trend might affect economic development, how a particular health-care system could affect health status, etc.).
- How variables, trends, actors, policies, decisions, events, and actions have interacted to shape the new situation (how population mobility has contributed to the spread of certain diseases, how policies on the training of health personnel have led, in the scenario, to the overabundance of certain personnel categories;
how decisions by pharmaceutical companies and government agencies have led to the shortage of essential drugs described in the scenario, etc.).

Many different methods can be employed during the scenario-construction component. As already mentioned, certain projections may be carried out using mathematical programs or models of the econometric type (see p. 172); this work will probably be done during the earlier components and simply "translated" into new forms during the scenario building.

As the examples above illustrate, however, scenarios often require much more than mathematically determined projections. The consequences that sectoral changes might have on other sectors must be visualized. The way in which variables and trends and actors might interact to bring about a particular scenario must be understood. No mechanical technique exists for handling these aspects of scenario building; imagination and insight are necessary. In addition, the preparation of the final scenario is a group process in which it is important that everyone’s ideas are solicited and some kind of consensus is reached. This is why the filling in of scenarios typically involves brainstorming (see section 6.2.5) and other creativity-promoting methods, consensus-building techniques like Delphi (see section 6.2.4), and social science tools such as actor analysis (see section 6.2.15) and role playing (see section 6.2.16).

Throughout scenario construction, during both the framing and the filling in, teams should be constantly testing the draft scenarios to make sure that they meet certain basic requirements. Those which do not should be set aside or appropriately modified. The testing should cover applicability, validity and comparability, after which the products of the component can be prepared.

**Applicability**

All scenarios should be suited to their intended application, in both the kind of future they portray and the form in which they are expressed. Projects done in order to provide forecasts that can be used in national planning require scenarios depicting futures of different probabilities. In an activity carried out to empower a group of people by helping them to identify their vision of the future, the scenario generated must be one of the desired future. Furthermore, a scenario aimed at policymakers must be in a form that will ensure its acceptance by that group, while one meant for the public must be appropriate to that target audience.
Validity

Scenarios should be logical, reflect what is known about the real system, and be internally consistent. A scenario in which a new disease emerges and quickly reaches epidemic levels, but there are no consequent impacts on the health-care system, is not a valid scenario.

Comparability

Scenarios that will be weighed against each other must be comparable—they must portray distinctly different futures, yet have certain basic characteristics in common. There are, of course, situations in which there is no need to make scenarios comparable. This is obviously true in any project that produces a single scenario, e.g. a scenario of a predicted future or a scenario of an envisioned, desired future. Such scenarios “stand on their own” and are not intended to be comparable. In addition, a project team may intentionally generate multiple scenarios that cannot be compared with each other. These non-comparable scenarios may be set at the same time in the future and within the same country, but all other aspects differ, possibly even the sectors considered. Such scenarios are typically created to stimulate thought and encourage debate about the future, which is a valid purpose. Most often, however, comparable scenarios are more useful because they provide information that is directly applicable to policy-making and planning.

A series of almost identical scenarios is certain to be both boring and non-instructive, so good comparable scenarios are markedly different from each other. Each presents a vivid comprehensive image of a particular future that is easy to distinguish from the others with which it will be compared. It is because of these powerful images that scenarios often end up with evocative names such as doomsday, collapse, stormy weather, bright future, renewal, the caring society, high-tech, prosperity, solidarity, and green and clean.

Although comparable scenarios should be different from one another, they also must have certain things in common. To begin with, they should be of the same geopolitical scope. If two scenarios are set in different countries or regions, they are not comparable—unless they are being used to contrast the futures of those two areas. This type of comparison is uncommon because it normally provides only limited information that will be useful in policy-making and planning. For example, researchers in Thailand will find it more useful to compare several scenarios about their own country, rather than comparing their national health future with that of Argentina, Italy, and Kenya. It is also impossible to compare scenarios focused at different geopolitical levels. A scenario of a global future, one looking at the national future, and one specifically about the future of a city may together form an interesting composite picture, but they are not comparable.
Similarly, comparable scenarios must have the same time perspective. A scenario set 15 years in the future and one set 50 years in the future cannot be compared. It should be noted, however, that scenarios set at different times may constitute a series tracing the potential or desired evolution of a system.

Sectoral coverage must be the same for scenarios to be comparable. Scenarios about the economic sector, the demographic situation, and politics are not comparable. Even the particular system and issue within a sector must be the same. A scenario about human resources development, one about equity in health-care services, and one about epidemiological trends are not comparable, even though they are all concerned with the health sector.

In addition, comparable scenarios must deal with the same elements. The elements of a scenario include indicators or measures, key causal variables, and relevant actors within the system being considered. Other elements, in the same categories, may be drawn from sectors influencing that system and from sectors being influenced by it. Elements in a health scenario might thus include indicators such as life expectancy, morbidity, mortality, demand for health care, availability of health care, socioeconomic and environmental conditions affecting health, decision-makers controlling policies affecting health, and so forth. Potential elements in a health-care scenario would include human resources, hospitals, financing, management structures, health authorities, private and public deliverers of health-care services, and so on.

Comparable scenarios must contain the same elements. A health-futures scenario that contains such elements as health financing schemes, the development of human resources for health, and primary-secondary-tertiary mix of services is not comparable with one in which the elements are the pharmaceutical situation, the geographical distribution of medical specialists, and the structure and function of the ministry of health.

Constructing comparable scenarios so that they contain the same elements is not difficult; it simply requires the listing of the elements to include and then making sure that all the scenarios that are intended to be comparable do in fact include a description of these elements.

Finally, comparable scenarios must be based on identical background situations. Consider a team that wants specifically to analyse the consequences of possible differences in policies and programmes. Their project will involve constructing scenarios based on those possibilities. For these scenarios to be comparable, the key aspects of the future other than the policies must be the same. There will be no logical basis for comparison if the scenario based on policy 1 also assumes peace, a healthy economy, and rapid technological advances, while the scenario based on policy 2 also assumes war, a collapsed economy, and no technological developments. Some teams avoid this problem by building a reference scenario describing the general
assumed situation. Alternative scenarios are then constructed by adding various sets of assumptions to this base.

To summarize, if scenarios are to be comparable, they must meet the following criteria:

- They must be markedly different from one another, providing vividly contrasting images of the future.
- They must describe the future state of the same country or other geopolitical unit; in other words, they must have the same scope.
- They must have the same time perspective, i.e. they must be set at the same time in the future.
- They must focus on the same sector and the same system or issue.
- They must include the same elements.
- They must be based on the same background assumptions about the future; the assumed future must be identical, apart from the assumptions expressed in the frames that make the scenarios different from each other.

Products of the component

Once the scenarios have been created, they must be put into forms in which they can be transmitted. These are the products of the component. Many different forms are possible, and the one that is most appropriate will depend on the purpose and objectives of the work and the nature of the intended audience.

Fairly straightforward descriptive text is possibly the most common form and can be adapted to various audiences, e.g. official reports for policy-makers, popularized versions for the public, and textbooks for use in schools. Scenarios can also be transformed into future history, fictional interviews, case-studies, science fiction, plays, or short stories, published as paperback books, or serialized in newspapers and magazines. Scenarios aimed at policy-makers and academic audiences may include statistics, graphs, and tables; others may be enhanced with photographs and art work. Scenarios can also be communicated via poetry, music, maps, videos, multimedia presentations, and television and radio shows.

4.2.8 Evaluating the scenarios

Teams go through the process of evaluating scenarios twice—once during their creation and then again during this component. The first process, which is referred to in this handbook as the testing of scenarios, involves making judgements about the validity, applicability, and comparability of the draft
scenarios. The second process, here called evaluation, consists of comparing the completed scenarios in terms of their desirability or probability (depending on the project) and identifying their implications, particularly for policy-making, planning, and programmes.

How the evaluation component is handled will depend on the type of scenarios constructed and the intended application of the project results:

- If a number of probable scenarios have been created, this component might involve identifying the most desirable of these scenarios and then determining the policies and actions required to facilitate its achievement.
- If a single scenario of a desired future has been constructed, this component could be focused on estimating its feasibility, defining a strategy for its achievement, or determining how much it would cost to achieve.
- If a single scenario of a dystopian, negative future has been created, this component could be aimed at identifying key points where different decisions could prevent the scenario from becoming a reality.
- If several wild-card scenarios have been generated, the component might include an analysis of what steps could be taken to prepare for the threats and opportunities the imagined scenarios would bring.
- If scenarios have been created on the basis of different policies, these could be evaluated in terms of selected criteria or objectives such as political feasibility, economic impact, social justice, and the effect on different stake-holder groups.

Thus if a "most likely future" scenario of national health has been constructed during a health-futures project, the evaluation component would probably focus on the implications of that future for health policy-making and planning. What can the ministry of health, other government agencies, other actors in the health sector, and society at large do to prepare for, and respond to, expected trends and events affecting health?

If the project has involved the construction of several scenarios of possible health futures, questions of the same sort can be asked—what are the implications of these scenarios and how can we prepare for each of them? In some cases preparations may already have been made for handling the most likely of the possible futures. The evaluation component can help in determining what must be done to prepare for futures that are less likely yet still possible.

Another approach that can be used with multiple possible health scenarios is to evaluate them according to their desirability. In effect, the team says, "All these health (or health-care) futures could come into being. Which of them is the most desirable, and what needs to be done to ensure that it—and not some other possible future—actually happens?" Sometimes the
"best" scenario will be best for everyone, but different futures will often be preferred by various stake-holders, including the general public, physicians, other health-care personnel, hospitals, health insurance companies, and so forth. Answering this question may therefore require each scenario to be examined in terms of how well it meets specific criteria and how well it supports the objectives of specific stake-holder groups.

If the project has generated several different wild-card scenarios in health, all of them involving major threats to public health, the focus of the evaluation component will probably be on determining an overall strategy for emergency preparedness, practical steps that can be taken to improve the handling of the health crises portrayed in the scenarios, and measures that could be taken to reduce the negative impacts of the scenarios or even to prevent them from becoming a reality.

A vision, a scenario of a desired health future, will require a different approach. The emphasis will be on determining how the scenario can be achieved. This may involve the process of backcasting, already mentioned, in which a team moves backwards from the future into the present, identifying key points at which decisions must be made or actions taken to ensure the vision's fulfilment. Likewise, if a single scenario of a dystopian, negative future has been created (perhaps even as the most likely future), evaluation could be aimed at identifying key points where different choices could prevent it from being realized.

If a national futures study on health has produced several alternative scenarios based on different policies, the evaluation process might involve questions such as: “Which scenario results in the greatest health gains?" "Which results in the most equitable distribution of these health gains?" "Which provides the most cost-effective health care?" “Which provides the most accessible and equitable health care?” “Which allows maximum involvement of the public in the shaping of health?” “Which scenario places the government in the best position for performing essential public health functions and responding to health-care needs?"

In doing the evaluation component, teams should be careful to avoid inappropriate questions. Perhaps the most common error is to judge scenarios using criteria that have already been built into them through the assumption sets used to frame them. Desirable and undesirable scenarios should not be judged by their desirability, since their level of desirability has already been determined by the chosen assumption sets. For example, the desirability of a vision—a scenario of a desired future—is inherent in the basic assumption on which it was constructed, namely, “If the future is as we desire it to be...” Since the scenario is already defined as being desirable, there is no point in judging its desirability. (This does not apply if the scenario is constructed by one group and then submitted to another, such as
a group of stakeholders, for their opinion and feedback.) Likewise, scenarios of different probability should not be compared to determine their respective probabilities, since these will already have been defined during the framing process, but they can be judged in terms of their desirability.

In less structured futures activities, such as quick exercises that last only a day or process-oriented projects at the community or institutional level, the product of the evaluation component may simply be a list of things to do next or a short internal memorandum on the same topic. In formal studies, the work done during this component should be recorded and summarized in a document that can be included as a chapter in the final project report.

The evaluation component often involves techniques such as cost-benefit analysis and risk analysis. Also useful are techniques that weigh choices in terms of multiple criteria and multiple objectives. Groups will sometimes want to make use of whatever procedures and methods their institution normally uses for defining strategies and drafting action plans. Optimization modelling (see p. 174), which determines the "best" way to reach a particular goal, can also be used. All these decision-making tools can be used by the study group itself or turned over to outside experts, who carry out the process using a Delphi questionnaire or at a Delphi conference (see section 6.2.4). Information on a variety of tools and methods relevant to this component is given in Chapter 6.

4.2.9 Applying the results

After the scenario or scenarios have been created and their implications identified, the results of the work can finally be applied. In effect, the application component is the achievement of the specific objectives laid down in the terms of reference. As with every other component, what this involves will depend on the particular project. If the terms of reference state that the objective is to provide a range of probable scenarios that can be used in the formulation of a new national health plan, the application component will comprise any activity through which the results are used in that process.

In national projects carried out by government agencies, the previous component may have generated a strategy for achieving a particular future, a practical action plan, and/or specific recommendations regarding policies, programmes, and legislation. The application component will then consist of activities directed towards ensuring that the strategy is adopted, the action plan is carried out, and the recommendations are followed. In futures projects addressing the future of institutions, the application component will be similar, but focused on institutional strategies and plans rather than national ones.
The preparation, publication, and distribution of a project report often form a major part of the application component, as may other means of communicating the results of the project to the target audience. If the scenarios have been created as future history, stories, or art work, these can also be published. Meetings, seminars, and conferences can be held to present the scenarios and their implications, articles can be written for the professional and popular press, and television and radio coverage can be arranged. The scenarios and the project conclusions can be distributed using Internet functions such as bulletin boards, gopher sites (see section 8.3.2), and World Wide Web (WWW) home pages (see section 8.3.5).

Attention must be given to the intended application from the time that the project begins. No matter how exciting the scenarios and how cleverly they are expressed, decision-makers and stake-holders are unlikely to take them seriously unless they have been involved in their creation in some way. Various ways in which the participatory base of a project can be broadened—thus increasing the chances of successful application—are discussed in section 3.2.2 and outlined in Box 6 (see p. 61).

4.2.10 Questions frequently asked about components and scenarios

Answers to a number of questions frequently asked about components and scenarios are given in Box 8.

Box 8. Questions frequently asked about project components and scenarios

- Do we need to use all the components? Do we need to build scenarios? In some projects it is more appropriate to use only a few components or even just one, e.g. if the purpose and objectives of the work can be fulfilled without scenarios being constructed or if time and resources are too limited to allow scenario construction.

- How many and what kind of scenarios shall we build? If the purpose is prediction, a single "most likely future" scenario can be built. If the purpose is forecasting, several scenarios of different probability are appropriate. If the purpose is to increase foresight, a variety of scenarios will be needed, including some that are of low probability but high impact. If the purpose is to test options, one scenario should be built for each option considered. If the purpose is envisioning, one scenario of a common desired future can be built, or several scenarios can be created to reflect different desired futures.

- If we are building more than one scenario, should they be comparable? This will depend on the purpose, the planned evaluation, and the intended application. In general, scenarios should be comparable when scenarios of different probability are created as forecasts and will be used as direct inputs into policy-making and planning; scenarios
are built to reflect alternative options and will be used in the selection of one option; several scenarios of desired futures are built and will be weighed against each other. On the other hand, scenarios need not be comparable if they are designed to strengthen foresight by presenting stimulating images of very different futures, to encourage discussion of the futures, or to increase preparedness for unique events.

• How shall we choose the elements to include in the scenarios? The elements described in the scenarios usually include key output variables, key actors, etc. Selection of elements is largely subjective. Most groups select what they think are the most important aspects of a system, but others may concentrate on those that are controversial, interesting, or can be influenced by policy. Some narrowing down occurs when the terms of reference are drafted ("In this project, health-care scenarios will be built that describe human resources, health-care facilities, essential drugs, etc."). Groups will probably identify some elements when they go through the process of clarifying issues, and yet others as they collect information, describe the past and present, and analyse the system.

• How do we choose frames for scenarios? An infinite number of possible frames exist, and there is no set formula for choosing between them. The most important rule of thumb is that the frames used should result in scenarios that fulfil the purpose of the project. Thus if the purpose is envisioning, the frame should consist of desired events and trends, rather than high-probability ones. If the purpose is to encourage foresight, the frames should be interesting combinations of possible events, not all of them necessarily likely. If the purpose is forecasting, each frame will need to include events of similar probability or a combination having a certain judged probability. If the purpose is prediction, the frame should consist of the "most likely" future trends and events as judged by experts and/or identified during the "imagining future trends and events" components.

4.3 Putting the pieces together: an example of a project design

The components that often enter into a futures project have been described in previous sections. They have been presented as a linear sequence, but only a small percentage of futures activities follow such a sequence. It is much more common for the design to omit certain components, emphasize others, and even include loops in which several components are repeated. More than 30 different designs are outlined in Chapter 5, and these are by no means the only possible ones. A project will be described in more detail here to illustrate one way in which components can be combined in a design. This is shown in Fig. 2, but it is again emphasized that it is just one example of the many ways that a group might put components together, depending on their
Figure 2. Example of a project design

1. Application of the results in policy-making and planning
2. Evaluation of the scenarios
3. Filling in the scenarios
4. Framing the scenarios
5. Imagining future trends and events
   - Analysing the system
     - Acquiring information
     - Describing past and present
6. Clarifying the issues
7. Written evaluation of how well the various alternative scenarios measure up to selected criteria
8. Alternative scenarios based on different policy options
9. Reference scenario
10. List of sets of future events likely to occur together (one of these sets used as background assumptions for reference scenario)
11. Description of the system, including relationships of key variables, actors and their strategies, etc.
12. List of the key issues to be addressed in the project
purpose and objectives, the subject being addressed, and the circumstances under which the work is carried out.

The hypothetical project takes place in a country where there is concern about trends and possible developments regarding pharmaceutical products and essential drugs. The topic has become one of major importance within public health circles, and top officials of the ministry of health decide that the time has come to re-examine national policies in this area. The ministry appoints a steering committee to organize and oversee the project. The coordinator of the national programme on essential drugs is one of the members, as is the chairman of the pharmacology department of the country's leading school of public health, and the head of a nongovernmental organization concerned with pharmaceutical issues such as the effectiveness, safety and pricing of drugs, and equitable access to them. The committee drafts terms of reference for the activity, including its purpose, which is to test different policy options regarding pharmaceuticals.

The committee then selects a task force to carry out the work. Since many of the task force members work for the national health policy and planning bureau, that bureau is designated as the secretariat for the project. Other task force members come from other parts of the ministry, including the food and drugs division, from other government agencies, and from university departments.

The steering committee and the task force meet several times during the early stages of the project. During the first meeting, the purpose is discussed in detail to ensure that it is understood by all the task force members. Two joint working sessions are then held to draft a project design. At the fourth meeting, the steering committee and the task force work together on clarifying the issues. Their discussion leads to a decision about the topics to be addressed. Among these are drug resistance arising from the overuse of antibiotics, the excessive prescription of pharmaceutical products by physicians owning shares in pharmaceutical companies, the illegal over-the-counter availability of certain prescription drugs, the impact of advertising by international pharmaceutical companies, the distribution of essential drugs in different parts of the country, the scarcity and cost of certain essential drugs, problems arising from the use of syringes and the need for alternative means of administering medications, potential breakthroughs in pharmaceuticals that would be relevant to the national situation, the efficacy and potential of traditional medicines, and so on.

The task force now begins working on three components simultaneously, namely, the acquisition of information, the analysis of the system, and the description of the present and past situation. Members identify all the relevant literature with which they are already familiar, and copies of these books and documents are assembled to form a reference collection for the
project, which is kept at the secretariat. This collection is used constantly to provide answers to questions that arise during the analysis of the system. For example, when key variables are being identified, an initial list is generated by means of brainstorming (see section 6.2.5). The members of the task force then scan the list to see whether any variables have been omitted that should be included in it. Likewise, as key actors are identified and analysed, much of the needed information comes from the collection. It is decided that, as part of the analysis, a system-dynamics model (see p. 170) of the system will be constructed to simulate the use of pharmaceuticals in the country and factors contributing to that use, including availability, distribution, price, advertising, financial interests, and so on. This model does not deal with every question being addressed in the project. It does not, for example, consider the problem of drug resistance arising from the overuse of antibiotics. The task force decides—quite correctly—that this and various other issues not included in the model can be analysed separately, as long the various parts of the analysis are consistent with one another.

Analysing the system naturally requires looking at the historical and current trends of key variables and the past and present behaviour of actors. Questions arise about how the availability of essential drugs has changed over time and what trends in causal factors have influenced those changes. Likewise, the task force will certainly ask how and why the behaviour of the key actors has varied over the years. As a consequence, the analytical process results not only in an overall picture of the system, but also in an understanding of that system’s historical and current status.

At the same time, both carrying out the analytical component and describing the past and present raises questions that cannot be answered by the materials in the collection. The task force realizes, for example, that they need more information about the current strategies of the international pharmaceutical companies. With the help of a librarian, they identify some new books and articles on this topic. Copies of these recent publications are obtained, used in the analysis, and added to the collection. The task force finds answers to other questions by posting queries on an Internet bulletin board and sending them to various colleagues by mail or e-mail. Yet other kinds of information are obtained by carrying out in-depth interviews with a small group of selected experts. So, as the analysis proceeds and the picture of the past and present situation is constructed, the information collection naturally grows.

A short report is now sent by the task force to the steering committee, outlining the results of the work to date. One section of the report is a list summarizing the information resources that have been assembled, including publications and databases, plus the activities that have been carried out in order to obtain specific information (e.g. interviews). Another section de-
scribes the national history and current situation regarding pharmaceuticals. The final section is an outline of the system, as determined by the model and other analytical work. This outline indicates the key variables, the primary linkages among them, as well as the key actors and their strategies.

Following feedback from the steering committee, the task force moves on to the next component in their design, namely, imagining future trends and events. This component is carried out in two steps. The task force begins by generating their own list of future trends and events by doing their own brainstorming and by scanning the literature and popular media for emerging phenomena. Materials already in the information collection are used in this process, and new resources are also identified and added to it.

As a second step, the task force invites the input of outside experts. Experts who are potential participants are contacted, and those who agree to take part are sent a background paper describing the conclusions of the task force to date. The experts are then brought together for a 2-day working session. During the first day they use brainstorming (see section 6.2.5) and structural analysis (see section 6.2.14) to generate their own list of possible future trends and events affecting the pharmaceutical situation in the country. This list is combined with that of the task force. The experts then record their individual judgements about the probability of each trend or event occurring.

On the second day, the experts are given a new and shorter list indicating which trends and events the group as a whole considered most likely to occur. They then apply a matrix-based technique called cross-impact analysis (see section 6.2.24) to this list so as to evaluate the impact that each event would have on the occurrence of another event in the list. This process identifies clusters of events that are considered likely to occur together.

The task force is now ready to frame and fill in the scenarios. They select one of the event clusters as their basic assumptions about the future and build a reference scenario describing the likely future of the country with regard to pharmaceuticals. In doing so, they make use of the computer model that they created earlier. By adding to this model the selected assumptions about the future, they can simulate the behaviour of the system under these conditions. This in itself is not sufficient to create the scenario, however. The task force also spends a great deal of time discussing how the events shown in the model would translate into real life conditions.

The reference scenario is written up with supporting graphics and submitted to the steering committee, which then provides feedback in the form of three alternative policies about pharmaceuticals that they can imagine being adopted by the government in coming years. Each of the policies is comprehensive, covering matters such as testing, pricing, regulation, and so
forth. Based on these three policies, the task force frames and fills in three more scenarios, all assuming the reference scenario but each being modified to reflect the future if one particular pharmaceutical policy is adopted. During this construction process, drafts of the scenarios are constantly tested to make sure that they are applicable, valid, and comparable.

Once the scenarios are completed and have been put into the form of written text and graphs, they are submitted to the steering committee. The steering committee joins up with the task force in the evaluation component, in which questions such as which policy best guarantees a regular supply of essential drugs, which policy results in the lowest prices for these drugs, which policy prevents overprescription and overuse of prescription drugs, and so forth, are posed.

The product of the evaluation is a final report, drawing on all the previous components and presenting the evaluation results. This is submitted to the ministry of health for internal use in their reconsideration of pharmaceutical policies. The ministry also forwards the report to legislative committees responsible for drug-related issues, institutions doing research on pharmaceuticals, pharmaceutical companies, and other stakeholders. Both the task force and the steering committee work to call wider attention to the project results. Central to this process is a national conference organized by the ministry and other agencies to present and discuss the results and their implications for policy-making and planning regarding pharmaceutical products and essential drugs.

References


CHAPTER 5

Alternative designs

5.1 How designs can vary

Components common in futures work were described in the previous chapter and were presented in a particular order or design. As already noted, this design is by no means the only possible one. In fact, the designs of all futures projects will differ from one another in the following three characteristics:

- The components included.
- The emphasis given to each.
- The order in which they are carried out.

It is only to be expected that project designs will differ from one another. If attention is focused on future events that have no history, gathering background information will not take much time, but if the focus is on causal variables for which databases exist and past trends are considered important, collecting such information can be a major task. If the goal is to generate an accurate prediction, the work will demand careful analysis and projection, but if the question is what future is hoped for, rather than what future is expected, only limited analysis will be required before a scenario is built. However, an analytical component might be carried out after the scenario is built, to determine how the desired future can be achieved.

Design differences are a major reason why some futures exercises take a short time, sometimes just a day or two, while others require a month, a year, or even longer. Obviously, a rapid run through a few components can be completed much more quickly than a comprehensive treatment of all possible components.

In the following pages, numerous examples of alternative designs are outlined, some hypothetical, but most adapted from actual futures projects, including some at the national level (1). They have been chosen to illustrate the diversity of possible designs suitable for different types of projects and to make several essential points about design, namely:

- Designs can range from exercises based on a single component to full-scale studies involving all components.
Projects may incorporate the same components but those components may be arranged in different designs.

Projects may have the same components arranged in the same basic design and yet be dissimilar because different components are given major emphasis.

Projects may have the same design and yet differ in the relative importance of products and processes.

Projects may have identical purposes (e.g. envisioning) and yet have markedly different designs.

The designs given here are by no means the only possibilities. Each team should feel free to create their own on the basis of the available personnel, financial resources, and information base, the timetable for the project, and its purpose and objectives.

5.2 Exercises with only a few components

Simple exercises involving only one or two components may be the commonest type of futures work. These are generally activities that can be carried out in an extremely short time as part of regular staff work. Matters such as legal establishment and organizational structure may then be irrelevant, and products are likely to be for in-house use only. However, these activities may sometimes require more time and may even become ongoing, as some of the examples below illustrate.

5.2.1 Building an information base for futures work

An organization that is seriously considering using futures exercises regularly may decide to concentrate first on the information collection component and build a strong information base for later work. The information collected will naturally focus on the sector or sectors of interest to the organization, and information about both variables and actors will be relevant. Possible items include quantitative and qualitative information, computerized data, bibliographical materials (printed and in other storage forms such as CD-ROMs), survey results, reports and other primary literature on the topic of interest, and so forth. The most likely product of the activity is a collection of different kinds of information that can be used in futures projects undertaken by the organization.

5.2.2 Developing a model of the system

The analytical component can be an exercise in itself, again often as preliminary work for later projects. Any appropriate set of methods and tools can be
used. The product is a model of the system or sector, a representation of how the variables are related, in the form of a diagram, mathematical equations, or a computerized model. If the situation allows, a computer model may be the most useful choice, especially one that allows the generation of scenarios based on different conditions. Such a model can then be used in a wide range of projects.

5.2.3 Scanning for relevant emerging trends

The identification of future events and trends can easily be treated as a separate exercise. The work can be done quickly or on an ongoing basis. In a quick scan, members of the organization look through information sources such as academic journals and the popular press in search of articles about new and emerging issues and phenomena. These may either be within the primary sector of interest or have the potential to affect that sector. After a certain time has elapsed or a certain number of sources have been scanned, the results are summarized. The product is usually a list of factors that might affect and complicate the organization's plans in some way. This list may be considered in planning and policy-making, or used to identify issues that should be the subject of more comprehensive futures projects, or in the building of quick scenarios (see section 5.2.6 below).

5.2.4 Using experts to get a picture of the future

Outside experts can also be used to identify future trends and events. This can be done either by using small-group processes at a meeting or conference or through a Delphi (see section 6.2.4) carried out by post or by electronic mail and other forms of electronic network communication. The participants may be asked to identify trends and events that they expect within the sector and/or those external to the sector but affecting it. The product and its possible applications are the same as in section 5.2.3 above.

5.2.5 Identifying potential future roles for actors

That part of the analysis component that deals with actors and the component on future trends and events can be combined into an exercise about the future roles of actors. The work begins by determining who the key actors are in the system, analysing their relationships, and clarifying their current roles. New trends and events that could affect the sector are then identified, and consideration given to how the actors might respond, including old roles that they might drop and new ones that they might assume. Such an exercise
can be used within an organization to anticipate competition and conflicts with other actors and also to foresee new roles and opportunities. In the public sector, an exercise of this sort can provide an early warning about possible problems that might arise in the performance of essential functions.

5.2.6 Building quick scenarios to improve awareness

Simple exercises may involve only the framing and filling in of scenarios. The frame, the “if” statements, can be preselected or chosen by the participants. In either case, the frames are determined using a $2 \times 2$ matrix, in which each axis represents the extreme end-states of a trend or the two alternative decisions that can be made about some policy issue (see section 4.2.4). The group discusses the scenarios that they think would develop within the four frames, and the product consists of four brief written scenarios. The process can then be repeated using another matrix based on other trends or decisions.

If the parameters represented in the matrices are ones that the decision-makers accept as being of key importance, the results may be applied in planning and policy-making. However, quick scenarios of this sort are usually constructed to encourage futures thinking within an organization.

5.2.7 Evaluating scenarios to rehearse the future

The evaluation of a scenario in order to determine its implications can be a separate exercise. The scenario that is evaluated may already exist in some form or may be specially generated for the activity, when those carrying out the exercise can simply select the frame, fill in the scenario and present it as a short written description of some future, which may be desired or undesired, likely or unlikely.

The participants then discuss and decide how the organization, institution, or community could best respond to the situation depicted in the scenario. The activity is, in effect, a rehearsal of the future. If the decision-makers take the exercise seriously, it can lead to a decision about how certain situations will be handled if they do in fact arise at some future time.

5.3 Streamlined and compressed designs

Much of futures work cannot be categorized as either a simple exercise or a complex study. Between these extremes lie many other possible designs, some of which involve many but not all components, and some include all components in condensed form.
5.3.1 Carrying out a QUEST

QUEST (quick environmental scanning technique) was developed in the early 1980s as a simple rapid method of identifying and exploring strategic alternatives (2). A QUEST exercise leads to a broad analysis of the external environment and a rough assessment of the organization's or agency's options for handling that environment. The exercise also highlights areas that could benefit from greater attention to planning. The method is inexpensive and simple to implement because it relies on information already available to the participants.

The process begins with the recognition of some potentially critical problem. Four steps are then taken, including two working sessions, and the entire exercise can easily be completed within a month. The first step is preparatory and involves precisely defining the issue to be analysed, choosing the participants (usually 12-15 people), and selecting dates and locations for the working sessions. These are usually held away from the normal workplace to avoid distractions. In addition, the first step covers the component of identifying and collecting information, but this is limited to readily available information, which is assembled in a notebook for the use of the participants.

The second step is a working session that lasts a day. Its aim is to encourage the participants to think about the "environment" of the organization or institution in the broadest possible terms. The mission and objectives of the organization are discussed, and key stakeholders and other key actors are identified, as well as their priorities. After this initial discussion, the participants go on to list the changes that could have a significant impact on some aspect of the organization's environment, including both individual events and shifts in trends. The emphasis is on thinking comprehensively and imagining a broad range of possible changes, even if they are unlikely. Brainstorming guidelines apply—no evaluation or discussion of implications is allowed while the ideas are being generated. Once this is completed, the participants consider the likelihood and magnitude of the imagined changes, their impacts on each other, and the effect that they could have on the organization's strategic position.

The third step is a written report summarizing the results of the working session. This includes both the assessment made in the early discussions plus the various scenarios describing different environments that the organization might have to face during the period being considered. The ideas should be presented as the group's conclusions, rather than attributed to individual participants. The report is given to the participants, and time allowed for them to read it and respond.
The final step is a second working session, normally lasting half a day, to identify strategic options. Possibilities are proposed and evaluated by the participants, the criteria being how appropriate each is in terms of the institution's weaknesses and strengths and how well it responds to possible changes in the external environment.

QUEST is not meant to be used as a basis for major policy changes, but rather as the initial phase in the review of an organization's or institution's strategy, which can be used to help people think longer term and to encourage them to give adequate consideration to possible changes in the organization's environment. A QUEST should therefore end with a set of assignments to the participants in preparation for the next phase of the review. These are typically in-depth evaluations of the most important strategic options identified during the exercise.

5.3.2 Other condensed exercises based on working sessions

QUEST is just one example of how a futures project can be condensed into an exercise involving just a few working sessions. Many other variations are possible. Condensed exercises do not have to generate macroenvironmental scenarios, nor must they necessarily identify strategic alternatives. They can result in any kind of scenario and be carried out for any purpose.

In addition, condensed exercises may differ from a QUEST in how much information is collected before the working session, what level of detail is sought in the analysis of the system and its variables, the degree of attention paid to key actors, the emphasis placed on the external environment, and the time devoted to identifying possible changes and their impacts on each other.

For example, a condensed exercise may be designed so that most of the standard components are run through rapidly at the beginning of the first session, simple matrix tools being used to identify key variables and select assumptions sets for the frames (see section 4.2.3). Once the frames are established, most of the working time is then devoted to the process of creating the scenarios.

Alternatively, the time can be divided up so that each component is given about the same attention. Yet another possibility is that the participants contribute their own written scenarios well in advance of the first session, after which a small group sorts and analyses them, and selects several for consideration. These are presented in a session where the participants concentrate on evaluating the scenarios in terms of their implications for the organization and on drafting appropriate strategies or action plans based on that evaluation.
Because they do not allow sufficient time for in-depth analysis, condensed exercises are seldom directly applicable to policy-making and planning. They are generally used instead to identify issues or possibilities that deserve more detailed examination or to add a futures perspective to an ongoing process. However, if an exercise has been sharply focused on an extremely limited theme, if the work has been adequately prepared, and if the exercise itself has been carried out with great care, the outcome may be considered by decision-makers as sufficient grounds for adjusting policies or plans.

5.3.3 Imagining better futures with visioning sessions

Visioning sessions are often used in futures exercises to create a scenario of a desired future (3-5). They are normally done as a group activity with a facilitator. The general nature of the vision is first defined—a healthy community in 2010, the ideal corporation in 20 years time, the desired agency 15 years in the future, a country in which people would like to live in 2020, and so on. If the group has never done visioning before, the facilitator may provide a brief introduction to the concept, but the facilitator's own vision must not be expressed during this presentation. On the other hand, it may help if some of the participants give an account of something that they have experienced that represents their vision. Examples must be positive and personal. A dozen or so items that meet these criteria can be written down somewhere where everyone can see them to help them to understand the kind of events, ideas, and images that go into a vision.

Often the next step is for the facilitator to take the whole group through what is called a guided imagery exercise (see section 6.2.25), which takes about a quarter of an hour.

The participants then divide into small groups of 6–8 people, each of which is provided with a blank flipchart and its own facilitator. The facilitator asks the group members in turn to read items from their lists. Several rounds will establish the core themes in the shared vision. The group then does a composite drawing of that vision, again taking turns, each member adding something to the picture during each round. Symbols may be used, but words should not be avoided. After 20 minutes, the group members check their lists for missing ideas, and add them to the drawing. Participants will probably need reassurance that the important thing is to get their ideas transformed into images on paper, not to produce a picture of professional quality. The participants reconvene and all the groups present and explain their drawings. As they do so, the ideas expressed by the pictures are written on flipchart sheets.
After all the presentations have been completed, the notes on the sheets can be grouped under major common themes, which then become the basis for further action. If the visioning session has been about, e.g. a future healthy community, the themes would probably include characteristics such as a clean and green neighbourhood environment, opportunities for healthy recreation, mechanisms for preventing and defusing hostility and violence, and so forth. The next step would be to decide what actions can be taken to promote each of these characteristics in the community.

5.3.4 Building a foundation

A project of this sort is done to lay a foundation for other futures projects. The focus is on the initial components leading up to the framing of scenarios, and no scenarios are constructed. Instead, the group doing the work clarifies the issues, identifies and assembles information, analyses the system, traces the historical trends and describes the current situation, and considers future trends and events. The amount of time devoted to the activity, the tools used, and the form of the products generated will depend on the specific circumstances and the intentions of the group. In every case, the result of the work is a report that summarizes the findings of the group and that can be used in subsequent futures projects. Products such as databases and computer models may also sometimes be generated.

5.3.5 Creating a compendium of existing futures works

This project involves gathering together existing reports and publications regarding the sector of interest, including official reports, academic papers, and, in some cases, more popular publications. Selected sections of multisectoral futures studies may also be relevant. When these are put together to form a compendium, they provide a composite picture of how the sector is currently seen—its current status, the role of various actors, expected trends, imagined future events, and alternative scenarios, including those that are considered to be probable, improbable, desirable, and undesirable. This composite picture can be used as the foundation for other futures projects. For example, an already created vision of a desired future may be selected for a project in which the technique called backcasting (see p. 123) is employed to determine how the future can be achieved. Other information in the compendium, e.g. about key actors and their priorities, can be used for this purpose.

Putting together a compendium has other uses, e.g. it can clarify where there are conflicts between images of the future. If one key institutional actor is expecting a particular future to develop, but the other actors are working
on another assumption, the question naturally arises as to the causes underlying this difference in expectations. A compendium can also draw attention to those aspects of the sectoral future that have not yet been considered and are potential topics for a futures exercise.

5.4 Reiterative designs

In some designs, the team goes through the components several times, rather than just once. Such designs are generally chosen in order to provide “practice runs” for the team before they carry out a complete project or in order to facilitate the integration of information, but they can also be used in other ways. Some examples of reiterative designs are given below.

5.4.1 A multiple-loop design

In this design, the project is done in several loops, normally three. During each loop, the team carrying out the project goes through all the chosen components. The first loop is completed very quickly, using no more than 10% of the total time allotted for the project and following a highly compressed form of the design being considered for the final loop. In other words, the first loop is a “dry run” that gets the work started and gives the team some practice in working with the various components. The result is a rough draft report, perhaps just a memorandum of a few pages, that is given to the sponsoring bodies with a request for feedback. The design is then revised to take account of the lessons learned during the first loop and the advice received from sponsors and advisers.

The team then does a slower and more detailed second loop, which takes up about 20–30% of the project time, and in which greater consideration is given to details such as possible tools. At the end of the loop, another report is prepared, and feedback is invited once again. Finally, the team produces its third and last design and carries out the third loop. The final products are then distributed to the sponsoring institutions for application.

5.4.2 Using a series of futures projects to help to integrate policy-making and planning

The purpose of the work is to provide an ongoing process for linking decision-making in a set of connected sectors or subsectors, in order to promote communication and consistency. The process involves the execution of extremely brief but regular futures-oriented exercises. The first exercise is focused on a subsector that is considered highly predictable. The design includes the standard components, but in very abbreviated form. The
result is a set of feasible scenarios, which are described in a short report distributed within the sponsoring institution. This product is also fed into the next exercise, which looks at the future of another subsector closely related to the first. This exercise also yields a report, which provides input into a third exercise, and so on.

