Environmental Health Services in Europe

Policy options

by Ian MacArthur and Xavier Bonnefoy

WHO Regional Publications, European Series, No. 77
The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this Organization, which was created in 1948, the health professions of over 190 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world of a level of health that will permit them to lead a socially and economically productive life.

The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health problems of the countries it serves. The European Region embraces some 860 million people living in an area stretching from Greenland in the north and the Mediterranean in the south to the Pacific shores of the Russian Federation. The European programme of WHO therefore concentrates both on the problems associated with industrial and post-industrial society and on those faced by the emerging democracies of central and eastern Europe and the former USSR. In its strategy for attaining the goal of health for all the Regional Office is arranging its activities in three main areas: lifestyles conducive to health, a healthy environment, and appropriate services for prevention, treatment and care.

The European Region is characterized by the large number of languages spoken by its peoples, and the resulting difficulties in disseminating information to all who may need it. Applications for rights of translation of Regional Office books are therefore most welcome.
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After the Rio, Cairo and Copenhagen summits, it is absolutely clear that countries need to analyse carefully whether they are developing in a sustainable way, with demographic trends compatible with that development and in line with the basic prerequisites for a harmonious society. The Second European Conference on Environment and Health, in Helsinki in 1994, provided the Member States of the WHO European Region with the framework for environmentally friendly and healthy development.

In publishing this series of books on environment and health services, we at the WHO Regional Office for Europe hope and intend to provide Member States with authoritative documentation on the ways and means at their disposal for managing their services. This second volume aims at providing policy guidance and options in the area of environment and health management. It has been produced as an aid to the process of reorganization and to initiate debate within countries on the best structures and policies for effective environmental health services. We hope that these books will encourage countries and cities to analyse and restructure their environmental health services in a way that will allow them to pursue a health policy compatible with health for all and the Helsinki Declaration.

This volume is the result of a joint effort by many partners, among whom the Chartered Institute of Environmental Health in London played a very important role. The advice of all experts involved was invaluable,
and has been instrumental in providing the Regional Office and the Chartered Institute with recommendations that will allow them to pave the way for developing environmental health services in line with the best available knowledge.

J.E. Asvall
WHO Regional Director for Europe
The following advisers gave of their valuable time and experience in guiding the development of the first two books in the series: Maria Haralanova, Director, Department of Health Promotion and State Sanitary Control, Ministry of Health, Sofia, Bulgaria; Michael Jacob, Consultant in Food Safety and Environmental Health, Rickmansworth, United Kingdom; Antonio Lobato de Faria, National School of Public Health, Lisbon, Portugal; Andreas Kappos, Behörde für Arbeit, Gesundheit und Soziales, Abteilung Gesundheit und Umwelt, Hamburg, Germany; Jean-Luc Potelon, Sanitary Engineer, Grenoble, France; Julius Ptashekas, Director, Environmental Medicine Centre, Vilnius, Lithuania; and Linda Smith, Head of Environment and Health, Department of the Environment, London, United Kingdom.

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The Chartered Institute of Environmental Health in London seconded Ian MacArthur to the Regional Office for two years. This secondment made the whole project possible, and both Ian MacArthur and the Institute are warmly thanked.

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The 27 individual country reports have not been published by WHO. They are, however, available as unpublished documents on request to the Regional Office. Although each report has been reviewed by experts in the country concerned, it does not necessarily represent the true position or policy of that country.

The technical language used when discussing environmental health and associated topics is particularly difficult, owing to many historical, social and cultural factors. In an effort to aid the understanding of a common language and terminology, readers are requested to refer to the glossary of terms produced for the Second European Conference on Environment and Health, held in Helsinki in June 1994.
Introduction

The concept that environmental conditions can affect health is relatively new, yet it has become clear in recent years that health is central to the pressing concerns of environment and development. In 1984, the European Member States of WHO adopted the strategy for health for all (1), setting out a common set of health targets for all countries in the Region. Among those targets were several relating to environmental health conditions and management. In 1989, the WHO Regional Office for Europe organized the First European Conference on Environment and Health in Frankfurt-am-Main, when the European Charter on Environment and Health was adopted (2). The Charter was seen as the first major step towards the creation of national policies on environmental health.

Other international actions have also had a significant impact on this area of work. The United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, endorsed “Agenda 21”, a vision for ensuring that development is carried out in a sustainable manner (3). The principles that underlie the concept of sustainability also serve to mould the way in which environmental health issues must be addressed. The WHO Global Strategy for Environment and Health, as endorsed in 1993 in World Health Assembly resolution WHA46.20 (4), reflects the importance of the Rio Conference in dealing with environmental health.

Concerns for European environmental problems have also received attention from the international community. The United Nations
Economic Commission for Europe and the Organisation for Economic Co-operation and Development have together undertaken a process to produce a broad strategy that serves as an environmental action programme for central and eastern Europe, requiring the development of individual national plans. The most recent international event relating to environment and health was in June 1994, when the Regional Office organized the Second European Conference on Environment and Health in Helsinki (5). The Conference sought to bring together some of the existing initiatives and reflect on how best to progress with the various actions required. The Conference called for the creation by 1997 of national environmental health action plans, which would integrate the work already undertaken in the fields of environmental protection and sustainable development with those components that relate to health. The Environmental Health Action Plan for Europe (6), adopted at the Helsinki Conference, recognized the need for improved environmental health services in countries as a fundamental starting point from which effective environmental health policies could be delivered.