5.4.3 Generating reference and alternative scenarios

In this project, the team first goes through all the components, focusing on a "most likely" future. The assumptions might include a continuation of certain trends, adjusted to take into consideration interactions between them plus the impact of highly probable future events. The resulting scenario is called a reference scenario (or a baseline scenario in some schemes). This initial scenario is not evaluated or applied.

The team now goes back to the framing component and selects a new set of assumptions about future events. The resulting frame is "if things are developing as in the reference scenario but events X and Y occur, then..." The team then creates an alternative scenario within this frame. After it is completed, they return once again to the framing component and select another set of assumptions, producing a frame such as "if things are developing as in the reference scenario but events A and B occur, then..." This frame, too, is used to create an alternative scenario.

The team goes through this process as many times as are required to generate the scenarios needed to fulfill the project's purpose. They then go through an evaluation component in which all the alternative scenarios that have been created are considered in the light of chosen criteria, such as desirability, feasibility, implications for policy-making, and so forth. Finally, the team carries out whatever application is appropriate.

5.4.4 Shifting the focus

It is sometimes necessary for a series of scenarios to be created that are linked together and yet differ in focus. A team might choose to begin by creating a single scenario of a "most likely" future in the macroenvironment, i.e. in those areas that surround the sector of interest and have a major impact on it. A macroenvironmental scenario for the health sector would probably take account of socioeconomic development, demographic trends, environmental changes, technological advances, political situations, and so forth.

After this scenario has been created, the team shifts focus to the specific sector and forecasts several probable scenarios, all of which are based on the assumption that the macroenvironment is as depicted in the first scenario. Finally, focus is shifted to the institutional level. Using each of the probable
scenarios, the team creates alternative scenarios for their own institution based on different strategies. The end result is a series of related pictures of the macroenvironmental future, the sectoral future, and the institutional future.

5.4.5 Exercises fulfilling many purposes

A series of exercises can be carried out for different purposes. For example, a team might create a scenario of an expected future, then forecast several other probable ones, then generate some wild cards, and finally create visions of desired futures. In each step, the group adopts a design suitable to the purpose at hand.

This approach, which is generally only used in major studies and ongoing programmes, requires a great deal of work. Its great advantage is that its multiple perspectives provide a fully comprehensive picture of the future and allow comparison between, for example, the expected future (which is probably planned for in some way) and wild-card futures (which may not be planned for at all). Likewise, a series of this sort can highlight the gap between futures that are currently probable and those that are desired and could be worked towards.

5.5 Alternative designs for fully fledged projects

Designs may include all components and yet differ from each other because of the manner or order in which those components are handled. The following pages provide numerous examples, grouped together according to their general purpose (prediction, forecasting, foresight, envisioning, and testing options) and designated in line with their specific purpose.

5.5.1 Depicting a "most likely" future

The subject is a sector or subsector that is well understood, is considered predictable, and for which extensive data are already available. The purpose is to generate a single scenario portraying the "most likely" future in this sector. The design places particular emphasis on gathering information from existing sources and carrying out mathematical analyses and projections by means of a computer model. The projections may be fairly simple, consisting of extrapolations from current situations, or they may take into account various expected events and influences.

In either case, the team produces a single scenario of what they consider to be the most likely future. Evaluation is based largely on identifying the implications of that scenario for the sector concerned. The product is a formal
report, including descriptive text plus graphs and tables, which is submitted to the sponsoring institutions for application.

5.5.2 Using an alternative approach to define the “most likely” future

Predictive futures exercises are usually based on mathematical analysis and modelling, but this is not the only design option. An alternative is to generate a scenario of the “most likely” future by drawing on the opinions of experts. This approach may lack mathematical precision, but does have the advantage of drawing attention to possible discontinuities and other deviations from current trends that are not considered in a simple projection.

The process goes through the initial components as previously described. When it is time to identify future trends and events, a list of up to 100 different ideas about the future is generated, some of which may be projections of present trends while some may be totally new. Brainstorming sessions, interviews, surveys, or other processes may be used to create the list. It is then submitted to experts for their opinions, usually through a Delphi, each expert being asked to express a personal opinion about the probability of each event. Feedback through the Delphi is used to enable the group to reach a consensus about the most likely set of future events and trends. (Or, alternatively, the results are collated and those considered to be most probable by the greatest number of participants are identified.) These events and trends are then used as the frame for a single scenario that is presented as a prediction of what the future is most likely to be.

5.5.3 Providing contrasts to a prediction

The project is done in response to a prediction that has already been made within the sector but that does not take into consideration interactions or future events that could have an impact on current trends. The purpose is thus to provide other pictures of the future that do take such matters into account.

The team focuses attention first on achieving a better understanding of the system, analysing how trends depicted in the original scenario might alter as a result of feedbacks between sectors. They also identify emerging phenomena and possible future events that might change the scenario, and consider future interactions among actors that would lead to a different kind of future. All this information is then integrated into several alternative scenarios. The evaluation process consists of comparing these images of the future with the original scenario, and pointing out the policy and planning implications of the alternative scenarios for institutions within the sector.
5.5.4 **Doing a straightforward forecasting project**

This project is done in order to forecast several futures of high probability. The process is identical to that described in section 5.5.2, but several sets of probable assumptions are selected and then used in framing scenarios. The result is three or more distinct scenarios, all of which are considered to be fairly probable.

5.5.5 **Exploring the probable future with a quick alternative approach**

The assumption here is that the future will result from the interactions of major underlying forces. The work involves a short discussion of issues, some information collection, and an analysis aimed at identifying two major forces within the sector being studied. The extreme forms that these forces are likely to take in the future are then estimated. A simple $2 \times 2$ matrix is used to "cross" these extremes against each other, and results in frames for four scenarios (see p. 89). None of the scenarios is considered more probable than the others, but together they are seen as covering much of the probable future. The scenarios can then be evaluated in the light of their implications, and the results applied.

5.5.6 **Providing foresight in order to identify research priorities and information needs**

The purpose of the project is to identify possible future problems within the sector, so that relevant research can be planned and carried out. The design is identical with that described in section 5.2.7 up to and including the scenario building component. Widely different assumption sets are selected, including some for wild-card scenarios. During the evaluation component, the scenarios are examined to identify new problems that might arise in each situation and that will require information or knowledge that does not currently exist. The result of this evaluation is a list of information-gathering activities and research topics requiring attention in preparation for the future. The team produces a report on the project and its findings, which is considered by decision-making and research institutions in determining information and research priorities within the sector.

5.5.7 **Improving foresight by examining a wide range of possible futures**

The design is a variation on those described in sections 5.5.2 and 5.5.4. It includes the standard components in the usual order, appropriate emphasis being given to all steps. Various scenarios are then framed, using a variety of
assumption sets of different probabilities, including some that are extremely unlikely. Evaluation involves identifying the implications of the whole set of scenarios for policy-making and planning within the organization concerned, including decisions about what resources should be allocated to preparations for unlikely scenarios and about how the organization should respond to the scenarios depicted. The team prepares a report presenting the findings and making specific recommendations regarding matters that will require special attention and possible policy changes.

5.5.8 Improving foresight about unexpected crises

This project is done in order to support emergency preparedness. The design described in section 5.5.2 is used. During the component on future trends and events, an extra effort is made to imagine unlikely happenings. Environmental scanning may also be used to identify emerging phenomena. The assumptions selected during the framing component are all low-probability events that would have a major impact on the sector, only one of which is assumed in each scenario. Evaluation addresses the question of how the institution concerned can best respond if the various scenarios become a reality. The results can be used to "rehearse" these responses and/or to construct a formal institutional plan about how to handle the emergencies created in the scenarios.

5.5.9 Encouraging foresight by stimulating debate about the future

Consideration of wild-card scenarios is not the only way to improve foresight. One alternative is a project that increases futures awareness by stimulating debate and discussion about the future. The design described in section 5.2.2. can again be used, but the framing is based on interesting "mixed" assumption sets that combine probable, improbable, desirable, and undesirable future events. This results in several distinctive scenarios that are neither probable nor desirable but that catch the imagination. The team does not itself attempt to evaluate or apply the scenarios but distributes them by means of books, public seminars, and other methods in order to encourage widespread discussion of the future.

5.5.10 Exploring alternative policy directions

The project is done to analyse the possible consequences of alternative policies currently under consideration in a sector. The core design is similar to that described in section 5.2.2. When the framing component is reached, assumptions are chosen that reflect different policy decisions. The result is a
set of scenarios depicting possible long-term consequences of policy choices. The team then evaluates these scenarios in terms of preselected criteria such as effectiveness, cost, responsiveness to public needs, equity, and so forth. The product is a report to the sponsors, describing the work, but leaving final applications to the decision-makers.

5.5.11 Using a computer model to study the long-term implications of policy decisions

This project is similar to that described in section 5.5.10, but more time and effort is devoted to the early components, and particularly to analysis. A computer model of the system-dynamics type (see p. 170) is built to simulate the system's behaviour. The framing is based on different policy decisions. The scenarios are generated by running the model over a simulated extended period of time under the different policy conditions. Evaluation focuses on identifying the unexpected consequences that the policies may have in the long run. The product is a report submitted to policy-makers for their consideration.

5.5.12 Using a desired future scenario as the basis of a national strategy

The project is done for the purpose of developing a national strategy regarding some aspect of a particular sector. The group initially skips the early components and goes directly to the construction of a single scenario of a desired future, making use of ideas about such a future gathered from written sources and obtained through participatory activities, such as guided imagery sessions (see section 6.2.25). An evaluation is carried out to identify the specific objectives that the scenario implies. The group then goes back to the information component and gathers information relevant to the objectives, which is used in the analytical component to investigate whether current trends are such that these are likely to be achieved and to determine the extent to which they are in harmony with the goals of key actors in the sector. By evaluating the results, key points are identified where action must be taken if the objectives are to be reached. The report summarizes the project and makes specific recommendations regarding policies and programmes required to ensure the achievement of the desired future.

5.5.13 Developing a common vision of the future

The purpose is to generate a single image of a desired future that is both feasible and compelling. The project is limited to an institution, community, or other entity, which ensures a high degree of participation and facilitates
the translation of the vision into practical actions. The work begins with the
definition of issues, but information gathering and analysis are omitted or
handled quickly. The scenario frame is already defined—the desired future.
Most of the project time is thus devoted to filling in the scenario, i.e. describ­ing
the desired future in detail. Depending on the specific project, the vision
may or may not be expressed as a tangible product. Evaluation, if carried out,
is concerned with the practical actions needed to achieve the vision, which
constitute the application component of the project.

5.5.14 Demonstrating that a desired future can be achieved

The purpose of the project is to mobilize action by demonstrating that policy
changes and other selected measures could bring about a particular desired
future in a sector. The team begins the work by defining the desired future in
terms of specific objectives, which are quantified as far as possible. In the
next phase of the work, a computerized model is constructed of the sector’s
structure and function. Once the model has been refined so that it accurately
reflects the current system, assumptions are made about policy changes and
other measures aimed at achieving the objectives. These assumptions are
incorporated into the model, which is then run to generate a scenario show­
ing the result of these measures. Evaluation involves comparing this scenario
with the specific objectives identified at the beginning of the project. The
outcome is an estimate of the degree to which the desired future would be
achieved if the prescribed measures are carried out. The product is a report
distributed to the institutions that are in a position to carry out these
measures.

5.5.15 Tracing a path backwards from a desired future to the present
(backcasting)

The project is done by a group of institutions within a sector to determine
what specific steps must be taken to reach a desired future within that sector.
Rather than working forwards from the present to the future, the team works
backwards from the future, using the technique called backcasting. The team
begins by constructing a scenario of a desired future for the sector, either by
using some kind of visioning process or by more deliberate analysis. The
question is then posed “If the sector is to be like this in the year X, what must
it be 5 years earlier?” The result is a new scenario set in the year X-5. The
team then repeats the process, again creating a scenario for 5 years earlier,
and so on until the present is reached. The whole series of scenarios is then
evaluated to identify the measures that must be taken to bring about the
various transformations. This process involves extensive actor analysis. The
product is a report that decision-makers in the participating institutions can use in policy-making and long-term planning.

5.5.16 Identifying an optimal path to a desired future

The project is carried out to determine the "best" way to reach an envisioned future. It starts with the creation of a scenario of the desired future, including the objectives that would have to be achieved to reach that future, e.g. in a health-care project, one objective might be the provision of basic health care in all the regions of the country. The financial, personnel, energy, and material resources needed to achieve the objectives by means of various measures are then identified. One approach might involve increasing the number of physicians and building more regional hospitals, while another might involve training more medical assistants and establishing more community health centres. The approaches are then evaluated in terms of criteria such as public accessibility, cost to the government, contribution to employment, and so on. The results of the evaluation are translated into strategy recommendations.

5.5.17 Identifying a range of desired futures

The assumption underlying the project is that a diverse society probably has more than a single vision of the future. Special emphasis is given to gathering information about individuals' visions of the future through surveys and in-depth interviews. The team analyses the information and identifies points of agreement and disagreement. These results are combined to form several desired-future scenarios that reflect the diversity of opinions within the society. These can be evaluated in several ways in order to determine the points of conflict among them, their respective implications for policy-making, their political feasibility, and so forth. Application is most likely to be aimed at increasing awareness among decision-makers of the diversity of views that exists among the public about what constitutes the desired future.

5.5.18 Encouraging positive images of the future through a multiple team effort

The purpose of the work is to encourage positive images of the future that give people hope and provide a common goal towards which they can work. The scenarios consist of "optimistic but feasible" visions rather than projections based on the current situation. Participation is extremely wide, and the core participants are divided into teams. These might be, for example, regional teams or departmental teams within a national institution.
Each team works independently to produce a single scenario of a desired but possible future for the country or the institution. This process may be handled through envisioning or more deliberate scenario construction. The products are separate reports from each of the teams, which are then used to build an integrated and internally consistent scenario for the entire country or institution. Evaluation involves comparing this integrated scenario with current plans. The outcome is a set of recommendations about policies and actions that would bring the future closer to the preferred one.

5.6 Guidelines for selecting designs

The preceding sections have outlined a large number of futures designs, ranging from simple exercises involving only one or two components and requiring only a day or so to complete to ongoing programmes based on the reiteration of multicomponent studies. Teams should remember that these are not the only possibilities and should not hesitate to create their own design. In fact, most teams will probably discover than none of the designs given is the right one for their particular project and will decide to create their own tailor-made version.

Inventing a design is not hard. The basic steps are outlined in Table 2. The team asks what kinds of scenarios will have to be built to fulfil the purpose, objectives, and planned applications of the project. They next consider component arrangements through which such scenarios could be constructed. From the possible designs, they select one that seems feasible in terms of the money, time, and personnel available for the work. They consider what criteria will be used during the evaluation component and, finally, they decide who will be involved (the team itself, the public, outside experts, etc.), what products will be generated in each component, and what tools and methods will be employed.

It should be noted that teams should decide on purpose, organizational arrangements, components, and designs before they choose their tools. Selecting tools first can restrict design options or force the team to use a particular design. It can also result in undue emphasis on, and unnecessary concern about methods. Most functions can be carried out with a variety of tools, so that a project is not likely to flounder because instructions about a particular method are not available or the budget makes the purchase of a particular piece of software impossible. Whether a team invents a unique design in this way or uses one of those presented in this chapter, they should bear the following fundamentals in mind:

- If the organizational structure involves both a team and a board of directors, they must agree about the design.
Table 2. *Steps In the invention of a project design*

<table>
<thead>
<tr>
<th>Step</th>
<th>Questions to be considered</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>1. Select the type of scenario(s) to be constructed (visions, wild cards, probable futures, etc.)</td>
<td>What are the purpose, objectives, and planned applications of the project?</td>
<td>A decision about what kind of scenarios and how many of them will be constructed during the project</td>
</tr>
<tr>
<td>2. Identify the components and component arrangements (designs) appropriate for the scenario(s) to be constructed</td>
<td>What components must be included in the design to make the scenario(s) valid and applicable (e.g., extensive analysis for a highly probable scenario)?</td>
<td>A list of possible designs to be used during the project in creating the chosen scenario(s)</td>
</tr>
<tr>
<td>3. Select one design from among those that have been identified as appropriate for the scenario type</td>
<td>What is available in terms of money, time, and personnel?</td>
<td>The choice of a single design that is both practical and appropriate for the type of scenario to be built</td>
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<tr>
<td>4. Choose the criteria that will be used to evaluate the scenarios</td>
<td>What is a logical basis for judging the scenarios after construction (probability, desirability, fulfilment of criteria such as equity, public participation, etc.)?</td>
<td>A decision about how the evaluation component of the design will be carried out</td>
</tr>
<tr>
<td>5. Decide who will carry out each component</td>
<td>What is the organizational structure of the project (Team, board of directors, etc.)? Who else might be involved in the work (consultants, outside experts, etc.)?</td>
<td>Assignment of different components or parts of components to different parties involved in the project</td>
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<tr>
<td>6. Identify the expected products</td>
<td>What tangible outcomes are needed from each component as inputs to other components? What outcomes will be needed for the evaluation of the entire project?</td>
<td>A checklist of products to be generated during each component of the design</td>
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<tr>
<td>7. Select the methods and tools</td>
<td>What functions must be carried out during each component? Which tools carry out these functions? Of these, which are most appropriate in terms of cost, equipment, required expertise, etc.?</td>
<td>A decision about methods and tools to be applied within each component in the design</td>
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</table>
• The design should be suited to the purpose and objectives of the project.
• The design should be chosen carefully even if the primary concern is with process rather than products.
• The design should be such that whatever products are expected from the work can in fact be generated.
• Deadlines, human resources, budget, and other practical matters should be considered in creating the design.
• The overall design should always be settled before the methods and tools are selected.

References
6.1 The functions of tools

As noted at the end of the previous chapter, tools should be selected for a futures project after other basic decisions have been made about the work's purpose, design, organization, and intended application. This does not mean that methods and tools are unimportant. Good quality tools, appropriately applied, can do much to ensure the success of a futures project, and the choice of tools deserves as much care and consideration as do other decisions about it.

A large number of methods and tools are described in the futures literature and yet others can be found in the publications on related fields such as strategic management, technological forecasting, economic forecasting, and system analysis—300 pages were devoted to the subject in the Handbook for futures research (1), which was published almost 20 years ago. Many of the methods described in that book—trend extrapolation, the Delphi technique, cross-impact analysis, and others—continue to be widely used, and many more have been created since then or have been taken from other disciplines.

Countless attempts have been made to impose some order on this diversity, but the resulting schemes have unfortunately made a murky situation even murkier. To give but one example, some taxonomies divide futures methods into the following three categories: (1) methods that are objective and quantitative and involve trends, projections, and extrapolations; (2) normative and qualitative techniques based on subjective judgement and expert opinion; and (3) methods that are systemic, multi-optional, or causal.

All these categories have certain shortcomings. Many methods commonly used in futures work do not fit neatly into them, while others fit into more than one. Some methods exist in numerous varieties, of which some fit into one category and some into another.

A case in point is cross-impact analysis, which may be carried out within a Delphi exercise or independently, may incorporate brainstorming or not,
and may focus on numerical probability or ranking of desirability. The result is that cross-impact analysis is classified in various schemes as a subjective method, a method for soliciting expert opinion, a multi-option analysis technique, and so on.

The confusion becomes even greater if categories bearing the same label are considered. Mathematical techniques such as moving averages, linear regression, curvilinear regression, time-series analysis, and Markov chains (see section 6.2.21) may all be lumped together under the heading of "trend extrapolation". But "trend extrapolation" may also be used to indicate a single type of trend analysis, or to label a whole class of futures methods, including morphological analysis, historical analogies, and scenario building. Faced with this disarray, groups trying futures work should realize that it is actually quite simple to select appropriate tools in a rational manner. The secret lies in remembering that the categories commonly used to classify tools (quantitative, qualitative, objective, subjective, systemic, etc.) refer to certain characteristics of the tools but do not indicate their functions. Thus, in choosing tools, teams should not ask "Do we need an objective, subjective, or systemic tool?" but "What are we trying to do at this point?" or "What product are we trying to produce?" Several tools will probably be available that can be used to fulfil that function or generate that product. In futures work, tools are usually needed in order to carry out the following functions:

- Soliciting expert opinion, i.e. obtaining ideas or judgements from people outside the core group.
- Generating ideas, i.e. imagining many alternatives.
- Developing consensus, i.e. reaching group agreement on a decision.
- Analysing, i.e. elucidating the structure, function, and relationships of a system.
- Scanning, i.e. tracking trends and recognizing new developments that may affect the system’s future.
- Projecting, i.e. moving from the present into the future.
- Making judgements, i.e. weighing alternatives and determining their consequences.
- Empowering, i.e. helping people to shape their own future.

Sections 6.1.1-6.1.8 describe these functions and indicate generally what types of tools and methods can be used to carry them out. The specific tools mentioned can be found later in the chapter. Although references are given, descriptions of most tools can be found in the futures literature, so that readers wanting further details or examples will find them in numerous texts (1-8).

Table 3 shows the general relationship between functions and tools, but it is not a one-to-one relationship. Most functions can be carried out with
Table 3. **General relationship between functions and tools**

| Tools                          | Soliciting expert opinion | Generating Ideas | Developing consensus | Analysing | Scanning | Projecting | Making judgements | Empowering |
|-------------------------------|---------------------------|-------------------|----------------------|-----------|----------|------------|-------------------|------------
<p>| In-depth interviews of experts| XXX                       |                   | XXX                  | X         | X        | X          | X                 |            |
| Genius forecasting            | XXX                       |                   | XXX                  | X         | X        | X          | X                 |            |
| Surveys                       | XXX                       | X                 | XXX                  | X         | X        | X          | X                 |            |
| Delphis                       | XXX                       | XXX               | XXX                  | X         | X        | X          | XXX               |            |
| Brainstorming                 | XXX                       |                   | XXX                  |           | X        |            |                   |            |
| Checklist                     | XXX                       |                   | XXX                  |           | X        |            |                   |            |
| Attribute listing             | XXX                       |                   | XXX                  |           |          |            |                   |            |
| Morphological analysis        | XXX                       |                   | XXX                  |           |          |            |                   |            |
| Idea generation               | X                         | XXX               | XXX                  |           | X        |            |                   |            |
| TKJ method                    | X                         | XXX               | XXX                  |           | X        |            |                   |            |
| Quality circles               | X                         | XXX               | XXX                  |           | X        |            |                   |            |
| Nominal group method          | X                         | XXX               | XXX                  |           | X        |            |                   |            |
| Colour-based tools            | X                         | XXX               | XXX                  |           |          |            |                   |            |
| Structural analysis matrix    |                           |                   | XXX                  | X         |          |            |                   |            |
| Actor interviews and surveys  | X                         |                   | XXX                  | X         |          |            |                   |            |
| Role playing                  |                           |                   | XXX                  | XXX       | XXX      |             |                   | X          |</p>
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<tr>
<th>Method</th>
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<tr>
<td>Actor analysis and political mapping</td>
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<tr>
<td>Simulation games</td>
<td>X</td>
<td>XXX</td>
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<td>Time-space grids</td>
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<td>Futures wheels</td>
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<tr>
<td>Statistical analysis</td>
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<tr>
<td>Environmental scanning</td>
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<td>Trend-impact analysis</td>
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<td>Cross-impact analysis</td>
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<td>Guided imagery</td>
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<td>Relevance trees and paths</td>
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<td>Cost-benefit and risk analysis</td>
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<td>Multiobjective, multicriteria decision-making</td>
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<td>System-dynamics modelling</td>
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<td>Econometric modelling</td>
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<tr>
<td>Optimization modelling</td>
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* XXX = a major function of this tool; X = one possible function of this tool.*
one of many tools, a single function often requires several different tools, and some tools and methods can be used to perform more than a single function.

6.1.1 Soliciting expert opinion

Events that have not yet occurred cannot be analysed nor can experiments be carried out on the future to test a hypothesis about what will happen under different conditions. How, then can we set about knowing the future? One way is “to ask the experts”, and that is what human beings have been doing for thousands of years. As Rush and Miles have put it:

“...The use of expert judgement is perhaps the oldest method of forecasting—even if techniques such as brainstorming and Delphi questionnaires have tended to replace the scanning of entrails, and appeals to expertise and technical rigor have replaced appeals to divine intervention” (9).

In a typical futures project, the experts are persons whose viewpoints are considered valuable because of their historical experience within a particular sector, their understanding of how that sector functions, their familiarity with the key actors, or their ability to solve problems creatively. Not every expert has had extensive professional training or holds a high position in the academic or government hierarchy. When the question being asked is “What do young people think?”, the experts are the young people themselves. If the question is “What are the attitudes of the grass-roots women’s movements?”, the experts are the women in those movements.

Examples of situations in which expert judgement may be needed in futures work include the following:

• A value judgement must be made, e.g. about the nature of a desirable future.
• Data on some historical or current situation are either not available or are available in unusable or prohibitively expensive form, so “educated guesstimates” are wanted.
• Direct extrapolation of historical trends does not seem to be appropriate because of the current situation.
• There is a need for the subjective integration of various factors or trends into a total picture of the future.
• Opinions are needed about the relative importance of newly emerging phenomena.
• Ideas are required about phenomena that might come into existence in the future.
Groups engaged in futures activities may want to solicit the opinions of experts on many different topics, e.g. what the scope of the study should be, which variables and actors are of key importance, which assumptions should be used for constructing scenarios, which scenarios are “best” in some regard, and what strategies and tactics would be most effective in realizing a particular future. The goal is often to obtain a consensus opinion from the experts, but may sometimes be to obtain a wide range of ideas. The specific methods that serve the function of soliciting expert judgement include interviews, genius forecasting, surveys, Delphis, and various group methods, all of which are described later in the chapter.

6.1.2 Generating ideas

During most futures activities the need often arises for creative thinking, the generation of many ideas or solutions. Many good ideas never come to light because the people who have them fail to appreciate their value and consequently never express them. Thus the process of generating ideas can be facilitated by methods that involve the temporary suspension of judgement. The technique most widely used to stimulate the flow of creative ideas through the suspension of judgement is called brainstorming (see section 6.2.5). Numerous elaborations on brainstorming exist and tools that organize the ideas generated during brainstorming sessions are also available, one example being cognitive kinetics (CK) (see section 6.2.13).

Idea generation is often used in futures studies as a first step in analysis. When a group wants to analyse key variables, key actors, or future bearing events and trends, the first step is the generation of lists of possibilities. Such lists are more likely to be comprehensive if they are constructed using idea-generation methods. Idea generation is also used in creative problem-solving, i.e. the development of alternative solutions. For example, when a particular desired future has been identified, idea-generation techniques can be used to imagine different ways in which that future could be attained. The development of alternative solutions typically begins with the generation of ideas, which are then modified or combined to produce new solutions; attribute listing, checklists, and morphological analysis are all suitable tools for this procedure.

Idea generation in itself does not indicate which choices should be made among the many ideas or alternatives generated. In practice, however, brainstorming is almost always combined with some procedure that allows evaluation and decision-making. Examples include idea-generation sessions, the TKJ method, quality circles, nominal groups, and colour-based tools (see sections 6.2.9, 6.2.10, 6.2.11, 6.2.12 and 6.2.13, respectively). These different approaches differ in the degree to which they are structured (e.g. how much
interaction is allowed among the participants) and how much the selection process is aimed at building consensus. Sessions may be held "in house" by groups doing futures studies or may involve outside specialists, when they are also a means of soliciting expert opinion.

6.1.3 Developing consensus

The expert opinions that a team gathers by various means represent a collection of individual perspectives. This is sometimes unimportant, e.g. when a team needs information about the range of attitudes towards an issue, but it can also be important when the team must make a selection, narrow down the choices, or set priorities. What is needed then is a method for developing consensus, either among the team itself or among outside experts.

It is sometimes possible to "create" such a consensus artificially by, e.g. the statistical analysis of surveys or interviews. This approach may work well with objective questions that have been answered using a multiple-choice or ranking system, but when teams evaluate responses to more open questions, they may be influenced by their own prejudices and preconceptions or biased by the position and reputation of the respondents. Poor ideas may be given undue consideration just because they come from an established authority, while good ones may be discounted because they come from someone less well known. These problems can be avoided by ensuring that real agreement is reached, usually by means of a Delphi exercise in which they carry on an anonymous and controlled debate or through a nominal group.

Although consensus building is often linked to the solicitation of expert opinion in the futures literature, it is also frequently needed in steps not requiring expert judgement. Futures groups can make use of simple consensus methods, such as TKJ (see section 6.2.10) and quality circles (see section 6.2.11), to make decisions throughout the course of their work.

6.1.4 Analysing

Analytical tools will be needed whenever a team needs to determine causal relationships, to trace and assess trends, or to identify agents of change. In other words, analysis is needed if the question "What exactly are we trying to do at this stage?" leads to answers such as "We're trying to understand how this system (sector, actor, etc.) operates", "We're trying to determine the history of this variable," or "We're trying to understand how this factor is affected by others".

Analysis can be carried out to some degree simply by drawing on existing knowledge and insight about the system's structure and function. Usually,
however, understanding does not come so easily, and important points can be missed. Analytical tools can then be very helpful. Many of these tools work by laying out information about the system in an orderly and comprehensive manner so that what can be known about the relationships between the elements in the system can be extracted. Structural analysis, for example, is a method of clarifying the relationships between variables so that the key variables can be identified. Actor-analysis methods work in a similar way, and provide information about the ways in which actors' interests converge and diverge. Trend-analysis methods are used to extract information about real trends in different variables from historical data.

Certain computer modelling techniques can also be used in analysis, different approaches serving different purposes. System dynamics (see p. 170) can be employed to determine the underlying structure of the system that causes its dynamic behaviour. Econometrics (see p. 172) can be used to determine the relationships between variables and to quantify them on the basis of historical data, while an optimization model (see p. 174) can be constructed to find the best way to reach a chosen goal.

6.1.5 Scanning

Ample warning is often given about the changes that the future will bring, so that we can better anticipate and prepare for the future if we are aware of what is going on now. Most people engage in constant passive scanning, in which incoming information, from all sources, is checked for indications of impending change. This same process—but carried out actively, in a disciplined manner, and with carefully selected information resources—is a standard futures method. Industries may do ongoing scanning to pick up signs of emerging technologies or changing markets, for example. Agencies and organizations may also carry out “environmental scanning” as a permanent activity, in order to keep an eye on external events that may influence the future of the institution concerned or the sector with which it deals. In addition, scanning is often worked into individual futures projects in various ways.

A distinction must be made between scanning and surveillance. Surveillance is linked to strategic planning and is focused on trends and developments within the sector itself. Scanning goes beyond the sector, to identify and track external forces in the “environment” that could affect the sectoral future. For this reason, the scanning process is often referred to as environmental scanning.

Any method that addresses the question “What can we see today that gives us an indication of what tomorrow might be?” can be regarded as contributing to the scanning process. Thus interviews with experts about
what they think the future may bring can contribute just as much as graphs of current trends. The media, ranging from specialized academic journals reporting on scientific research to newspapers and popular magazines, can also be rich sources of ideas.

6.1.6 Projecting

Projection is often closely linked to mathematically based forecasts, e.g. those based on national economic indicators; such calculations are examples of this method, but projection is not just a matter of mathematical equations. One of the definitions of projection is "sending something forth in one's mind", so that any activity that requires the imagining of a future or a hypothetical situation will involve projection.

"Seeing" the possible impacts of the assumed events and developing a feel for how actors might interact with each other under different circumstances are therefore also valid examples of projection. So too is backcasting (see section 5.5.15), in which an image of a particular future is created and then projected backwards to the present to determine what steps would be needed to reach that future.

Specific projection techniques vary widely. The most sophisticated are computer models of entire systems. One function of econometric models (see p. 172) is to forecast the short-term future behaviour of a system, while system-dynamics models (see p. 170) can be used to simulate the system's expected behaviour under given conditions. Many of the methods used in trend analysis are also projection tools. For example, once a trend has been analysed and "fitted" to a curve, the resulting equation can be used to determine the value of the variable at some given time in the future. When the historical data are most complicated, exponential smoothing and decomposition (see p. 158) may be used together to project into the future. There are also simple projection tools that can help groups to organize their ideas about future possibilities; examples include time-space grids and futures wheels (see sections 6.2.19 and 6.2.20, respectively). Finally, simulation games (see section 6.2.18) and role playing (see section 6.2.16) are also projection techniques since they stimulate imagination about what might happen under various conditions.

6.1.7 Making judgements

Futures studies typically involve choosing between various actions, deciding which future is to be pursued, what strategy is to be employed, what projects are to be carried out, and so forth. The process of evaluating alternatives in
futures is often referred to as finding the "most preferable" future or the "best" strategy.

However, groups doing a futures study often discover that just defining "most preferable" or "best" is more difficult than they anticipated. Alternatives can be judged in terms of the total costs and benefits that would result, or in terms of the costs and benefits that would result for each stake-holder or each sector. The alternatives can also be evaluated from different perspectives (technical, organizational, and personal) or in terms of other criteria based on completely different objectives, such as equity or conservation of scarce resources.

Thus, judgements may not always be easy to make. The many factors that must be taken into consideration must be untangled, the stake-holder identified, and priorities established. These processes can be facilitated by relevance trees (see section 6.2.26), optimization models (see section 6.3.5), and multicriterial-multiojective decision-making methods (see section 6.2.28).

6.1.8 Empowering

Empowerment means giving people the power to participate in the creation of their own futures. The perception of the future then changes from one of predetermination to one of possibilities. When people are empowered, they can look beyond today and imagine a different and better tomorrow—they stop feeling hopeless and begin taking meaningful action. Empowerment is of wide interest in the futures community and is included as one objective of many futures projects. There are even participatory futures activities in which the empowerment of a community or a working group is the primary goal. The simplest and best known empowerment technique is guided imagery in a visioning workshop, but whole futures programmes can also be structured around empowerment, which may then be referred to as "transformation management" (10).

6.2 Types of futures tools

Some futures tools are described in this section, while subsequent sections deal with computer modelling, futures tool kits, and the criteria for tool selection, and describe how individual tools can be applied, both independently and within specific components of futures projects. The methods and tools presented here have been chosen to demonstrate the variety of ways of handling the various functions discussed in section 6.1.

These are not, however, the only tools used in futures work. Others used in public policy analysis (11–13) will often be applicable, while standard
techniques used in public-health surveillance and trend assessment will be useful in certain projects. A team will sometimes want to use the qualitative research procedures employed in the social sciences, on which numerous publications are available.

6.2.1 In-depth interviews of experts

There may be times during futures work when the views of a few knowledgeable experts are all that is needed to carry out a particular step, and also times when the thoughts of a single brilliant and imaginative person are more valuable than those of 1000 other people. The appropriate way to solicit opinions is then through in-depth interviews (3), which can yield valuable results if they are planned and executed with sufficient care.

The question or questions on which an expert opinion is needed should be carefully delineated, and the possible ways of soliciting that opinion should be considered before the decision is made to carry out an interview. In other words, the group doing the work must ask: What exactly is the information or opinion we need? Is an interview the best way to get it? In particular, the published literature should be reviewed before an interview is arranged. There is no reason for a team member and an expert to waste time on questions that have already been addressed in available articles or books. The person to be interviewed should also be selected with care. The most famous or outstanding expert in a particular field may not be the most appropriate one; depending on the issue and the way in which the information will be used, a person who is deeply concerned about that issue or someone who has a reputation for “wild ideas” may be more suitable.

Interviews can be done in person or on the telephone, but face-to-face interviews usually yield better results. A list of questions should be prepared with care and followed during the interview, but the expert should be allowed to “go off on a tangent,” since the ideas thus thrown up may be so creative and unusual that the team has not even considered asking about them.

6.2.2 Genius forecasting

Genius forecasting is a special method of soliciting expert opinion. The person concerned should be someone whose ability to imagine how trends and new factors may interact and to create vivid images of what the future may hold far exceeds that of other people. Geniuses may generate and publish their forecasts as works of fiction or more mainstream futures studies, or their ideas may be captured through in-depth interviews by people
who recognize their insight, creativity, and judgement. The difficulty with this method is that it involves finding and recognizing a genius.

6.2.3 Surveys

The greatest limitation of interviews and genius forecasts is that they solicit individual opinions and perspectives, which may be extremely wise and insightful, but also completely incorrect. Policy-makers may be willing to use the opinions of four or five highly knowledgeable people as the basis for a long-term programme that anticipates events quite far in the future, since time will still be available for manoeuvring and changing course.

Where the shorter-term future is concerned, however, most decision-makers prefer to have a broader opinion base. Written questionnaires are therefore commonly used in futures activities to survey opinions (3). They may be used, for example, to canvass ideas about the forces driving a particular trend or the likelihood of certain events occurring at some time in the future. The questionnaires are usually sent to experts, i.e. people who are known to have special knowledge or experience of the issue being addressed. Surveys can provide a fairly accurate reflection of expert opinion in a particular field, although they seldom yield nuggets of wisdom and insight.

As with interviews, the amount of information that is obtained from a survey will depend on the thought put into its design. Surveys are more likely to be successful if the information needed is identified before the questionnaire is written, and if it is designed specifically to yield that particular information. Only questions directly related to the desired information should be asked, since the less time it takes to fill in a form, the higher the probable response rate. In addition, questionnaires should always be tested on a small sample group and revised, if necessary, before they are sent out to the large target audience.

To obtain honest responses, the participants may have to be allowed to remain anonymous but, regardless of whether the responses are anonymous or not, the questionnaire should be structured and worded in such a way as to allow respondents to express their real opinions. Every effort should be made to avoid questions that give unfairly limited choices, including yes/no questions (except, of course, when yes or no really are the only possible answers). In multiple-choice questionnaires, an item marked "other" may often be needed. Some questions should be completely open-ended, requiring a written answer of several words, sentences, or even paragraphs: "What are you planning...?", "What would you choose to do if...?", and so on. The questionnaire should also allow space for any comments that the respondents may wish to make that are not direct replies to any particular question.
There is no ideal size for a survey group. Futures teams tempted to keep the number of respondents small should remember that a 100% response rate is unheard of, and that even one of 25% may be good under certain circumstances. Teams tempted to send out thousands of copies should remember that printing and postage cost money, as does the time required to read, tabulate, and summarize the survey responses.

6.2.4 Delphis

The Delphi technique was developed, elaborated, and tested by Helmer, Dalkey, and Gordon of the RAND Corporation in the 1950s in response to a need within its own futures programme (14) and has become a standard futures tool (2, 3, 15). The procedure is aimed at obtaining a reliable consensus of opinion from a group of experts through a series of questionnaires interspersed with controlled feedback. In an essay entitled “On committees” (16), Thomas notes that the Delphi method was brought about by the need for effective “futuring” and adds:

The work of committees can be a deadly serious business. This is especially so when there is a need to forecast the future. By instinct, each of us knows that this is a responsibility not to be trusted to any single person; we have to do it together.

Like a survey of experts, the Delphi technique is aimed at soliciting expert opinion—but there is a difference. Surveys are aimed at discovering the thoughts, beliefs, or actions of a select population—experts in a particular field or a particular group of social actors. Although the whole population is not involved, the goal of the survey is to obtain a feel for the views of that population through the examination of the sample group. A Delphi exercise, on the other hand, is not meant to mirror the opinions of anyone other than those of the participants themselves, who are usually experts in the field concerned. The primary purpose is to provide a framework for controlled debate that often leads to consensus among the participants.

The key elements of a Delphi are: (1) structuring the flow of information; (2) providing feedback to the participants; and (3) guaranteeing their anonymity. Rather than getting together to discuss and debate their differences of opinion, the participants complete questionnaires on the topic that they have been appointed to address, and then send them to the coordinator, without any discussion with the other participants. The answers are collated and sent back to the participants in such a way as to preserve the anonymity of the responses. The participants are then asked to read carefully through all the comments and to reconsider their original answers. They then complete another set of questionnaires, which are again sent to the coordinator.
several cycles, usually three, something close to consensus is generally reached. A Delphi can also be run in order to discover differences in opinion rather than for the purpose of reaching a consensus.

The coordinator of the Delphi must take great care when designing the questionnaire. Questions must be precise, and they must allow participants the opportunity to express their true feelings. The coordinator must also be able to report the findings in a way that truly preserves anonymity, e.g. if the questionnaire requires answers in the form of whole sentences or paragraphs and some of the participants have distinctive styles of writing, it may be necessary to use a statistical reporting system or to paraphrase individual comments.

There are numerous variations on the basic Delphi method (4), some of which are aimed at reducing the usual long response time. An example is a Delphi workshop, in which the participating experts are brought together in a central location for several days. On the first day they are presented with the first questionnaire, which they complete without any discussion with the other participants. That evening the results are tabulated and the second questionnaire is prepared. On the second day the experts complete the second questionnaire, and so on. The disadvantage of such a workshop is that the experts are likely to discuss their ideas with each other, even if they are clearly instructed not to. However, a workshop has the advantages of compressing the Delphi process into a few days and avoiding any problems that may arise from an unreliable postal system.

There are also electronic versions of Delphi. In one type, a single computer with multiple terminals is used. The participants sit in the same room and register their answers to various questions on their individual terminals. These are integrated by the software, which then displays the group's opinion as a histogram; this provides the feedback for the next round. With the spread of the Internet and the development of software that allows inputs from members of a group, on-line Delphis are also gaining popularity.

In futures studies, Delphis are often used to solicit expert opinions on purpose, scope, key variables, actors, assumption sets, scenarios, strategies, and tactics. The opinions of the experts are usually expressed, not in the form of written answers to questions, but through the assignment of weight (evaluating relationships according to their relative strengths, judging probability, ranking by value) or the expression of choice (selecting among various possibilities). Thus a Delphi can be used both in futures activities that are objective and exploratory and those that are subjective and normative. Since methods such as structural analysis and cross-impact analysis are useful in organizing these responses, Delphis and analytical tools are often used together.
A Delphi can be a major operation, and is definitely not an everyday management tool. Thus, when a futures team has a decision to make on which consensus is desired, the use of a method that is less expensive and time consuming is preferable.

6.2.5 **Brainstorming**

A technique widely used in futures work to stimulate creativity is brainstorming (17). Real brainstorming, as opposed to regular discussions carried out under the same label, is conducted according to fairly strict guidelines. A specific problem is posed, and the participants are invited to suggest ideas for its solution. As ideas are proposed, they are written down where all can see them, e.g., on blackboards or large flip charts. The emphasis is on generating a large number of suggestions. Any idea is acceptable, and “wild” ideas are as welcome as “reasonable” ones. Building on the ideas of others is encouraged, and emphasis is placed on the quantity of ideas. The mood of the session has a major impact on its outcome. Spontaneous laughter is acceptable, but sarcasm and ridicule can significantly decrease the effectiveness of the exercise. It is important, therefore, that the participants maintain a positive attitude and good humour. Absolutely no critical evaluation is done during the session, not even of the most “unreasonable” suggestions. If the brainstorming group is large, it can be divided into small groups that compete with each other—one point is awarded for every idea proposed and two points for any idea that is not suggested by any other group.

Brainstorming can be amazingly effective, but has its limitations. It only works if people feel safe with it. Teams that have no experience of creativity techniques or that have a strict hierarchy are not likely to respond well to pure brainstorming, and may feel more comfortable with other approaches based on brainstorming but having a more reassuring structure. On the other hand, teams that have used brainstorming for a while may become bored and want to try some other technique. Plenty of alternatives are available, e.g., checklists, attribute listing, and morphological analysis, which are described below. This is but a small sample, however. As noted in Chapter 3, teams wanting more information about these and numerous other methods should consult books such as 101 creative problem solving techniques (18), Conceptual blockbusting: a guide to better ideas (19), or a similar source.

6.2.6 **Checklist**

The checklist is a series of questions used to stimulate thinking about a process, plan, or device. The participants select some entity for consideration and then apply words from the list. Osborn’s list (17), which is the most
famous, is based on a series of verbs: adapt, modify, magnify, "minify", substitute, rearrange, reverse, and combine. Many other lists are also available, based on other verbs (integrate, symbolize, soften, flatten, abstract, freeze, etc.) or prepositions (18). Teams often construct their own lists.

An example of a checklist similar to that of Osborn (17) reads as follows:

- **Adaptation.** Are there new ways to use this thing as it is? New ways to use it if it is modified?
- **Modification.** Is it possible to change meaning, material, form, shape, pattern, pathway, equilibrium, or format? Is there a possible "new twist"? Are other changes possible?
- **Minimization.** Can it or pieces of it be made smaller? Thinner? Shorter? Streamlined? Can it be omitted? Split up? Condensed? Understated? Can something be subtracted?
- **Substitution.** Can other processes, materials, approaches, or ingredients be used? Other sources of authorization, power, or funding? Who else can do this, use this, etc.? What other groups and places can be involved?
- **Rearrangement.** Are other patterns, layouts, sequences, ratios, or schedules possible? Can components be interchanged or repeated? Can the whole be subdivided? Can the parts be integrated into a whole?
- **Reversal.** Can it be turned backwards, sideways, upside down, inside out? Can roles be reversed? Can opposites be transposed?
- **Combination.** Can a blend, assortment, or ensemble be used? Is it possible to combine units? Purposes? Appeals? Ideas? Work? Personnel? Costs?

### 6.2.7 Attribute listing

In attribute listing (18), the team begins by writing down all the parts of something that needs to be improved, and notes the current nature of each part. Variations and modifications are proposed, first for each attribute singly, then for combinations of attributes. If, for example, the matter under consideration is the national health service, some of the current attributes might be:

- Delivered at large regional hospitals.
- Provided by doctors and nurses.
- Financed by the central government.
- Focused on treating diseases.
Once the attributes have been listed, they can be changed—separately and in combination. Thus, one example might be health-care services based at local community centres, provided by paramedical personnel and auxiliary nurses, financed regionally, and focused on preventive medicine and health improvement.

6.2.8 Morphological analysis

Morphological analysis is a famous and effective means of catalysing inventive solutions (18). It is similar to attribute listing but is used for developing totally new designs, as opposed to adapting old ones. Because it feels structured, morphological analysis is a good first choice for a team that is uneasy about idea generation.

The team begins by making a list of all the general attributes that can be assigned to the system or entity being considered. They then propose as many variations as possible for each attribute and consider all combinations of them. The health-care example in section 6.2.7 might be handled in a morphological analysis as follows. First, the general attributes would be listed:

- Location (urban hospitals, large regional hospitals, community health-care centres, within patients’ homes, at schools and other institutions, etc.).
- Personnel (doctors, nurses, auxiliary nurses, paramedical personnel, volunteers, medical and nursing students, practitioners of traditional medicine, etc.).
- Financing (by the central government, by the regional government, by communities, by direct payment by patients, through public or private health insurance, with assistance from international aid agencies, etc.).
- Focus (treating illness, improving public health, maternal and child care, preventing the spread of epidemics, health education, etc.).

These possibilities could then be combined in various ways to create images of new health-care systems. In one, for example, health-care services would be provided at local health centres, primarily by paramedical staff, they would be financed by the community, and the primary focus would be on providing primary care and health education.

6.2.9 Idea generation

One method of “idea generation”, namely that developed by the Battelle Institute, consists of the following steps (18). A group of 8–12 persons are convened, briefed on a topic, and allowed to interact, usually by brainstorm-
ing. A moderator records ideas on large sheets of paper taped to the walls. Idea generation ends at a predetermined time or when the pace begins to lag. The participants then "vote" for what they think are the best 5-10 ideas by making a X against each of those concerned. Consensus is not required nor are the participants obliged to reach one.

6.2.10 The TKJ method

The TKJ method (18) is similar to Batelle's idea-generation method but is directed more towards consensus building. It was developed by Professor Kawakita of the Tokyo Institute of Technology. The process is begun by a facilitator, who identifies the overall objective and convenes the meeting. When the participants meet, they decide how many statements each person will be able to write in each round (the absolute maximum is 10), how much time will be spent on each round, and how close to consensus the group must come. The facilitator then specifies the first issue, and each person writes, on individual cards, statements reflecting ideas, opinions, or concerns about that issue.

The cards are then shuffled and dealt out to the participants so that everyone ends up with a set of mixed cards. One person, chosen by the coordinator, reads what is on one card out loud. All the other participants check the cards that they hold and raise their hands if they find a card bearing the same or a similar idea. When called on by the coordinator, a participant holding such a card reads out the statement, and the group decides whether it is "similar enough" to be considered the same; if so, the card is put in a stack with other similar cards. The coordinator then asks someone else to read a card, and the process continues until all the cards are in stacks. There will probably be a few large stacks containing cards that reflect majority opinions, concerns, or ideas, and others that contain only one or two cards. The topics within the larger stacks can then be treated in other rounds, using the same steps.

6.2.11 Quality circles

Another method combining idea generation and consensus building is the quality circle, first developed by Japanese industry as a way to improve corporate communication and performance (20). The process involves the consideration of a specific, limited topic, which may be expressed as a problem to be solved or a decision to be made. For example, a community health-care team that is seeing a marked increase in smoking in its area might use a quality circle to answer the question "How can we increase the effectiveness of our health education about the risks of smoking?"
The technique consists of three parts that are reiterated. The group members, who are arranged in a circle, first take turns in a brainstorming session, expressing their ideas on the question being addressed. These are recorded on a large surface, such as a blackboard, that is visible to the entire group. No one is allowed to dominate; everyone is given a set amount of time to express ideas or is limited to one idea per round. All participants must contribute. Those who have no ideas during a particular round say "pass" when their turns come. The standard guidelines for brainstorming apply, so that criticism of ideas is not permitted.

After the first step is complete, the circle members are given the opportunity to express their objections or concerns about the proposed ideas. This is also done by going around the circle, each person being given a limited time to speak. Finally, the circle votes, by voice, by a show of hands, or by ballot. The majority opinion rules. The result is usually a narrowing of the problem, and the process is repeated until a decision has been made on how to deal with it.

6.2.12 Nominal group method

The nominal group method was invented in the late 1960s (18). It resembles quality circles closely but the generation of ideas and the selection process are more structured. It is generally used when the issues to be discussed are sensitive or controversial ones, when there is a danger that one or more people will attempt to dominate the process, or when other circumstances make a controlled session necessary or preferable.

A moderator addresses a preselected group of participants, describes the nominal group method, and gives a quick briefing on the topic to be considered and the desired outcome of the session—ideas about how a particular problem can be solved, for example. Then, without any discussion, the participants make lists of their own ideas on the topic. These ideas are then read out one at a time, each person speaking in turn. Several of these "round robins" are carried out until all the ideas have been proposed and written down on large sheets of paper taped around the room. The participants then ask any questions that they may have about any of the proposed ideas; this step is also handled in the same way. However, no objections or criticisms may be expressed about any of the ideas.

The group now consolidates the ideas. If an objection is raised to any idea being consolidated with another, this is not allowed. Finally, the group votes by secret ballot. Various techniques can be used. In one, each participant selects eight ideas as the best and then ranks these, giving eight points to the best of all, seven to the next best, and so on. The points are added up, and the ideas receiving the most points are identified as the group's choices.
6.2.13 Colour-based tools

The idea-generation techniques outlined so far result in a numerical ranking, but others result in coloured patterns. An example is "cognitive kinetics" (CK), which captures ideas and allows them to be organized into new patterns. CK is more commonly known as the hexagon method because it is based on hexagon-shaped magnetic plaques in different colours. Ideas can be recorded on the surface of the plaques using erasable marking pens. A computerized version is also available.

Another idea-generation and selection tool called an abacus that generates coloured patterns (21) also exists in both manual and computerized versions.

Like the manual version of CK, the manual version of this second colour-based tool consists of coloured magnetic plaques that attach to a metal board. Some plaques are coloured like traffic lights—green is positive, red is negative, yellow is tentative. White is used for a neutral vote, black for an abstention. A grid is set up in which rows are statements and columns are group members. Members of the group indicate their reaction to each statement by placing plaques in the appropriate row. The result is a coloured pattern that can be "read" to identify issues on which there is good agreement (all reds, all greens), ones on which there are uncertain or mixed feelings (many yellows, whites, and blacks), and so on. Once the initial pattern has been created, a discussion is held. As participants change their minds, they make appropriate changes in their plaques, until a final pattern emerges.

6.2.14 Structural analysis matrix

Structural analysis has its historical roots in operational research and input–output modelling and went through much of its early development at the RAND corporation. A structural analysis matrix provides a framework for the clarification of relationships and can be used in futures studies in the identification of the key variables in the system being studied (6). The process begins with a listing of "all" imaginable variables. The initial list might be generated through a brainstorming session by the team, but consideration should be given to increasing this list through interviews and other information sources. The final list should not include more than 80 items.

The structural analysis is then carried out to determine the impact of each variable on all the others. This does not involve new research on the system but is based instead on information that people already have about it, often because of their professional experience in the sector concerned. This analysis may be done by the team members themselves or by experts through a
Delphi. In either case, the participants record their opinions on a matrix in which the number of points is the square of the number of variables, e.g. 2500 for 50 variables. An example of a very simple structural analysis matrix is given in Table 4.

Each member of the team rates each point on the matrix using an agreed scoring system. In a 0/1/2 system, the impact of variable \( a \) on variable \( b \) is rated 0 if there is no impact, 1 for a low impact, and 2 for a high impact. The scores are then counted, e.g. with a 0/1/2 system, a variable judged by an expert to have only a low impact on six other variables would have a score of 6. The participants' scores for a particular variable are then added together to give a total score, and the variables with the highest total scores are identified as the "key" ones, since they have the greatest total impact on the other variables. Variables that are the most susceptible to being influenced can also be identified.

The simplest structural analyses rank variables only according to their current direct influence. More thorough analyses involve tracing the impact of variables through various loops of influence. The tracing of indirect impacts can be tedious, but can be speeded up by means of microcomputer programs. Another variety, which overlaps with cross-impact analysis,

<table>
<thead>
<tr>
<th>Table 4. Example of a simple structural analysis matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable b</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Population growth</td>
</tr>
<tr>
<td>Land quality</td>
</tr>
<tr>
<td>Water quality</td>
</tr>
<tr>
<td>Mining activities</td>
</tr>
<tr>
<td>Refugee population</td>
</tr>
<tr>
<td>Armed conflict</td>
</tr>
<tr>
<td>Drug activities</td>
</tr>
<tr>
<td>Total influence of variable a</td>
</tr>
</tbody>
</table>

* 0 = no or insignificant influence; 1 = minor influence; 2 = major influence
evaluates variables in terms of their potential future impact. Participants complete a second matrix, indicating non-existing but possible relationships between the variables, i.e. ones that do not exist now but may develop as the system evolves. A “complete” structural analysis can thus include the identification of direct, indirect, and potential relationships between variables.

In the hypothetical example shown in Table 4, the demographic sector is analysed to determine which variables are the most important, both as inputs and outputs. The grid shows the rankings given by one expert participating in the analysis. In a real analysis, many more variables would be included, and the final scores would be based on all the experts’ judgements. A 0/1/2 scoring system is used, so that, as already explained, 0 indicates no or insignificant influence, 1 indicates minor influence, and 2 indicates major influence. The number in each box is the influence of variable a (at the top of each column) on variable b (at the left of each row). The summed scores indicate the total influence and the total susceptibility of each variable.

The numbers assigned by the expert reflect the situation in the particular country being studied. The population is growing rapidly, and the consequent need for food has resulted in marginal land being used for agriculture. This has in turn led to soil erosion and a decline in water quality caused by silting and chemical runoff. Water quality is also being damaged by mining activities, the most serious problem being mercury contamination resulting from gold mining. The environmental deterioration within the country is giving rise to a growing number of “environmental refugees”. Also contributing to the large refugee population is serious armed conflict, which is occurring in agricultural areas (where the fighting is over arable land and water sources), in mining areas (where it is over claims to mineral rights), and in certain mountainous areas (where clashes are taking place between rival drug cartels and between the drug cartels and the indigenous population).

6.2.15 Actor interviews and surveys

As noted earlier, interviews and surveys are often used as devices for soliciting expert opinion. It sometimes makes more sense for interviewees and survey participants to be selected not because of their expertise but because they belong to a particular group (e.g. policy-makers) or are associated with certain institutions or organizations—in other words, because they are or represent social actors. The rationale for this method is obvious—if information is needed about the future behaviour of certain actors, one possible way of finding it is to ask them. However, the answers obtained through direct questioning must be interpreted with care and supplemented with
other information, since actors may "hedge" their responses for reasons of self-interest.

6.2.16 Role playing

Role playing, in which members of a group assume the roles of different social actors and simulate their behaviour and interactions under a set of assumed conditions, is particularly useful when it is not feasible to obtain information directly from the actors about their intentions. This technique has a long and well established place within the political sciences and in actual political decision-making. For the method to work, the group doing the role playing must be knowledgeable about the social actors they are representing and must be willing to throw themselves into their roles. The effectiveness of the technique can be increased if props that make the situation more realistic are used, and the participants must be careful to remain in their roles throughout the exercise. A single simulation need not last longer than an hour.

Role playing is probably underused in futures work as a device for actor analysis. Its record indicates that it is quite useful as a device for understanding and forecasting the future behaviour of social actors. Furthermore, it requires no special training, takes only a short time, and costs nothing beyond the time invested. The fact that it is used so seldom probably arises from the embarrassment that many people feel in "play acting" rather than from a rational analysis of the method.

6.2.17 Actor analysis and political mapping

Interviewing or surveying key actors may provide a great deal of information, but in its raw state this information does not give a clear picture of how the actors may behave in the future. Developing such a picture is the function of actor analysis. There are many ways in which this can be done, including political mapping and the SWOT technique, in which all the key actors are evaluated in terms of their strengths and weaknesses, and the opportunities and threats facing them. More in-depth analyses look at the objectives and strategies of the actors and the ways in which these may interact in the future. Matrix devices and diagrams are usually employed to order the complex information obtained and allow it to be visualized.

In an actor-analysis tool created specifically for use in futures studies (7), key variables are first identified through structural analysis or other system-analysis technique. Whatever agents control the key variables are identified as the key actors. An initial table is then constructed in which the columns are actors and the rows are characteristics of the actors, e.g. their overall aims
and specific objectives, ongoing projects, motivations, constraints, preferences, resources available for projects, attitudes, linkages, current and past alliances and conflicts, means for resolving conflicts, and so forth. Where information is lacking, interviews, reviews of the literature, and other devices are used to fill in the blanks.

Examination of the table will reveal certain objectives about which the actors are either allied or in conflict. These objectives become the columns of another matrix, the rows indicating the various actors, and the contents of the matrix indicating the current attitude of each actor to each objective (in favour of the objective, opposed to the objective, or neutral). The information in this signed position matrix can be transferred to a diagram, with the objective at the centre, the actors placed around it, and signed arrows (+ and -) indicating the attitude of the actors towards the objective.

The next step is to determine the number of objectives on which the attitudes of each pair of actors diverge or converge. This can be done very easily if the number of actors and objectives are small, otherwise an algebraic device called matrix multiplication is generally used. The resulting new matrix indicates the number of objectives on which each pair of actors is in agreement and the number about which they disagree.

This information can now be translated into two diagrams, one showing convergences and the other divergences regarding objectives. In the convergent diagram, each actor is represented by a labelled circle or other symbol. Lines are drawn between those actors that are in agreement on one or more objectives. The number of agreed objectives is indicated both by the thickness of the lines and by a numerical notation on the line. The divergent diagram is drawn in the same way, but with lines indicating relationships of divergence. These convergence and divergence diagrams make it possible to see how much agreement and disagreement exists in the system, which actors have converging interests and are potential allies, which actors are in situations of greatest conflict, and so on. Further steps can be taken to modify the diagrams in order to incorporate information such as the hierarchy of objectives (how important each objective is to each actor) and the balance of power among the actors.

6.2.18 Simulation games

Role playing (see section 6.2.16) is actually a special case of simulation gaming in which the emphasis is on the actors and their interactions. Simulation gaming can also be used to develop an understanding of the entire system or to identify the key variables within that system. Many simulation games exist, both in computerized and non-computerized forms. In a simulation game that has been used quite widely in the futures approach (22), each
participant in the game takes the part of a minister responsible for a particular set of sectors. Information is presented at the beginning of the game about the existing state of the country and the demographic and socioeconomic situation. Ministers also have access to all information about the factors controlling the variables within each sector and about the interactions between the sectors. The government has certain resources available to it, and the ministers' task is to make a group decision about how those resources should be allocated. That decision is fed into a user-friendly microcomputer model that carries out the necessary projection process and reports back about the state of the country 5 years in the future—the size of the population, the condition of the industrial sector, the nutritional level, and so on.

This simulation game does not simulate any real country, and the projections calculated by the model are not the important ones, which are those that the participants attempt to do in their heads. The game's function is to help players to develop the skills that they need to analyse multisectoral systems. After they have played several rounds of the game, they understand how difficult it is to project the behaviour of interlinked variables, begin to develop a sense of how feedback loops and time delays operate, and gain insight into the unanticipated impacts of policies, including impacts on other sectors.

6.2.19 Time-space grids

Matrices in which time is measured along one axis and sectors or variables along the other are called time-space grids or time-series tables (3). A simple example is shown in Table 5. In a grid constructed for a national health-futures study, time might be divided into 5-year units spanning the past 30 years and 30 years into the future and cover such factors as demographic changes, epidemiological patterns, health-care delivery systems, availability of medical personnel, and so on. Historical and possible future events and relationships within these areas over the time specified are entered in the appropriate places in the grid. Despite their simplicity, these grids can be very helpful in organizing information and ideas and might be used by a national futures team for initial rough analyses.

6.2.20 Futures wheels

The futures wheel or problem diagram is another simple analytical tool that is widely used in futures work, where it is generally used to identify possible consequences of trends, events, or changes (8). An example is shown in Fig. 3. The process is begun by selecting something that might happen in the future. This is written down in the middle of a piece of paper or of a black-
board. Immediate consequences are then identified and written down in a rough circle around the central idea. The outcomes of these consequences are then considered and written down as offshoots of each of them. Since the number of consequences grows exponentially, it only takes a few rounds to

Table 5. **Example of a simple time-space grid**

<table>
<thead>
<tr>
<th>Aspect of health-care system</th>
<th>Period</th>
<th>Period</th>
<th>Period</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 years ago–10 years ago</td>
<td>10 years ago– today</td>
<td>Today–10 years from now</td>
<td>10 years from now–20 years from now</td>
</tr>
<tr>
<td>Health planning</td>
<td>National (first and second national health plans)</td>
<td>National (third and fourth national health plans)</td>
<td>Mixed. First steps towards regional planning</td>
<td>Primarily regional with some national control</td>
</tr>
<tr>
<td>Public/private mix</td>
<td>99% public</td>
<td>95% public, wealthy paying for private care</td>
<td>Major move towards privatization</td>
<td>About 80% private</td>
</tr>
<tr>
<td>Equity in access to health-care services</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Extremely low</td>
</tr>
<tr>
<td>Health-care priorities as reflected in money spent</td>
<td>Secondary and tertiary care in urban areas</td>
<td>Shift towards primary care as major expense</td>
<td>Secondary and tertiary care again due to privatization</td>
<td>Mixed; different in various regions</td>
</tr>
<tr>
<td>Development of human resources for health</td>
<td>Top priority to training of physicians</td>
<td>More training of midwives, nurses, medical assistants</td>
<td>Some tendency to return to top priority to training of physicians</td>
<td>No clear policy at national or regional level</td>
</tr>
</tbody>
</table>

* Time-space grids can be used to organize historical information and/or ideas about possible future events. In this hypothetical case, the total period is subdivided into decades, only five decades are covered, and limited details are recorded. In a real study, the subdivisions would be shorter, the total period longer, and much more information would be included.
Figure 3. Example of a futures wheel

The urban population doubles in the next 15 years

- Knowledge of traditional medicine declines
- More deaths and injuries caused by traffic accidents
- Air quality deteriorates
- Increase in respiratory diseases
- Increase in sexually transmitted diseases
- Traditional family ties are broken
- Number of vehicles in urban areas increases dramatically
- More people take up "modern" habits such as tobacco smoking
- Increase in cholera and other waterborne diseases
- More deaths and injuries caused by traffic accidents
- Health care declines due to fewer financial resources
- Number of physicians in urban areas declines
- Water quality deteriorates in the cities
- Wealthier people move to outlying suburbs
- Negative effects on health care, e.g. on safety of therapies using water

Increase in cholera and other waterborne diseases

WHO 97475
generate a long list. A wheel in which just three major consequences are identified at the first ring, three for each of those at the second ring, and so on through four rings will result in 120 consequences \((3 + 9 + 27 + 81)\).

Futures wheels can be done by individuals, by pairs who take turns, or by groups. If a group approach is taken, a consensus technique may be adopted, in which everyone in the group has the power of veto over every proposed idea. If a possible consequence is proposed and even one person in the group thinks that it is not likely to happen, the idea is dropped, immediately and without discussion, and the group moves on to consider other possibilities. If this rule is accepted and enforced, it is possible for a group to construct a four-ring wheel in a matter of a few hours.

The value of futures wheels lies in their capacity to elucidate unexpected consequences, particularly when a four-ring wheel is used. They also help a group to understand that it is hard to predict the total effect of an event or decision, since one series of consequences set off by the original event or decision may end up "colliding" with another. There is nothing "wrong" with a futures wheel that contains conflicts, since this is what happens in real life—a decision or action may lead to several sets of results, some of which may even cancel each other out.

6.2.21 **Statistical analysis**

Numerous methods exist for analysing mathematical data; some that are of particular relevance to the futures approach are described below. Teams wishing to use these tools will need to acquire more detailed instructions from standard textbooks on statistics or to hire a professional statistician.

It should also be noted that many commercial software packages currently available include forecasting models. Even simple spreadsheets can be very useful in providing initial calculations and graphs. If the purpose and design of the project justifies using software of this sort, teams should first check on packages already being used in their institutions. If this search does not yield the appropriate programs, the team should then contact software retailers. Electronic spreadsheet software can be used for calculations, cost-benefit analysis, and some simulations, projections, and model building. For more complex statistical and computational work (e.g. descriptive statistics, regressive analysis, analysis of variance, baseline data analysis), other software programs are available.

**Time-series analysis**

This involves searching the past and the present for trends and describing these trends as accurately as possible so that forecasts can be made of their
projected continuation into the future (3). In practice, this means that data on the history of a particular variable are collected and plotted as a line that is described by a mathematical equation, which is then used to calculate the value of the variable at some time in the future. The technique is based on the belief that the future will be, at least to some degree, a continuation of the past and present. When a system is seen to be moving in a particular direction, it is assumed that, by virtue of its momentum, the movement will continue and that the direction will remain the same.

The simplest kinds of time-series analyses and projections involve plotting data manually or with computer software programs and then extrapolating the plotted trend, often by eye. The training needed to do such analyses and extrapolations is minimal, and they have, at least in some fields, a fairly good reputation as devices for short-term forecasting over periods of a year or less. However, events and other trends may impact on the future behaviour of the variable, causing it to follow a dramatically different pathway than that indicated by a simple extrapolation. The further in the future, the less likely it becomes that an extrapolation will reflect reality. Trend extrapolations are therefore not a good method for use in futures studies, which by definition have a longer time-frame. Nevertheless, they are often carried out as a first step.

The other problem with simple extrapolations is that the data points seldom fall on a straight line or smooth curve; instead, they usually form a jagged pattern in which the “real” trend is hidden by the irregularities, so that extrapolation from the plotted curve is not always easy. Various methods have been developed to address this problem by distinguishing and “extracting” the systematic variations in the time series from random variations and unique events. The future of the variable can then be forecast by extrapolating the systematic variations. The methods most commonly used for this purpose include linear regression, curvilinear regression, Markov chains, moving averages, exponential smoothing, and decomposition, all of which are briefly described below. Detailed descriptions of these and other time-series analysis techniques can be found in mathematically oriented futures texts as well as in standard statistical handbooks (2, 23).

**Linear regression**

Many data series do not give straight lines when plotted but nevertheless contain trends that can be “fitted” to straight lines. Linear regression involves finding the straight line that best fits the data in the series. This line is described by the equation \( Y = a + bX \), where \( Y \) is the dependent variable being plotted, \( X \) is the independent variable, and \( a \) and \( b \) are the intercept
and slope of the line on rectangular coordinates, respectively. A line is considered to be the best fit when the square of the errors is a minimum, where error is defined as the vertical distance between the line and the actual historical value at the same time. In other words, the best fitting line is the one for which the sum of all the squared errors is minimized.

If a linear regression is successful, the best fit equation can be used as the basis for projection. The straight line can then be extended with the same slope to produce a projection, or, alternatively, any future time can be substituted for \( X \) in the equation to determine the value of the variable \( Y \) at that time.

The degree of association between the variables \( X \) and \( Y \) can also be calculated and indicated by the correlation coefficient \( r \) (also known as the linear correlation coefficient or Pearson's correlation coefficient). The value of \( r \) ranges from \(+1.0\) to \(-1.0\); both extreme values indicate perfect fit, i.e., that all the data points fall exactly on the straight line. A value that is close to 1, either positive or negative, indicates that there is a high linear relationship between the two variables. A very small value of \( r \) can indicate many things, e.g., a non-linear trend, a linear trend that is highly variable, a linear trend with seasonal irregularities, or a variable for which there is no trend at all.

**Curvilinear regression**

Where time-series data do not fit straight lines, other analysis techniques can be used to discover the underlying trend. One of these is curvilinear regression, a non-linear regression in which the dependent variable is expressed as a polynomial in the independent variable, e.g., \( Y = a + b_1X + b_2X^2 \). A log transformation, one of the commonest curvilinear regressions, involves calculating and plotting the logarithm of each value of the variable. Other transformations can be done by taking the square root of each value of the variable or some power, such as the square or the cube.

**Markov chains**

These are used to forecast the future behaviour of variables that move back and forth from one state to another. The recent behaviour of the variable is analysed to determine the underlying pattern of the transitions, and the projection is based on the assumption that this underlying pattern will remain the same. Markov chains are currently very popular, and articles based on Markov analysis are fairly common in the futures literature. However, the validity of the method as a forecasting device has not been fully evaluated.
Moving averages

This is a technique used to improve the fit of data to a line. For annual data on a variable over a given number of years, the technique involves first plotting the raw annual data and then the average values for overlapping multiyear segments. For example, a plot of 3-year averages would begin with the average of years 1–3 being recorded as the value for the second year. The average of the variable of years 2–4 would then be calculated and recorded as the value for the third year, and so on, until the final 3-year average has been calculated and recorded. Plots can be done to represent averages for intervals of different length—3 years, 5 years, 7 years, and so forth. The longer the averaging interval, the smoother will be the trend line, which can then be used to forecast the future behaviour of the variable.

The technique of moving averages has many advantages. It is simple to carry out, and computer software is available to facilitate the analysis. The method removes seasonal variations, which is an advantage as long as these are irrelevant to the problem being analysed. On the other hand, the method also has certain flaws, one being that the resulting curve lags behind the available data, since the most recent are averaged together with those from previous years, while another is that the technique requires a great deal of data, and can consequently become extremely costly.

Exponential smoothing and decomposition

Exponential smoothing is similar to moving averages but gives greater weight to the most recent data. The older the data, the less their influence. The decrease in weight is exponential, hence the name of the method. It is often used in conjunction with decomposition, a method that decomposes a time-series plot into three components—the basic trend, the seasonal patterns, and the averages.

6.2.22 Environmental scanning

Environmental scanning is a method of gathering information about developments, and particularly precursors of major future events, outside a particular sector or institution (in the "environment") but affecting its future (5). The traditional method of environmental scanning involves reading journals and other periodicals, clipping relevant articles, and building up a database that is regularly analysed to detect new trends. The information explosion is making this approach untenable, but new information technologies offer the possibility of new forms of environmental scanning.

The scanning process involves collecting, screening, and evaluating information, and possible information resources must therefore be identified.
Traditionally, these have been periodicals available to the group doing the monitoring—scholarly journals, popular magazines, newspapers, records of government proceedings, newsletters, bulletins, reviews, and so forth. The list of information resources normally begins with publications specializing in the topic that is the focus of the scan; others can be added as they are discovered, usually through references in selected articles. Thus a scanning process carried out by a health agency would begin with a set of periodicals specifically about health. Items in these periodicals regarding possible technical breakthroughs might then point to technological journals that could be added to the monitoring list.

The journals chosen are monitored regularly for items that fit the criteria of relevance. Obviously, these criteria should be chosen so as to eliminate items that have nothing to do with the issue or sector under consideration. They should also specify a restricted time-frame within which the items must fit, usually the period during which policy options would begin to have a real impact if they were put in place now; this often ranges from 1 to 50 years in the future. Selected items are clipped or copied and stored in an information collection or database. The database must be kept up to date, and older items should be removed and archived at regular intervals. These items can be gone through periodically to check on the effectiveness of the scanning system, e.g. to see whether any items described precursors that were not recognized as such.

Each item is evaluated at the time that it is found, and the entire collection is evaluated on an ongoing basis to identify possible new trends, patterns, and precursors. Eventually, the ongoing evaluation process leads to hypotheses about emerging trends or possible future events. Other resources are then sought and screened for information that relates directly to the hypothesis; this step involves scanning older information resources and/or a wider range of current resources. Hypotheses that are supported can then be used by the institution in its own planning for the future or, in the case of a formal futures study, to project what trends and events may be important in the future.

Because most sectors are affected by many others, a scan must be broad in scope. Both the information resources and the individual items should be chosen to ensure that every part of the “environment” is covered. One approach is to include items of four kinds in the scan, namely those covering economic trends and events, technological innovations, social change, and legislative and regulatory developments. Another approach, known as STEEP, involves gathering items that describe relevant patterns and emerging phenomena in the social, technological, economic, ecological, and political sectors.

Environmental scanning is often carried out as an ongoing activity to support decision-making and planning in an institution. However, a
condensed form of scanning can also be used in a specific futures project as one means of identifying emerging issues, new trends, and precursors.

The publications explosion since the 1950s makes effective manual scanning increasingly difficult. Scanning operations usually involve the regular monitoring of a large number of publications; the very largest may cover several hundred periodicals. Since there are almost 150000 serial publications in existence, and the number continues to grow, even the largest scans can deal only with an insignificant fraction of the available information.

Various systems and technologies, already developed or in process of development, are aimed at tapping information resources more effectively than is possible with traditional environmental scanning, e.g. software and hardware that allow articles to be copied directly into databases, where they can be searched for key words, organized by topic, linked by hypertext, and otherwise manipulated to extract the maximum information. Even more important are well established tools, available in many libraries, that facilitate searches for information of various kinds. A search in a CD-ROM index can, in a matter of seconds, yield a list of articles on a specific topic from thousands of different periodicals. Other tools, such as current awareness publications, abstracts, reviews, and bibliographies, can also improve the quality of a scan, broaden its scope, and reduce the time required to carry it out. On-line bibliographical databases reached via the Internet have the same advantages. Further information on the use of such technologies is given in Chapter 8.

6.2.23 Trend-impact analysis

Trend-impact analysis was developed in the 1970s (24). The forecast resulting from the extrapolation of a time series, which depicts the future as it will be if no developments affect the existing trends, is taken as the baseline. A list of events, e.g. political movements, new technologies, social changes, and other happenings that could affect the course of the trends, is then drawn up, and these are evaluated, both in terms of their expected impact on the forecast and their expected probability of occurrence. The analysis involves the use of combined sets of events and the adjustment of the baseline forecast according to the impact of each set. The result is a range of various forecasts of different assessed probabilities.

6.2.24 Cross-impact analysis

The original form of cross-impact analysis was developed in 1966, but the term is now used to refer not to a single method but to a whole family of techniques that are often used in futures studies (24).
Cross-impact analysis is used to analyse the interactions of future events and trends and as a device for selecting the assumption sets on which scenarios will be built. The necessary judgements regarding influence, probability, or desirability are typically made by experts through a Delphi or a survey, and an average (mean) value is then calculated from the responses.

The idea underlying cross-impact analysis is that the occurrence of an event or trend can affect the likelihood of other events. Three possible relationships exist: (1) the events or trends may be totally unrelated; (2) the occurrence of one event or trend may enhance or increase the probability of a second, by provoking it or facilitating it; or (3) the occurrence of the first event or trend may decrease the probability of the second by preventing it or making it practically impossible or politically unfeasible. Judgements about these relationships can be recorded in a cross-impact matrix that indicates the impacts that the items listed along the vertical axis would have on the items listed along the horizontal axis. An example of a simple cross-impact matrix is given in Table 6.

Impacts can be indicated in various ways, e.g. double plus (the first event or trend strongly increases the possibility of the second), plus, zero (no influence), minus, and double minus. An alternative is to use numbers ranging from some positive number to the negative form of the same number (e.g. 3 to −3). Either way, the data can be aggregated by adding them up to obtain a measure of the direct effects of an event or trend on the occurrence or non-occurrence of other trends or events in the set. The aggregated data can then be used to determine which events have the greatest influence and which are most susceptible to influence by others.

First-stage cross-impact matrices of this sort are often followed by more in-depth analyses that trace the impact of a single event through all its chains of influence. ("If this happens, then these two events are more likely to happen, and these three are less likely to happen, and that means that these other events are more likely to happen ...") This process can be cumbersome, especially if more than 10 or so items have to be considered. Software exists, however, that handles the tedious task of tracing and summing the chains of effects.

Another way in which cross-impact matrices can be used is as a device for recording experts' judgements about the probability of a particular event or trend happening, given the occurrence of another event or trend. Once these assessed probabilities have been recorded in the matrix, the probability of many different combinations of events can be calculated. In a highly normative study, this method can be adapted so that events are ranked on the basis of values rather than probability, the aim being to identify, not the most likely combinations of events, but the most desirable ones.
6.2.25 Guided imagery

Guided imagery is often used in visioning sessions of various sorts (25). A facilitator takes a group through the exercise, which usually takes about a quarter of an hour. Sitting quietly, often in the dark and with their eyes closed, the participants imagine travelling 15 or 10 years into the future to visit their envisioned society, community, institution, or country. The facilitator speaks quietly, "guiding" the participants into the future. ("The year is 2010. You have been away from home for many years and you have just

Table 6. Example of a simple cross-impact matrix

<table>
<thead>
<tr>
<th>Events influenced by those in columns 2–6</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality declines</td>
<td></td>
<td>0</td>
<td>+2</td>
<td>+2</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>Universal education for girls up to the age of 16</td>
<td>-3</td>
<td>-3</td>
<td>0</td>
<td>0</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>100% immunization</td>
<td>+1</td>
<td>+2</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Safer childbirth</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>Rapid population growth continues</td>
<td>-3</td>
<td>-3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
</tr>
</tbody>
</table>

* A cross-impact matrix is used to record experts' judgements about the influence that future events would have on the occurrence of other future events. It is typically used to identify sets of events that seem likely to occur together and can thus be included in the same scenario frame. In this example, the assessed influence is expressed as a numeral (e.g. +3 means that the first event would greatly increase the chance of the other event occurring, -3 means that the occurrence of the first event would greatly decrease the chance of the other event occurring, etc.). The judgements made by the expert indicate that the first four future events would most probably occur together (at least within the country), but that they would probably not occur together with continued rapid population growth at the national level. In a real project, a matrix would include many more items, and opinions would be solicited from numerous experts and then summed.
returned...”), pointing out to the participants what they should pay attention to, and what they should notice in the images that come into their heads—how things look, feel, smell, and sound. The instructions must not be too specific, however, nor should they reflect the facilitator’s own values. If the facilitator asks “What do the cars look like?” or “What kind of computers are being used?”, this implies that the vision must include cars and computers, while questions such as “How are people getting from one place to another?” and “What tools are people using in their work?” point to the kind of factors than may be important in determining the quality of the future but leave the participants free to imagine a wide range of possibilities.