This is the second in a series of publications relating to environmental health services in the WHO European Region. It serves to complement closely the first book (7), which provides factual descriptions and partial analysis of the existing provision of environmental health services in the Region, and is based on the same format and principles. The information for both of these publications was collected through a series of 27 country reviews carried out by international consultants between March 1993 and March 1994 (Annexes 1 and 2).

The reforms that swept central and eastern Europe and the former USSR in the late 1980s and early 1990s, and the economic changes now taking place in this part of the Region, have inevitably led to changes in government structures and institutions. In several countries it was the “green movement” and the environmental lobby that were at the forefront of the pressure to change the former regimes. In only a few years, however, it has been realized that the new reforms will not solve the environmental damage that has been bequeathed to these countries. Even the many internationally funded capital investment programmes, aimed at producing specific solutions for particular problems, have not been sufficient to make a significant impact on the environmental health problems inherited by the new governments throughout the eastern half of the European Region. It has become apparent that long-term investment
in the capacities and structures in countries will be required before last-
ing changes can be brought about in the management of the environ-
ment. Many countries are therefore currently reviewing their entire le-
gal and institutional structures in relation to environmental health serv-
ices. In many countries, a new environmental protection system is being
developed. The existing capacities and management traditions, however,
do not always allow for radical reforms in the strategies and policies of
national, regional and local authorities, and inevitably some environ-
mental protection measures will have to wait.

This volume on policy options has been produced as an aid to the
processes of reorganization, and to initiate debate within countries on
the best structures and policies for effective environmental health ser-
vices. It will also serve as an extremely valuable and supportive tool in
the development of national environmental health action plans, which
are to be produced by 1997 under the terms of the Helsinki Declaration.

This book comprises six chapters that closely mirror those of its com-
panion volume (7), which provides an overview of current European
practice. By this means, the reader can compare how existing services
operate against the policy options for reforming particular aspects of the
delivery of environmental health services. The overview also provides
examples of the principles set out in this publication. There is, therefore,
much benefit to be gained by referring to both volumes when looking at
the future work of environmental health services. Both publications are
intended to be used as reference works, providing a complete overview
of a subject area within each chapter. Inevitably, therefore, there will be
an element of duplication between the chapters of essential information
common to more than one subject area.

As its title suggests, this publication is intended to offer options for
development. It is not intended to provide a prescriptive model for re-
form. It is essential that each country uses the information provided and
adapts it to its own unique situation, reflecting the various historical and
cultural differences that enrich the European Region.

There are, however, some principles in the delivery of environmental
health services that cannot and should not be compromised. Chapter 1
addresses many of these essential building blocks in exploring the con-
cepts of environmental health. It shows why environmental health is
important, and why it is a function that requires commitment at the highest level.

Chapter 2 deals with the implementation of strategies by the environmental health services, provides methodologies through which the various sectoral policies that influence environmental health can be integrated, and demonstrates how environmental health agencies can go about their tasks.

Chapter 3 relates to the institutional development required for the delivery of effective environmental health services, and the level of government best suited to deliver them. Obviously, the institutional infrastructures in a country have been created against the background of the political and social development of that country. The principles explored in Chapter 3 do, nevertheless, attempt to highlight some of the principles of governance that can be used and adapted to national traditions and existing structures.

Chapter 4 concentrates on what environmental health services do. It discusses their functions, and provides options on additional areas of responsibility beyond their traditional roles.

There is clearly little point in identifying policies, devising strategies and providing suitable institutions to deliver environmental health services if there is insufficient capacity to deliver what is required. Chapter 5 considers how capacities can be developed according to four different frameworks: economic, legislative, professional and informational.

Finally, Chapter 6 raises the issue of the evaluation of environmental health services. This is a particularly difficult area, which is certainly worthy of further research. This chapter sets out the problem, but in truth offers little in the way of solutions. Clearly, services must be evaluated if effective management is to be achieved, but the complex mix of policies, actions and effects involved in environmental health make such evaluations fraught with difficulties.

The WHO European Region comprises 51 countries of immense diversity. Although this volume does not provide solutions to every problem in the development of environmental health services, it does attempt to give a “shopping list” that can be used to create unique solutions for
individual needs. Undoubtedly some will disagree with these concepts and principles – it would be hard to imagine the completion of such a work without a contrary view. The Regional Office would therefore be grateful to receive comments on the content or style of this publication, as these will be very useful in any future revision.
The countries of the WHO European Region are enormously diverse. Their diversity relates not only to their geographical and cultural differences but also, and perhaps more importantly, to the range of social and economic conditions that currently prevail in these countries. As a result, the perspective taken on environmental health issues, and particularly on how these services are delivered, reflects this wide degree of variation throughout the Region. Some countries have well established environmental health services that can trace their origins back 100 years or more, while others are only now developing services for environmental health work.