When the exercise ends and the lights are turned on, the participants note down the aspects of their images that they found most important, striking, surprising, or original. These are then used during the remainder of the visioning session as contributions to the common vision generated by the group.

6.2.26 Relevance trees and paths

Relevance trees are used in optimization, i.e. for finding the “best” solutions (3). In futures studies they are often used to determine the best overall strategy and tactics for reaching a particular future. The technique involves the drawing of a diagram that looks like a tree, hence the name. The base of the tree represents a particular objective, from which arise branches signifying various subcategories of objectives. The subcategories in turn branch off into general lines of actions, which give rise to specific actions, the “twigs” of the tree. Such a tree usually involves 5-7 different levels. Once the tree is built, a weight can be assigned to each item to indicate how much it could contribute to the successful achievement of the larger objective of which it is a part. The significance of the different lines of action represented by the relevance tree can then be determined using matrices.

6.2.27 Cost–benefit and risk analysis

Cost–benefit analysis is a technique borrowed from economics and used in futures studies to weigh various options (2). The underlying concept is that a “best” solution or pathway exists and is that in which the ratio of cost to benefit is the lowest. Once alternatives have been identified, a list is made of the potential costs and benefits of each. The cost–benefit ratios are then calculated, and the alternative that provides the greatest benefit per unit cost (or lowest cost per unit benefit) is then chosen. Such an analysis may be used, for example, in selecting the best strategy for achieving a particular desired scenario. It is also used to evaluate scenarios themselves, although it is then
likely to be inadequate. Risk analysis is essentially a variety of cost-benefit analysis, in which benefits are weighed against risk rather than cost.

Some cost-benefit analyses can be carried out by means of linear programming, a mathematical procedure that identifies the "best" solution to a problem. The goal to be achieved must be stated precisely, the possible actions for reaching the goal must be specified, and the constraints must be defined. Linear programming is a subset of optimization modelling, which is described in section 6.3.5.

6.2.28 Multiobjective, multicriteria decision-making

In decision-making, it is necessary to decide first of all on what criteria, and on whose criteria, alternatives will be judged, e.g. on what basis one scenario or another will be identified as being the most desirable. Where an issue is complex and many decision-makers and/or stakeholders exist, the answer may not be obvious. Those involved in decision-making are likely to see the problem in very different ways and hence to disagree about general and specific objectives, how much attention should be paid to present and future generations, to the interests of different regional, ethnic, sex, or age groups, and so on. Such disagreement relates not only to the answers, but also to the questions.

Many of the traditional methods used in evaluating alternatives, such as cost-benefit analysis, may lead to a decision but fail to resolve the conflicts because they approach the issue from a single perspective. One solution to the problem is therefore to use some type of decision-making method that involves different perspectives. One example of such an approach is TOP, in which decision-making is done from technical, organizational, and personal perspectives (26). Other methods first identify various criteria and objectives (3), often those advocated by different stakeholders, and then evaluate the alternatives according to these criteria or objectives. In practice, a list is made of the alternative actions or policies being considered, as well as of the criteria on which they will be judged. The consequences of the alternative actions or policies are then analysed, after which all these consequences are ranked according to the various criteria. Finally, the results are tabulated and summarized.

Variations on the basic system are also possible, including some in which the criteria are weighted, and others in which computer software is used. A recommended course or set of policies may be defined once the analysis is completed, but the normal role of the software is not to make the decision but rather to provide a framework for analysis and negotiation.

It may help to use computer software designed for decision-making processes. One such computer program was originally developed for use in
decision-making in the environmental field but can be adapted to any other sector (22). It is specifically designed to support the multicriterial and multiobjective analysis of problems in which more than a single basis can or should be used in evaluating alternatives. As pointed out above, the program does not make the decision, but it does help the decision-makers to clarify their own positions and facilitates communication and negotiation among them.

Another software package for making decisions and judgements (21) was originally developed for use in futures projects within the industrial sector but can also be applied to decision-making in many other sectors.

6.3 Computer software and models

6.3.1 Roles of software and models in futures studies

Computer software must be selected and used with care since it tends to be expensive. Computer models can also be highly distracting and cause teams to lose sight of the purpose of their work. For all these reasons, computer software is recommended only if it carries out a unique and essential function or if it provides the least expensive or most efficient means of using a particular method. Thus, before a group doing a futures project purchases a piece of software or builds a model, they should ask themselves whether it is really needed and whether a less expensive and time-consuming tool might be perfectly adequate for the task in question.

Groups interested in using computer software to support their work will find there is much to choose from. The first step is to distinguish between the following categories:

- Software that organizes information or carries out a certain analytical function on data, but does not model the whole system being studied.
- Models that simulate a given system or process and are designed to help users to understand that system or process.
- Generic models into which users load information about a specific system in order to represent that system.
- Modelling language software and modelling frameworks used in building models of various types.
- Original models constructed from scratch, using modelling software plus information about the specific system.

6.3.2 Software that carries out simple functions

Mention has already been made of computerized versions of many of the basic techniques used in futures work—morphological analysis, structural
analysis, actor analysis, cross-impact analysis, and so forth. Support software is also available for idea generation, group decision-making, and other group processes (18) and for most statistical procedures (3).

6.3.3 Simulations of particular systems

Numerous models are available that simulate the behaviour of specific systems, e.g. the whole world, a hypothetical country, international politics, the acceptance of a new concept, and so forth. Such models differ enormously in their usefulness, cost, hardware and data requirements, and in the quality of their documentation. The trend is toward models that cost less and can be run on personal computers. Many such models are reviewed in Managing a nation (22).

In most models of this sort, the internal structure and relationships are fixed, but the user can change the conditions, including the policy options. When the conditions are set and the program is run, the results show how—according to the modellers—the system will respond under the chosen conditions. Various actors within the system are often specified, and their interests and strategies are programmed into the model. By “playing” with such models and testing different sets of conditions, members of a futures team can develop new insights into how their own sector works, as well as a better understanding of processes going on in the external environment.

Some global models simulate political and economic relationships among the countries of the world, while others simulate global interactions between population, land, resources, environmental pollution, and capital invested in agriculture, industry, and services. Simulations range up to 100 years. Some deal with entire countries and allow various simulations, such as the effect of alternative policies on development, the effects of demographic patterns on different sectors, or the effects of employment and income distribution. Others analyse alternative assumptions about national and global futures and incorporate submodels covering areas such as economics, population, energy, and agriculture. Yet other simulation models represent not the world or a country but a process such as specific health-care interventions or family planning measures, or even the interactions between a political or social action group and the society of which it is a part.

6.3.4 Generic simulations

Unlike the models described above, generic simulation models do not represent any specific system but provide a framework into which certain kinds of information can be loaded in order to simulate different systems. The danger
in using these models is that their own structure may include descriptions of mathematical relationships that do not hold true for all systems. The framework must therefore be thoroughly understood before such models are used.

One example of a generic modelling framework (4) does not represent any particular system, but can be used to represent many different ones, and is often used for that purpose in technological forecasting. Despite its comparative simplicity, it does allow insight into complex systems, and provides an understanding of the effects that variables can have on each other.

The user supplies initial values for each of the variables in the model, a matrix indicating the effects that the variables have on each other, and a set of environmental factors that have an effect on each variable. The system's behaviour is then simulated by the program through the integration of the differential equations underlying the interactions among the variables. The product is a plot showing the changes in the variables over time. The user can specify the length of the run, the time interval between points on the plot, and the forms in which the product is displayed (graph on screen, graph sent to a printer, or data stored in a file).

The original version of this modelling framework was based on paired interactions, so that each variable was influenced by only one other variable. This flaw was later addressed, and new versions can handle complex interactions. It is still necessary for groups using this or similar frameworks to verify that the differential equations underlying the model correspond to those in the real system, or the results will be invalid.

Another generic modelling framework (27), is designed for in-depth analysis and the strategic management of issues that are likely to change over time, and operates by generating alternative plausible future scenarios describing both the performance of the system being analysed and the behaviour of its external environment. Each simulation run produces a single scenario.

For the model to work, certain information sets must be loaded in. One set consists of trend projections, including initial assumed forecasts of the organization's performance over time and of exogenous trends, or a model that generates such projections, while a second consists of a cross-impact model for those events whose occurrence would have important consequences for the system being considered. When a simulation is run, the modelling framework uses the cross-impact model to compute the probabilities of the occurrence of each event in the first year, and then uses a random number simulation to decide which events will occur in that year. It then uses the results to adjust the initial forecasts and the probability of remaining events in subsequent years.
The adjusted forecasts are reported to the participants using the simulation. They assess the result, and decide whether to change their strategy and, if so, how. After their decisions are put into the framework, another run is made to cover the second year. The participants consider the results, make decisions, enter them in the modelling framework, and so on, until all the years within the period specified have been covered. The product of such a simulation is always a scenario describing one possible future and taking the form of trend projections over time, together with a description of events that influenced trends and when they occurred, and the policy changes introduced by the analysts and their impacts.

One feature of this modelling framework is that the users cannot select a single, determined set of assumptions but can only indicate the probabilities of various events. Thus, different things may happen each time the model is run, even if the initial assumed forecasts are the same, so that the framework reflects the uncertainty of the real system. The simulation is also made more “real” by the fact that it stops after each time unit, thus allowing the kind of ongoing reviews and policy adjustments that occur in actual situations.

6.3.5 Modelling languages and frameworks

Building an original model can be a long and expensive proposition, and learning to build good models can take years of practice. If the purpose of the study requires the building of a model, at least one member of the team must be an expert modeller, or funds must be available to hire a modeller as a consultant.

There are literally hundreds of modelling languages and frameworks that can be used to build original models; prices range from US$100 to over US$100,000. The Society of Computer Simulation International, which publishes the magazine Simulation, produces annual reviews of modelling language software. The review of each item of software includes a very brief description of its function, the required computer hardware, the operating system, and other support software, where to write for detailed information, and the approximate cost. The Society’s 1990 reviews of about 200 software items are available in the book Managing a nation (22). Groups who do not have access to this book or who want updated versions of the information should write to the Society for Computer Simulation International, PO Box 17900, San Diego, CA 92177-7900, USA (tel: 1 619 277 3888; fax: 1 619 277 3930; e-mail: scs@sdsu.bitnet).

Model construction is based on certain assumptions about reality. Modellers are rational and scientific. They see events not as mysterious happenings without causes, but as the natural results of interacting forces, and therefore believe that even complex systems can be understood through
observation and analysis. They also think in terms of systems and complex interactions and tend to engage in both reduction and synthesis, i.e. they like to take a system apart, study the elements, and then reconstruct the whole and examine its behaviour. Finally, they are future oriented, i.e. their aim is to use historical information and current understanding to elucidate what the future may bring.

Despite these common features, models are based on markedly different paradigms, of which three will be considered here, namely, system dynamics, econometrics, and optimization. Further details and examples of these three approaches can be found in the literature (28, 29).

System dynamics, econometrics, and optimization differ from each other in several ways. They use different information bases, are based on different mathematical procedures, and differ in the relationships among the elements of the system. These can be:

- **Deterministic** (related by absolute statements) or **stochastic** (related by probability statements).
- **Discrete** (with a relationship that can be described by thresholds, discontinuities, and individual points) or **continuous** (with a relationship that can be described by a smooth line without jumps or breaks).
- **Linear** (in a relationship that gives a straight line when shown as a graph) or **non-linear** (in a relationship that gives a curved line when shown as a graph).
- **Simultaneous** (responding to each other in a time period that is insignificant within the model) or **lagged** (responding to each other after a significant time delay).

Most importantly of all, these different modelling paradigms are aimed at the fulfilment of different functions. System dynamics is used to clarify a system’s internal structure and forecast its behaviour under certain conditions, econometrics to make short-term predictions based on historical data, and optimization to determine the best solutions among various defined alternatives. Different types of models are therefore useful at different stages in policy-making. A system-dynamics model can be useful early in a formal futures project or a policy formulation process so as to provide a better understanding of the structure and operation of the system. Econometric modelling can be used to generate short-term future scenarios as part of the process of identifying alternative strategies. An optimization model is appropriate for determining the best way to reach a desired future.

Any group considering the construction of an original model should therefore review the purpose of their work and the basic function that the model must fulfill before selecting one of these approaches. The fact that different sorts of models serve different functions can be forgotten very
easily when an enthusiastic modeller begins urging the adoption of a favourite model or modelling program.

Model building for a futures project should also be delayed until the group has a clear idea about the time required to build a model and its cost, and also knows what kind of data would be required. An optimization model of an extremely simple problem can be built very quickly, but one of a major and complex issue can require years of work, including the time spent in collecting the required data. The assembling of databases can likewise delay the construction of econometric models. System-dynamics models are not so data hungry, but may require long periods of time to be spent in interviews and direct observations of the system and its actors, since this method of modelling is based on a deep understanding of the relationships underlying the system’s behaviour, including intangibles such as motivations. No matter what kind of model is built, adequate time should also be allocated for validation and sensitivity testing.

**System dynamics**

This is aimed at identifying the underlying structure of complex social systems that gives rise to their long-term dynamic behaviour. System-dynamics simulations are thus fairly closed models that focus primarily on the internal organization of the system rather than on external events happening outside it.

Within a system-dynamics model, accumulations of material or information—ideas, perceptions, knowledge, population, money, capital stock, natural resources, and so on—are represented as levels. The flows of material or information among the levels are designated as rates. Not all levels and rates are physical quantities, but all have real counterparts in the system being modelled. The whole system is driven through a set of interconnected feedback loops, i.e. relationships involving two-way causation, so that, when a decision is made within the system because of certain information, and that decision leads to action, the action then changes the system. There are flows of materials or information, and levels change. New information about the state of the system then feeds back to the decision point, causes new decisions, new changes in the system, and so on. Changes do not necessarily occur instantaneously, however, because the feedbacks are delayed or lagged. Feedbacks can be positive, i.e. they amplify disturbances, or negative, i.e. they counteract an initial disturbance and move the system back towards equilibrium.

The behavioural patterns of the system are caused by the loops. Thus exponential growth occurs in systems in which there is a dominant positive feedback loop, while a strong negative feedback loop causes a system to peak
and then return to its original state after disturbance. Oscillatory behaviour results from a strong negative feedback with a time delay, and linked positive and negative loops that respond without significant time delays underlie sigmoid curves.

System-dynamics modelling can be used in structural analysis, i.e. to determine how a particular system is actually put together and thus what its key variables are. If all the important relationships are built into the model, but it does not simulate the system's actual behaviour, this is often a signal that some essential factor or relationship has been overlooked. A system-dynamics model can also be an effective means of actor analysis, since it allows the inclusion of information about the goals, values, desires, expectations, and perceptions of the actors.

System-dynamics models have numerous advantages. They handle the kind of relationships that often occur in real social systems, namely those that are non-linear and involve lagged feedbacks. They deal with whole aggregate systems, so tend to have few details and are generally small, containing between a few dozen and several hundred endogenous variables. As a result, they tend to be quite transparent and easy to understand. The drawback of this simplicity and clarity, ironically enough, is that they are often dismissed by decision-makers who in effect say "If I can understand it, it can't be worth anything".

Another advantage of such models is that their data requirements are modest. The model is aimed at the aggregate system, so that disaggregated data are not needed. Historical time series used for parameter estimation are of limited relevance and are not required in a functional system-dynamics model. Parameter estimation is not so important for several reasons, e.g. precise prediction is not a goal of system-dynamics modelling. In addition, the non-linear structure of the models make them less sensitive to differences in parameter values; the negative feedback loops tend to return the system to equilibrium, balancing out small differences in numerical values within it. Numerical data nevertheless do play a role in the model, but the work put into estimating parameters should be kept at some reasonable level, since the quality of the model does not depend markedly on the accuracy of the parameter estimates. There are, of course, situations in which the system is very sensitive to a single parameter, so that changes in that parameter cause changes throughout the system. Such parameters are important, since they may represent important leverage points in the real system, and they must be carefully estimated, but sensitivity analysis—testing the full range of uncertain parameters to see what effects they might have—is often done quite informally in system-dynamics modelling.

Although large amounts of numerical data are not required for a system-dynamics model, it is essential to understand the system being modelled. If
such an understanding is lacking, the process of building the model can promote its development. Information about actors is part of the picture and can be obtained through interviews and other standard means. With an understanding of the system and familiarity with system-dynamics ideas, a modeller can build a model using any general-purpose modelling language, while languages developed specifically for system-dynamics modelling are also available.

The validity of a system-dynamics model is checked by making sure that every component of the model has a counterpart in the real system and that any parameters sensitive to numerical changes in the model are also sensitive in the real system. Other tests include running the model under extreme assumed conditions to see whether the resulting behaviour is plausible, and running it under known historical conditions to see whether the behaviour pattern generated is the same as the historical one. In practice, the validity of system-dynamics models is judged primarily on their utility and their ability to represent the actual behaviour of the systems that they simulate.

The output of a system-dynamics model is a qualitative description of a system's structure and behaviour under various conditions. Such a model can be an extremely valuable tool in developing a general understanding of the system as a foundation for policy-making and strategic planning or as part of the analysis in a formal futures study. The model does not yield precise values of key variables at specific times, so is not a useful tool for quantitative forecasting and the construction of probable future scenarios. However, if the group doing a futures exercise wants scenarios describing how the system might behave under various conditions, as opposed to what is likely to happen, system-dynamics modelling is a highly appropriate method.

Econometrics

In econometric modelling, systems are seen quite differently from the way that they are seen in system-dynamics modelling. The dynamic component of their behaviour is not considered to be of such great interest, since systems that are not at rest are considered to be on their way from one optimum or equilibrium point to another. Furthermore, the goal of the modelling activity is not to determine the underlying causes of the system's behaviour, but rather to predict its future behaviour on the basis of historical data.

Whereas in a system-dynamics model the system's structure and internal relationships are represented as levels, rates, and feedbacks, in an econometric model they are represented by a set of equations describing numerical relationships between variables. Unlike system-dynamics models, econometric models are typically open, driven in part by exogenous variables. The
feedback loops that are so essential in system-dynamics models are present in econometric models but are not so important, and most of them are represented by simultaneous equations indicating that time lags are insignificant.

Building an econometric model consists of two steps: (1) specifying the structure of the system using economic theory; and (2) estimating the parameters (statistically quantifying them) using historical data. A number of sophisticated estimation techniques are available, but in practice the technique most often used to estimate the parameters for an econometric model is linear regression (see p. 156). Application of this statistical method requires all relationships to be linear or to be transformed into linear form.

It can be argued that econometric modelling does not accurately reflect the economic theory on which it is based. Economists certainly believe that economic relationships can be non-linear and delayed, but econometric models focus on linear and simultaneous ones. Economic theory does not exclude the possibility of economic systems behaving in unprecedented ways, but the models assume that the systems will behave as they have in the past. Economics also recognizes the important effects that unobservable factors such as human desires and motivations can have on social systems, but econometric models exclude such factors. Even measurable variables are left out if there are insufficient historical observations to allow estimation of their statistical relationship to other variables, so that very important factors can be omitted.

Another flaw inherent in econometric models—one that has led to much criticism—is that they fail to address questions about underlying causes. The equations that make up the model express statistical relationships, but not necessarily functional ones, although they are sometimes interpreted as such. This raises questions about the limitations of econometric models as devices for the structural analysis of a system. On the other hand, econometric models are well suited for short-term forecasts. Once the coefficients of the equations have been determined using the historical observed values of the variables, the model can be run to generate the values of these variables at some future time. It is assumed that there will be no changes in the relationships from the time that the estimate is made and the end of the forecast period, an assumption that becomes increasingly unlikely as the time span of the forecast is increased.

The strength of econometrics lies in the fact that the model is based on real-world observations. Disaggregated data are not usually needed, since the models typically deal with highly aggregated variables. Nevertheless, data requirements are rigorous, so that systems for which accurate and complete data are unavailable are not good subjects for econometric modelling. Data requirements can also push up the cost of building an econometric
model, if a large, high-quality database has to be constructed before the modelling process can begin.

The validity of econometric models is often judged on a quite subjective basis, by running the model and checking to see whether the resulting variable values are "reasonable". Another approach involves running the model over some historical period and checking the results against the real-world data—something of a circular process, since the real-world data were the basis for the model in the first place. Sensitivity testing is also a problem. Econometric models are more sensitive to parameter variation than system-dynamics models, both because of their structure and because they are aimed at precise prediction, but thorough sensitivity testing is seldom done because of the time and cost involved.

Optimization modelling

Optimization models are quite different in their purpose from the two types of models described above. Rather than being designed to simulate systems, they are constructed to identify the best solutions to particular problems. Models of this sort are often used in operational decision-making within industry, but they can also be used to solve policy problems in other sectors.

The basic function of optimization models is the selection, from many possibilities, of a single option that allows the maximum achievement of some goal under a specific set of conditions. The goal must be expressed as the maximizing or minimizing of an "objective function", which is some measurable aspect of the welfare of the system. This objective function may be GNP, per capita income, the saving of scarce resources, or some non-economic measure of social well-being. The policy choices open to the decision-makers are the control variables. Necessary and desired relationships among the control variables, i.e. certain things that physically must add up (e.g. the resources invested in different ways must equal the total resources invested) and social and political boundaries to the solutions, comprise the model's constraints. Once the objective function, options, and constraints have been clearly defined in mathematical form, the problem can be solved by finding the maximum or minimum point in the area defined by the constraints as being feasible.

An optimization model always has a single objective function, but secondary objectives can be expressed as constraints. The function is, in effect, the constraint that has been singled out as most important. Thus a health-care optimization model might be built to find the least expensive way to provide health care without the quality falling below certain standards, or to find the best way to provide high-quality health care without exceeding a
certain cost. The choice of the objective function and the constraints are always value judgements made by the modeller or the modeller’s clients.

The objective function and constraints of an optimization model are often expressed as linear equations. The model is then an example of linear programming, a mathematical procedure for which many computer programs are available. The building of the model is simplified by the existence of such software, but the process of representing the problems may be complex, difficult, and immensely time-consuming. Many optimization models are highly disaggregated and contain hundreds or even thousands of equations, which makes them costly to run, as well as opaque and difficult to understand.

Optimization models are powerful decision-making tools that are often relevant to the practical concerns of policy-makers. They can provide solutions in the final stages of decision-making, when the goals are established, the options have been narrowed down, and the constraints agreed. If these aspects of a problem have not been clarified, the construction of an optimization model can reveal where the conflicts lie, give a clear indication of the trade-offs that must be made in the decision, and facilitate discussion and negotiation. Optimization models can also be used to investigate how changes in priorities, and hence in objectives or constraints, can shift the decision point, making a different solution the “best” one. And, finally, such models can be used to identify sets of objective functions and constraints that have no mathematical solution—i.e. which options, under which constraints, make achievement of the objective impossible. However, optimization models in themselves have limited usefulness as means of understanding a system’s structure and behaviour or formulating policy options in the first place.

Optimization models are often not tested very thoroughly for sensitivity. This is unfortunate, since they tend to be very sensitive to small changes in parameters. The output is a single point, and small changes in the objective function or constraints can move the point significantly and result in completely different policy choices.

6.4 Tool kits and consulting services

Several futures tool kits exist—some as publications, some as software, some as both—and clients can also arrange for consulting firms to handle certain futures processes for a fee. Costs vary tremendously, as the few examples here demonstrate.

One book on technological forecasting (4) focuses primarily on this aspect of the futures field. Trend analysis tools predominate, but other standard methods such as Delphi, environmental monitoring, scenarios, cross-impact,
and relevance trees are also included. The book comes with software for a program which creates data files, sorts data from Delphi rounds, fits curves to data, and runs a simulation model (see p. 166). This is a simple generic simulation model that can be used to project the behaviour of various interacting variables under chosen conditions, including impacts from outside variables. A teaching and demonstration version of a cross-impact model is also included.

A tool kit has been produced in the form of a slim paperback volume (21) that describes many standard methods (scenarios, structural analysis, morphological analysis, Delphi, cross-impact analysis, relevance trees, and multicriteria evaluation), as well as special tools and variations created by the author and others. More detailed coverage of the same tools is provided in two other books by the same author (6, 7). Computerized versions of many of these tools are also available, but are expensive.

A guide to technology forecasting and strategy analysis methods (3) is available. Some methods described are specific to technological forecasting (e.g. patent trend analysis and portfolio analysis), but most are used throughout the futures field—trend extrapolation, time-series estimation, regression analysis, system dynamics, S (sigmoid) curves, historical analogies, interviews, questionnaires, group dynamics methods, scenarios, and paths and trees. The guide includes a table giving average costs of many of the methods.

6.5 Application of futures tools and criteria for selection

As has already been pointed out, teams should first decide the purpose and design of their work. They can then go through the design, ask what function has to be performed at each step, and select the tools that they prefer. The resulting “toolbox” may include a large number of different tools or only a few, depending on the project. Particularly if teams are working to a tight schedule, they may find it easiest to use a “prepackaged toolbox” such as those mentioned in section 6.4. The obvious advantage of such packages is that they can save the time that would be spent in looking for individual tools, but serious difficulties will arise if a team uses a set of tools that has been assembled for a project quite different from their own in purpose and design.

There is no reason to use a more expensive or complicated technique than is necessary at any point in a project. Expensive tools, including computerized versions of standard methods, are not necessarily better than those that are less costly or even free. Similarly, complex tools, including complex models, are not necessarily better than simple ones. Teams should also be
careful not to select a particular method just because it is a "standard" futures technique or because it is currently fashionable.

The following checklist may help teams to evaluate possible tools—including computer software of all sorts—for a futures project:

- Is this tool designed for the task that must be carried out at this point?
- Of all the tools available for this particular task, is this the simplest?
- Is it valid? Does it make sense? Does it really work? Does it do what it is meant to do?
- Is it robust? Can it be applied in many situations, or is it applicable only under a narrow set of conditions?
- Is it affordable? Is the cost reasonable in the light of the expected benefit?
- What hardware and software support, if any, does the tool require?
- What data are needed to use it? How long a time series is required? How disaggregated must the data be?
- Does the tool require outside expert opinion or other input?
- How much time does it take to learn how to use this tool? How much time does it take to use?
- Is it transparent and user-friendly?
- Are clear documentation, training, and support available?

As pointed out earlier, there is no one-to-one relationship between the functions that futures methods perform and the individual tools. The same can be said about the relationship between the components of an exercise (clarifying issues, gathering information, etc.) and the specific tools. Several different tools can generally be used to carry out a particular component. Some components may even require more than a single tool, while there are certain tools—e.g. Delphi, morphological analysis, and cross-impact analysis—that can be used in more than one component.

To take one example, imagine a forecast exercise aimed at projecting historical and current trends in order to generate a number of feasible scenarios. What will be involved in the component labelled "identifying and acquiring information"? Existing databases will be identified and used, relevant published information will be gathered, and there will also most probably be surveillance activities to gather current data about the sector. Now imagine a similar exercise, modified so that the projections take into account the impacts of possible future events. There is no database on future events, but there is information in the form of opinions and ideas. So "identifying and acquiring information" might involve soliciting expert opinion through in-depth interviews or generating ideas about possible future events through brainstorming sessions.
Box 9. **Examples of how futures methods and tools can be applied outside formal futures projects**

- An ongoing surveillance programme for a sector can be expanded to include environmental scanning, so as to ensure that important developments external to the sector but relevant to its future are identified and then tracked.

- Brainstorming, attribute listing, checklists, or morphological analysis can be used to generate innovative solutions to problems that cannot be solved by an institution's regular method of problem-solving.

- Actor analysis can be used when an institution is considering its long-term strategies and wishes to identify possible sources of conflict with other agencies and organizations and areas where it may be able to cooperate with them.

- Key variables analysis can be useful if questions arise about whether current policies and practices are actually dealing with the most important factors in a system.

- Multicriteria, multiobjective evaluation methods can be used whenever a choice must be made between alternatives and consideration must be given to more than one set of stake-holders or set of values.

- Doing a quick plot to show recent changes in an important variable can draw attention to a trend that should not be ignored.

- Guided imagery can be a useful technique for re-empowering a group of people who are overwhelmed by current problems and feel themselves incapable of solving those problems.

- The Delphi method can be used when an institution needs an accurate survey of outside expert opinion on any aspect of its current or future situation.

- An organization that finds itself repeatedly surprised by, and unprepared for, change may improve its foresight capacity by brainstorming about possible wild-card events.

- When a persistent problem does not yield to a rational solution, building a system-dynamics model may reveal its underlying cause.

- When a goal has been selected, but it is not clear how it can "best" be reached, building an optimization model can clarify the options.

- If an institution or group has become stuck in a single way of thinking, just posing the question "What if..." can stimulate new ideas and approaches.
Similar examples could be given for all the common components of futures work. There are no rules of thumb about which methods to use at each stage of the work. A large number of tools are potentially useful in the execution of each component, and the nature of the specific project will determine which of them is appropriate.

It should also be remembered that futures techniques are applicable not only in projects that are specifically labelled as being futures work, but can also be applied within existing, ongoing policy-making, planning, and programmes to add new dimensions and insight. A few examples are given in Box 9, but teams should feel free to use their imagination in finding ways to use futures tools within their institutions. The possibilities are endless.

References


CHAPTER 7

Application of futures techniques to health

7.1 Current status

Until recently, the international health-futures field has been dominated by the industrialized countries. The best-known work has been done in a few countries by a small group of institutions such as STG in the Netherlands, the Institute for Health Systems Development in Japan, and the Welsh Health Planning Forum in Wales. Many factors have contributed to this situation (1). Futures is better established in the developed countries than in the developing ones, since richer societies generally pay greater attention to long-term problems and possibilities than do those preoccupied with current threats to survival. Also, health futures research is easier in countries where much of the knowledge base for health futures is created and published. In particular, health professionals who read English and live near research libraries well stocked with English-language books and journals have much easier access to the international literature on health futures than do their colleagues elsewhere.

The potential of computer networks to provide equality of access to information remains unfulfilled. Health professionals are more likely to have access to the Internet if they live in industrialized countries. Full connections to the Internet, with the possibility of tapping databases, moving files, and reading on-line library catalogues are still rare in developing countries. Furthermore, resources created in the United States dominate, and many of these are of limited usefulness elsewhere. The same can be said about many tools used in health-futures work. Cost is also a major problem, since expensive proprietary tools are beyond the financial reach of many potential users in developing countries. Also, sophisticated computer models and informatics systems can be difficult to transfer, since they often require advanced equipment, elaborate databases, and technical support. Another problem is that the models available often address problems or make assumptions that are specific to the industrialized world. Tools that are adaptable, of high quality, easily accessible, and broadly applicable are still the
exception, and this lack of appropriate tools is yet one more factor discouraging and impeding health-futures research in many countries.

However, the situation is beginning to change, thanks to the effort being made by WHO to encourage the application of futures in support of health planning and policy-making; health for all by the year 2000 is one of the most important pieces of health-futures work ever done and, as the major international vision of future health, has inspired health strategies around the world for almost 15 years. Today, WHO continues to encourage long-term perspectives on health. The World Health Assembly at its forty-eighth meeting in 1995 adopted resolution WHA48.16 calling for the elaboration of a new global health policy to guide the updating of health-for-all strategies. One aspect of the new policy will be an analysis of health up to the year 2025.

WHO also convened an international consultation on health futures in 1993 (2, 3). The consultation, the first of its kind, brought together health professionals and futures experts from most parts of the world and drew international attention to the health-futures activities going on in many different countries. It has been followed up by a variety of activities, including the publication of two special journal issues about health futures (4, 5) and the preparation of this handbook.

Health futures has also received attention at WHO's regional offices. The WHO Regional Office for Europe has held several international consultations on future trends and the European health-for-all strategy. The Pan American Health Organization, which acts as the WHO Regional Office for the Americas, has been active in promoting health futures, and made health trends one topic of a 1996 regional conference. The Regional Office for South-East Asia is working with several of its Member States to establish national health-futures projects. It is hoped that this handbook will encourage ministries of health in other countries and regions to consider using futures as a complement to ongoing planning and policy-making. Box 10 describes how a national health agency might carry out a series of health-futures activities. In this piece of futures history, a ministry official summarizes for a new minister of health the various kinds of health-futures work that have gone on in the ministry between 1986 and 2003.

7.2 Basic considerations for health-futures projects

Groups that decide to carry out a health-futures activity should first familiarize themselves with the earlier chapters, since the points made there apply as much to health futures as to futures in general. In particular, groups should be aware of different perceptions of the future, opinions about values in futures, and purposes. They should realize that the successful implementa-
tion of futures work demands adequate attention to matters such as terms of reference, fund-raising, structural organization, and group processes. They should know the common components of futures work and understand how these can be arranged to create a variety of designs, and they should have some idea about the range of methods available for futures work.

Once these are understood, groups can move on to consider important points specific to health futures, namely:

- Factors affecting health (and how they are treated in health-futures work).
- The relationship between health futures and health-care futures.
- Possible topics for health-futures projects.
- Trends and future events that could influence future health and health care.
- Values relevant to health-futures work.

Box 10. *Memorandum dated 1 June 2003, to the Minister of Health from the Director-General of the Department of Health Planning and Policy-making*

Let me begin by saying how glad we are to have you back in the ministry and how much we look forward to working with you. As you requested at our initial meeting last week, I have summarized for you the futures work that has gone on in the ministry, especially since you left in 1986. Actually, it is difficult to say exactly when we got involved with futures, since part of the ministry's work has always been oriented towards anticipating health trends and health-care needs, and the adoption of strategic approaches further encouraged the consideration of future threats and opportunities. So we were already using an extended time perspective for some policy-making and planning long before futures became a recognized approach within the ministry.

Then, in 1987, a few staff members became very interested in the futures field. Our library acquired some futures materials, and we had informal sessions at which tools were discussed. The outcome was that a few departments began applying individual futures methods. More projections were done about trends, especially epidemiological and demographic ones. Brainstorming and other techniques were integrated into the standard procedures of certain units. The emergency preparedness group did a modest Delphi exercise about potential industrial threats to health. Small activities of this sort, futures-oriented and/or involving one or more futures methods, became quite common here during the late 1980s. This continues to be so. In my estimation, most of the ministry's futures work consists of futures exercises done within a single department and lasting just a couple of days or weeks, plus the application of single futures tools to regular policy-making and planning processes.
Our first scenario project was done in 1988 and was about primary health care for rural areas. The funding came from an international foundation. The exercise involved half a dozen people who worked on it part time for a couple of months. There were three scenarios, which represented the basic approaches to rural health care being debated at the time. The group sat together and imagined, "What long-term consequences, both positive and negative, might result from approach A being accepted?" They did the same for approaches B and C and then wrote up their ideas in narratives that described what the alternative systems might lead to in 15 years. The results were written up as case histories of fictitious patients, describing how they were handled under the various systems. The report was very readable and caused considerable in-house debate. It didn't replace the work being done by the policy analysis unit, which focused on more immediate consequences, but it was a valuable complement.

In 1990 we began an initiative to promote healthier urban areas, in which we again used a futures approach. This project was different from other projects because it involved generating a vision of a desired future. The work was carried out by our health promotion people in collaboration with local health departments. Only one major scenario was constructed, that of "the healthy city". The work began with community-level visioning workshops in the major cities. Information from these workshops was then incorporated by a professional team into a single coherent vision and translated into required policies and actions. The local health departments that had organized the workshops also used the final vision to design action plans for their communities.

WHO organized its first consultation on health futures in 1993, and we obtained a copy of the consultation report. Soon afterwards we received special issues of World health statistics quarterly and Futures about health futures, and later the WHO publication Health futures. These gave us a better feel for how broad the futures field was and the many ways in which a futures project could be designed, and it was at this time that greater enthusiasm developed in house about using futures to support policy-making and planning.

In 1997 we decided to participate in a health-futures activity that the WHO regional office was organizing. The project that we did as part of this activity focused on the development of human resources for health. We constructed a scenario of what the manpower situation was likely to be in 20 years if training policies and programmes remained the same. But this "trend" scenario wasn't useful by itself. It predicted the number of health-care providers without saying anything about the factors that would determine the demand for health care. So three plausible scenarios of health-care demand were also constructed, based on different assumptions regarding future population size and structure, demographic distribution, health status, life expectancy, level of investment in health care, and so forth. By comparing the manpower trend scenario with the plausible scenarios of possible demand, we were able to get a better idea of what we should be doing about manpower development. The project resulted in our putting much greater emphasis on the training of nurses.
midwives, and medical assistants than we otherwise would have done, and that decision proved to be a wise one.

When we approached the year 2000, the idea arose of marking the occasion by setting up a "scanning" mechanism. Scanning is an ongoing process for identifying emerging issues and phenomena. The idea seemed a good one, so a trial run was approved. Out of it came a report plus a sample bulletin showing the kind of information that scanning would collect. These products were certainly thought-provoking, and the report gave interesting examples of the practical benefits of scanning. The result was that we decided to supplement the regular surveillance activities within the statistics department with some scanning. The department now issues a monthly two-page bulletin called *New trends*, which is widely read within the ministry.

The most recent futures activity in which we have been involved was started in 2000 and completed last year. This was the multisectoral "Sustainable Society 2020" study that we did with four other ministries and several nongovernmental organizations. It resulted in an official report, a paperback book, a half-hour television documentary, and teaching materials for the schools. Many of the issues overlapped our own concerns, including equity and the satisfaction of basic needs, and much of the analysis dealt with health determinants, including population patterns, socioeconomic conditions, and environmental quality. There was substantial public participation, including through local workshops. A great deal of time was spent translating the scenario into recommendations about steps by which the government, NGOs, the private sector, and individual citizens could bring the desired future into being.

To summarize, the health-futures work done in the ministry has been carried out as a complement to ongoing planning and policy-making processes. Specific activities have ranged from rather simple exercises to quite complex projects and have addressed many different topics within health and health care. I await further discussions, at your convenience, about how we might proceed with this important work.

### 7.2.1 Factors affecting health

In health futures, as in other parts of the health sector, health is generally considered to be shaped by four sets of factors—hereditary, behavioural, environmental, and medical. Individual health-futures activities may focus on one of these areas or may address more than one or all of them.

Heredity, the genetic inheritance of the individual and the community, is currently a "given", i.e. something that cannot be significantly changed. Genetic research may well provide treatments for inherited diseases, however, and future health programmes may emphasize preventive action and
early intervention for individuals at increased risk for a particular disease. This is one the factors addressed in that part of health futures that analyses the future of therapeutics.

Behaviour includes all the actions that affect both the individual’s and the community’s health—diet, smoking and drinking habits, sexual contacts, hygiene, exercise, use of medical services, and so forth. Behavioural factors are important in health futures since many policies and programmes aimed at improving the future health status of a population require behavioural change. These factors are of particular interest in futures work done in support of disease prevention and health promotion and protection.

Environmental factors affecting health include those linked both to the natural and cultural environment and to socioeconomic conditions. This broad category thus encompasses climate, water and air quality, pollution, noise levels, crowding, violence, living conditions, satisfaction of basic needs, equity, income distribution, employment, social and family contacts, participation in decision-making, cultural perceptions of health, and a host of other determinants shaping individual and community well-being. Health-futures research with a particular focus on this area may address trends in the natural environment and their anticipated impacts on health, the role of poverty, the potential health impact of expected social change, future health threats to marginalized and vulnerable populations, and so forth.

The fourth set of factors affecting health are those related to the health care available to the population. The range of health-care services provided, the geographical distribution of these services and their accessibility, the quality of the services and access to them are all part of the picture. Projects on health-care futures or medical futures therefore concern trends and possibilities in the health-care sector and its constituent institutions and professions. Such projects look, for example, at the future of health-care systems, financing schemes, the training of personnel, pharmaceuticals, other therapies, and new medical technologies, as well as the prevention and control of specific health problems.

7.2.2 Relationship between health futures and health-care futures

Health-care and medical futures often dominate discussions about health futures, and many teams doing national health-futures projects will probably assume that their work will deal with some aspect of health care. However, health-care futures is just a subset of health futures (6). In deciding whether they will concentrate on health care or some other aspect of health, teams should remember that, historically, medicine has played a relatively small role in overall health. Major improvements in public health have resulted
primarily from better economic, environmental, and social conditions (7). Health improved in many countries during the nineteenth century as the result of reduced family size and improved nutrition, and public health measures such as sanitation. Medical interventions came into the picture later and made relatively smaller contributions (8).

The importance of non-medical factors in determining health is also clear where health has deteriorated. The disastrous impacts of war and famine on human well-being are obvious. Health also declines with economic depression, social disruption, and rapid industrialization and urbanization. Factors like these are the primary causes of poor health in much of the world today. To be healthy, people must have decent housing, adequate nutrition, safe water, sanitation, and environment free of toxic wastes and violence. They must also have means of supporting themselves and opportunities to participate in decisions about their own lives. In other words, health requires a healthy society—one that meets the population’s basic needs and is ecologically sustainable, peaceful, and participatory (9).

It is also clear, however, that access to health care, and especially to primary health care and protection from communicable diseases through immunization, can do a great deal to improve the health status of a population. Furthermore, changing socioeconomic conditions, environmental quality, and personal behaviour patterns takes a great deal of time and work. Efforts to promote public health should certainly take into consideration the impacts of economic development, environmental protection, and the encouragement of healthy lifestyles, but the role of the health-care system in providing basic preventive and curative care should not be neglected or discounted.

7.2.3 Possible topics for health-futures projects

As noted in the previous section, various aspects of the health-care system are valid topics for health-futures projects—but so are many other subjects. The list given in Box 11, although not comprehensive, indicates the wide range of possibilities. The specific topic for a project should be chosen on the basis of the following three primary considerations.

Firstly, the topic should be a "real" problem that will benefit from a longer-term perspective. Teams should have no problem in finding such topics among subjects that the health sector of the country concerned is currently analysing, discussing, debating, planning for, and making policy decisions about. Health-futures work is wasted if it deals with totally abstract topics that have no relevance to real decisions and actions.

Secondly, the topic chosen should be such that the project does not duplicate existing futures work. If the country has a tradition of health futures
Box 11. *Examples of possible topics for health-futures projects*³

- The future health status of the population.
- The future health of the indigenous population (or of refugees, marginalized groups, etc.).
- The future health of children.
- The aging population and the implications for future health and health care.
- A national health vision.
- Renewing the national commitment to health for all.
- Developing healthy communities for the new century.
- Healthy cities by the year 2020.
- Urbanization and health: alternative scenarios.
- Rural health: projections and possibilities.
- Poverty and disease: trends and alternative future scenarios.
- The role of socioeconomic conditions in shaping future health.
- Population trends and their effects on health.
- Future scenarios for family planning, birth control, and birth spacing.
- Safe motherhood: looking towards the future.
- Possible breakthroughs in contraceptive technology and reproductive health.
- The national disease burden: scenarios for the future.
- Visions of a future without a specific disease (e.g. tuberculosis, HIV/AIDS, etc.).
- The future of a group of diseases (e.g. childhood diseases, diarrhoeal diseases, cardiovascular diseases, lung diseases, neoplasms, perinatal diseases, parasitic diseases, viral diseases, etc.).
- Communicable diseases: projections and policy implications.
- Emerging patterns in chronic disease.
- Long-term health impact of policies on tobacco sales and advertising.
- Scenarios of newly emerging diseases.
- Alternative scenarios of the epidemiological transition.
- Disease prevention and control in the future.

³ The project topic should be a real problem within the health sector, something that has not yet been studied at the national level from a futures perspective, and compatible with the project's practical constraints.
• The future of social medicine (environmental medicine, preventive medicine, health education, clinical medicine, etc.).

• The future role of traditional medicine in the national health-care system.

• The future of health information systems, including the role of the Internet.

• Health statistics: planning for future health information needs.

• Alternative futures for public health.

• Health authorities and other actors in the health sector: current and future roles.

• Fulfillment of essential public health functions in different future scenarios.

• Priorities for public health during the epidemiological transition.

• The long-term implications of decentralizing health planning and development.

• The future of essential drugs.

• New vaccines and future health.

• Emerging trends in therapeutics.

• New trends in preventive medicine.

• Long-term implications of alternative policies on pharmaceuticals.

• Medical technologies: forecasts for the future.

• Potential impacts and policy implications of medical breakthroughs.

• Emerging trends in medical diagnostics.

• Future laboratory technologies for community care.

• National environmental change and its future impact on health.

• Safe water: essential for life, today and tomorrow.

• The role of sanitation in future urban and rural health.

• Today's pollution and tomorrow's ill health.

• Long-term health impacts of radioactive and toxic wastes.

• The potential impact of global climate change on the national health status.

• Trends in vector-borne diseases and future needs in vector control.

• The influence of tourism and travel on national health status.

• Nutritional trends and their impacts on health.

• Diet, exercise, and health.
• Population, agriculture, food supply, and health: alternative scenarios.
• Nutritional deficiencies: patterns and projections.
• Trends in violence and their impact on current and future health.
• Environmental change, conflict, and future health: seeing the connections.
• Human behaviour and health education: trends and possibilities.
• Tobacco and mortality: trends, forecasts, and alternative strategies.
• Illegal drugs: current and future implications for national health.
• Alcohol abuse: historical patterns and alternative future scenarios.
• Alternative scenarios for primary health care.
• Mental health services for the future.
• Future medical-care services for elderly populations.
• Providing health and social care for the disabled: trends and innovations.
• Future scenarios for dental health.
• Emergency health services: preparing for future crises.
• Maximizing efficiency in the delivery of health care.
• Accidents and trauma: scenarios and implications for planning.
• Improving access to health care.
• Quality and equity in health care: scenarios for the future.
• Community-based health care: trends and possibilities.
• Scenarios of health-care financing.
• Balancing the public and private sectors in future health care.
• A vision for tomorrow: health care without hospitals.
• Trends and possibilities in physical facilities for health care.
• Alternative scenarios for national development of human resources for health.
• Physician demand and supply: trends and policy options for the future.
• Nurses, midwives, and medical assistants; current and future roles.
• Geographical distribution of health-care personnel: projections and implications.
• Alternative futures for schools of public health.
(although perhaps under a different label), it may be advisable to survey the work done to date before selecting the topic for a new project. This survey should include not only investigations done in government agencies, but also research carried out by academic departments, research institutes, non-governmental organizations, and other entities.

Thirdly, the topic selected should be one that can be handled well within the practical constraints of the project. If a topic can only be addressed through a comprehensive, multicomponent project lasting an entire year and requiring expensive software—and the team has limited resources and a short period in which to work—it must either be set aside or appropriately modified or limited. As an example, consider a ministry of health that would like to look at the future development of human resources for health. A full-scale project examining all aspects of this subject may not be possible under current conditions, but it may be feasible to address a more limited topic, such as the potential future role of paramedical personnel in rural community health centres.

7.2.4 Trends and events that may affect future health and health care

In selecting their topic, teams should pause to think about the trends and events that may affect future health and health care. Of course, once they begin their projects they will probably devote considerable time to the specific trends and events that could influence those aspects of health or health care being addressed by these projects, but it is also worth while to think about these matters while the project is being formulated and the topic selected. The relative importance of various problems may look quite different when long-term trends and possible future events are considered. As a result, teams may come to realize that issues that are currently given low priority may be of great importance in the future, and vice versa.

Teams looking for such hidden issues will need to think about developments both within the health sector and in the macroenvironment. Of course, some changes will be the result of breakthroughs in health care and medicine, e.g. cures for major diseases, but if future health depends on future healthy societies, the most important trends and events will be those that promote or impede the development of such societies. In fact, it is already possible to identify existing trends and to anticipate future phenomena that could prevent the development of healthy societies in the future. These trends and events, which are intimately connected, include the burden of disease, inequity, population growth, environmental degradation, plus war and other violent conflicts (6).

The burden of disease and the epidemiological profile may remain basically the same for much of the world during the next few decades. In the
industrialized countries, the population will probably continue to suffer from cancer, heart disease, musculoskeletal conditions, neuropsychiatric disorders, and other chronic conditions. It can similarly be expected that the health profile of the least developed countries will continue to be dominated by communicable, maternal, and childhood diseases. However, many less developed countries will enter an epidemiological transition, in which diseases of industrialization will come to predominate instead of communicable diseases and other traditional causes of death. The transitional period, in which both kinds of health problems are common, will be very difficult, particularly if it is prolonged. This is true, in part, because of the serious effects that the double burden of disease will have on the productivity and development of the country, and in part because of the cost and logistic problems of providing preventive, diagnostic, and curative health care for two sets of diseases and conditions. A prolonged transition has already been seen in some countries, and this pattern raises serious concerns about public health futures in the less developed countries (10).

Chronic diseases may decrease somewhat in the richer countries through the adoption of healthier lifestyles resulting from individual choice and shifts in social and cultural values. Unfortunately, the healthier lifestyles in the industrialized countries may lead to less healthy ones in the developing countries. Since tobacco consumption began falling in the richer countries, the tobacco industry has launched vigorous campaigns aimed at the enormous populations of the poorer ones. The anticipated result is a major epidemic of tobacco-related diseases during the 21st century, possibly leading within a few decades to 7 million annual tobacco-related deaths in the less developed countries alone (11).

The 21st century may also bring some striking new epidemiological patterns, but what these may be is impossible to predict. New diseases may arise and reach epidemic levels as dramatically as HIV/AIDS has done (12, 13). Existing viral diseases could also take on new forms as a result of mutation, and some that have seemed under control may become major threats once again. New non-infectious conditions may result from the increasing contamination of the environment, while others already in existence, such as melanoma, may become a greater problem due to increased UV radiation levels. Global warming could result in the wider distribution of diseases carried by insects and other vectors.

Trends in equity are another major concern that must be considered by groups thinking about the future of health. Dramatic inequalities exist in health and health care today—both between and within countries and communities—and the gap is widening. Some people lack access even to the basic prerequisites for health, while others have more than their fair share. Most societies hope and expect that modern economic development will
solve this problem, but industrialization does not automatically do away with inequity. In fact, industrialization typically results in worse, not better, health status for many of the poorer and more marginalized members of a society, as they move from rural villages to urban slums.

In should be remembered, too, that inequity is not only the unfair distribution of economic wealth or inequalities in access to health care, but also involves the uneven distribution of education, good living and working conditions, and social status and power. There is apparently a connection between equity and health that is distinct from any effect traceable to wealth alone (14). Limited control over one's own life, low social status, and a lack of self-esteem can contribute significantly to poor health. As a result, reduced public participation in decision-making, including decision-making about health, can lead to even greater inequities in health.

The health of future societies will also depend on the complex and interrelated phenomena of population increase and environmental deterioration. During this century the world's population has grown enormously, and population growth is continuing in the least developed countries. The number of human beings on earth during the coming century will strain the capacity of societies to provide for basic needs and will make health for all an enormous challenge. This will apply particularly to the developing countries, where population growth is accompanied by rapid urbanization. By the year 2000, half the world's population will live in urban areas (15). The poor housing and sanitary conditions, epidemic disease, social disintegration, and violence endured by many of these urban dwellers will be a major challenge to future public health.

Continued population growth can also affect health through increased material consumption and its effects on the environment. The industrialized countries use a disproportionate share of the world's resources and have shown little willingness to change this pattern. Developing countries aspire to, and strive towards similar levels of material production and consumption. The result is ecologically irresponsible and unsustainable development that has significant adverse effects on human society and health. Indeed, in presenting the report of the World Commission on Environment and Development, Our common future (16), to the World Health Assembly in 1988, Gro Harlem Brundtland noted that "ultimately, the whole report is about health". Some specific aspects of environmental deterioration that are major concerns because of their potential to affect the future of human health include the following:

- Acid precipitation.
- Depletion of the ozone layer and associated increases in UV radiation.
- Loss of arable and pasture land through desertification and erosion.
• Decline of harvestable terrestrial, marine and freshwater species, contributing to possible malnutrition and famine.
• Depletion of aquifers and pollution of ground and surface waters.
• The steady decline in fossil fuel resources without sufficient investment in the development of safe and sustainable alternatives, thus threatening the provision of all basic needs and social services.
• Air and water pollution and seepage from the underground storage of toxic wastes, leading to both direct health threats and indirect health consequences.
• Global warming that may disrupt agriculture and cause malnutrition and famine, as well as the spread of tropical infectious diseases transmitted by insects.

The possible consequences of global climate change on public health have been described (17). In this scenario, the greenhouse effect leads to crop failures and then to widespread famine. Since malnutrition impairs immunity, epidemics of infectious diseases soon follow, and the situation is made even worse by the depletion of the ozone layer and consequent increased UV radiation, which also damages the immune system. As human populations, hungry and desperate, become increasingly aggressive, violence and war escalate. The effects of the war further damage the environment, leading to yet further decline.

The possibility that environmental deterioration can actually lead to increased conflict and violence is the subject of recent work by Homer-Dixon and his colleagues (18-21), who conclude that "unequal access to resources combines with population growth to produce environment damage. This phenomenon can contribute to economic deprivation that spurs insurgency and rebellion."

In fact, there has been an alarming increase in violent conflicts in many parts of the world in recent years, including international and civil wars and intra-community strife, and the impacts on health have been extremely negative. The young men who do most of the fighting are by no means the only victims. The children, women, and elderly who make up the civilian population are just as much at risk. Fighting results not only in death and injury but also in the dislocation of key services supporting health, including sanitation and health-care services. War interferes with agriculture and food distribution, causing scarcities and even famine. Social disruption associated with armed conflict leads to the break-up of families and communities, the creation of a refugee population, and a long legacy of mental health problems and suffering. Refugee populations may also be the more direct consequence of climatic and other environmental changes, as people flee from uninhabit-
able regions. As with all major population movements, the rapid influx of these refugees into other regions will cause serious health problems.

Both in selecting their themes and in addressing those themes, health-futures teams should give serious thought to these matters and to the basic question: What could happen to future health if this century’s trends towards social inequity, population growth, and environmental degradation continue? This question is an uncomfortable one because it leads to such grim images of the future, and human beings generally prefer utopian visions to apocalyptic ones, but it should not be ignored, and important matters related to it should not be excluded as topics for projects simply because they may result in negative scenarios.

7.2.5 Values appropriate for evaluation of health-futures work

Regardless of what theme they select for their work, a health-futures team will most probably create one or more scenarios. As explained in earlier chapters, the term “scenario” is used in this handbook to mean any expressed image of the future. Thus a vision of a healthy community, generated by that community through guided imagery and presented in the form of rough sketches, is just as much a scenario as is a description of the expected future disease profile of the country, produced as a formal report by a professional team after a year’s work. Furthermore, scenarios can portray desired or undesired futures, expected and unexpected ones, ones that seem quite likely, ones that are unlikely wild cards, and even futures that are mixtures of these different types.

An important component in most futures work is evaluating the scenarios that have been created. Scenario evaluation has already been discussed in Chapter 4 (Common components), and the points made there also apply to health futures. In addition, when health-futures teams evaluate scenarios, they should remember to use criteria that reflect the fundamental principles and values of the health sector. Thus, in looking at health and health-care scenarios, they might ask questions such as these (the two alternative questions apply respectively to sets of comparable scenarios and to free-standing scenarios such as visions developed through consensus):

- Which scenario provides for greatest equity in health and health care? or Does the scenario provide for equity in health and health care?
- Which scenario is most cost-effective? or Is the scenario cost-effective?
- Which scenario is most sustainable? or Is the scenario sustainable?
- Which scenario allows for greatest public involvement? or Does the scenario allow for public involvement?
• Which scenario brings about the greatest reduction in the disease burden? or Does the scenario bring about a reduction in the disease burden?
• Which scenario provides for the greatest health improvement? or Does the scenario provide for health improvement?
• Which scenario allows for the best coverage of essential public health functions? or Does the scenario allow for coverage of essential public health functions?

Questions such as these are important not only as guidelines for the evaluation of scenarios, but also because they indicate the underlying rationale for all health-futures work. Such work can be intellectually exciting, but it cannot be justified solely on these grounds. The investment of money, personnel, and other resources in health-futures work is justifiable only if it supports public health goals, including improvements in health and the more equitable distribution of such improvements.

7.3 Recommendations for health-futures teams

Teams doing health-futures projects can do much to ensure the success of their work by following certain guidelines while carrying out their work. A few of these are specific to futures work in the health sector, but the remainder are recommendations that apply to all futures work and have already been mentioned in previous chapters; they are repeated here because of their importance.

Firstly, the practical activities necessary to support the project should be carried out. Normally these will involve getting the project legally established, drafting the terms of reference, drawing up a budget and seeking funds, setting a timetable, developing an organizational structure, holding meetings and otherwise handling communications, and evaluating the project after its completion. In particular, each team can increase the effectiveness of their work by:

• Preparing clear terms of reference, including a good summary paragraph.
• Involving policy-makers and stake-holders in the project, and devoting adequate time to ongoing communication with these individuals through means such as printed materials, seminars, and conferences.
• Arranging effective sponsorship that provides adequate logistic, financial, and political support, does not impose an undue burden on any sponsor, provides good contacts, and does not make unreasonable demands on the team.
• Giving early and continual attention to the intended applications, i.e. how the results of the work will be used.
• Networking to prevent duplication of work and facilitate access to information.
• Giving appropriate attention to technical matters, including the use of computers and computer models and software to support the work.
• Giving appropriate attention to group processes such as those that encourage a variety of thinking skills, stimulate creativity, make team members appreciate different personality styles, enhance group problem solving, and promote organization learning.

Secondly, the design of the project (the components carried out and the order of their execution) should be selected deliberately and with care, even if the project is primarily process-oriented. If the organizational structure is complex and involves both a team and a board of directors, they should agree on the overall design. The general criteria for that design include the following:

• It should be suited to the purpose and objectives of the project.
• It should allow for the generation of whatever products are expected from the project.
• It should be appropriate in terms of the available financial and human resources and the timetable that must be met.

Thirdly, groups should select their tools and methods only after they have decided on the overall project design. Ready-made toolkits are not recommended unless they happen to contain the exact tools needed for specific projects. The selection process should focus on the function of various tools, rather than on whether they are quantitative or qualitative in character. Adequate attention should also be given to the constraints imposed by the budget, deadlines, staff workloads, the availability of expertise, and the data and hardware requirements of various techniques. Thus every method or tool that is being considered for use in a project should satisfy the following criteria:

• It should be appropriate to the task in hand.
• It should be as simple as it possibly can be and still perform its function.
• It should be valid, robust, and user-friendly.
• It should be affordable; the cost should be reasonable in terms of the project budget and should generate benefits that are sufficient to justify it.
• If it requires certain hardware or software, data, or other inputs, these should be affordable and available.
The time required to learn how to use it and to apply it should be reasonable in terms of the project timetable.

Its documentation should be clear, and the necessary technical support and training should be available.

Fourthly, because scenarios are central to most futures work, special care should go into the framing, creation, and evaluation of such scenarios:

- The frames (the "if" statements on which the scenarios are based) should reflect the purpose of the project.
- The scenarios should be tested during their construction to make sure that they are applicable, valid, and (in most cases) comparable.
- Comparable scenarios must present distinct and vivid images of the future, but the background assumptions, scope, time perspective, sector or issue addressed, and elements must be the same.
- During the evaluation component, the scenarios should be judged according to their probability, desirability, or other criteria, but the criteria used should not be those already built into the scenario through the assumptions sets.

Finally, some recommendations can be made regarding the design and implementation of health-futures projects in particular:

- Health futures should usually be incorporated into existing and ongoing institutional activities within the health sector rather than being carried out separately.
- Ideally, future-oriented activities should be carried out regularly in order to provide input for health policy formulation and health planning.
- If a decision is made to carry out a series of health-futures projects, the initial activities should address common factors (e.g. demographic and epidemiological profiles) that will be relevant to many of the projects.
- Because cost is a major issue in the health sector, more attention will be paid to health-futures projects and their credibility will be increased if the work includes cost analyses of alternative policy options.
- Health-futures scenarios can remain relevant to health policy-making for a longer time if they are periodically updated to take into consideration changes in demographic and epidemiological patterns, technological breakthroughs, and other relevant factors.
- To help to promote the discipline of health futures, teams should publish their research results, especially as books published by leading international publishers and as articles in international refereed journals.
• Consideration should be given not only to health-futures activities within the health sector itself, but also to futures activities that are multidisciplinary, carried out in cooperation with other sectors, and include health or factors affecting health.

• National health-futures projects may be of greater value if they are done in coordination with similar efforts in neighbouring countries, making it possible to integrate the results into regional projections, scenarios, and strategies.

• If a country is serious about using futures approaches to strengthen policy-making and planning, a long-term commitment must be made to the development of a national cadre of professionals familiar with futures methods. Such a commitment is likely to involve not only government agencies, but also schools of public health and other institutions in the academic sector.

• The availability of data needed for health-futures activities should be ensured through cooperation among relevant groups, such as health statistics units, bureaux of planning within various ministries, and official data centres.

7.4 Designs for health-futures activities

Because there is no single right way to do futures work, groups interested in health futures have a vast number of possibilities from which to choose. Even if only the basic topic and the overall design are considered, hundreds of alternative health-futures projects can be imagined. A number of actual health-futures activities from around the world are summarized in section 7.5. A variety of hypothetical designs were sketched in Chapter 2 (Interviews with leaders of futures projects), while others were described in the memorandum in Box 10. Yet more—ranging from simple exercises to complex, ongoing programmes—are provided in this section. These designs are examples, not recommendations. For instance, the design outlined for a project on essential public health needs (see section 7.4.3) is not the recommended way to address this topic, but merely one of the many ways in which it could be approached. Many more "models" can be generated by combining the alternative designs in this chapter and in Chapter 5 with the examples of health-futures topics listed in Box 11 (see p. 188).

Teams working in institutions that lack experience with futures and/or have limited time and resources to spend on futures work will find it advisable to begin with a modest effort. An example would be a simple health-futures project in which the design includes only a few components, all of which can be carried out by existing personnel, and none of which require special equipment or software.
A few teams will be in quite different situations where considerable futures expertise already exists and substantial resources are available for health futures. It may then be reasonable to consider setting up permanent programmes of health-futures research that can provide regular input into health policy-making and planning. Programmes of this sort can be established within institutions such as ministries of health and involve a series of collaborative activities carried out together with other government agencies, university departments, and private sector organizations.

7.4.1 Rapid health-futures projects (RHFPs)

An RHFP is identical to a “first loop” project as described in section 5.4.1, but is specifically focused on some aspect of health or health care, such as one of the topics listed in Box 11 (see p. 188). The group doing the RHFP goes through all the standard components, but each step is highly condensed. The timetable and budget are strictly limited, the work is done entirely by in-house personnel, and no attempt is made to compile a database or to solicit outside expert opinion. An RHFP can be an effective, rapid, and inexpensive way to broaden a group’s perspective, so that they pay greater attention to future possibilities, including changes in trends and the long-term impacts of policies. An RHFP can also be used as a trial run to determine whether a particular issue is suitable for a full-scale futures project.

7.4.2 Renewing health-for-all strategies

Health for all is both a scenario of a desired future and strategies for realizing that future. It has, since its formulation, been an important guiding vision for WHO and its Member States. Major efforts are now being made to renew the commitment to this vision and to reshape the strategies for its achievement. Health futures can be useful in such a task. An example is given below of a project in which futures techniques are applied to the efforts within a national ministry of health to achieve health for all. The project is carried out within a short period of time, namely about 6 weeks, and does not involve formal scenario construction.

The work is carried out as part of the ongoing long-term planning of the ministry. The planning department handles coordination and prepares the terms of reference. A memorandum is sent to all departments, inviting their participation, and a project team is established. Each member works on the project part-time throughout its duration. The team spends about a week gathering together already existing in-house information on current progress towards health-for-all goals within the country. These include reports specifically on health for all plus documents on health status, equity,
participation, and other aspects of the health-for-all strategy. From these various sources, the team prepares a summary report for their own use, describing how much progress has been made in achieving the various objectives. The time spent in preparing this summary is also limited to 1 week, on the understanding that the product will necessarily be short and incomplete.

The team then addresses the question "Are the aspects of health for all that are most problematic now the same as those that we expect to have difficulty with during the next 20 years?" Answering this question will require the team to go through some kind of projection into the future, mentally integrating current trends and possible future events. In this process, they are free to choose the methods that they use. They can rely on existing projections, generate their own using simple mathematical models, do brainstorming to imagine future events, and so forth. This process is limited to 2 weeks. At the end of this time the team must agree on the goals of health for all that they expect to be the most difficult to achieve in the future.

A 2-day session is now organized, involving ministry staff, representatives of institutions and organizations working in partnership with the ministry, and other leaders in the public health field. The purpose of this meeting is clearly defined. The participants' responsibility is to generate, and to work out in detail, specific suggestions about how the difficult objectives can be achieved, the emphasis being placed on new proposals. The first day is devoted to various creative problem-solving exercises and visioning. A number of arrangements are possible. The participants can be divided into small groups, each group dealing with a single objective, or all groups can deal with all the objectives. Each group can use the same set of tools, or can select their own. One highly appropriate method would be to use a checklist to generate possible modifications of already existing programmes aimed at each objective. Attribute listing could also be used to imagine new variations on current programmes, and morphological analysis could be used to create totally new solutions. Visioning exercises could also be done—not to identify the objectives, since these are already defined—but to imagine how they might be achieved. The second day of the workshop is spent analysing the many suggestions in terms of desirability and feasibility, looking for points where efforts could be combined or where several institutions could share responsibilities, and identifying measures that could serve more than one objective.

The team's preliminary work on the difficult objectives plus the recommendations of the participants about how these objectives might be achieved are written up as a report, which is then sent to the department of planning and other ministry departments for consideration and action.
7.4.3 Re-examining how essential public health needs can be met in the future

Most institutions have well established ideas about their purpose, and these ideas are reflected in, and reinforced by, their structures and budgets. The drawback is that, as a result, they usually find it difficult to respond appropriately and adequately to rapidly altering conditions. The world changes, the country changes, the sector changes, but the institutions remain as before, with the same priorities and the same programmes. Thus the activities of institutions within a sector may become increasingly incongruous and ill adapted to the real world, so that essential functions are not performed. This problem can be solved by a futures approach.

Consider a ministry of health that wishes to re-examine how rapidly changing conditions are affecting essential public health functions and the role of the ministry and other institutions in performing those functions. A project with this purpose might be done as follows.

A team is formed, consisting of ministry staff plus representatives of a few other key public health agencies and organizations. This team begins by identifying in general terms the public health needs that must be collectively met by the public health system of the country. They also gather information on current health trends (e.g. recorded increases in diphtheria and tuberculosis, resistance to antibiotics, increased smoking) and other relevant trends (e.g. increasing urbanization, declining water quality). The team then carries out a series of in-depth interviews with selected individuals to solicit opinions about future threats to health (e.g. increased incidence of melanoma due to ozone depletion, spread of certain communicable diseases due to climate changes, delayed health problems appearing 10 years after environmental accidents, etc.).

Finally, the team produces a document consisting of three main parts:

1. A graphic presentation of possible future public health problems, including projections of current health trends, as well as the emergence and growth of new phenomena.
2. A chart translating this information into future public health needs that will have to be met by actors within the sector.
3. A grid showing these future public health needs and evaluating the actors' current potential to meet each need. This grid shows, in effect, where the gaps are in the coverage, and what emerging needs will soon be unmet unless one or another institution takes on the necessary function.

Translating trends into needs for the chart is a fairly straightforward process. An increase in communicable but preventable diseases translates into a need for vaccination campaigns. A higher incidence of environmentally related
disorders translates into a need for improved legislation and cooperation on environmental issues. A future with many new health problems translates into a need for strong health surveillance programmes, and so on.

The document is then distributed within the ministry for use in the reconsideration of its priorities, programmes, and roles. It is also shared with other relevant public health institutions and used as the basis for discussions about the future distribution of responsibilities within the health and health-care sectors.

7.4.4 Creating regional visions of a future healthy society

In many countries, an increasing amount of planning and policy-making regarding health is being shifted to the regional and even the community level but, especially if there is a long tradition of decisions being made at the national level, health authorities at the regional level may find the transition a difficult one. Health futures may provide an effective means whereby regionally based health goals can be identified and regional resources mobilized to work towards those goals. The national ministry of health can facilitate the process by sponsoring a programme in which all the regions construct their own visions of a future healthy society. The ministry can serve as the coordinating body for the programme, arranging for regional project leaders to meet, providing guidance about designs and methods, and publishing and distributing the resulting products. One way in which such a programme could be implemented is outlined below.

The ministry contacts the regional health authorities to explain the purpose and terms of reference of the programme and to invite their participation. Each interested region then sends a project leader to a national planning meeting. At this meeting, the differences between visions of preferred futures and other kinds of scenarios are clarified. A few examples are presented of project designs by which scenarios of desired futures can be created, and the project leaders are given written materials about these and other approaches, as well as relevant tools and methods.

The project leaders return to their own regions and establish their respective teams, which probably consist of only a few individuals. The projects are highly participatory, however, and the role of the team members is to encourage that participation. Each team decides on its own how best to do this—through public meetings, the mass media, school programmes, presentations to civic groups, interviews with community and corporate leaders, and so on. Teams are free to establish boards, accept funding support from sponsors, and otherwise develop their regional activity as they see fit.

As their work proceeds, the project leaders send periodic reports to the ministry on progress and problems. These are duplicated and shared with all
the other teams. A major benefit of this approach is that problems common to all the regional projects can be identified and joint solutions then sought. The team leaders also meet at designated intervals for in-depth discussion and exchange of ideas.

After 9 months, each team prepares an interim “verbal report” on the regional vision to date, using graphs, maps, slides, music, text, and whatever other media are considered appropriate. These verbal reports are presented at a series of regional seminars for the purpose of feedback. Three months later, the final versions are presented at a national conference which is given nation-wide publicity. The visions are also translated into written form and published as a book and a series of pamphlets.

Each regional health authority then proceeds with the work as it sees fit. A next step might involve addressing the question “How could this vision be realized?” One approach would be a backcasting exercise (see section 5.5.15) that starts in the future and works back to the present. Such an exercise asks “If we want to reach our vision by the year ZZZ, what needs to be done 5 years before . . . 10 years before . . . ?” The regional health authority might also want to explore other ways in which the regional vision can be applied to planning and policy-making, including the setting of programme and research priorities.

7.4.5 Broadening surveillance with environmental scanning

A primary responsibility of a ministry of health is monitoring the health of the population. Countries handle this in various ways, e.g. through reporting systems for certain diseases, health surveys, epidemiological trend analysis, and so forth. The results are widely used in national health planning but, since they measure and track health status, they miss many important trends and changes in the external factors that influence health and disease. Surveillance also focuses on recognized phenomena, rather than new and emerging ones. The benefits gained from health surveillance can thus be enhanced by broadening the ministry’s scanning programmes to include external factors and emerging trends. Environmental scanning has already been described in Chapter 6, but some alternative ways of establishing and operating environmental scanning in support of health planning and policy-making are as follows:

- The ministry of health engages a new staff member who is responsible for keeping abreast of developments in other sectors, scanning periodicals, clipping articles, maintaining a database of items, and writing a monthly in-house report summarizing apparent trends and interesting new developments.
• The ministry establishes an environmental scanning committee, which assigns responsibility for the tasks listed above, and also makes a formal presentation once a year to the policy-makers within the ministry.
• The ministry establishes an environmental scanning programme in collaboration with several other parties, including the national school of public health and the national library of medical and health sciences. Responsibilities are shared and information pooled.
• The ministry establishes a modernized version of environmental scanning, relying heavily on information resources available locally, e.g. CD-ROM indexes (see section 8.2.4), and available on-line resources (see section 8.3). Any of the arrangements mentioned above could still be appropriate.

7.4.6 Improving foresight about therapeutic technologies

Pharmaceuticals and other therapeutic technologies are constantly evolving, and every new development offers hopes and raises issues. The health authorities of a country are responsible for keeping up with new technologies and for drawing up guidelines for their application. This process can be greatly improved if they are aware of the technologies that might arise in the future, their possible positive and negative consequences, and the kinds of decisions that will have to be made about them. Such foresight allows regulatory bodies time for careful consideration of alternative policies and avoids both hastily formulated guidelines and situations in which there are no guidelines at all. A project designed to improve foresight in this area might be organized as follows.

The ministry of health appoints a small group of people with a particular interest in the topic to carry out a thorough survey of recent literature, gleaning ideas about areas in which medical technology companies are carrying out research, where breakthroughs may come, and what problems are already foreseen regarding any of them. In doing this survey, the group looks for both expected developments and those that are unlikely but possible. The literature search is supplemented by interviews and a Delphi exercise involving experts in the field.

The group now constructs an illustrative scenario in which a full range of consequences arising from one new medical technology is elaborated in narrative form, describing the possible impact on the health of the population, how the technology is integrated into the health-care system, the legal questions that arise regarding marketing and regulation, and so forth. This scenario becomes one section of the group's report to the ministry.
Another section of the report presents, in tabular form, a list of possible technological breakthroughs in the next 15 years and the issues that may arise regarding each of them. No attempt is made to present this information as complete scenarios, but groups within the ministry or other health-sector institutions may use the report as the foundation for further scenario building.

7.4.7 Understanding social actors affecting health

The health of a population is affected not only by the health policies and programmes of the government but also by other social actors. These play important roles through the health impacts of their products and services, the effects of their activities on the natural environment and the socioeconomic situation, their influence on the training of health professionals, their control of access of health care, and so forth.

Thus a national health agency trying to understand the factors affecting the health of the country might benefit from analysing the interests of other health authorities at the regional, national, and international levels, medical schools, hospitals, health insurers, pharmaceutical companies, community-based health networks, patient lobbying groups, health-care practitioners, professional medical associations, and legislative committees dealing with health. Much can also be learned by examining actors outside the health sector that nevertheless markedly affect health. Depending on the country, these might include major corporations, banks, government agencies, political parties, religious institutions, women's groups, grass-roots organizations, universities, indigenous peoples, and the media. In some situations, the health of the population may be strongly influenced by major land owners, the army, the police, rebel movements, or organized crime cartels. Relevant external actors may include neighbouring countries and major trading partners, the World Bank and the IMF, international aid agencies, donor countries, and former colonial powers.

Health agencies can use health futures to better understand these actors and their strategies, so that more effective partnerships can be established in support of health planning and policy-making. A project for this purpose might be carried out in the following way. A working group is established, drawing on interested people from a cross-section of different departments within the agency. Someone knowledgeable in actor analysis (or willing to learn the techniques) is named as the group leader. At the group's initial meeting, the leader briefly introduces some of the techniques used in actor analysis. The group then brainstorms to produce an extensive list of possible key actors to be analysed. This list is distributed to selected people in the agency, who are requested to indicate which actors on the list they consider
most important in the long-term health situation. The top 10 or 15 actors are selected for analysis.

At the second meeting, this list is discussed, and each group member is assigned one or two actors to investigate. The facilitator explains what information will be needed—the actor's strengths and weaknesses, current policies that affect health or health care, possibilities for the future, current partnerships, points of conflict with other actors, and so on—and distributes a reporting form in which the information is to be recorded. The group members then work on their own, gathering information on their assigned actors. They may do this as they wish, e.g., by looking through documents and reports or interviewing colleagues in the agency. They may also talk to outside experts, and even to individuals who represent the institutional and organizational actors being studied. The findings are recorded on the reporting form, and copies of all the reports are distributed to every member of the group.

At their third meeting, the group members identify the health-related issues of importance to the key actors. Each issue is then expressed as an objective, and matrices are built to show the attitudes of the actors to a particular objective. For example, three key issues might be the regulation of pharmaceutical products, smoking patterns in the population, and the siting of primary care services. These could be expressed as objectives: "the formulation of a national policy on pharmaceutical products", "a decline in the incidence of smoking in the population", and "transfer of increased responsibility for primary care to community health centres". The matrix for the first objective might show the pharmaceutical companies as being strongly opposed, the medical association as being somewhat opposed, patient lobby groups as being in favour, and international nongovernmental organizations as being strongly in favour. Each matrix can also be translated into a diagram.

Even if they agree on one objective, institutions and organizations will not necessarily cooperate on that objective if they strongly disagree on others. The next step is therefore to analyse the potential for collaboration among various actors. This analysis is handled by the group leader and possibly one group member, using political mapping techniques (see section 6.2.17) and the information collected and generated to date. The resulting diagrams are distributed to the group members.

The final meeting is devoted to role playing. The group members represent the social actors that they have studied, endeavouring to remember what has been learned through the research, and the analysis of objectives and of potential collaboration. Each role play lastis about an hour and is based on a different policy decision by the ministry of health or other key agency regarding one key issue. The anticipated responses of the actors are noted by a rapporteur.
The group leader then drafts a report summarizing the work and its results. Group members comment on the draft, and a final version is prepared and distributed throughout the agency. A meeting is also held, at which group members give a verbal presentation about the project and its results and answer questions.

7.4.8 Thinking ahead about the development of human resources for health

A country may suffer from repeated imbalances in the supply of health professionals if decisions about training programmes are simply made in response to current shortages and surpluses in various personnel categories. Avoiding this problem demands a futures perspective. One way to plan more effectively for long-term personnel development is described here.

A project team is established, made up of members from the ministry of health, the school of public health, professional organizations for health professionals, and other interested groups and institutions. The team collects whatever information it can about the number of people currently working in each health-care profession, their pattern of distribution in the country and trends in that pattern, and the rates at which individuals are leaving and joining these professions. With this information, a rough projection model is created which forecasts the number of health-care professionals of each type at some future time, perhaps 15 years hence, and their distribution in the country. This projection is based on the assumption that current trends or policies will remain unchanged.