Before setting out the various policy options for the establishment, development and management of environmental health services, it is necessary to establish a clear and common understanding of some key terms and concepts. This is essential in the light of the many different perceptions and understandings in the field of environmental health.

This first chapter therefore defines the basic foundations of environmental health and environmental health services, outlines their objectives and, among other things, describes the concepts of intersectoral working, sustainable development and health for all.
Definitions are of fundamental importance. They set out the precise scope of and the restrictions placed on the activities of environmental health institutions and professionals. Any definition of environmental health must therefore encompass both its present and future needs. In this chapter, an amended definition of environmental health is proposed and, for the first time, a separate definition of environmental health services is suggested. Changes to the existing definition were required to specify the types of environmental factor that affect health. The definitions also aim to highlight the work of environmental health services in addressing the problems of the past, present and future. Quality of life and the concept of sustainability are also incorporated.

WHO (2) has defined the term “environmental health” as comprising those aspects of human health and disease that are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health. Although some may find this definition a little old for the problems facing environmental health professionals today, it does serve as a strong basis for development.

Environmental health problems clearly relate to areas beyond the mere physical interaction of environmental and health factors. More and more, there is an indication that the social and psychosocial factors in the environments in which we live also have an effect on health. It is clear, then, that environmental health as a discipline must now encompass these areas as well as those traditionally associated with the term. It can be difficult to prove a direct correlation between some of these social factors and health. Some may be precursors of other, more tangible effects, while others may have a synergistic effect. This should not make them any less important in the consideration of environmental health priorities.

Such factors can relate directly to quality of life, which is now becoming the major area of concern in countries where mechanisms for the control of the main physical factors influencing health are well established. Environmental health must therefore reflect these changes in perspective and they must be added to the current definition.

The following new definition of environmental health is therefore proposed (8):
Environmental health comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting and preventing those factors in the environment that can potentially affect adversely the health of present and future generations.

It is natural that countries adopt policies to deal with environmental health issues that reflect their various social and economic needs. These are formed by a mixture of historical, social, regulatory, economic and public control policies. All policies require to be implemented and/or monitored, however, and in this respect environmental health services are vital to the strategies that aim to address environmental health issues. They are not, however, limited to these areas alone; environmental health agencies can also make a considerable contribution to formulating and promoting environmental health concepts for the purposes of decision-making, and to delivering public education and information.

Environmental health services are the direct interface between policy-makers and those who are subject to that policy control. They also have a direct relationship with the general public, in dealing with their complaints and concerns relating to environmental health issues. There is a need for such services to be appropriately targeted and sympathetic to public needs, while at the same time representing the views of the relevant authorities, be they local, regional or national.

Thus, environmental health services can be defined as those services implementing environmental health policies through monitoring and control activities. They carry out that role by promoting the improvement of environmental parameters and by encouraging the use of environmentally friendly and healthy technologies and behaviour. They also have a leading role in developing and suggesting new areas of policy.

There are several stages in the formulation and implementation of environmental health policy in any country. When environmental health priorities within a country, region or district have been identified, consideration must be given to how those priorities can be dealt with. This can be achieved through a number of intervention mechanisms, and it is the role of environmental health agencies to carry out that intervention work. Any policy must, however, enjoy legislative support, since this
demonstrates government commitment to the issues and provides those who implement the policy with legal guidance and authority.

Environmental health services originated from the movement to improve sanitation and public health during the Industrial Revolution in western Europe of the late eighteenth and early nineteenth centuries. Increased urbanization and poor standards of city housing, together with intolerable working conditions, created an environment in which maiming, death and disease were commonplace among the relatively young. Some enlightened industrialists and others expressed concern about and resolved to act against these conditions. Through their work, which linked environmental conditions to health problems and disease, the public health movement and services were born (9).

Today, environmental health services are still founded on the principles of public health, and indeed many of the problems faced by western Europe in the last century are reflected in some of the eastern countries of the European Region. Nevertheless, many of the areas that the services are now expected to address, such as quality of life, are more diverse and complex and need to be dealt with in a multidisciplinary manner.

Many of the prevailing systems of environmental health control in eastern countries were developed in the mid-1950s, largely on a two-tier system of local administration. The upper tier was the main (district) level formed by the larger cities, towns and rural areas. The second tier comprised the authorities of villages and the smaller urban settlements. Both levels had extensive legal powers, including the supervision of the economic plan for the area as well as the administration of a variety of services, including that of health. There was nevertheless a lack of real autonomy, primarily caused by the principle of “democratic centralism” that referred all decisions to the next higher level, and so on up to the national level.

In practice, the upper tier was almost always the dominant force. It represented the lowest level of central control – a form of direct central rule at local level. The lower tier was thus devoid of all real power. Having inherited such an infrastructure, the new democracies are struggling to match the needs of local people to the mechanisms required to provide appropriate local services.
The range of subjects dealt with under the banner of environmental health varies from country to country, and are so diverse that no single profession or institution has the capacity to deal with them all. Some individual professions or agencies may deal with many aspects of environmental health, yet they may have to seek additional technical assistance from elsewhere. On the other hand, they may deal with just one dimension of environmental health control, such as law enforcement, rather than providing services directly to the public or industry.

Environmental health agencies also have an important intermediary role in the formulation of policy. Through their work, they are able to identify potential problem areas and bring them to the attention of the policy-makers. They can then monitor policy and report on its effectiveness to the policy-makers, so that it can be amended as appropriate.

HEALTH FOR ALL PRINCIPLES

The health for all policy for Europe, as expressed in the targets for health for all (10), unites 860 million people in the WHO European Region, an area stretching from Greenland in the north and the Mediterranean in the south to the Pacific shores of the Russian Federation. The policy sets out the improvements in the health of Europeans that are expected by the year 2000. It also describes the strategies for achieving them through healthier lifestyles, improvements in the environment and the provision of high-quality services for prevention, treatment, care and rehabilitation. The targets are intended to fuel debate on the formation of national health policies and their implementation in WHO Member States.

Targets 18–25 are concerned with the contribution of the environment to health. They link together the emerging commitment of the environmental policies that lead to ecologically sustainable development, the prevention and control of risks, and equitable access to healthy environments. Their aim is to provide opportunities for people to live in communities with socially and physically supportive environments.
Health for all target 1, relating to equity in health, states (10):

By the year 2000, the difference in health status between countries and between groups within countries should be reduced by at least 25%, by improving the level of health of disadvantaged nations and groups.

This target is of particular importance for environmental health services. Disadvantaged groups within a country are often those who live in the worst housing with poor sanitation and water supplies, who work in the most dangerous occupations, and who have limited access to a wholesome and varied food supply. In short, they are often those people who live and work in the worst environments.

To reduce such inequalities, people must have equal access to environmental health services and there must be an uptake of services that relates to need. The geographical distribution of service resources should also reflect the needs of the entire population. The provision of advanced medical technology should not be restricted by social or economic disadvantage, and services should be sensitive to the needs of minority groups. To achieve this, the disadvantaged within the population will require special assistance and attention.

The transboundary nature of many of the environmental factors that contribute to such inequalities means that cooperation at the international level is essential. This is obvious in areas such as the control of air and water pollution, but such collaboration is also important wherever specific assistance is offered, either directly or through an international agency such as WHO.

Health for all target 18 states (10):

By the year 2000, all Member States should have developed, and be implementing, policies on the environment and health that ensure ecologically sustainable development, effective prevention and control of environmental health risks and equitable access to healthy environments.

The target goes on to state that Member States should:

- review, adapt and develop their environment and health policies in the light of the European Charter on Environment and Health, as an essential component of health for all policy;
formulate and implement country, regional and/or local laws, regulations, incentives and practices accordingly; [and]

establish country, regional and local mechanisms for involving people in policy development and implementation.

Sustainable development is dealt with in more detail later in this chapter, but it is worth stating here that all references to ecological protection in this book pertain to those ecosystems that are required to sustain human environments.

Target 19 states (10): “By the year 2000, there should be effective management systems and resources in all Member States for putting policies on environment and health into practice”. This target is a key indication of the need for effective and appropriate environmental health services. It goes on to state that the target can be achieved if Member States:

• establish systems for environmental monitoring and impact assessment, linking environment and health information;
• use country, regional and local mechanisms to involve government, industry, primary producers and community groups in environmental health action based on full sharing of information;
• consider the impact on environment and health of policies and strategies in sectors such as urban planning, energy, transport, industrial development and agriculture;
• mobilize adequate resources from all sectors to achieve environmental health targets; [and]
• develop management systems, operational methods, appropriate technology, research and training to support environmental health management.

OBJECTIVES OF ENVIRONMENTAL HEALTH SERVICES

At their most basic, the objectives of environmental health services are to protect and promote environmental health. Their primary aim is to ensure improvements in living conditions in order to promote human health. Several secondary objectives can be identified as contributing to the whole. These include developing and enforcing legislation, promoting public participation and involvement, influencing the development of government responsibility at all levels, and supporting practical and academic research.
Whichever of the definitions of environmental health given above is used, it will serve to set out the basic mission of the environmental health services. Nevertheless, intermediate, practical objectives should not be overlooked. Environmental health services are primarily concerned with environments supportive of human health, and with ensuring improvements in health in all environments where people live.

The population of the WHO European Region enjoy a wide diversity of such environments, but their quality varies immensely. It therefore follows that people’s aspirations will differ from country to country, from region to region, and even from city to city. One of the objectives of environmental health services, therefore, should be actively to promote and develop public aspirations for a continual improvement in local, national and international environments, within a framework of realistic targets (11).

Environmental health agencies and institutions are at the forefront of changes in environmental health policies, conditions and problems. They can act as the “eyes and ears” of policy- and decision-makers. They should therefore see as one of their objectives the creation and development of government responsibility, at all levels, to respond to the public’s wishes.

In setting their objectives, environmental health services must not only address the current problems. They must recognize that they are also required to work to correct previous environmental health problems and to promote good practices in the future. This requires them continually to evaluate their effectiveness within their available resources, and to address new issues once existing problems no longer present an unacceptable risk and are adequately under control.

One of the basic functions of environmental health agencies is to enforce legislation. Many laws in the field of environmental health rely on the principle of self-regulation, and environmental health services must control and monitor this process. A further objective is to promote the use of healthy technologies and the “cradle to grave” considerations in production processes.