In parallel with this activity, the team also collects national demographic projections from official sources. These provide information on total population growth, the changes in the demographic structure, and the geographical distribution of the population, and give a general indication of how many people will be needing health care, what age they will be (and thus what kind of health care they are likely to need), and where they will need that health care to be delivered.

By comparing the forecasts with the projected demographic trends, planners can get a general idea about the kinds of shortages or surpluses that may develop, in what categories, and where. If current trends indicate decline in the number of students entering training to become qualified midwives, while projections foretell an increase in the number of females of childbearing years and continued population growth, clearly some thought must then be given to training more midwives. If the general trend towards urbanization is a slow one, but the trend for physicians to practise in cities is a sharply rising one, consideration must be given to introducing incentives for physicians to set up rural practices or to the training of medical assistants.
and other health professionals who may be more willing to live outside urban areas.

As the final step in the project, the team might build a computer model that simulates the supply and demand of health professionals. After the model is refined so that it accurately reflects the actual behaviour of the system, new information could be added in the form of possible future events that might affect the supply or demand for certain kinds of health professionals. The model would translate these possible future events into alternative scenarios: "if civil strife in surrounding countries generates a need for health professionals to care for large refugee populations... if the rate of urbanization changes and the urban population doubles in 15 years..." etc. A selection of these scenarios are generated, translated into prose, and submitted to a panel of experts, who evaluate them in terms of their feasibility. The scenario that is judged to be the most likely is used as a major input by the ministry of health and other parties in making a long-term plan for the development of human resources for health. Several other scenarios that are judged to be highly probable are used as the basis for contingency plans.

7.5 Examples of actual health-futures activities

The futures projects described above are all hypothetical. An account is given below of actual health-futures projects from around the world. The projects differ from each other in almost every aspect and further indicate the diversity of possible approaches. Only short summaries are provided here. More details can be obtained from the documents referred to in each case, including the various articles in the special health-futures issue of Futures (4).

7.5.1 Nicaragua: defining a preferred health-care system for the early 21st century

The Center for Health Research and Studies, School of Public Health, Autonomous National University of Nicaragua, has done a health-futures exercise with some technical assistance from the Pan American Health Organization (22). The work was done in response to the crisis in the health sector. The unstable political situation has made it extremely difficult to protect and promote public health, and it was felt that the construction of alternative health scenarios for Nicaragua in the early 21st century could have positive effects by clarifying priorities and enhancing cooperation. A futures project was therefore initiated at the School of Public Health with the following overall objectives:
• To construct several alternative scenarios for Nicaraguan health services at the beginning of the 21st century.
• To select one of these scenarios as the vision of the preferred future.
• To delineate the preferred future scenario’s implications for the formulation and implementation of health policies.
• To apply the lessons learned during this activity to the organization of the health services and the development of human resources in the health sector.

A paper reviewing Nicaragua’s recent social, economic, and political history and describing the current health situation and the organization of health services was prepared as a basic background document for two national scenario workshops. The 50 participants in those workshops included professionals from institutions responsible for the training of health personnel, national political, social and economic institutions, and multilateral, bilateral, and nongovernmental cooperative organizations, as well as leaders in the health sector. This group represented many of the principal social actors that will help to build Nicaragua’s future health.

Using a brainstorming technique, the participants generated two lists, namely one of the main current and future health problems in the country, and the other of the most important elements shaping the country’s future health situation during the next 15 years. The results of this exercise were then used to identify the variables considered to be most important in shaping the macroenvironment, the epidemiological profile, institutional and community health practices, and the demand for health services. The selected variables were then structured into three alternative scenarios by projecting them under different conditions. The participants then evaluated the scenarios according to their desirability and chose one of them as closest to their vision of the preferred future. They also identified a number of specific policy changes and actions that would have to occur if this preferred future is to be achieved. These included a reversal of current health spending trends, a strengthening of the technical and financial roles of international cooperation programmes, the formation of local networks of public and private health services, the education of health professionals for the performance of multiple tasks, and so forth.

7.5.2 Indonesia: assessing health trends at the national and regional levels

In 1990 Indonesia was involved in preliminary activities directed towards the country’s second long-term development plan. An understanding of past, current and future trends affecting health was needed to construct a valid health component for this long-term development plan. Anticipation of
the future health status and health-care needs of the population was also necessary to clarify objectives, strategies, and implementation measures within health planning. Consequently, a trend assessment of national health development was carried out and used as an input to the national development plan (23). The work was done by the National Institute of Health Research and Development (NIHRD) with technical assistance from WHO.

After the national health trend assessment was finished, interest developed in applying the same approach at the provincial level. Provincial health trend assessments were seen as useful for several reasons. Since Indonesian provinces are extremely diverse, a set of provincial studies could give a more accurate picture of health status and trends than a single national study. Also, since the government was beginning to decentralize the health sector, it was necessary to strengthen the health-planning abilities of provincial health officials.

The project was initiated in 1993. The national team consisted of officials of the Ministry of Health and other related ministries, members of professional organizations, and academics from the universities. A core group was established that prepared materials, established preliminary methodologies and procedures, and trained the five provincial teams.

The work was carried out in three phases. In the first phase, a set of standard study elements for a provincial health trend assessment was established for use in the provincial studies. These included a review of the literature, a choice of key variables and data sources, the analysis and simple projection of the variables, the identification and analysis of key future-influencing factors, an advanced analysis of the system, and the preparation of a report, followed by evaluation and monitoring. The methods to be used included mathematical tools and computer modelling, as well as Delphi and other methods of soliciting expert opinion. The underlying assumption was that health status is influenced by human behaviour, the health-care system, the "environment" (including general socioeconomic conditions and the natural environment), and health policies and plans. The approach adopted therefore emphasized the review and analysis of these four factors and their interactions.

During the second phase, each participating province established an integrated team, appointed by local officials and consisting of staff members of the health office, the school of public health, and the provincial planning body. The involvement of professionals from related agencies was also encouraged. Each team went through a training exercise lasting about 6 days.

The actual studies were carried out during the third phase of the programme. To gain broad political support and also to begin developing
constituencies for the products resulting from the studies, the team began by discussing with local officials the work's objectives, methodologies, planned implementation, and terms of reference. The work involved data collection, analysis and interpretation, the formulation of conclusions, and the discussion of a draft report with relevant local officials, after which it was revised and published. The national team provided supervision and monitoring and put together the results from the five provinces.

7.5.3 Wales: linking national to local strategies in health and social services

The British National Health Service (NHS) is administered separately in England, Wales, Scotland and Northern Ireland. NHS Wales fulfils its mission through a strategic planning approach that involves the development of local strategies for services in various health-gain areas (decreases in various types of cancer, in cardiovascular diseases, etc.). This strategic approach has been elaborated with the help of the Welsh Health Planning Forum, which assists in the planning of health and social services and stimulates debate about the future. Forum members are drawn from NHS Wales, the social services agencies, the Welsh Office, the Welsh Consumer Council, and other bodies.

In the early 1990s, as part of its examination of long-term health issues and the delivery of health and social care in the early 21st century, the Forum began addressing questions about the future of the NHS in a rapidly changing environment. Studies commissioned by the Forum warned that the pattern of health and social services would inevitably change in response to both internal and external forces. The project "Health and Social Care 2010" was initiated to clarify what changes might be expected, and to provide a context for local strategies and a longer-term framework within which the development of services could be planned (24).

In 1992, the Forum organized a consultation that resulted in a report that was widely circulated in Wales, reviewing some of the forces likely to influence the future development of the services and describing a vision, i.e. a positive future, in the area of health and social care. The forces of change were seen as acting on the health and social services in five areas—science and technology, society, individual lifestyles, the pattern of diseases, and the economy and working conditions. The vision incorporated improvements in services that might be made possible by these forces of change. The health service envisioned was very different from the current hierarchical one, in which the secondary health-care sector dominates and consumes a large proportion of the total budget. Instead, the service envisioned was based on "clusters of services". General care teams would meet the majority of needs,
including active efforts to promote and maintain health, initial diagnosis and assessment, most forms of treatment, and social support. More resources would be assigned to community-based services, which would be more diverse. Existing professional staff would change their roles in accordance with the new patterns of service, and care managers would be responsible for ensuring continuity of care for individual patients and clients. The "gatekeeper" role of the general practitioner would remain, although some initial assessments would be carried out at a distance. The trend would be towards the provision of care close to where the patients lived, even in their own homes. Remote diagnosis, minimally invasive surgery, and a greater range of services on the "general care circumference" would combine to reduce the need for secondary-care hospital beds.

In conjunction with the vision, the Forum delineated a number of indicator objectives, i.e. specific developments that could reasonably be expected to have occurred if the vision was realized, as follows:

- Health promotion targets on smoking, physical exercise and weight will have been met.
- Arrangements will have been made in each local community for the pooling of NHS and local authority funds to provide local access to minor surgery, a minor accident service, certain specified diagnostic services, therapy services, and social work assistance.
- All mental illness and mental handicap hospitals that were open in 1985 will have been closed.
- Everyone over 85 years old will have a keyworker, i.e. a person who will advise and support the client in gaining access to appropriate services and coordinating those services.
- Referrals from general practitioners to specialist medical services will have been reduced by 20%.
- Of outpatient consultations with specialist medical staff, 40% will take place in locations other than a district general hospital.
- Of all surgical interventions, 80% will be minimally invasive and 60% of surgery will be by day case.
- Acute beds in district general hospitals will have been reduced by at least 40%.

As a next step in the project, groups at four pilot sites tested the feasibility of the vision by considering how these indicator objectives could be achieved within their local systems and evaluating the desirability of each objective on the basis of agreed criteria. Several hundred people took part in the exercise, including health-care professionals in primary and secondary care, social services staff and managers, representatives of voluntary organizations and the lay public, and other persons with special expertise.
The original intention was to test the feasibility of the vision some 18 years into the future, in the year 2010. However, this proved too far into the future for people to visualize. As a compromise, it was decided to examine developments in the year 2002, the idea being that conclusions about 2010 could be drawn from the pace and nature of change likely in that year.

The pilot groups assumed that the level of funding for the health and social services would not be increased, and that the current method of financing health, mainly through taxation, would not change. In addition, the groups assumed that the statutory division of responsibilities would remain, the NHS being responsible for health services and the local authorities for social services. Otherwise, the groups were encouraged to use their own experience and local knowledge to decide whether the objectives were achievable and desirable and to be as innovative as possible in identifying solutions to problems.

Determining how the indicator objectives could be achieved was like finding a path through a maze. Starting in 1992, the pilot groups had to find a way to achieve each objective by the year 2002. While exploring possible pathways, they inevitably stumbled into dead ends where progress was impeded by lack of money, public opposition, or other obstacles. Whenever they reached such a road block, they went back and tried an alternative path. Once the goal was reached, the group then used a set of agreed criteria to decide whether the benefits gained from the achievement of the objective were sufficient to justify the cost. When the process was complete, the original vision was revised to produce what might be called a vision adjusted for feasibility. Many of the aspects of this scenario are based on developments that have occurred—services being moved to new locations, new technologies replacing the old, new kinds of training for health-care professionals, and so forth. In the scenario, the number of beds required in hospitals for the acute specialities decline, largely but not entirely as a result of reductions in the surgical bed complement. Greater use is made of day-case treatment, resulting in shorter hospital stays. Some hospital services are available nearer to home, and more specialist consultations and treatment take place in dispersed settings. Some specialist services, however, remain concentrated and are available at fewer sites. There is greater cooperation between the health and social services, and the boundaries between them are blurred.

7.5.4 Japan: forecasting health-care needs using a demand-side approach

A supply-side approach dominates much of health care in Japan, including health policy, planning and programmes, health financing, and the development, distribution, and use of health resources. One weakness of this ap-
proach is that resources are allocated without consideration for how actual health-care demands vary as the health of the population changes, and this can lead to waste and unnecessary cost.

More than 15 years ago, the Institute of Health Systems Development began developing a demand-side decision-making support system called bioforecasting technology (BFT) (25). The BFT system links the care delivered by providers to forecasts of the population's future health. The purpose of BFT is to design optimum health-care systems characterized by efficiency, quality, security, continuity in services, fair and equitable access, efficiency, and minimum waste and misuse of limited resources.

BFT forecasts the future population and its health status by integrating significant biological, epidemiological, social, economic and behavioural factors under assumed future conditions. The underlying concept is that the human population constantly changes its structure, health status, and need for various health-care services. However, these changes can be anticipated, since they are generated by what is happening now and will happen in the future, including trends in the political, social, economic and health-resource environment, the state of the natural environment, the behaviour and attitudes of individuals, public health measures, and other factors.

BFT is based on a pattern-recognition type of computer model, which integrates changes and interactions between two major sets of factors, namely "basic factors" that determine the condition of the population and "key changing factors" that are expected to influence future need and demand for health services. The model accepts data on over 100 basic factors and about 60 key changing factors. The basic factors are grouped into categories covering:

- **Natural environment** (geography, climate, etc.) and social environment (housing, per capita income, industry, schools, water supply, nutrition, etc.).
- **Population** (total number, ethnic mix, birth and death rates, etc.).
- **Health and social care needs** (health promotion and maintenance, community health, etc.).
- **Medical care needs** (inpatient and outpatient data, medical care policy, and delivery system, etc.).
- **Use of health, medical and social resources** (number and type of facilities, number of beds, length of stay, equipment, number of health professionals, etc.).
- **Availability and accessibility** of health medical and social services (distance, location, etc.).

The categories of key changing factors include:
• Sociobiological factors (population structure, community structure, urbanization, etc.).
• Socioeconomic factors (industry, education, job security, earning power, etc.).
• Health technology (new technologies, patterns of practice and care, etc.).
• Strategic health policy (health targets, priorities, financing, laws, regulations, etc.).
• Quality of life (lifestyles, foods, family structure, security, etc.).
• Behaviour and desire for health (individual habits, health incentives, eagerness for change etc.).

Data on basic factors are updated every year from factual survey sheets, various reports and studies, and new policy and programme documents. Forecasts about key changing factors are updated every 5 years based on visions, scenarios, action statements, proposals and plans issued by government bodies and other institutions, and on the scenarios of the Institute of Health Systems Development itself.

The BFT model provides forecasts 5, 10, and 15 years into the future on the population's health and disease structure, its need for health care and services, standards of health care and management of services, and needs for health-care resources. The reliability of the BFT method and the accuracy of the results have always been checked by comparing actual demographic patterns, social and environmental changes, and health-care structure and patterns with those forecast 5 years after the forecasts were made. During the BFT's first 5 years of use, the forecast values were a maximum of 14.0% higher and 5.3% lower than the actual values. During the past 5 years, these maximum differences have been 8.7% and 0.6% respectively. These figures show the high accuracy of the forecasts provided by the BFT approach.

BFT forecasts have been used to support health planning, evaluation, research and decision-making in over 314 cities, towns and villages in Japan. These localities, which have a total population of approximately 25 million, represent over 17% of the national population. Furthermore, they reflect a variety of different living conditions and environments that cover almost 90% of the demographic and epidemiological patterns within the country.

BFT users have included not only health authorities and other government agencies, but also health-care institutions, university departments and research institutions, insurance companies and financial corporations, community-health organizations, city planners, and others. At the request of the Minister of Health and Welfare, BFT is now being used nationally to optimize the use of hospitals and other health-care resources in Japan. The application of BFT to health-care planning in six developing countries has
also been arranged and financed by the Japanese International Cooperation Agency.

Projects in which BFT has been used cover a wide range of purposes. The majority have been carried out to support regional health planning and planning for hospitals and health centres. For example, it has been used to optimize the use of medical-care resources (hospital, clinics, physicians, and dentists) by evaluating the quantity and type of resources within each zone, the ease of access of communities to the various resources, their economic feasibility, and how equitable, acceptable, and affordable the services were for the people being served. Other BFT projects have focused on healthy cities, healthy aging, emergency care, cancer care, assessment of health-care technologies, plans for the reallocation of resources and services among national hospitals, and health insurance.

Other situations in which BFT could be used include the formulation of strategic health policy and new forms of health care to meet health-for-all objectives, setting health-care standards, devising health-promotion measures, prioritizing health investments, planning research on, and the development of health products, structuring the education of health-care professionals, and carrying out studies on health risks and insurance.

Plans are being made for the further improvement of the BFT system. One aim is to provide mechanisms to facilitate the recognition of changes in factors affecting human health. Another is to generate common projections for key changing factors for countries with similar profiles. Improvements in communication are also being investigated, including possible on-line BFT services.

7.5.5 The Netherlands: using scenarios to inform public health policy

In health, as in other sectors, policies arise from mental images of the future. Factors contributing to these images include norms, values, perceived opportunities and threats, and perceptions of reality, but when many stake-holders are involved and there are many different views of the future, as in the health sector, it becomes difficult to reach a consensus on specific policy targets. The situation is made even more complicated by the very short time horizon of governments and other major stake-holders, the general lack of insight into the complexity of the health sector, and the lack of essential information about trends and possible futures in health. As a result, proposals for health-care reform are very often based on "grand designs" implemented through a long series of ad hoc decisions that do not take into consideration the long-term impact of various policies or their interactions.

In 1984, the State Secretary for Health in the Netherlands took steps to address this problem by introducing futures methods into the health policy-
making process at the national level. The Steering Committee on Futures Health Scenarios (STG) was established to organize and facilitate research and discuss alternative futures in public health (26). The organization of the STG and its relationship to various institutions were designed to provide strong links with policy-makers yet allow the group to carry out scenario building without outside interference.

Most of those who have served on STG since its establishment have been highly experienced public health professionals and top officials from various health agencies and organizations and corporations in the health sector. Examples include former Ministers of Health, the Director of the National Institute for Public Health, the Surgeon General, the Chairman and Vice-chairman of the Dutch Health Council, the former Chairman of the Netherlands Medical Society, and the Director of the Social Health Insurance Union. The STG secretariat was incorporated into the Staff Bureau for Health Policy Development of the Ministry of Health, and a budget was secured of about US$1 million per year.

The main task of STG was to carry out research on alternative futures in public health and to help structure debate on them. The work was carried out through a series of scenario projects focused on a specific public health issue. Each project was carried out by an appointed commission with the help of appropriate research institutes. The formal representation of interest groups in the scenario commissions was avoided; instead, commission members were chosen on the basis of what they could personally contribute to the projects.

Most projects began with 2 years of study by two leading researchers, including fact-finding, modelling, simulation exercises, Delphi exercises, and the design of scenarios. Each project involved the construction of both exploratory and strategic scenarios. Once the research was completed, a discussion phase of about 6 months was initiated, in which health-care providers, consumer groups, insurance companies and other relevant stakeholders took part. As part of this dialogue phase, 2-day national conferences were organized at which the research results and some general conclusions of the commission were presented to about 50–60 participants. STG then formulated a document for submission to the Minister of Health outlining the results of the research and dialogue process and making policy recommendations.

Since its establishment, STG has carried out dozens of scenario projects on specific health topics, and the resulting reports have played an important role in the decision-making process within the health sector. Most reports have dealt with specific issues such as health-care technology, primary care, medical health care, care of the elderly, cancer, HIV/AIDS, the future of
medicines, cardiovascular conditions, diabetes, rheumatism, and chronic lung diseases. In cooperation with the National Institute for Public Health (RIVM), STG has also published an integrated overview of disease-oriented futures studies, in which the results of the research on future health, disease and lifestyle have been brought together in a broad framework.

STG's work has been extremely successful. The scenario projects have often contributed to a better understanding of health issues and to better communication between the stake-holders by providing a neutral forum for discussion. The reports of the different scenario commissions have provided expertise and insights regarding future health-care technologies, future developments in disease patterns, changing concepts and structures in the health-care sector, and influence of environmental factors on the health of the population. The conclusions of the commissions and STG's policy recommendations have enabled policy-makers and policy-making bodies (politicians, administrative agencies, insurance companies, organizations of health professionals) to make more rational (or at least less irrational) decisions about investments and priorities in the health and health-care sector. Many of the ideas first proposed in STG publications have been adopted by stake-holders. All the reports prepared by the scenario project commissions have been published commercially (see Chapter 8), have sold well, and are widely quoted in the press, in political debates, and in policy documents.

Despite this success, in 1994 the Ministry of Health decided—mainly because of budgetary constraints—to "privatize" STG as the independent Foundation for Future Health Scenarios. The Ministry now requests and funds scenario activities on a project-by-project basis. A fairly broad advisory board of high-level executives in the Netherlands health-care sector has been established to ensure that close ties are maintained with policy-makers in relevant organizations and agencies. A second foundation with an international orientation—the Foundation for Strategic Health Policy Development (SOG)—has also been created to support and complement STG's research.

STG's work has been important not only for health planning and policy-making in the Netherlands, but also for the international development of health futures as a discipline. In particular, STG has learned many lessons about factors that improve the quality and impact of health futures research, and has shared this information with other groups through publications and active participation in international health-futures meetings.

For example, a major challenge for health futures is finding a methodological approach that allows linkage among various scenario projects. Scenarios often incorporate certain common issues or make assumptions about
certain background conditions, such as the demographic structure of the population now and in the future, existing and future medical services, risk and exposure indicators, policy measures, economic forecasts, social developments, and attitudes towards health. If these are dealt with separately in each futures project, it will be impossible to integrate the results. This problem became apparent during the early years of STG's work, as did a related problem regarding financial analyses of alternative scenarios. STG responded by investing in research aimed at standardizing the scenario approach and introducing the analysis of costs, and has published two methodological reports that provide guidelines for further research (27, 28).

STG has also recognized that effective communication is essential to health-futures work and has devoted considerable time to contacts with stake-holders and policy-makers. Communication has been handled through conferences, workshops and seminars, day-to-day discussions and interactions with policy-makers, the production of formal reports by the commissions, the commercial publication of these reports, and the writing of newspaper stories and articles for scientific journals.

STG’s experience has also shown that health-futures work thrives only if the top managers of major administrative departments and umbrella organizations in the health and health-care sector become involved early and actually participate in the design and discussion phases. As a consequence, STG has made continuous efforts to attract the interest and commitment of key people in health, in both the public and private sector.

During the first decade of STG’s work, it was also recognized that planning and policy-making with the use of scenario techniques must be an ongoing and periodic process. It was realized that scenarios are of limited value a few years after they are constructed but can be made relevant again through updating and adjustment to take new trends and factors into consideration. STG has consequently asked the research institutions that did the original scenarios to carry out periodic “renewals”. This process not only keeps the scenarios relevant but provides an early warning system, since it leads to the identification of new trends that could have an impact on public health.

Another important development arising from the STG experience is the realization that, even if a country has a scenario-generating programme similar to that of STG, futures-oriented units are also needed within major government agencies, academic departments, and organizations in the health and health-care sectors. In the Netherlands, a special division for epidemiological research and modelling has now been created within the National Institute of Public Health, but many more units of this sort are needed.
7.5.6 Malaysia: using futures in the development of a national health plan

Since 1970, Malaysia has had a planning horizon of 10-20 years, which has been reflected in a series of Outline Development Perspective Plans (2). The second such plan covers the period 1991–2000, for example, while 5-year planning is carried out inside the frameworks provided by these longer plans.

National health planning is done within the context of overall national development planning. Although plans are prepared separately by various health and health-related agencies for inclusion in the 5-year development plan, the Ministry of Health is the primary institution responsible for planning for the health sector. The Ministry’s planning process involves the identification of community needs and demands through analyses at the state level, followed by compilation of the information into projections of the country’s future health.

During the 1980s, it became clear that a more integrated approach was needed to deal with emerging issues in the health sector. For example, uncontrolled growth of private health care was leading to problems in equity, resources for public health were not being used optimally, and health personnel in the public sector were inadequate.

In response, a National Health Plan Study was begun in 1990 in order to develop a national health planning methodology, to carry out a trial of the methodology, and to produce a draft National Health Plan. The objectives also included an evaluation of the study and the formulation of recommendations to the Government. The work was carried out in two phases and involved both local experts and foreign consultants.

The planning process proposed by the study involves the calculation of days of healthy life lost (DHLL) for the country. The judgement of the team doing the work was that this was a more comprehensive measure than conventional mortality and morbidity indicators.

The process begins with the generation of projections for a variety of socioeconomic factors and the modification of these projections as necessary following input from experts. The impact of these factors on disease risks is then assessed, and the future disease burdens in terms of DHLL are calculated. Next, the effects of different intervention scenarios on the disease burden are estimated using similar methods, including the solicitation of expert opinion.

The process also looks at future resource requirements for each category of intervention applied to each disease. These requirements include professional and support staff time, costs of drugs and other supplies, operating costs, and so forth. This part of the analysis makes possible a comparison of the expected future cost-effectiveness of different interventions.
During the trial run of the process, several scenarios were also produced, among which were three depicting different ways of organizing the health system and four reflecting different systems for country-level policy-making in the health sector.

The problems encountered during the Malaysian study were those common to all futures work. Because of practical limitations, the scenarios were quite superficial, and the lack of adequate data was also a major difficulty. Nevertheless, the scenarios were found to be useful at the macro-level, and the Malaysian study was an important experiment in combining futures techniques such as the solicitation of expert opinion and the construction of scenarios based on the more conventional quantitative analysis typical of most national planning.

7.5.7 Peru: looking at health as part of overall national development

Not all analysis of future health has taken place in health-futures projects. Some has taken place instead within multisectoral futures studies, as in the Peruvian "21st century study" done by Grupo de Análisis para el Desarrollo (GRADE) in Peru (29). The study, which was conceived in the early 1980s and is still continuing, is an ongoing programme of interlinked projects. One major activity has involved simulations of alternative feasible futures; another has focused on desired futures; yet another is concerned with external factors affecting Peru's future. The results of the projects, including recommendations regarding government policies in various sectors, have been published and made available to national policy-makers, and the sectoral models have also been transferred to the Peruvian National Planning Institute.

Health and factors affecting health have received considerable attention in GRADE's work. For instance, in the project on feasible futures, simulation models were constructed for 10 sectors, and projections generated by these models were then integrated into comprehensive national scenarios. The 10 sectors chosen for analysis were population, education, health services, housing, labour force, agriculture, nutrition, energy, mining, and industry. Three of them—population, nutrition, and health services—have a direct influence on health status, while the others have indirect health impacts via the socioeconomic conditions of the country.

7.5.8 Other studies

The Peruvian national study is just one of many that have looked not only at future economic development, but also at future human health and well-being. In fact, health care, the environment, socioeconomic conditions, popu-
lation, urbanization, and other factors affecting health have been addressed in almost all such studies. Numerous examples can be found in Studies for the 21st century (30) and in the special Futures issue on national 21st century studies (31). Thus, as noted earlier, groups interested in promoting health-futures work should consider not only projects within the health sector itself, but also possible participation in multisectoral national futures studies.

References


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8.1 Introduction to information-seeking

Every team doing national health-futures work will need information, regardless of the activity’s purpose, its design, or the key factors being considered. A project carried out to create a vision will require information about the opinions, values, and dreams of the country’s people. Such information can be collected by means of expert interviews, Delphis, and community visioning exercises. An analysis designed to trace certain epidemiological trends may involve the generation of information through surveys and fieldwork. Many projects will require information on emerging factors that is best found by scanning the popular media. All these techniques are valid means of obtaining information for national futures work.

8.1.1 Why the literature is important

"The literature"—which today includes both printed and electronic materials—is the fundamental means of communication in health futures as in other disciplines. It is the primary medium whereby professionals around the world exchange information, and contains a wider range of creative ideas, in-depth analyses, and thought-provoking debates than can be found anywhere else. By checking these sources first, teams can avoid wasting time and money “inventing” solutions and “creating” databases that already exist.

The specific information sought in the literature will obviously depend on the team’s background and the nature of the project.

8.1.2 Developing a good search strategy

Tracking down information can be complicated, since no single source ever provides all the information needed, and information is stored in many different forms, including books, journals, in-house publications of health
agencies, trade publications of the pharmaceutical and health-care industries, conference proceedings, and documents from international agencies. Some types of information, such as statistical and bibliographical databases and indexes, will most probably be stored in electronic form, either on-line or in portable forms such as CD-ROMs (see section 8.2.4). A search strategy that is both effective and efficient is therefore essential. Unfortunately, the most widely used strategies are neither one nor the other. Librarians claim that most researchers still rely primarily on browsing (sometimes called "unstructured manual searching") and "snowballing". The latter involves finding one key book or article, checking the reference list and identifying the most relevant citations, obtaining these books and articles, checking the reference lists in these, and so on, until a bibliography is constructed. Browsing and snowballing, if practised diligently, do yield results, but are normally inadequate to provide the information needed in a national health-futures project.

Teams who want their work to have a solid information foundation should begin by becoming familiar with local libraries and the information resources available there and by mastering computerized catalogues and CD-ROM indexes if they are available. If time and circumstances allow, they can then broaden the strategy by making use of resources accessible through computer networks, such as on-line indexes and the library catalogues called OPACs (on-line public-access catalogues).

Developing a good search strategy will also involve learning to "coax" references out of electronic cataloguing and indexing systems, most of which are organized so that users can search in a variety of fields, such as author, title, general subject, and key word, but the choice of field and the actual search string can make a major difference. A search done with "futures" as the subject will not give the same references as one using "futures" as the key word, for example.

The choice of search term or phrase is also important, particularly in less sophisticated systems that do not allow truncation or Boolean logic ("future*" for "future" and "futures", "medicine or health" to find all items covering either topic, and so on). Requests for publications about "futures" are likely to result in references having to do with commodity markets, while searches for materials on "futurism" will probably return citations about the futurist movement in art. Searches for "health futures" often have no results (Your search has yielded 0 records) or call forth messages that seem to forewarn the catastrophic collapse of public health (Futures and health do not co-exist).

Thus the most effective searches will involve many patient attempts using different search fields (subject, key word, word in title, etc.) and a wide variety of search terms. Some suggested search terms are given in Box 12.
Box 12. *Examples of search terms relevant to national health-futures activities*

- **Health futures**: health, public health, medicine, medical (each of these alone and combined with the following—futures(s), planning, trend(s), new, emerging, new directions, innovations, forecast(s), projection(s), prediction(s), scenario(s), forecasting, projecting, predicting, year, century, 21st century, millennium).

- **Research techniques, measures, and patterns**: health surveys, nutritional surveys, health status, health indicators, health statistics, women's health statistics, vital statistics, disease statistics, disease burden, disease patterns, epidemiology, epidemiological profile, epidemiological methods, life expectancy, mortality, morbidity, infant mortality, years of life lost, statistical model(s), system-dynamics model(s), econometric model(s), forecast model(s), pattern-recognition model(s), stochastic model(s).

- **Public health**: national health policy (policies), national health system(s), health promotion, healthy communities, healthy cities, health education, disease prevention, disease control, preventive medicine, social medicine, environmental medicine, legislation, health legislation, regulation(s), health regulation(s), intervention(s), vaccination, vaccines, immunization, vectors, vector control.

- **Population, demography, and family planning**: population, population growth, population projections, population studies, population surveillance, population control, family planning, birth control, birth spacing, contraception, abortion, fertility, birth rate, demography, demographic transition.

- **Health care and medical treatment**: health, health care, health-care, healthcare, health service(s), health-service(s), medicine, medical (each of these alone and combined with the following—national, community, primary, mental, managed, system(s), reform(s), financing, economics, prices, pricing mechanisms, technology, technologies, provider(s), health manpower, human resources for health, physicians, nurses, paramedics, midwives, workforce, professionals, accessibility, supply and distribution, delivery, equity, cost–benefit, policy, policies, program(s), programme(s), future(s)).

- **Therapies and prevention**: therapy, therapies, drugs, pharmaceutical(s), treatment(s), technology, technologies, medicine, medical, therapeutic (each of these alone and combined with the following—preventive, prevention, essential, control, alternative(s), holistic, traditional, social, effectiveness, assessment, integrated, integration).

- **Specific diseases and conditions**: malaria, AIDS, HIV/AIDS, HIV, sexually transmitted diseases, STDs, tuberculosis, diphtheria, poliomyelitis, measles, tetanus, diarrhoea, diarrhea, diarrhoeal disease(s), diarrheal disease(s), worm infections, cardiovascular disease(s), nutritional deficiencies, coronary disease(s), lung disease(s), respiratory tract disease(s), diabetes, neoplasms, cancer, mental illness(es),
(neuro)psychiatric conditions, psychological disorders, maternal, perinatal, communicable disease(s), noncommunicable disease(s), contagious disease(s), parasitic disease(s), chronic disease(s), chronic conditions, tropical disease(s), tropical medicine, injuries, accidents, epidemic(s), viruses, viral diseases.

- **Specific populations:** child health, child welfare, women's health, maternal-child health, family health, aging, ageing, aged, elderly, developing countries, less developed countries, LDCs, industrialized countries, low-income economies, middle-income economies, high-income economies, ethnic groups, refugees, indigenous people(s), urban health, rural health, chronically ill, disabled, mentally ill, global, international, national, subnational, regional, community, local.

- **Actors:** public, patient(s), national (local, regional) government, political parties, health ministry, ministry of health, public health department, national health service, health authority (authorities), health agency (agencies), WHO, World Health Organization, hospital(s), doctor(s), nurse(s), medical personnel, paramedical personnel, medical profession(s), medical professionals, insurance companies, health maintenance organization(s), HMO(s), pharmaceutical industry (industries), pharmaceutical company (companies), health-care provider(s), corporations, communities, media, citizens' groups.

- **Health behaviour and lifestyles:** behaviour(s), behavior(s), health behaviour(s), health behavior(s), age factors, risk factors, nutrition, eating habits, food, exercise, smoking, tobacco, alcohol, drugs, substance abuse.

- **Environmental and socioeconomic factors:** global change, climate change, environmental health, environment, pollution, toxic waste(s), radioactivity, environment and health, water supply, sanitation, urban development, urbanization, poverty, malnutrition, socioeconomic factors, income distribution, education, education for women, equity, access, epidemiological transition, health transition, social change, cultural change, culture, human needs, human well-being, human welfare, human security, human rights, ethics, values.

The list is not comprehensive, and not all terms will be relevant to all activities. Groups carrying out health-futures projects should develop their own lists, based on their specific informational needs and the success that they have when they search with different terms in various indexes. General guidelines and advice about search fields and search terms are available in most libraries that have CD-ROM facilities and computerized catalogues. There are also general guides available on searching in the medical literature (1). However, there is no way to know *a priori* which terms will be most effective; the knowledge must be built up through experience.
Teams may find it particularly difficult to track down “grey literature”—materials that are produced in-house rather than being formally published (2). Documents of this sort are produced by research institutes, government offices, nongovernmental organizations, departments of public health, WHO and other United Nations agencies. Now that desk-top publishing systems are becoming more widespread, the physical distinction between grey literature and formal publications is often less obvious. The difference between the two categories is important, however, since grey literature is not usually handled by commercial booksellers and is less likely to be found in libraries. Teams should therefore look for items of this sort in the miscellaneous document collections of libraries or request them directly from the author or the issuing institution.

How much of the literature can be accessed—and how easily—varies tremendously in different parts of the world. Although more information may be accessible than is generally realized, teams in developing countries will probably experience greater difficulties (3–7).

If a project will require a large information base, it may be advisable to include an information specialist on the team. If an ongoing, large-scale futures programme is contemplated, it may even be worthwhile for a team member to take a brief training course in information technology. Information on such training courses can be found in international library journals.

The WHO library in Geneva is engaged in a variety of activities aimed at improving access to health information. The WHO library publishes subject lists of recent publications on various health-related topics and also assembles and distributes essential information modules on various key topics. It provides a monthly satellite transmission to Africa on current health publications especially relevant to that region and also publishes a printed version called Digest for Africa. Another WHO library publication, the newsletter Liaison, provides current information about library associations, training programmes, conferences, new information resources, and much more. The library is also responsible for an on-line bibliographical database called WHOLIS, which covers all WHO publications since 1948, plus all World Health Assembly and Executive Board documents, unpublished documents, and articles in WHO periodicals and newsletters since 1986. Books and periodicals not published by WHO but included in the WHO library collection are also listed.

Teams should also check the facilities and services offered by the libraries of their respective WHO regional office. The library of the Pan American Health Organization is of special importance to teams working in Latin America, since its collection includes Spanish and Portuguese literature relevant to health futures.
8.2 Finding information locally

8.2.1 Research libraries

Teams that become enthusiastic about the information-seeking process may be tempted to begin by arranging a connection to a computer network and looking for material on the Internet. However, the material most relevant to national health-futures research is more likely to be found in a local library than in a computerized database on the other side of the world. The best strategy is to start with manual rather than computerized sources, and with local rather than on-line sources.

The best sources of printed materials will almost certainly include libraries. If the sponsoring institution or agency has a library, this should be checked first, followed by those at universities, medical faculties, hospitals, and government agencies. Where information access is difficult, all possible libraries should be investigated.

Information on libraries throughout the world can be found in international directories of academic institutions and libraries (8-10). Directories of academic institutions provide information on colleges, universities, learned societies, professional organizations and research institutions, and list every important library in the world. Library directories provide similar information and also list the library associations to which each library belongs and through which interlibrary loans can be arranged. Special library directories covering specific regions, such as Africa, also exist.

High-quality libraries are the major repositories of the books, journals, conference reports, reference volumes, and other printed materials that might be useful in a health-futures project. In addition, good libraries are information-technology centres that make available various tools through which research materials can be identified and obtained, including printed bibliographies and indexes, computerized card catalogues, a variety of indexes on CD-ROM, and on-line connections to the Internet.

Books needed for a project but not available in the local library may be accessible through interlibrary loan, and it may also be possible to obtain photocopies of articles in journals that the library does not subscribe to. Most libraries belong to various associations through which requests for interlibrary loans are handled, and librarians will be able to find all or most of the materials related to public health in this way. If a team is working in a university or other academic setting, has a tight budget, and really needs a particular publication that is not available even by interlibrary loan, the library may have a donor-supported book-purchasing programme through which it can be bought. Publications about futures will be harder to find than those on various aspects of health. Teams requesting books through
interlibrary loan may want to give the librarians the addresses provided in Chapter 9.

To make effective use of the resources at a library, it helps to learn how it is organized and what it has to offer. It is also important to check whether the library has terminals linked up to a computerized catalogue and ones providing access to CD-ROM indexes (see section 8.2.4) and to the Internet. Computerized catalogues provide information about the printed resources available at the library, and have replaced the old card catalogues at many libraries. Where card and electronic catalogues coexist, the former usually contain only older materials; new acquisitions are listed only in the computerized catalogue. Most libraries make terminals available so that users can search the catalogue themselves.

The catalogues vary a great deal, but most offer a menu-driven system that allows easy searches of various sorts. After gaining some experience, users may want to try more sophisticated searches involving truncations, Boolean logic, and classification codes. Printed brochures and help screens built into the catalogue are normally available to teach users how to operate the system.

8.2.2 Journals

Journals have become a major medium for the exchange of ideas and data because they allow for rapid worldwide communication, and are now as important an information source as books. Health-futures teams should make use of those that are available and relevant.

One way to find journals that carry articles relevant to health futures is to flip through the periodicals in the reading room of a library. The periodicals that a library subscribes to are also usually listed, with descriptions, in the library's computerized catalogue, thus providing another route for finding the most useful titles. The catalogue of the National Library of Medicine, for example, includes descriptions of over 1400 English-language journals in the public health field, including about 190 in health planning and 150 on development and health. Yet another way to find journals is to use Ulrich's international periodical directory (11). The 1994–95 edition lists more than 140000 journals and other serial publications from around the world and includes both title and subject indexes.

Journals likely to carry articles of interest to national health-futures teams will include those on futures, forecasting, technological trends, modelling and analysis, health, public health, public health administration, health policy and planning, health care, and related topics. Periodicals about factors that affect health—population, socioeconomic development, environment,
urbanization, etc.—will also yield many useful papers. Serial publications of WHO, the Pan American Health Organization and other WHO regional offices will be particularly useful to those doing certain types of health-futures work, as may also be periodicals published by internationally important health centres such as the London School of Hygiene and Tropical Medicine and the Centers for Disease Control and Prevention in the United States.

Many health journals occasionally publish special issues or supplements on specific aspects of health, including health futures, while periodicals that do not normally address health matters sometimes publish special issues focused on health. Among the topics covered in recent special issues have been health futures and the futures of health, health care, health-care reform, health care in the Member States of the European Union, health and wealth, human health impact assessment, healthy surveys, health care for the elderly, migration and health, environmental change and public health, and women, ecology and health.

Box 13 lists some journals that might contain articles relevant to health futures. Most of the periodicals listed deal with issues from an international or regional perspective. Regional and national periodicals may contain just as many relevant articles as international journals. Researchers with WWW access can get a better idea of the wide range of journals available by browsing in the periodicals titles in the WHO library database.

**Box 13. Some journals relevant to national health-futures activities**

- *AIDS* and public policy journal. Frederick, MD, University Publishing Group.
- *Boletín de la Oficina Sanitaria Panamericana*. Washington, DC, Pan American Health Organization (also available in English).
- *Boletín de medicamentos esenciales*. Geneva, World Health Organization (also available in English, French, and Arabic).
- *Boletín demográfico*. Santiago, Chile, Centro Latinoamericano de Demografía.
HEALTH FUTURES: A HANDBOOK FOR HEALTH PROFESSIONALS

- Cahiers de sociologie et de démographie médicales. Paris, Centre de Sociologie et de Démographie Médicales.
- Choix. New York, NY, United Nations Development Programme (also available in English) (formerly Développement mondial).
- Development dialogue. Uppsala, Sweden, Dag Hammarskjöld Foundation.
- Ecología humana y salud. Mexico City, Mexico, Centro Panamericano de Ecología Humana y Salud.
- Epidemiology. Baltimore, MD, Williams & Wilkins.
- European bulletin on environment and health. Copenhagen, WHO Regional Office for Europe.
- Foro mundial de la salud. Geneva, World Health Organization (also available in English, French, and other languages).
- Futures research quarterly. Bethesda, MD, World Futures Society.
- Health affairs. Bethesda, MD, Project Hope.
- Health policy. Amsterdam, Elsevier Science.
- Health policy and planning. London, London School of Hygiene and Tropical Medicine.
- Health transition review. Canberra, Health Transition Centre, Australian National University.
• International journal of health services. Farmingdale, NY, Baywood.
• International quarterly of community health education. Farmingdale, NY, Baywood.
• Journal of health economics. Amsterdam, North-Holland.
• Notas de población. Santiago, Chile, Centro Latinoamericano de Demografía.
• Population research and policy review. Amsterdam, Elsevier Science.
• Rapport mondial sur le développement humain. Paris, Economica (also available in English).
• Revista panamericana de salud pública. Washington, DC, Pan American Health Organization (formerly Boletín de la Oficina Sanitaria Panamericana).
• Salud fronteriza. Washington, DC, Pan American Health Organization.
• Salud y paz, desarrollo y democracia. Washington, DC, Pan American Health Organization.
• Seguridad social. Mexico City, Mexico, Secretaría General de la Conferencia Interamericana de Seguridad Social.
• SidAfrique. Paris, Organisation Panafriicaine de Lutte contre le SIDA.
• Social indicators research. Dordrecht, Reidel Publishing.
• Social science and medicine. Oxford, Pergamon Press.
• Technology and health care. Amsterdam, Elsevier Science.
• Third world planning review. Liverpool, Liverpool University Press.
• Tribuna de l'eau. Liège, Belgium, CESEDUC.
• Women's health journal (ISIS International). Santiago, Chile, Latin American and Caribbean Women's Health Network.
• Worldwatch. Washington, DC, Worldwatch Institute.
8.2.3 Reference materials, secondary and tertiary literature, current awareness tools

A futures team may begin their searches concerned that very limited information is available, but once they have learned how to search, may be just as concerned about the wealth of available primary sources—books, reports, journal articles, and other original publications. It may then be advisable to turn to reference literature and secondary sources, which can be found through library card catalogues, or in the special rooms set aside for them in many libraries. Reference literature includes handbooks, directories, encyclopaedias, and similar resources that provide overviews and summaries of particular subjects, while secondary sources include bibliographies, indexes, current awareness tools, and abstracts based on the primary literature. In reality, the line between the two categories is a hazy one, since many resources include both reviews and literature citation, and some books can best be described as tertiary sources, since they are surveys of the secondary sources—directories of directories, for example (12).

Not all secondary materials are books, since review papers, literature reviews, bibliographical articles, and abstracts can also be found in periodicals. Some journals specialize in reviews (Annual review of public health, Health transition review, etc.), publishing summaries of research and development in specific areas, as well as bibliographies of recent publications. There are also periodicals that consist solely or largely of abstracts, e.g. Excerpta medica.

The amount of reference and secondary material about health futures is still limited. Health futures in the late 20th century (13) is a collection of previously published papers in the field, and Information for health futures research (14) contains an overview similar to that provided in this section, plus a bibliography that is somewhat more oriented to European and North American health-futures interests. In the area of health itself, works of reference and secondary and tertiary literature abound. The National Library of Medicine in Bethesda, MD, has in its collection over 1000 bibliographical resources about health, approximately the same number of handbooks on the same topic, 700 encyclopaedias and almost 500 resource books, resource directories, sourcebooks and references. One of the most valuable is the Encyclopedia of health information sources (15), which lists over 13000 publications, organizations and databases on health-related subjects.

The secondary sources known as current awareness tools are designed to keep researchers up to date on publications in their particular field. The best known is Current contents, which exists in many versions, including several related to health—clinical medicine; life sciences; social and behavioural sciences; engineering, technology and applied sciences; and agriculture, biology and environmental sciences.
The major current awareness tool in the futures field is *Future survey*, published by the World Future Society (see Chapter 9 for the address), which includes about 1000 abstracts a year on books, reports and articles regarding the future, including some on health, sustainable development, environment, and related areas. The United States is the source of most of the items abstracted, but many of them are general in character or global in perspective. It is published as a monthly and an annual; back numbers are available. Other surveys of the current futures literature are provided by *Futuresco* (16) and *OECD futures studies information base highlights* (17).

WHO headquarters in Geneva and the various regional offices produce a variety of bibliographies and catalogues that are excellent current awareness tools for national teams, especially for references of regional importance. The lists compiled by the WHO library of recent books and documents on selected topics are also excellent, and include both English and French references. Lists have been prepared on subjects such as accidents and safety; health; Africa; development; disaster and emergency preparedness; environmental health; financing health care in developing countries; health economics; health law and bioethics; health management and planning; health-related publications of the United Nations and the specialized agencies; health services; health services for the aged; mental health; nutrition; oral health; refugees; traditional medicine; and urban health.

Reference literature is an important source of basic factual and statistical information. WHO publications, including those of the regional offices, and the publications of the United Nations and the specialized agencies are important sources of global and regional statistics on health (18–22). United Nations documents are also the place to look first for data on factors influencing health, such as socioeconomic conditions. Most teams will be able to obtain statistics on their own country from official and academic sources but, if unpublished sources are difficult to obtain, published information on the results of national demographic and health surveys may sometimes be available (23–26).

High-quality international yearbooks or handbooks are also a source of certain kinds of statistics, e.g. the *Europa world handbook* (27) and *Handbooks to the modern world* (28) provide overviews and statistics on countries and regions of the world. Such sources are also important because most national futures teams will need information on key actors, i.e. the institutions and individuals whose actions are likely to influence the future. In normative, change-oriented futures activities, information on actors may also be needed so that they can be drawn into them. International yearbooks include directories in which the postal and e-mail addresses and telephone and fax numbers of major institutions in every country of the world—international and
national agencies, nongovernmental organizations, important foundations, universities, and so on—are given.

Directories also exist of organizations, institutions, companies, networks, and associations involved, e.g. in health, health care, development, population, and environment. Information on professionals working in futures, health futures, health promotion, and health care can be obtained from other directories and from membership lists. The National Library of Medicine, Bethesda, MD, also maintains an on-line directory of institutions, organizations, and companies in health and related fields. Instructions for accessing that directory are given in section 8.3.4.

8.2.4 Computerized databases on CD-ROM

Although well structured and conscientious searches through printed reference materials and bibliographies can yield good results, the exponential increase in the number of research publications is quickly making them impractical. In order to keep pace, national health-futures teams will need to make use of indexes, especially computerized ones.

Indexes are collections of references organized in such a way as to make it possible to search for material in specific ways—by author, title, topic, key words, geographical area, year of publication, and so on. Most indexes include only journal articles, but some incorporate books, agency reports, conference proceedings, and similar materials. In general, the format of indexes is fairly simple, and they provide only basic references, but some include abstracts or even list the references cited in each article.

Although many indexes exist in printed form, these are quickly being replaced by computer-readable versions that offer several advantages. Thus coverage is broader, since a single index can include literally millions of records. Searches can be done much more rapidly; a search that would take years to do manually can be done with a computer in a matter of hours. The databases are updated regularly, so that the material is more up to date than that in printed indexes. And, finally, when searches are done using computer-readable indexes, the information that a researcher wants to save can usually be printed out or transferred to another computer.

Many computer-readable databases are available in the form of CD-ROMs (compact disc-read only memory). Commercial companies build the databases, load them on to the CDs, and sell these to individuals and institutions, including university libraries. Although the major users there may be the information specialists, most libraries also allow researchers access to the discs. In 1979 there were only 300 computer-readable databases in existence, as compared with nearly 4000 currently available on CD-ROM. Many are indexes; the rest are non-bibliographical databases providing information in
the form of news stories, official documents, time-series data, statistics, images, and directories.

Most indexed databases allow searches by title, author, subject, or key word, but the exact system depends on the database. To learn to use a CD-ROM database, the first place to look is on the CD itself. Every index contains information about how the system works, the function of various keys, and so forth. A second source is the printed guide to the database, which provides guidance on matters such as search terms.

Information about available computerized databases is found in Gale's two-volume Directory of databases (29), which is available at many research libraries. One volume is devoted to CD-ROMs. A subject index simplifies the task of finding databases relevant to health and health care. A sampling of indexes likely to be relevant to health-futures projects is given in Box 14. The list includes indexes available on CD-ROMs, those accessible on-line, and those that can be found in both forms.

Many tertiary, secondary, and reference literature sources are available on health futures, health, health care, and medicine (30–49). Publications of the same sort, but in environmental science and sustainable development, are also available (50–54), and are of potential relevance to many health-futures projects. Selected directories of individuals, organizations, companies, and services in the areas of health, health care, and futures also exist (55–68).

8.2.5 Journal articles, books, reports, and other primary literature

Primary literature resources—books, journal articles, reports, and other documents—exist on literally every topic that might be addressed in a health-futures study. Providing a bibliography of such resources is impossible since those published in the past 5 years alone number tens of thousands. Those included in the list of references at the end of this chapter are a very small sample and are provided primarily to give teams an idea of what is available in the primary literature. To find other publications relevant to their particular work, teams should use CD-ROM and on-line indexes and other secondary sources (see Box 14), if they are available.

Health-futures teams unfamiliar with futures may want to read more about the subject, and should look for books and articles that provide overviews of futures, present various philosophies, describe scenario building, or cover certain methods. Proceedings of futures conferences may also be of interest. Descriptions of previous national health-futures projects should yield many good ideas about design and methods. Especially noteworthy are the dozens of reports prepared by STG (Steering Committee on Futures Health Scenarios) in the Netherlands. Reports on national futures activities
in other countries may also be helpful, even those from sectors other than health.

The public health literature will also be extremely useful. There are numerous publications that examine public health from a futures viewpoint, describing it in terms of trends, forecasts, projections, causative factors, actors, models, scenarios, alternatives, prospects, transitions, visions, and strategies.

In addition, teams should look for publications on public-health methods that can be applied to health-futures work, e.g., health surveys, epidemiological analyses, environmental impact assessment techniques, health services research, health informatics, and so on.

In most national health-futures projects, some consideration should be given to the international situation, including global health patterns, health-
care systems and health policies in different countries, trends in health-care reform, worldwide developments in health promotion, and the healthy cities project. For this type of information, the most likely sources are books published by major publishers and reports and discussion papers from international agencies and leading research institutions.

The major information requirement for any national health-futures activity will obviously be material about the country concerned, its people, and their former and current health situation. Much of this literature is likely to be published within the country and in the national language either in the form of commercially published books, or if these are not available, in reports of the ministry of health, other national agencies, and local organizations. Such publications and reports are particularly useful in a futures project since they will include discussions of emerging local trends and prospects.

Books on the major factors affecting health, including individual behaviour are also important. Thus publications on drugs, alcohol, and tobacco provide insights into trends and possible interventions in these areas. The natural environment also influences health, so that literature on ecology, environmental degradation, toxic wastes, air and water pollution, and similar topics may be needed. Teams may also need materials on the major changes in the earth’s climate and atmosphere and on the potential effect of these changes on public health. Socioeconomic factors are also important so that recent publications on the links between the environment, development, urbanization, and health may be needed. Poverty and lack of power are among the major impediments to health, so that publications on equity, income distribution, and community empowerment should also be considered.

In creating their scenarios for future health, many teams will want to consider the diseases currently affecting the population and others that may threaten it in the future. Numerous books are available on the epidemiology, trends, prevention, and control of both communicable and chronic diseases. Some books deal with diseases more prevalent in industrialized countries, while others focus on those characteristic of the developing countries and tropical regions or on specific diseases or groups of diseases, including HIV/AIDS, tuberculosis, cholera, cardiovascular disorders, and cancer. Some teams will be working in countries going through or anticipating an epidemiological transition, and numerous reports and articles are available describing the transition and the implications for public health administration, policy-making, and planning.

Information and statistics are available on many special populations, including the elderly, rural and urban communities, mothers and children, refugees, and workers. Publications on women’s health include many related
to reproductive health; the literature in this area overlaps that on family planning, population, and demography. Technology will undoubtedly affect health and health care in the future, and teams should therefore look for in-depth analyses of technological trends and possibilities. Books in this field include general reviews, as well as studies on technologies relevant to human reproduction, the prevention and treatment of cancer, cardiovascular disease, pharmaceutical products, and much more.

Finally, good futures work usually requires looking beyond the clearly established trends, spotting emerging phenomena, imagining and being prepared for the unexpected, including new epidemics, natural catastrophes, global changes, man-made disasters, technological breakthroughs, and revolutionary changes in social structure or behaviour patterns.

The list of references at the end of this chapter includes selected primary literature relevant to health-futures research. (The references at the end of the individual chapters in this handbook should also be checked.) Most of the references are futures-oriented and deal with trends, innovations, and alternatives. With a few exceptions, the materials were published since the late 1980s, and only English-language publications are included. This list is provided solely as a “current awareness” tool; new material is constantly being produced and published. The references cover:

- Futures and futures methods (69–101).
- National and regional futures and futures studies (102–122).
- Health futures (123–154).
- Models, modelling, forecasting, projection techniques, and specific forecasts and projections (155–175).
- Demographic and epidemiological surveillance, health surveys, health impact assessments, health indicators, informatics, statistics, healthcare research and health policy analysis (176–213).
- Public health, trends in global health, determinants of health, and strategies for health for all (214–236).
- Health care, health systems and policies, equity and economics (237–256).
- Disease control and emerging diseases (257–263).
- Trends in tuberculosis (264–267).
- Chronic diseases, cancer, diabetes, cardiovascular conditions (274–277).
- Tobacco and substance abuse (278–281).
- Nutrition and food (282–283).
- Epidemiological transition, health transition (284–297).
• Ageing populations, health of the elderly, health care for the elderly (298–303).
• Maternal and child health, women’s health, reproductive health, family planning, population policies, sex and health (304–311).
• Population, development, sustainable development, global climatic and environmental change, environmental impacts on health (312–324).
• Urbanization and migration (325–330).
• Healthy cities, healthy people, health promotion (331–342).
• Mental health care (343–346).
• Occupational health, exposure to toxins, accidents, trauma (347–348).
• Disasters and emerging threats to health (349–358).
• Diagnostics, therapeutics, technologies (359–373).

8.3 Finding information on-line

After their own institutions’ collections and the local research libraries, the next best place for health-futures teams to find relevant material is on-line, in the Internet or some other computer network. Teams that want to use on-line resources will need a computer hooked up to the system by way of cables or a modem, various programs that allow access to different resources, a security system to protect against worms (network viruses), and the knowledge to make the whole thing work.

There are many different types of computer networks; some are aimed at the general public or the research community, some oriented towards social change, and others used primarily for business purposes. A network may operate in a single country or throughout the world. The computers within an individual network all use the same protocol and the same system for addressing information packages, thus allowing communication among the subscribers. Many networks are linked to each other via gateways, which makes it possible for the users of one network to cross over into another, although this often requires some sort of registration or subscription. The Internet, the world’s largest computer network and the one most used by the research community, is described in some detail in the following sections.

Networks can be accessed in various ways. In some parts of the world, academic institutions have installed hardware and software that provide direct connections to all on-line services. These institutions usually pay a group user fee, so that individual researchers are not charged for access. Elsewhere, however, researchers must purchase their own equipment and programs and pay a commercial provider.
8.3.1 Internet programs and navigational tools

Teams using the Internet for the first time will find it a challenge. The first problem is that the net includes great amounts of redundancy—multiple copies of popular tools, files, databases and other items, plus multiple routes for getting from one point to another. The second problem is that the system looks different on various terminals depending on hardware, software, and type of connection. The third problem is that learning to use the Internet is not at all like mastering the operating system of a computer, which is static and is updated only every few years. The Internet is in constant flux, so that knowledge about how to carry out a particular function or how to reach a certain resource can quickly become obsolete. Old tools and resources are regularly moved or removed, new ones appearing in their place, and old pathways are closed, while others open. Furthermore, Internet software is elaborated at an amazing rate. As the system changes, the recommended programs change also. Currently, the basic list of programs for a full connection to the Internet would include the following:

- An electronic mail program and newsreader program.
- A telnet program to allow distance log-in to readable databases, such as most on-line catalogues at research libraries.
- Netscape or a similar WWW scanning program to provide access to materials stored on World Wide Web servers.
- A gopher program to provide access to many Internet resources through hierarchical menus.
- A file transfer protocol (ftp) program so that files can be transferred from ftp servers.

Just keeping abreast of new Internet developments can become a major preoccupation, to the detriment of actual research. The only way that people can keep up with its growth and development is to devote all their time to watching its evolution and reading about it in information technology magazines. A wiser strategy is to master a few Internet programs and become familiar with selected Internet tools and resources, then gradually build up expertise by using these in actual research. Thus teams just learning to use the system will probably do best if they concentrate on a couple of basic functions such as those described in the following pages.

Despite its structural complexity, the Internet has a basic functional simplicity. Everything that happens on the net involves temporarily linking one computer to another (or several others) in the system. One basic Internet function made possible by these linkages is communication. Electronic mail, or e-mail as it is usually called, is the simplest form of communication; it allows a user to exchange messages with other users who have e-mail boxes.
Many varieties of e-mail programs exist of varying degrees of sophistication. A standard version lets the user attach a document file to the e-mail message, allows the sending of a single message to multiple recipients, has a storage capacity for copies of incoming and outgoing messages, provides printed versions of messages on request, and more. Documents can also be transmitted from one e-mail user to another—theoretically. In reality, the process is still limited, since it requires the users at both ends to have the appropriate hardware, software, and know-how to handle attachments.

Another form of communication, usually called "news", is essentially an expanded type of electronic mail that handles the mass exchange of messages among people interested in a particular topic. The Internet's Usenet is the world's largest version of this service, but it also exists on other computer networks in numerous varieties and under various names, such as bulletin boards, mailing list, listserv, conference, chat group, and so on. Subscribers sometimes automatically receive in their e-mail boxes copies of all communications received by a particular group. Mass communication can also be arranged as "real time discussions", in which participants type in their conversations as bulletin boards in which incoming materials are posted and can be accessed but are not automatically distributed, as exchanges set up for a specific purpose and limited duration, and as archives in which earlier messages to various groups can be read and copied.

This mass communication function of the Internet has caught the public's imagination, and groups have been formed on every imaginable topic. At least one on-line forum now exists for just about every imaginable aspect of medicine, alternative medicine, health, illness, health care, health professions, patients' rights, and other health-related topics. Although some of these may yield ideas, contacts, and information valuable to a health-futures project, the number that do so will be small. On the other hand, a well structured group with clearly defined discussion topics can be a valuable place to meet and exchange ideas with unseen colleagues around the world.

The Internet's other basic function is information access, and the information available on the net is immensely rich. Even the description "the world's largest library" is inadequate. For example, via the Internet a team can search through the OPACs (see p. 227) of medical and health libraries all over the world and find the newest books in any field. It is also possible to tap into other kinds of computerized databases, in most cases free of charge. In addition, teams can take copies of files made available by researchers, universities, official agencies, and professional organizations. Such files, containing research papers, electronic journals, government documents, official reports, codes for models, software and more, now number in the millions.

Newcomers to the Internet are certain to be impressed by the extensive resource listings and excited by the access to high-quality, copyright-free
resources that can be used free of charge. They are also likely to be discouraged when they realize that there is little or no quality control in the system and, at least so far, no highly effective device for sorting through all the available materials. Thus one of the major challenges of the Internet lies in learning to identify and find relevant resources. Luckily, the net itself contains numerous navigational tools that help users find the materials that they are seeking. These tools include menus, directories, subject trees, and search engines.

8.3.2 Gophers

Gophers are named after small mammals that live in colonies in the North American prairies, in underground burrows that connect to each other and to the surface. A gopher that enters any burrow can find its way to any other part of the burrow system. Likewise, on the Internet, users who have a gopher program on their computers can "burrow through gopher-space" to gopher servers anywhere in the world. These servers are computers maintained by academic institutions, international organizations, government agencies, and other entities, each providing, in a simple menu format, information about the sponsoring institution, access to files that can be copied and transferred, and linkages to other gophers.

Gopher computer programs are often available free of charge or at very low cost, take up little computer memory, and require relatively modest investments in hardware and cables. Furthermore, the gopher part of the Internet is very user-friendly. To enter the system, a user just clicks on an icon labelled "gopher" on a monitor screen. A connection is then made automatically to a host server. The first menu that appears will include at least one route out of the local institution. Examples are items such as "Information from others", "The rest of the world", "Gophers elsewhere", or "Internet resources". In order to move through the Internet, the user selects one of these and then looks on the next menu for something interesting. Depending on the computer hardware and software used, selecting an item may involve clicking on the relevant line with a mouse to highlight it and then double clicking, or moving up and down with the directional arrows and then pressing the enter key. The system for moving back to previous menus also depends on the computer and the specific gopher program.

Specialized gophers are available on both health and medicine. Gophers are also maintained by many professional organizations, international institutions, and government agencies working in health and related fields.

Despite its many advantages, the future of gopherspace is doubtful. In the wealthier countries, most institutions have now established WWW sites,
which are constantly updated. The parallel gophers, on the other hand, are often left as they were when the WWW site was initiated. The unfortunate outcome is that researchers in countries that have only gopher service now have access to comparatively limited and outdated information.

8.3.3 Telnet

For many health-futures teams, the most useful resources on the Internet will be bibliographical databases, including OPACs (see p. 227) at university and other research libraries. The primary reason for checking OPACs is to spot important books that are not available locally, so that they can be purchased or ordered through interlibrary loan.

The OPACs of over 1000 individual libraries are available via the Internet, as are the computerized catalogues of national libraries, national bibliographies, library consortia, and other special on-line library services that provide much more information than the OPAC of a single university library. Examples include the United States Library of Congress and London University’s Central Libertas Consortium. Many international agencies and nongovernmental organizations, including WHO, the International Development Research Council (IDRC), UNESCO, and numerous others, also make their bibliographical catalogues available on-line.

The single most useful OPAC for health-futures researchers is probably the catalogue at the National Library of Medicine in the United States, which covers almost 5 million volumes in medicine and related fields, including public health.

Some library catalogues can be reached and searched by way of the World Wide Web. In the United States, many of these WWW-accessible catalogues employ the same framework and search interface, called Z39.50, so that the libraries with such catalogues are often referred to as Z-Web libraries. Access to most on-line library catalogues, however, requires a telnet-type program.

Almost all library databases can be used free of charge. If an OPAC can be entered without using hackers’ tricks, it is intended for free public use. Users are only allowed into commercial databases and others that charge fees after they have contacted the providers and set up an account.

Information about which libraries have OPACs can be found on-line. Gopher users seeking this information should select menu choices such as “libraries”, “library catalogues via telnet”, “libraries around the world”, or “hytelnet”. Eventually they will be presented with a menu of all the telnet libraries in the world, arranged geographically. WWW users can find on-line libraries by using one of the WWW search engines.

Getting in and out of telnet OPACs used to be difficult. Each site has a unique address and a locally designed log-in system with a “password”—
not a secret word to keep out unauthorized users, but just a word that opens
the system. Today, the necessary information for logging in and using a
catalogue is generally provided to users when they make the connection
with the particular site.

8.3.4 On-line indexes

Searching through OPACs is a good way to get information about books.
OPACs also list periodical holdings, i.e. the names of the journals to which a
library has subscribed and the volumes and issues that it currently owns, but
it is not possible to use an OPAC to search for articles in those journals.
Instead, one must go to other computer-based databases.

Thus, in order to find references to papers in periodicals, it is necessary
to turn to some kind of on-line index. Many such indexes are accessible
via commercial vendors, and provide access to hundreds of different data-
bases covering a complete range of academic subjects in various languages.
Such databases are constantly updated and often contain references that are
only a few months old, whereas CD-ROM indexes can lag a year or two
behind.

The users of on-line indexes usually have many options. They can request
that a search be done simultaneously on the entire database, on a particular
search category, or on a set of indexes. Furthermore, different fields can be
used in searches, such as topic, author, institution, key words, title, language,
publishing year, and journal. Subscription to commercial on-line services is
expensive, although the quality of the information and the time saved may
justify the cost. Companies that offer training in how to use these commercial
databases can be found in many countries.

An alternative, at least for initial searches of English-language materials,
is the database Uncover, an index of the periodical literature maintained by
the Colorado Alliance of Research Libraries (CARL). Uncover is an extremely
useful source of information since it is the world's largest single periodical
index, it contains only references from the past 10 years or so, it is updated
constantly, and—very importantly—it can be read free of charge. This is
possible because CARL also sells journal articles via fax.

8.3.5 World Wide Web

The World Wide Web (WWW) is the part of the Internet capable of storing
and transferring files that are hypertext-based and/or include photographs,
graphics, sound, and films. WWW has grown rapidly in the last few years,
overshadowing other Internet components and appealing to general audi-
cences rather than academic ones. Unlike gopher and telnet, WWW includes
many commercial sites, and users moving through it can find themselves visually bombarded with advertisements.

WWW is enormous, and there is no comprehensive directory. All WWW programs come with built-in search services of various sorts. Web guides provide general menus to what is available. Search engines operate by allowing users to type in a word or phrase describing what they are seeking. White pages and yellow pages give on-line addresses for individuals and companies.

WWW resources relevant to health futures can be found by looking for health, health care, medicine, public health, environment, and similar categories using web guides and search engines. The experience can be very frustrating, however, since searches often result in millions of sites, many of which are commercial and most of which are irrelevant.

Some search services make things easier, responding to a search query with a menu of links by category. An alternative approach is to make use of a good "academic" menu, such as the one at the Bulletin Board for Libraries in the United Kingdom (BUBL), which provides carefully selected links classified by discipline.

Perhaps the best approach is to begin with a few major WWW sites, see what they have to offer themselves, and follow the links that they provide to other sites. Each relevant site can be marked with a "bookmark". This function allows the user to make an automatic connection with a WWW site by clicking on the name in a bookmark list.

References

6. Information development, 1991, 7(3) (special issue on acquisition education of scientific literature in developing countries).


29. *Gale's directory of databases.* Detroit, MI, Gale Research (regular new editions).


40. Health care management [Yearbook of health care management]. St. Louis, MO, Mosby (annual).


57. IHFN directory. San Francisco, CA, International Health Futures Network (annual, available from the three network secretariats in the United States, the Netherlands, and Japan; see Chapter 9 for addresses).


67. Network for strengthening health information, including health monitoring, evaluation, and futures studies: directory of members. Geneva, World
Health Organization, 1997 (unpublished document WHO/HST/97.1; available on request from Division of Health Situation and Trend Assessment, World Health Organization, 1211 Geneva 27, Switzerland).


112. Gillwald K et al., eds. Special issue on Central and Eastern European futures. Futures, 1992, 24(2).


244. Dahlgren G, Whitehead M. Policies and strategies to promote equity in health. Copenhagen, WHO Regional Office for Europe, 1992 (unpublished document EUR/ICP/RPD 414(2); available on request from Distribution Office, WHO Regional Office for Europe, 8 Scherfigsvej, DK-2100 Copenhagen, Denmark).

245. *Futures research quarterly*, 1994, 10(2) (special issue on health care and reform).


289. Cleland JG, Hill AG. *The health transition: methods and measures: proceedings of an international workshop*. Canberra, ACT, Australia, Health Transition Centre, the Australian University, 1991.


313. Environmental impact assessment review, 1990, 10(4) (special issue on environmental change and public health: the next fifty years).


325. International migration, 1992, 30 (special issue on migration and health).


373. Tavis LA, Williams OF. The pharmaceutical corporate presence in the developing countries. Notre Dame, IN, University of Notre Dame Press, 1993.
The information given here will facilitate contact among teams doing health-futures activities and between such teams and other members of the international futures community. The organizations and other bodies listed here are well known for their contributions in the fields of futures studies or health futures. The inclusion of entities, activities and products in this directory does not imply WHO’s endorsement of them over any other similar entities, activities and products that have not been mentioned. Rather, the ones mentioned represent those that at present are known to the author. In the event that there are other entities active in this field, or other activities and products available, WHO would be grateful to receive information about them.

9.1 International futures organizations, directories, and programmes

The World Futures Studies Federation (WFSF) is international in character, and its offices move from one country to another as new leaders are elected. Membership is by nomination and election and is restricted. Historically, WFSF has had close ties with UNESCO, the two organizations cooperating in arranging international workshops on futures and in maintaining the Futuresco database. WFSF holds world conferences every 2 years and issues a regular newsletter about futures activities around the world. The WFSF membership directory provides names, addresses, and contact numbers for individual and institutional members.

World Futures Study Federation
c/o the Communication Centre
Queensland University of Technology
GPO Box 2434
Brisbane Q 4001, Australia
Tel: 61 7 3864 2192
Fax: 61 7 3864 1813
Association Internationale de Prospective, also known as Futuribles International, is the major international francophone futures organization. The Association and its partners do futures research, maintain a futures library, publish *Futuribles* and a newsletter, run training courses in futures research and policy formulation, and manage two databases, the first on futures publications and the second on people doing futures research.

Futuribles International  
55 rue de Varenne  
F-75341 Paris, Cedex 07, France  
Tel: 33 1 4222 6310  
Fax: 33 1 4222 6554  
http://www.argia.fr/adminet/elus/visions/futuribles.html

The World Future Society (WFS), one of the major English-language futures organizations, is strongly American in character. Membership is open to all who are interested in the futures field, although there is also a special section for professional members. WFS publishes books, journals, and the invaluable *Future survey*, and organizes yearly conferences and various smaller meetings, workshops, and seminars, all of which are held in the United States.

The *futures research directory: individuals*, published by WFS, lists over 1000 individuals (mostly Americans and Canadians) working in the futures field and related areas. Each entry includes the person's address, profession, specialization, recent employment and publications. New editions are issued every few years. Updated editions of *The futures research directory: organizations and periodicals* are also issued periodically. Entries for organizations provide names of officers, contact information, sources of funding, and a description of programmes and publications. Entries for periodicals give the name and address of the publisher, subscription rates, frequency of publication, audience, and a general description of the type of material included. Both directories have geographical and subject indexes.

World Future Society  
7910 Woodmont Avenue, Suite 450  
Bethesda, Maryland 20814, USA  
Tel: 1 301 656 8274  
Fax: 1 301 951 0394  
http://www.tmn.com/wfs/

The Millennium Project, which is coordinated by the American Council for the United Nations University, is an ongoing project aimed at assessing long-range global issues, evaluating futures tools and methods, providing training on futures, and linking futures groups internationally.
9.2 Futures training programmes

Many institutions listed in The futures research directory: organizations and periodicals offer practical internships or seminars in futures research. Interested groups should contact futures institutes in their geographical area, especially those active in the health sector, and ask about training possibilities. The international futures organizations listed above also offer seminars and workshops and can be contacted directly for further details.

Few universities offer comprehensive futures training programmes, but individual futures courses are fairly common. Groups wanting future information should contact universities in their own areas to enquire about such courses.

The University of Houston at Clear Water offers a Master of Science degree in studies of the future to students from around the world. It is the only degree of its kind in the United States. It is based on 10 required and elective courses plus a thesis, project, or internship. Core courses include an introduction to futures studies, qualitative research, quantitative research, systems approaches, and a seminar on the practice of futures. Topics covered in some of the elective courses include world futures, social changes, strategic planning, visionary futures, and classic texts in futures.

Students in the standard programme take courses at the Clear Lake campus during the fall and spring terms. A summer option allows students to obtain the degree with only 6 weeks of study at Clear Lake during two summer terms. The remaining requirements are met through independent study and elective courses taken at home institutions.

Studies of the Future Program
University of Houston at Clear Water
2700 Bay Area Boulevard
Houston, Texas 77057, USA
Tel: 1 713 283 3323
Fax: 1 713 283 3810
http://www.cl.uh.edu/futureweb/

The “prospective” programme at the Conservatoire National des Arts et Métiers in Paris has trained many of the French-speaking futures researchers throughout the world. The education is at three levels—an undergraduate
programme providing basic courses in "prospective" and strategy, a graduate programme that introduces research techniques and methods, and a doctoral programme that involves the preparation of a thesis. Part of the training is provided in cooperation with Futuribles International, French university and business schools, and public and private companies. Courses are in French.

Laboratory for Investigation in Prospective and Strategy
Conservatoire National des Arts et Métiers
2 rue Conté
75003 Paris, France
Tel: 33 1 40272530
Fax: 33 1 40272743
E-mail: lips@cnam.fr

The Department of Political Science at the University of Hawaii offers a special "track" in futures. The alternative futures MA option gives students a theoretical and methodological background and the chance to apply futures approaches in an internship. Emphasis is on envisioning, designing, inventing, and achieving preferred futures. The curriculum includes required and elective courses both in political science and in futures. Among topics covered are the politics of the future, the future of political systems, and various research and forecasting methods.

Department of Political Science
University of Hawaii at Manoa
2424 Maile Way, Port 604
Honolulu, Hawaii 96822, USA
Tel: 1 808 956 6601
Fax: 1 808 956 2899
http://www.hawaii.edu/~future/

There is still no comprehensive professional training programme in health futures. However, interest in the subject is growing, and groups involved in health-futures work are urged to contact universities in their own countries to learn whether health-futures courses are being offered.

9.3 Health-futures networks and organizations

The National Library of Medicine in the USA maintains an on-line directory of institutions, organizations, and companies working in health and related fields, including some with a futures orientation.

There are currently two international networks for professionals working in health futures and related fields, one of which is an informal network, i.e. the members do not hold meetings but communicate with each other as the
need arises. The process is made possible through a directory entitled Network for strengthening health information, including health monitoring, evaluation, and futures studies: directory of members, issued periodically by WHO. The entry for each member of the network includes the name, contact information, interests, and the methods used in research.

Health Systems and Community Health
World Health Organization
20 Avenue Appia
CH-1211 Geneva 27, Switzerland
Tel: 41 22 791 2383
Fax: 41 22 791 4194
http://www.who.ch/
E-mail: orzeszynas@who.ch

The International Health Futures Network (IHFN) is an organization for persons involved in health futures work. The membership fee is US$100 annually, but inability to pay this fee is not a hindrance to membership. The fees help to defray the costs of the Network's annual meeting and its publications. Members receive a newsletter that is produced once or twice a year and the current membership directory. The 1995 directory listed about 250 members worldwide, mostly in North America and Western Europe. To date, the Network has not carried out any projects of its own, although several are planned. For information about members and current activities, interested parties should contact the appropriate secretariat:

IHFN European Secretariat
(Europe, Middle East, and Africa)
Dutch Health Management Forum
PO Box 7100
2701 AC Zoetermeer, Netherlands
Tel: 31 79 3687312
Fax: 31 79 3687481
E-mail: stg.hmf@sog.nl

IHFN North American Secretariat
(The Americas and the Caribbean)
The Healthcare Forum
425 Market Street
San Francisco, California 94105, USA
Tel: 1 415 356 4300
Fax: 1 415 356 9300
E-mail: ihfnthf@netcom.com
IHFN Asian Secretariat  
(Asia and Oceania)  
Institute of Health Systems Development  
6-12-9 Ochiai  
Tama, Tokyo 206, Japan  
Tel: 81 423 745691  
Fax: 81 423 746694

9.4 Health-futures contacts in WHO

The Department of Health Systems in WHO's Health Systems and Community Health cluster has promoted health-futures activities at WHO headquarters. The Department is currently involved in a project entitled "Health future 2025". For further information, contact:

Health Systems and Community Health  
World Health Organization  
20 Avenue Appia  
CH-1211 Geneva 27, Switzerland  
Tel: 41 22 791 2388  
Fax: 41 22 791 4194  
http://www.who.ch/programmes/WHOProgrammes.html

For copies of the report of the 1993 international consultation on health futures and information on current health-futures activities at WHO, contact:

Health Systems and Community Health  
World Health Organization  
20 Avenue Appia  
CH-1211 Geneva 27, Switzerland  
Tel: 41 22 791 2383  
Fax: 41 22 791 4194  
http://www.who.ch/programmes/hst/sci/sci-home.htm

To date, three WHO regional offices have taken major steps to integrate health-futures concepts into their activities; information about them is given below. By the time this handbook goes to press, other regions may also have launched health-futures activities. Readers wanting up-to-date information about which WHO regional offices are engaged in health-futures work should contact Health Systems and Community Health (see above).

The Pan American Health Organization has been involved in health futures for several years, has organized its own futures seminars, and has cooperated with Member States on several health-futures activities.
Office of Analysis and Strategic Planning  
Pan American Health Organization  
525 Twenty-Third Street, NW  
Washington DC 20037, USA  
Tel: 1 202 861 3218  
Fax: 1 202 861 8873  
http://www.paho.org/

The WHO Regional Office for Europe in Copenhagen has used health futures for a number of years in regional consultations on futures trends and the formulation of the European health-for-all strategy.

WHO Regional Office for Europe  
8 Scherfigsvej  
DK-2100 Copenhagen Ø, Denmark  
Tel: 45 39 171717  
Fax: 45 39 171818

At the WHO Regional Office for South-East Asia a regional project is under way to encourage Member States to apply health futures as a means for improving policy-making and planning.