To ensure continued development in their work, environmental health services must also support and suggest practical and academic research in areas where they have identified a lack of information or knowledge.
SOCIAL ASPECTS

The environmental factors that influence human health can be categorized as physical, biological or social. Traditionally, environmental health services have concentrated on physical and biological factors, which can be readily measured and whose effect on human health can be directly quantified (12). As many countries come to terms with such factors and bring them within acceptable limits, however, the environmental health services are being presented with problems that are rooted in complex social issues. Although they can be measured, such problems are difficult to correlate directly with human health.

The existing WHO definition of environmental health concentrates on factors in the environment and their impact on health. Within the European Region today, however, it is clear that, although some of these “factors” cannot be effectively measured or quantified, they still contribute to major public concerns. Economic, aesthetic and social factors all have a significant effect on the level or state of environmental health. Issues such as housing, urban development, transport and occupational stress all have direct or indirect effects on the health of the exposed populations. Environmental health services will have to turn their attention, in collaboration with other professions, to the environmentally related social and psychosocial factors that affect health.

Of primary concern in terms of these social aspects are urban growth and development. Increased urbanization has led to inadequate incomes, diets, housing and services, and it has often left such municipal services as waste collection and disposal unable to respond.

Of the many social and cultural factors with an impact on health, the most important, in both urban and rural areas, is poverty. Unemployment, as well as reducing income, creates stress and insecurity that may lessen resistance to disease. Education, health and other social services may also be less accessible to the urban poor, thereby increasing their vulnerability. Education is of primary importance to the improvement of environmental health, in that it creates the opportunity for people to increase their incomes and thus to afford healthier lifestyles.
Urban living brings about urban stress that can manifest itself in depression, anxiety, suicide, alcohol dependence, drug abuse and mental illness. Mental disorders have increased among older people living in cities, as have juvenile delinquency, violence and other problems stemming from psychosocial factors.

All of these issues are determined to an extent by public policies and programmes. They affect not only access to social services but also the economic sector. They determine the ground rules for social living, prescribe basic rights and entitlements, and provide a framework for socioeconomic development. The challenge in formulating such policies is to find a balance between economic growth and the maintenance of a secure social environment.

**Democratic Principles**

The adoption of democratic principles of government is the cornerstone of the establishment of effective environmental health services. The European Charter on Environment and Health (2) sets out the basic entitlements of individuals, including the rights of full information, active consultation and genuine participation in environmental health decisions. Democratic principles, however, also imply responsibilities. Every individual also has a duty to act responsibly in an effort to contribute to the protection of the environment. To achieve this partnership, environmental health services must adopt a role of promoting environmental health and be responsive and answerable to the needs and desires of the communities they serve.

Democratic principles of government are now familiar to all Member States of the WHO European Region. Such principles are the key to the establishment of effective environmental health services.

The European Charter on Environment and Health (2) states that every individual is entitled to:

- an environment conducive to the highest attainable level of health and wellbeing;
• information and consultation on the state of the environment, and on plans, decisions and activities likely to affect both the environment and health; [and]
• participation in the decision-making process.

Every individual also has a responsibility to contribute to the protection of the environment, and government agencies and public and private corporations must play a full role in protecting the environment and promoting human health through environmental health management. In this respect, environmental health services should actively and regularly provide the public with the information and tools necessary to facilitate this process. Furthermore, private industry should recognize the right of the general public to timely, accurate and comprehensible information on any impact on the environment.

SUSTAINABLE DEVELOPMENT

Sustainable development is more than environmental protection. The Rio Declaration on Environment and Development laid out the following guiding principles in relation to sustainable development that are particularly relevant to the delivery of environmental health services (3).

• Human beings are at the centre of concern for sustainable development.
• To achieve sustainable development, environmental protection must remain an integral part of the development process.
• Equity in the delivery of services is an essential part of sustainable development.
• Environmental issues are best handled with the participation of all concerned citizens at all levels.
• Effective environmental legislation should be enacted.
• Both the precautionary approach and environmental impact assessment should be widely applied as tools in competent decision-making.

Sustainable development was defined in Our common future (13) as “development that meets the needs of the present without compromising
the ability of future generations to meet their own needs”. It was further defined in the 1991 report of the World Conservation Union, the United Nations Environment Programme (UNEP) and the World Wide Fund for Nature, *Caring for the earth* (14), as “improving the quality of life while living within the carrying capacity of supporting ecosystems”.

There is no longer any justification for the claim that sustainable development is such an all-embracing term that it is effectively meaningless. There is now considerable agreement on the meaning of sustainable development and even, in the broad sense, on its implications for policy. Sustainable development goes beyond the idea of environmental protection as it has traditionally been conceived (15).

Environmental health has always included the concept of quality of life, though initial priorities rightly focus on matters deemed to present the greatest risk to health. Priorities constantly change, however, and environmental health services must adapt to those changes. As one group of hazards is eradicated or controlled, the services must turn their attention to the next problem while continuing to monitor the first.