Health Situation and Trend Assessment  
WHO Regional Office for South-East Asia  
World Health House  
Indraprastha Estate, Mahatma Gandhi Road  
New Delhi 110002, India  
Tel: 91 11 331 7804  
Fax: 91 11 331 8607

9.5 National programmes in health futures

Institutions and groups responsible for the health-futures activities described in Chapter 7 (Health futures) of this handbook are described below. Other institutes, agencies, and individual consultants around the world are involved in futures work of some sort; information about these can be found in the directories listed in section 9.3. The information given here relates to three major ongoing programmes that deal with health futures.

STG in the Netherlands has extensive experience of health-futures scenarios in support of health policy-making and planning at the national level. Formerly under the Ministry of Health, STG has now become independent.
The Institute of Health Systems Development (IHSD) is responsible for Bioforecasting Technology (BFT), a demand-side forecasting system for health care that has been used throughout Japan, as well as internationally.

Institute of Health Systems Development
6-12-9 Ochiai
Tama, Tokyo 206, Japan
Tel: 81 423 745691
Fax: 81 423 745694

The Welsh Health Futures Forum does futures-oriented policy analysis in health and health care. The Forum has recently been reorganized and renamed.

Welsh Health and Social Care Policy Institute
University of Glamorgan
Crickhowell House, Pierhead Street, Capital Waterside
Cardiff CF1 5XT, United Kingdom
Tel: 44 1222 502493
Fax: 44 1222 502490

9.6 **Computer networking information**

WHO is rapidly developing various on-line services and information databases, among which is a free on-line bulletin board in the area of health futures, with discussion groups on a wide variety of health topics. Both the focus and the participation are strongly international. For information about the bulletin board and how to join, contact:

Health Systems and Community Health
World Health Organization
20 Avenue Appia
CH-1211 Geneva 27, Switzerland
Tel: 42 22 791 2381
Fax: 41 22 791 4194
http://www.who.ch/programmes/hst/sci/c/discupan.htm
9.7 Potential funding sources

Teams are advised to read Annex 1 on seeking funding before contacting potential funders.

Most of the world’s major foundations are based in the United States, but about 700 of them fund activities outside the USA with grants totalling hundreds of millions of dollars a year. Information about foundations in the United States and Canada is available in The foundation directory produced by the Foundation Center. The guide to funding for international and foreign programs, from the same source, will probably be even more useful. The directories are expensive but are available in the reference rooms of major libraries around the world and in the libraries at many United States embassies. They are arranged by geographical location of the foundation, but also have indexes covering hundreds of programme categories.

An increasing number of foundations in the United States have WWW sites that provide detailed information about their programmes and guidelines for grant-seekers. Many of these foundations can be reached on-line through links provided at the Foundation Center’s own WWW site.

Foundation Center
79 Fifth Avenue/16th Street
New York, New York 10003-3076, USA
Tel: 1 212 620 4230
Fax: 1 212 807 3677
http://www.fdncenter.org/

Current information about funders in the United Kingdom is available in the Directory of grant-making trusts, published regularly by the Charities Aid Foundation (CAF). CAF’s web site also provides links to many foundations in the United Kingdom.

Charities Aid Foundation
Kings Hill, West Malling
Kent ME19 4YA, United Kingdom
Tel: 44 1732 520000
Fax: 44 1732 520001
http://www.charitynet.org/

A number of Japanese foundations have shown interest in programmes related to health and health care, community development, environmental protection, peace, public participation, and similar objectives. The directory of grant-making foundations in Japan contains information about the major Japanese donors. It is published by:
Teams that are thinking about applying for funding from European sources may consider contacting the European Foundation Centre (EFC) for information on membership or database searches. The EFC web site provides a growing number of links to European foundations.

European Foundation Centre
51, rue de la Concorde
B-1050 Brussels, Belgium
Tel: 32 2 512 8938
Fax: 32 2 512 3265
http://www2.poptel.org.uk/efc/efc.html

Within the European Union (EU), the Directorate General for Development (DG VIII) handles funding for developing countries. This is based on the Lomé Convention, which established relationships between the EU and the African-Caribbean-Pacific (ACP) countries. The funding process involves the submission of a proposal through the relevant government ministry (often the ministry of planning) in the country of origin. The ministry forwards the proposal to the EU delegation in that country, which then submits proposals to DG VIII for selection and approval. Funding may also be available from DG XII, which oversees programmes related to science and technology, and other Directorates General.

Staff, addresses, and telephone numbers within the EU change quickly. One way to obtain up-to-date information on programmes, addresses, and proposal requirements for the EU is to write to the Office for Official Publication or to check out current developments on the EU’s official web site.

Office for Official Publications of the European Communities
5 rue de Commerce
L-2985 Luxembourg

In general, requests to major international agencies must be channelled through national or regional representatives. Teams lacking the necessary contact information can obtain it from the appropriate central offices. A few international organizations that fund programmes in areas related to health include:
International Development Research Centre
PO Box 8500
Ottawa, Ontario
K1G 3H9, Canada
Tel: 1 613 236 6163
http://www.idrc.ca/

United Nations Development Programme
1 United Nations Plaza
New York, New York 10017, USA
Tel: 1 212 906 5000
Fax: 1 212 906 5001
http://www.undp.org/

United Nations Environment Programme
PO Box 30552
Nairobi, Kenya
Tel: 254 2 333930 or 52000
http://www.unep.org/

9.8 Selected publishers, booksellers, libraries, and distributors

Most printed materials relevant to health futures have been published by major publishers and will be available at research libraries or through commercial booksellers. Most software will also be easily obtainable through general commercial sources.

The addresses of WHO document centres, a few special publishers and libraries, and sources of specific tools mentioned in the handbook but not widely accessible are given here.

The Futures Study Centre in Australia produces a comprehensive, international series on futures studies. Information can be obtained from:

Futures Study Centre
62 Disraeli Street, Kew
Victoria 3101, Australia
Tel: 61 3 853 7882
Fax: 61 3 853 6380

The late Robert Jungk founded the world’s major futures library, an international collection of over 6000 books and 160 periodical in many languages. For further information, contact:

International Futures Library
Robert Jungk Foundation
Imbergstrasse 2  
A-5020 Salzburg, Austria  
Tel: 43 662 873206  
Fax: 43 662 871296

The publisher of the journal *Futuribles* bears the same name, and can also supply French-language futures books.

*Futuribles*  
55 rue de Varenne  
75341 Paris, Cedex 07, France  
Tel: 33 1 4222 6310  
Fax: 33 1 4222 6554

The Organisation for Economic Co-operation and Development maintains a database of key futures-oriented literature on various topics and periodically issues *OECD futures studies information base highlights*, which are bulletins containing abstracts of selected work. For further information, contact:

Organization for Economic Co-operation and Development  
International Futures Programme  
2 rue André Pascal  
75775 Paris, Cedex 16, France  
Tel: 33 1 4524 8200  
Fax: 33 1 4524 8500

UNESCO publishes at irregular intervals a bulletin on futures-oriented literature, entitled *Futuresco*. Titles to date have focused on education, environment, culture, human rights, and communication technologies.

UNESCO, BPE/BP  
7 place de Fontenoy  
75352 Paris, 07 SP, France  
Fax: 33 1 4306 0108

Adamantine Press recently began publishing books on futures and related fields. A catalogue of current titles can be obtained by contacting:

Adamantine Press  
3 Henrietta Street, Covent Garden  
London WC2E 8LU, United Kingdom  
Tel: 44 1 71 240 0856  
Fax: 44 1 71 379 0609
Futures is the major refereed, international futures journal in the English language. Information about subscriptions and the purchase of back issues, including the special issue on health futures, can be obtained by writing to:

Elsevier Scientific Ltd.
The Boulevard, Langford Lane, Kidlington
Oxford OX5 1GB, United Kingdom
Tel: 44 1865 843000
Fax: 44 1865 843010

The publisher of Futures research quarterly, Future survey, and The futurist is the World Future Society, which also sells books and videos on all areas of the future through the Futurist Bookstore. A catalogue is available on request.

World Future Society
7910 Woodmount Avenue
Suite 450
Bethesda, Maryland 20814, USA
Tel: 1 301 656 8274
Fax: 1 301 951 0394

For information on materials in the WHO library and the many services that the library offers, plus information about how to reach other WHO libraries, contact:

Office of Library and Health Literature Services
World Health Organization
CH-1211 Geneva 27, Switzerland
Tel: 41 22 791 2071
Fax: 41 22 791 4150

For information about books and other publications available from WHO and the Pan American Health Organization, contact the addresses given below. Marketing and Dissemination at WHO headquarters can also provide information about other WHO sales agents in various countries.

Marketing and Dissemination
World Health Organization
20 Avenue Appia
CH-1211 Geneva 27, Switzerland
Tel: 41 22 791 2111
Fax: 41 22 791 4857

WHO Publications Center USA
49 Sheridan Avenue
Albany, New York 12210, USA
Document Distribution Department
Pan American Health Organization
525 Twenty-Third Street, NW
Washington, DC 20037, USA
Glossary

The definitions given below apply specifically to the terms used in this handbook. They may have different meanings in other contexts.

**Actor.** An institution, group, or individual that plays a major role within a particular sector. In the health sector, important actors may include government health agencies, pharmaceutical companies, citizen groups working for a clean environment, medical associations, etc. Also called social actors.

**Actor analysis.** A set of methods used to determine which actors are most important within a sector, what their respective strengths and weaknesses are, what opportunities and threats the future holds for them, their stance on various issues and objectives, and their points of agreement and disagreement with other actors. Sometimes called political mapping.

**Actor interviews and surveys.** The gathering of information directly from the key players in a sector, either personally or through written material. One important version of the process is called solicitation of expert opinion.

**Advisory board.** A body sometimes established as part of the organizational structure of complex futures projects in order to allow broader participation. Its role is to give advice and assist with contacts and publicity, rather than to make decisions about project design and implementation.

**Alternative scenario.** A term used in various ways by different futures researchers. One common definition is simply any possible future. Another is a future that is different from and better than the expected future.

**Analysis.** Both a common component of many futures projects and the function of many futures tools, it involves determining the structure and function of a particular system or sector, the relationships among the key variables, and the behaviour of the key actors.
Applicability. A quality of scenarios for which they should be tested during construction. An applicable scenario is one that can be put to the use for which it is intended, e.g. a wild-card scenario is applicable in promoting foresight but not in prediction.

Application. How the results of a futures project will be used. In futures projects at the national level, the intended application often involves use in policy-making and planning.

Assumptions. The "if" statements used to frame a scenario. "If this policy is adopted, if this trend continues, if this event happens, then..." Often referred to as assumption sets.

Attribute listing. A method derived from brainstorming and used in futures work to stimulate new ideas and creative problem-solving. It involves identifying the parts of a system and their current characteristics, and then imagining how the parts could be modified by altering those characteristics.

Backcasting. Moving step-wise back in time from a future scenario to the present in order to identify the decisions and actions that must be taken at critical points if the scenario is to be achieved.

Baseline scenario. A term used to refer either to an initial scenario on which others are built or an initial scenario with which others are compared.

Bioforecasting Technology (BFT). A demand-side system for forecasting health-care needs, created and applied by the Institute for Health Systems Development in Japan.

Board of directors. In many projects, a body that has legal responsibility for the activity and plays a major role in decisions regarding purpose, objectives, and design but does not carry out the actual work.

Boolean logic. A system for indicating combinations of various sorts (A and B; A but not B; A or B, etc.). Important in doing searches for materials on computerized and on-line indexes.

Brainstorming. A fundamental method in futures work, used to encourage creative problem-solving. Involves the rapid generation of a large number of ideas under controlled conditions (no discussion or criticism is allowed, suggestions are made one at a time, everyone in the group participates, etc.).

Bulletin Board for Libraries in the United Kingdom (BUBL). A site on the Internet, accessible both via gopher and WWW, which has excellent subject trees on academic materials.

Checklist. A list of items to be considered at a particular point in a project (e.g. in writing the terms of reference). Also, a method used in futures work, in which each idea in a checklist is applied to a system in order to identify innovative solutions to problems.

Compact disc, read only memory (CD-ROM). The type of CD on which journal indexes are stored, allowing users to do computerized searches for articles by subject, author, etc.

Comparability. A quality for which scenarios should be testing during construction. Comparable scenarios share the same time frame, scope, elements, and background assumptions yet are different from one another.

Components. The units of which a futures project consists. The common components include clarifying the issues, acquiring information, analysing the system, describing the past and present, imagining future trends and events, framing the scenarios, filling in the scenarios, evaluating the scenarios, and applying the results.

Computerized catalogues. Searchable electronic databases, usually of the holdings of a particular library. Available through on-site terminals or online via the telnet part of the Internet. Examples include Locator at the National Library of Medicine and WHOLIS at WHO.

Condensed exercise. A futures activity that can be carried out in a short time and in which some or all of the standard components are compressed.

Consensus building. The process by which a group reaches agreement about the best solution to a problem or the best choice among alternative options.

Contrasted scenario. A scenario of a future that is other than the expected or extrapolated one.

Cost–benefit analysis. An approach used in evaluating alternatives, including different scenarios. Involves the weighing of the financial and other resources used against the gains achieved.

Creativity exercises. Activities, mainly carried out by small groups, designed to stimulate innovative approaches to problem-solving. Most are based on brainstorming and involve the temporary suspension of judgement as to the feasibility and value of different ideas.
Cross-impact analysis. A matrix-based method used in futures to record and tabulate the judgements of experts on how the occurrence of one trend or event will affect the occurrence of another.

Current awareness tool. A publication, issued at regular intervals, that lists recent books and articles on a particular topic.

Curvilinear regression. A non-linear regression in which the dependent variable is expressed as a polynomial of the independent variable. A log transformation is the most common type. This statistical method is often used to help to elucidate underlying trends when time-series data do not fit straight lines.

Database. An ordered collection of information, most often quantitative or bibliographical information stored electronically in a searchable form.

DDBS. The Development Data Base Services of the International Development Research Council. DDBS provides an on-line catalogue of publications on health, development, environment, population studies, and related areas, and also taps into the bibliographical databases of FAO, UNESCO, USAID, ILO, and UNIDO.

Delphi. An important technique used in futures work to solicit experts' opinions. The method allows participants to remain anonymous, encourages serious thought over debate, and facilitates the development of consensus. Each participant completes a questionnaire on a given topic and returns it to a coordinator, without any discussion with the other participants. The answers are collated and sent back to the participants in such a way as to preserve the anonymity of the responses. Participants are then asked to read all the comments and reconsider their original answers. They then complete another set of questionnaires and again return them to the coordinator. Consensus is usually reached after three cycles.

Design. The combination and arrangement of components within a project.

Desired scenario. An image of a future that is wished or hoped for. May be quite different for different groups in a population.

Development scenario. A scenario of events leading up to a final situation, as opposed to one just depicting that end state.

Donor. An institution, organization, agency, foundation, or individual that provides financial support to a project.

Dystopian scenario. An image of a future that is feared. Opposite of utopian scenario.
Econometric modelling. One basic approach to simulation modelling. Used especially for making relatively short-term predictions about systems that display regular behaviour and for which considerable historical data are available.

Electronic mail (e-mail). One of the services available through the Internet. Allows the sending and reception of electronic messages between users connected to it.

Elements. Those aspects of the future that are described in a particular scenario. In a health scenario these might include the size and structure of the population, the health profile, the burden of various diseases, the socioeconomic and environmental factors influencing health, the characteristics of the health-care system, and so forth. To be comparable, scenarios must include the same elements.

Emerging trends and issues. New patterns and developments that have not yet been widely recognized as important but which have the potential to influence a sector significantly.

Empowering. The process of giving people the hope and motivation that they need in order to improve their lives, now and in the future. Often the primary objective of guided imagery and visioning workshops.

End-point scenario. A scenario describing an imagined situation at some fixed point in the future, as opposed to a scenario that traces developments leading to that end state.

Environmental scanning. The identification and collection of information about developments in a sector's macroenvironment that may influence the future of that sector, and especially the identification of emerging trends and issues.

Envisioning. One of the important purposes for which futures work can be done. Typically involves the creation of a single scenario of a desired future towards which the group or institution can work.

Evaluation. Judging something (a scenario, a policy, a strategy, a futures project, etc.) in terms of selected criteria (feasibility, desirability, equity, cost effectiveness, etc.) or comparing two or more items in terms of such criteria.

Expert opinion. The judgement of a select group of individuals about a particular topic. In futures, expert opinion is frequently solicited regarding the structure of the system under consideration, key actors and their strategies, possible future trends and events, the feasibility or desirability of various scenarios, and so forth.
Experts. Individuals who are believed to have particular insight into a sector, system, or problem because of their experience or positions.

Exploratory scenario. A scenario depicting a possible future, usually one that is different from the extrapolated or most probable one.

Exponential smoothing and decomposition. A statistical technique used to improve the fit of data to a trend line. Similar to moving averages but gives more weight to the most recent data.

Extrapolation. Projection into the future based on the assumption that the variable in question will continue to follow its historical pattern of behaviour. Often done simply by extending a plotted trend line.

Extrapolation scenario. A scenario describing a future that is simply a continuation of current situations and trends.

File transfer protocol (ftp). The mechanism whereby documents stored on a server computer within the Internet can be transferred to a user's computer.

Filling in. The part of the scenario-building process in which the group creates an integrated image of the future within the framework established by the assumption statements. Once it is filled in, the scenario can be translated into a form that can be shared and communicated.

Focus. The level on which a particular project concentrates. The focus may be on the entire planet, a group of countries, a country, a region, or a local community, on a set of sectors, a single sector, or a system within one sector, or on a government, a population, an organization, an institution, or some other entity.

Forecasting. One important purpose for which futures work is carried out. Involves the creation of several possible futures that are identified as having certain levels of probability.

Foresight. The state of being prepared for the future. One purpose of futures activities is to improve foresight. This is typically done through the creation of possible scenarios other than the most expected one, including wild-card scenarios that are of low probability but would have a major impact on the sector or system if they did actually become a reality.

Framing. Selecting the assumptions, the "if" statements on which the scenarios will be based. A common component of many futures projects.

Future events. Things that might happen in the future, especially occurrences that would have a significant impact on a particular sector. Sometimes called future-bearing events.
Futures. An anticipatory discipline that can support and complement planning and policy-making.

Future history. A piece of fictional prose that describes possible future events as if they were historical happenings.

Futures wheel. A simple technique used in futures to identify and show graphically the possible consequences of different future events and choices.

Generic simulation models. General models that do not represent any specific system but provide a framework into which certain kinds of information can be loaded in order to simulate different systems.

Genius forecasting. A form of solicitation of expert opinion, in which the ideas of one or a few individuals regarding the future are collected for use in a project. This may be done by reading the published works of these individuals or directly through in-depth interviews.

Gopher. A part of the Internet that is extremely user-friendly and contains millions of documents and other resources easily accessible through hierarchical menus. Often referred to as gopherspace. Also, a computer program that allows access to gopherspace.

Guided imagery. A technique used in visioning workshops, in which a facilitator asks carefully worded questions to help the participants to imagine a desirable future.

Grey literature. Material that is not formally published. It includes much valuable information but may be hard to find since it is not usually included in indexes.

Group processes. Exercises, devices, and instruments whereby group members can learn to understand each other, to cooperate more effectively, and to develop from a committee into a true team.

Hardware. Microcomputers and accessory equipment such as printers and modems needed for the operation of computer software.

Health care. The services provided to a population in order to maintain health and prevent and cure diseases.

Health futures. Projects, analyses, and other activities concerned with the future of health. Distinguishable from health policy-making and planning by virtue of the time perspective, breadth of coverage, emphasis on underlying causes, sources of information used, and type of questions asked.
Health-care futures. That component of health futures that focuses on the future of medicine and other aspects of the health-care system.

Hexagons. A “cognitive kinetics” tool, available in both non-computerized and computerized versions, that facilitates the recording of ideas, as well as group decision-making.

Idea generation. The devising of new solutions to problems through creative techniques such as brainstorming, checklists, attribute listing, and morphological analysis.

In-depth interview. A focused interview with an expert on a topic, designed to solicit particular sorts of information and ideas. In futures work, used to obtain opinions and other inputs into projects.

Index. A searchable list of resources in either printed or electronic form, and especially a computer-searchable bibliographical database.

Information gathering. A common component of futures projects. Involves identifying and accessing quantitative and qualitative data needed for the project from computerized databases, printed materials, on-line resources, and individuals.

Informational meeting. A gathering of a project team for the sole purpose of handling practical aspects of project implementation, rather than to carry out project components.

Input variables. Those aspects of a system that are independent and that determine the output variables. In the health sector, examples of input variables are population size and demographic structure, patterns of personal behaviour, climate, environmental quality, socioeconomic conditions, quality and accessibility of health care, etc.

Internet. The world’s largest computer network, consisting of large servers and smaller personal computers linked together in a way that allows communication and information access.

Intersectoral. Refers to topics, issues, etc., that cross boundaries between two or more sectors, such as economics and health, environment and health, etc.

Implementation. The carrying out of a project or programme. Involves not only the work itself, but all the practical supporting activities such as preparing terms of reference, fund-raising, setting up an organizational structure, communicating, and carrying out a project evaluation.
**Issues.** The aspects of a topic that are being debated, demand attention, or require policy decisions, including risks, opportunities, concerns, values, and choices.

**Judgements.** Subjective evaluations based on selected criteria. In futures work, judgements are made about which variables are most important in the sector being studied, what emerging trends are likely to be influential in the future, the feasibility or desirability of scenarios, etc.

**Linear regression.** A statistical technique for finding the straight line that best fits the values of a series of data points. If a linear regression is successful, the best fit equation can be used as the basis for projection, the straight line being extended with the same slope.

**Loops.** Passages through the components of a project. Most projects involve a single loop, but multiple-loop designs also exist.

**Locator.** The on-line public access catalogue of the National Library of Medicine in the United States. A major resource for health-futures teams seeking information about books on specific topics.

**Macroenvironment.** The world surrounding the sector or system of interest in a particular project, especially those aspects that significantly affect the sector.

**Macrotrends.** Major patterns and changes over time, including those occurring at the global level and in the macroenvironment surrounding a sector. In health, macrotrends include global climate change, population increase, urbanization, etc.

**Markov chains.** A statistical technique used to forecast the future behaviour of a variable that moves back and forth from one state to another. Involves analysing the recent behaviour of the variable to determine the underlying pattern of transitions and then projecting into the future on the assumption that this pattern will remain the same.

**Mixed scenario.** A scenario based on assumptions that include desirable and undesirable events, probable and improbable happenings, etc. Sets of mixed scenarios are not comparable, but are sometimes created in order to stimulate debate about the future. Their major advantage is that they tend to resemble reality.

**Model.** An abstract representation of a real system, involving the key elements and their relationships with each other. Can take the form of mathematical equations, diagrams, computer programs, etc.
**Modem.** A piece of equipment that links a computer to a telecommunications system. Used to provide access to the Internet or another computer network.

**Morphological analysis.** A structured version of brainstorming used to stimulate creative thinking and problem-solving. Not to be confused with structural analysis.

**Mosaic.** One example of a WWW scanner, i.e. a computer program that allows access to, and use of, the World Wide Web.

**Moving averages.** A statistical technique used to improve the “fit” of data to a line by plotting the average values of a variable for overlapping periods of time. The resulting trend line can then be used to forecast the future behaviour of the variable.

**Multiple-loop design.** A way of doing a futures project in which the group goes through the chosen components several times rather than once. The first one or two loops are done in order to disclose design errors and to give the group practice, and are usually executed rapidly. A final loop, based on a revised design, is then carried out more deliberately.

**Multiobjective, multicriteria decision-making.** Evaluation that takes into account more than a single goal and more than one category of values. Often necessary when there are multiple stake-holders. Can be used in futures to judge scenarios.

**Navigational tools.** Programs and devices within the Internet that can be used to move within the network and to identify and access the resources available in it.

**Netlink.** A special subject tree of the Internet, which combines a hierarchical menu with a device for selecting resources by type (gopher, telnet, WWW, etc.).

**Networking.** Making contact with other individuals and groups, especially those that will be able to provide information, ideas, tools, and other resources for a project.

**News.** The function of the Internet and other computer networks that allows mass distribution of news items and other materials to large groups of individuals sharing a common interest.

**Nominal group method.** A small-group method for generating ideas and making decisions. Although very similar to a quality circle, it is more structured and is typically employed when either the issues or the participants make a controlled session necessary or preferable.
**Normative.** Refers to futures work that is based on explicit values and goals. Often involves the creation of a single vision or other positive scenario, which acts as a signpost pointing to a desired future.

**Netscape.** A WWW scanner, i.e. a program for accessing and using the World Wide Web part of the Internet.

**Objective (adjective).** Refers to futures work that is based on an analytical approach in which value judgements are delayed or left to other parties. Typically involves the creation of several feasible scenarios, which together provide a map of the possible future.

**Objective (noun).** A specific goal of a project, such as generating input for a national health plan, providing a long-term perspective for consideration in the formulation of an essential drugs policy, etc.

**On-line.** Accessible by means of the Internet or some other computer network.

**On-line public-access catalogue (OPAC).** A computerized library catalogue that can be reached through the Internet or another computer network and lists the books, journals, and other materials in a library’s holdings. Thousands of OPACs are available around the world.

**Optimization.** The process of finding the best solution to a problem or the best way to reach a particular goal. Involves the selection, from many possibilities, of a single option that allows the maximum achievement of some goal under a specific set of conditions. Optimization tools used in futures work include relevance trees and computerized optimization models based on linear programming.

**Options.** Choices and opportunities, including decisions about policies. Testing options is one of the important purposes for which futures work is carried out.

**Organizational learning.** The process whereby a group or institution learns from experience and changes its behaviour accordingly. Futures approaches, including the creation of scenarios and the rehearsal of possible institutional reactions to these scenarios, can be used to enhance organizational learning.

**Organizational structure.** The arrangement into functional groups of the people involved in a futures activity. The structure typically includes a team or task force, possibly a board of directors, and sometimes an advisory board or other supporting committee.
Output variables. The dependent aspects of the system that are controlled by the structural relationships among the variables in it and the values of the input variables. In health, output variables include morbidity, mortality, incidence and prevalence of specific conditions, disability-adjusted life years (DALYs), and other indicators of health and disease. The goal of futures work is often to maximize or minimize certain output variables.

Paradigm awareness. A term sometimes used in futures work to indicate a sensitivity to different cultural or professional perspectives.

Plausible scenario. An image of a future that is believable. Considered in some classification systems to be synonymous with a possible scenario.

Policy-makers. Individuals, especially those in official bodies, who have the authority to make decisions about what problems will be addressed within a particular sector and how these problems will be handled.

Political mapping. A technique in which key actors' situations and their relationships to each other are analysed and represented in graphic form. Roughly synonymous with actor analysis.

Possible scenario. An image of a future that could happen.

Prediction. One possible purpose of futures work. Involves the creation of a scenario depicting an expected future. Applicable to systems that are well understood, display regular behaviour, and for which significant historical data are available.

Preferred scenario. A scenario that is desirable, especially one that is desired more than other recognized possibilities.

Primary literature. Books, journals, journal articles, official documents, reports, conference proceedings, and other original sources of information.

Probable scenario. An image of a future that is considered likely to happen.

Product. Something tangible, often in written form, that is generated by a project or a component of a project.

Programme. An ongoing activity, such as a permanent series of linked futures projects.

Projection. The process of moving forward in time through, e.g. the extension of trend lines or the imagining of future events.

Purpose. The basic reason for doing a futures activity. Major purposes include prediction, forecasting, improving foresight, testing options, and envisioning.
Quality circles. A technique widely used in futures work, which combines idea generation through brainstorming with consensus-based decision-making. The technique involves three steps that are repeated until an acceptable solution is found to the problem under consideration.

QUEST. A technique for the rapid exploration of strategic alternatives, involving a broad analysis of the external environment and a rough assessment of options.

Rapid health futures project (RHFP). A quick futures activity, focused on some aspect of health or health care, in which all the standard components are executed in highly condensed form. An RHFP can be used to determine whether a particular issue is suitable for a more detailed futures project.

Reference material. Encyclopaedias, handbooks, manuals, yearbooks, and similar sources that present overviews and compilations of data on selected topics. Bibliographies of key publications are also often provided in these resources.

Reference scenario. Like baseline scenario, a term used either to mean a scenario on which others are built or a scenario with which others are compared.

Reiterative designs. Project designs that involve the repetition of all the components (multiple-loop designs) or of selected components.

Relevance trees. Also called relevance paths. Optimization tools used in futures studies to find the best strategy for attaining a particular future. Involves a tree-like diagram in which the base represents the objective, branches signify subcategories of objectives, and smaller branches and twigs indicate actions. Weights are assigned to indicate the contribution of each item to the successful achievement of the larger objective.

Risk analysis. An approach to evaluation in which emphasis is placed on identifying the risks associated with each alternative. In futures, risk analysis is often used in evaluating alternative pathways to a chosen scenario.

Role playing. A device used in futures to imagine how key actors would behave under different future conditions. Members of the team play the part of key actors and try to respond in accordance with what is known about these actors' strategies and concerns. The information is used in filling in scenarios.

Scanning. Keeping track of developments, especially those in the macroenvironment surrounding a particular sector.
Scenario. Any expressed image of the future.

Scope. The geographical coverage of a project, one aspect of its focus.

Search strategy. A logical plan for finding materials needed in a particular project, including steps to be taken to identify printed and on-line resources.

Secondary literature. Indexes, bibliographies, abstracts, and other printed and computerized resources that facilitate the identification of primary literature such as books and journal articles.

Sectoral. Referring to a specific division of some entity, especially within the activities of a government, such as the health sector, the educational sector, the economic sector, the environmental sector, and so on.

Simulation games. Games based on a model of a particular system, which allow players to investigate how the system would respond under certain selected conditions. Role playing is a special case of simulation gaming. Many simulation games are available, including some that are computerized or are supported by a computer program.

Simulations. Abstract versions of some real system, such as econometric and system-dynamic models that mimic the behaviour of particular sectors.

Snowballing. The process of building up a bibliography by first collecting references cited in recent relevant articles and books, then collecting the references cited in those sources, and so on.

Software. Models, spreadsheets, operating systems, word-processing programs, and other devices that provide the instructions that computers require to carry out their various functions.

Soliciting expert opinion. A basic technique of futures work, involving the collection of ideas and judgements from a selected group of individuals. In this context, experts are individuals who are believed to have special insight into a sector, system, or problem.

Sponsor. An institution or organization that assumes total or partial responsibility for a project and provides financial support.

Stake-holder. An institution, organization, or group that has some interest in a particular sector or system.

Statistical analysis. The process of examining and treating quantitative data to disclose underlying patterns, trends, causes, and relationships.
STEEP. An approach used in environmental scanning, which involves gathering items that describe relevant patterns and emerging phenomena in the social, technological, economic, ecological, and political sectors.

Strategic scenario. Either a scenario that describes a future that differs from the expected one due to interference, e.g. by policies, or a scenario depicting events leading up to a final future situation.

Structural analysis. A device for analysing how the variables in a system are related. Used in futures work to identify key variables within a system.

Style. A characteristic way of handling information, making decisions, and solving problems, etc., which differs from person to person. Often referred to as psychological style.

Subject tree. A list of resources available on the Internet, arranged in a hierarchical system.

Surveillance. Ongoing collection of information on developments within a sector. Not to be confused with environmental scanning, in which information is gathered about developments external to the sector.

Survey. The process of collecting information by canvassing a chosen group. Normally involves the distribution of a written questionnaire. Used in futures work as one means of soliciting expert opinion.

SWOT. An approach to analysing actors, involving looking at their strengths, weaknesses, opportunities, and threats.

System dynamics. A major category of simulation modelling. Useful in determining how systems are likely to behave under certain conditions.

Target audience. The group for which a product is intended (e.g. the target audience of this handbook or the target audience for the results of a futures project).

Task force. Another term for the team doing a futures project.

Telnet. That portion of the Internet that allows distance log-on into on-line public-access catalogues and similar databases.

Terms of reference. A written statement of the purpose and objectives of a project, the financial and human resources that will be used in carrying it out, the planned products, and other details regarding its design and implementation.

Tertiary literature. Printed resources that provide information about secondary literature; indexes to indexes, and bibliographies of bibliographies are examples.
Testing options. A major purpose of futures work. Involves creating scenarios based on the adoption of different policies or other decisions.

Testing scenarios. The process of checking scenarios during their construction to ensure that they are valid, applicable, and comparable.

Time perspective. The period, normally at least 10 years and usually much longer, that a futures project looks into the future. Also called the time frame.

Time-series analysis. Statistical methods that distinguish systematic variations in the historical behaviour of a variable from random variations and unique events. The future of the variable can then be forecast by projecting the systematic variations.

Time-space grid. A matrix in which time is measured along one axis and sectors or variables along the other. Such a matrix provides a concise overview of developments over time within a particular system.

Timetable. The schedule for a project, including deadlines for the generation of particular products.

TKJ method. A device employed in futures work to generate ideas for problem solving. Similar to idea generation but directed more towards consensus building.

Tool kit. A prepackaged set of tools for use in a futures project. To be avoided unless the tools carry out the specific functions required in the particular project.

Tools. Devices and techniques used in futures work to carry out particular functions.

TOP. One approach to multiobjective, multicriteria decision-making, based on consideration of technical, organizational, and personal perspectives.

Trend-impact analysis. A futures technique for producing forecasts of different probabilities. A baseline scenario is first constructed through extrapolation. Future-bearing events are then identified and evaluated in terms of their probability and impact. Finally, combined sets of these events are applied to the baseline scenario to create the forecasts.

Trends. Patterns in variables over time, and particularly developments that are likely to have serious implications for the future of a sector.

Trend scenario. A term used variously to refer either to an imaged future that is a simple extrapolation from current trends or to a “most likely” future that takes into account probable interactions between trends and future events.

Utopian scenario. The opposite of a dystopian scenario. An image of a perfect, ideal future.

Validity. One of the characteristics for which scenarios should be tested during their construction. A valid scenario is one that is logical and internally consistent.

Variables. Those parameters of a system that can change in value. See also input variables and output variables.

Vision. A positive scenario of a desirable future. Sometimes defined more narrowly to mean a desirable future that is also perceived as being feasible.

WHOLIS. The WHO on-line bibliographical database that covers all WHO publications since 1948, plus all World Health Assembly and Executive Board documents, unpublished documents, and articles in WHO periodicals and newsletters since 1986.

WHOSIS. The WHO Statistical Information System, an on-line system that provides access to various health and health-related databases, both statistical and epidemiological.

Wild-card scenario. A scenario that is considered to be very unlikely, but would have a major impact if it became a reality.

Working session. A meeting of a futures team or other body for the purpose of carrying out a particular task and generating a specific product.

Workshop. A meeting of a futures team or other body that may generate a product but one that is primarily process-oriented.

World Wide Web (WWW). One of the major components of the Internet, which allows access not only to text materials, but also to music, films, photographs, and graphics.

WWW scanner. A program such as Netscape or Mosaic, that can be used to access and use resources on the World Wide Web part of the Internet.
Drawing up a budget and seeking funding

Budgets for national futures projects vary considerably in size, as do the line items to be included in the budget. The institutional arrangements under which the work will be done, the organizational structure, the kind of scenarios to be constructed, the means through which the broader public will participate, the extent to which computers will be used, the planned products and their intended applications all need to be taken into account in choosing budget line items. Box A1 lists the costs commonly incurred in futures projects.

Funding for projects is sometimes provided entirely by the sponsoring institutions directly involved with the work, but a portion may also be provided by other funders. Some futures activities may be eligible for grants from international organizations, official agencies, corporate donation programmes, and private foundations. If financial support is to be sought outside the participating institutions, a fund-raising strategy should be formulated early, and proposals should be submitted in good time and through proper channels. Appeals to some international donor agencies must be routed via a national liaison officer, for example.

A request for funding should be submitted to a specific donor only if the project meets the donor’s criteria regarding the topic and nature of the work, the country in which it is being carried out, the kind of institutions involved, and the type of support needed. Certain donors give world-wide, but others make all their grants to projects in a particular region or a small number of countries. Some have a wide range of interests, whereas many give grants only in specific sectors such as agriculture, education, or population. A few funders allow their donations to be used to cover a wide range of expenses—operating costs, and costs of research, consulting, travel, publication, and conferences—but most impose restrictions on how the money is to be used. Furthermore, proposals to international agencies must usually be related to one or more specific programme categories, such as capacity building, construction of local databases, technical assistance, or training. Funders’ guidelines may exclude grants to certain kinds of organizations or institutions or
Box A1. Checklist for a project budget

- Institutional overheads or the equivalent (office space, utilities, basic office furnishings, office supplies, etc.).
- Purchase and servicing of equipment required by the project (including computers, printers, photocopying machines, telefax machines, modems, etc.).
- Communication expenses (mail, telephone, telefax, telex).
- Travel costs (in-country and international).
- Photocopying and printing (other than final products).
- Graphic and artistic work and other contracted services.
- Information resources (books, reports, journals and journal articles, CD-ROM indexes, access to on-line sources via the Internet or another computer network, etc.).
- Computer programs and models; building of a computerized model and/or database.
- Surveys, interviews, and Delphi exercises.
- Salaries and benefits for team members and support staff.
- Fees and expenses for consultants.
- Team meetings and working sessions.
- Meetings of the board of directors and advisory committee.
- Visioning workshops, including those carried out to broaden public participation.
- A national futures conference involving key decision-makers and stakeholders.
- Meetings and communications with other futures groups.
- Preparation and publication of formal reports and popular versions.
- Production of video or slide shows, other publicity and follow-up activities.
- Project evaluation.

Some of these items may not be relevant, depending on the particular project concerned.

to activities that already receive substantial funding from government sources.

Fund-raising should begin with appeals to donors located within the country concerned, since such funders are more likely to be concerned about
the future health of the country than are those in other parts of the world. Furthermore, external funders are more likely to give grants to a futures activity if local support, including financial support, has been demonstrated. Even multinational corporations sometimes make substantial donations to worthy causes in countries where they operate, as long as strong local financial and political support can be demonstrated.

When a national health-futures project is being planned, the WHO country representatives and the appropriate WHO regional office should be approached for discussions about technical guidance and exploration of possible sources of financial support. Other major international agencies are also worth contacting, particularly if the environmental and socioeconomic factors affecting health are to be given particular attention. The World Bank, the various international development banks, the United Nations economic commissions, the International Development Research Centre, the specialized agencies of the United Nations concerned with development, environment, population, food, housing, and other aspects of human welfare, plus the international development agencies of Canada, France, Germany, Japan, Norway, Sweden, Switzerland, and other donor countries may then be interested. The European Union is also a major international funder and gives grants through various directorate generals and special programmes.

In addition, many private foundations in Canada, Europe, Japan, and the United States are concerned either with health or with matters related in some way to health, such as equity, socioeconomic development, nutrition, family planning, environmental protection, and peace. Japanese foundations, even those making grants internationally, have traditionally requested proposals written in Japanese, which has made it difficult for most grant-seekers outside Japan to approach them. However, some of these foundations are now beginning to accept English-language proposals, and futures teams may find it worthwhile to approach those that seem most likely to be interested.

Information about potential funders can be found in directories produced by various foundation centres in Europe, Japan, and North America, which facilitate communication between foundations and distribute information about their activities. Section 9.8 provides information on such centres and also gives mailing addresses and telephone and fax numbers for a selection of foundations whose current programme guidelines make them potential sources of funding for health-futures projects, particularly at the national level.
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