This can be demonstrated by the work carried out through the environmental health services in some countries of western Europe. Diseases related to known environmental factors have, apart from sporadic cases, been largely controlled. Surveillance as part of control programmes is still maintained, but attention is increasingly being paid to lifestyle conditions and diseases related to environmental factors. A great deal of progress has already been achieved in these areas and the services are now beginning to address quality of life. It is worth noting that, although environmental health services should concern themselves with all three aspects at once, only in the relatively wealthy countries is quality of life actively discussed and a part of the normal work of these services.

Not only does sustainable development encompass certain issues, but it requires particular ways of managing them. There are three particularly important principles for the policy-making processes relating to environmental health services: policy integration, partnership and appropriate scale (16).

Policy integration involves introducing environmental considerations into all other areas of policy and the integration of different policy fields
and different levels of government. Partnership implies consulting with and the participation of all groups in society in the planning and implementation of sustainable development policies. Appropriate scale means handling policy at the level of government (from local to international) at which an environmental issue itself occurs, with emphasis on the principle of subsidiarity.

Environmental health services have an important role to play in the planning and management of sustainable development, as part of an integrated national and local structure. They are already involved in several aspects of sustainability and in policy management work such as environmental monitoring, education and enforcement. Their practical experience of working with business and the general public allows them to contribute to the implementation of policy by assisting and informing government, local industry and the general public.

Local issues of environmental quality, which have been considered the core work of environmental protection in the past, are related to sustainability in a number of ways. For example, motor transport is a contributor both to local air pollution and health problems and to global warming. Industries causing local pollution also use energy and produce solid waste. Policy towards such issues as food safety has implications for sustainability in relation to packaging and energy consumption during refrigeration. The relationship between sustainability and local environmental quality can be complex, and it is important that solutions to local problems also contribute to global sustainability, or at least avoid contributing to unsustainability.

**INTERSECTORALITY**

Many sectors of society must collaborate in order to achieve health for all. Intersectoral participation is needed to ensure health and protection from risks in the physical, economic and social environments. Such action implies cooperation among government agencies at national, regional and local levels and with other sectors such as business and industry, nongovernmental organizations (NGOs) and professional groups. It also implies a constant search for quality and cost–effectiveness. In terms of the establishment and
The development of environmental health services, the ministries concerned with both health and the environment must play leading roles in promoting intersectoral cooperation (10).

WHO’s European health for all policy (10) suggests that all sectors of society, including every individual, group and organization, have a duty to exercise care for a healthy environment when going about their business. Unless special care is taken, each person, group and organization – often without realizing it – tends to degrade the environment, to deplete the earth’s resources and to infringe the entitlements of others. As with individual health, therefore, environmental health is the responsibility of all sectors of society.

Potential hazards to health are caused by agents from many sources that reach humans by complex routes. The most effective protection from these hazards requires the cooperation of all sectors involved, and optimal progress depends on collaboration among all those responsible. When working in this manner, the individual professions or agencies involved must clearly recognize their responsibilities and limitations and respect those of others. Environmental health impact assessment can be used as a tool to promote this intersectoral approach (6).

Isolated decisions cannot usually solve problems of environmental health; lack of cooperation among authorities has in the past created or aggravated many problems. Mechanisms for intersectoral cooperation are the basis of policies on strategic and operational planning and for individual projects. Such cooperation must therefore work in particular at local level, where such decisions are made. Environment and health considerations must be addressed at the earliest possible stage in accordance with the principle of prevention.

Individual European countries vary considerably in the way they delegate responsibility for environmental issues as a whole, and for the health aspects of the environment, among government departments and agencies. This is true regardless of the system of government. The many possibilities for interaction between the policies of the health and environment sectors and those of others require both effective collaboration and very clear mutual objectives.

An important question is whether the political responsibility for major socioeconomic development should lie in the same hands as that for
protecting human health and the environment. The choice of structure, however, is probably less important than having clear overall objectives. Short-term clashes of interest between environmental health and economic objectives should be openly acknowledged, and there should be intersectoral links with clearly delegated responsibilities and public accountability to make sure that these links are effective.

Fig. 1 provides an example of intersectoral and multisectoral work. It shows that an intersectoral approach brings together the various different interests in delivering services, while the multisectoral approach deals individually with each component of environmental health. The intersectoral approach should function at both policy-making and service delivery stages, and at both national and local levels.

![Intersectorality versus multisectorality](image-url)
PROMOTION OF ENVIRONMENTAL HEALTH

The promotion of environmental health involves advocacy, education and lobbying. Environmental health services are normally located where they are best able to work for better management of the environment through environmental promotion activities. Promotion requires a proactive approach to defend environmental resources. Through the techniques of promotion, issues are placed in the public arena for debate and policy revision. Promotional activities are best undertaken at the level at which local communities can understand the issues and have a direct influence on their immediate environments. Environmental health promotion relies on the use of different techniques, including those of the mass media, education, petitioning, publicity, research and lobbying.

Promotional and publicity strategies encourage and maintain awareness about the environment and the related health issues. Such strategies can, however, place undue emphasis on certain issues purely because the publicity itself is good rather than the actual issue being publicized. For this reason, it is important that environmental health promotion is carried out in a planned and strategic manner.

Environmental health services must identify clear objectives and the target audience before embarking on publicity campaigns. Because these services are normally based at the local level, they are usually in an ideal position to educate, advise and persuade local communities on environmental issues.

The promotion of and education in environmental health issues create not only a sense of ownership of environmental problems among communities, but also involvement in potential solutions and decision-making processes. Once communities are better informed, they are more able and willing to participate in providing solutions (17).

Environmental health services must promote environmental health issues in all areas. They must ensure that these issues are included and remain on the agendas of local and national political, industrial, academic and community groups. Through such promotion they can advocate a coordinated and intersectoral approach to solving environmental health problems.
INTERNATIONAL COOPERATION AND COMMUNICATION

An increasing number of environmental health problems transcend national frontiers. Strong international cooperation makes it possible to ensure protection from transboundary pollution, access to adequate resources for healthy living, and the provision of services that are of high quality and take advantage of current knowledge and technology.

Many important international initiatives have been taken in the field of environmental protection. Many United Nations agencies have environmental programmes, and mechanisms are in place for regularly exchanging information and for taking joint action (18). In particular, the WHO Regional Office for Europe has carried out many environmental health activities with other United Nations agencies, the European Union (EU) (19) and its own Member States.

The ramifications for health of global disturbances to the environment will require further international attention in the future. Many of the current priorities in environmental health go beyond national borders and most require international, especially pan-European, cooperation if they are to be satisfactorily resolved. Well coordinated joint efforts in education, research and development should facilitate the most effective utilization of available resources.

International environmental health problems fall into different classes, and the services that must address these issues should also reflect their differing features. Some problems cannot be solved by a single country, and international assistance, aid and/or cooperation will thus be required to develop a solution. Other problems are by their very nature international, such as pollution of the Danube or the Aral Sea. Finally, some problems are created locally but affect much wider areas, such as transboundary air pollution and acid rain.

International cooperation is one of the principles of health for all (10). In the field of environmental health, it has been shown to have clear advantages for the solution of both international and national problems.
Chapter 1 sets out the concepts of environmental health. These are the foundations for the operational development of environmental health services. The question now is how these concepts can be translated into action. Strategies for environmental health set the structure and interrelationships among the various partners for the delivery of appropriate services. Several elements must be taken into consideration during this process, including policy formulation, situation assessment, priority setting, planning, public participation and management. This chapter outlines these components and the various options for their development and implementation, and discusses the advantages and disadvantages of certain strategies that can be adopted.

Policy Formulation

The process of policy formulation as a function of environmental health services is dealt with in depth in Chapter 4. Nevertheless, policy formulation needs to be considered in the framework of strategy development and implementation. The policy set on a particular issue is the starting point from which strategies are developed. Policies establish ground rules and determine the aims and objectives; the strategies then adopted must reflect the intent of the policy.
Strategies, however, will often have to take account of more than one policy. For example, an environmental health service may have a clear policy on the protection of foodstuffs. It may also have a policy on enforcement. When it comes to devising a strategy on food safety, therefore, both of these policies will have to be incorporated and reflected in the actions taken. Strategies must take account of a mix of policies, which may affect one another. Policy-makers must therefore be aware that their work has to be translated into strategic action, and they should make every effort to avoid drawing up policies that may conflict. Such difficulties will leave those who have to develop and implement strategies in an untenable position. Consideration must also be given to relevant policies developed elsewhere.

At its most simple, policy formulation can consist of three review stages. These are an internal review, where policy is considered and advocated by services or departments themselves; an external review, where the proposal receives comment from other administrative departments and the general public; and finally a political review, where a final decision is made. The policy development process may not always be in that sequence, but the final stage before implementation is always the political review. For environmental health services, policy is normally set at government level. Ideally, this will establish a long-term overview of environmental health and will allow strategies to be developed that prevent the unacceptable and promote the desirable. The essential aim of any government’s long-term strategy will be to put in place the services, incentives and controls that encourage individuals, households, communities, businesses and bureaucracies to promote health and the sustainable use of resources and to protect the natural and human environments.

Once a policy is in place, a general structure will be developed as part of the implementation strategy. The institutions within this structure can then be given freedom to generate their own policies. It is from here that service strategies can be developed, creating suitable structures, management systems, programmes and targets.

Environmental health services will therefore have little to say in the overall objectives, but the so-called horizontal policies – relating to how strategies can be implemented to achieve the specific objectives – can present several different options. Table 1 briefly describes some of these approach policies and outlines their perceived advantages and disadvantages.
<table>
<thead>
<tr>
<th>Type of policy</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proactive</td>
<td>Services actively measure, monitor and inspect. Programmes of work are formulated and targets are set. Attempts are made to create standards even better than those set out in legislation.</td>
<td>Has a positive effect on environmental health. Control of environmental health and standards lies with the environmental health services.</td>
<td>Can lead to more demands being made on the service. Can be expensive to operate.</td>
</tr>
<tr>
<td>Reactive</td>
<td>Complaints and emergency situations are responded to.</td>
<td>Concentrates on areas of greatest need.</td>
<td>Deals only with extreme situations. Cannot lead to a strategic and controlling overview. Is very expensive in the long term.</td>
</tr>
<tr>
<td>Specialist</td>
<td>Staff skills and resources are used to deal with individual sector-specific issues.</td>
<td>In-depth knowledge and well founded solutions are available.</td>
<td>Concentrates on one area only, thus no holistic view possible. Is resource-intensive. Lacks intersectorality.</td>
</tr>
<tr>
<td>Generalist</td>
<td>Staff skills and resources are used to deal with issues in an integrated manner.</td>
<td>Allows a general overview. Allows good identification and assessment of the complete problem.</td>
<td>Lacks specialist knowledge, although this can be obtained through centres of excellence.</td>
</tr>
<tr>
<td>Self-regulating</td>
<td>Those who have to comply with legislation monitor and control themselves internally. Inspectorates &quot;monitor the monitoring&quot;.</td>
<td>Can reduce monitoring workload. Allows resources to be devoted to priority problems. Is cost-effective. Can lead to better understanding by industry and commerce.</td>
<td>Is open to abuse. Is initially resource-intensive. Improvements beyond minimum standards are difficult to make.</td>
</tr>
</tbody>
</table>
The policy approaches described in Table 1 can be used in conjunction with one another, adopted at different times within an overall strategy, or used on their own. They can be used either for individual subject areas or across all areas of environmental health concern. The mixture of policies adopted will form the overall strategic or enforcement policy for a particular service. Such a policy will serve as the basis for subsequent activity, so it should be written down and made familiar to all involved in the environmental health services and to the general public.

For example, a strategy for safeguarding a wholesome and safe food supply may initially adopt an educative and proactive approach, whereby the environmental health services attempt to educate those in the food trade on the reasons for good hygienic practice. An enforcement approach could follow if standards have not improved. Obviously, such policies cannot cover every eventuality, and an element of flexibility should be considered. The adoption of the most appropriate strategy will depend not only on the stated policies but on other factors, including the relative priorities and available resources within the environmental health services. The following sections consider how these can be assessed and built into the strategy-formulating processes.

### Assessment of the Existing Situation

*Before strategies can be developed, it is necessary to establish exactly which problems require to be addressed.*
It may also be necessary to establish the urgency that should be attached to each issue in order to make the best use of the available resources. Several methodologies can be used to obtain this information, depending on the detail required and the various constraints imposed on data collection or recording systems. This section looks at the concepts of hazard and risk, and at how risk assessment and environmental health impact assessment can serve as useful tools in identifying and formulating strategies. It also identifies other matters to be considered when assessing needs.

Hazard identification
Hazards and risks are encountered throughout everyday life. The two terms are often confused and can become interchangeable in normal conversation. Technically, however, they deal with different though related concepts. The hazard associated with a situation relates purely to its potential to cause harm. Hazard analysis will reveal the extent of that potential. It will determine the worst-case scenario, the number of people or the extent of the area that may be affected, and the severity of injury or damage that could occur.

Environmental health services can identify a number of significant environmental health hazards through the process of hazard analysis. Hazards can be identified in several ways, but epidemiology, scientific research and toxicological information and analysis are all basic requirements. Without proven relationships between various factors and their effect on human health and the environment, the environmental health services cannot make informed decisions when identifying and analysing hazards.

Environmental health services can occasionally identify hazards that were previously unrecognized. Their main role in the formulation of strategies, however, is the recognition of existing hazards that may damage the environment or lead to increased ill health among the local population. Methods of identifying hazards include:

• investigating complaints from the public and other agencies;
• evaluating the results of monitoring and testing undertaken by other agencies;
• conducting specific surveys, and sending suspected hazardous materials for testing and analysis;
• routinely sampling and/or monitoring when this is not undertaken by other agencies;
• identifying sources of contamination; and
• keeping an open mind.

Physical surveys and archive searches can be used to supplement the above data, and could result in the creation of a complete register of hazards within the remit and geographical area of the environmental health services. It is important that all significant hazards within the area be identified, and that they include those hazards that, although perhaps transitory, can be predicted to be present from time to time. This is particularly important where an area is crossed by major roads and/or railways that may occasionally carry hazardous materials.

**Risk assessment and environmental health impact assessment**

Hazards relate to the potential of an item or situation to cause harm. The risk related to that hazard is the probability that or the frequency with which the predicted result of the hazard will occur. The risk associated with an identified hazard is therefore the major factor in determining the actions and strategies taken by environmental health services. The potential of a hazard may be great, but if it is effectively controlled and managed the likelihood of that hazard presenting a risk to a population will be reduced. Risk-based strategies for environmental health services allow precious resources to be directed to those areas that present the greatest probability of causing harm. To develop such strategies, risk assessment has to be carried out over the range of hazards identified.

Risk assessment in fact consists of two separate elements that have to be considered in stages. The first of these is risk estimation, which is the result of hazard analysis (i.e. the worst scenario, the size of the population or area likely to be affected, and the potential severity of the injury or damage) compared with the analysis of the risk. Risk estimation can be carried out by assigning numerical values to the different categories of hazard and risk. The resulting product of the two can be used as a very crude way of comparing the relative seriousness of risks.
This is not, however, the complete process, since risk evaluation must also be carried out. From the estimation of risk, a scale of relative priorities can be made based purely on hard data that can be proved and tested. Risk evaluation, however, also places a human significance or value on the estimation. Many risks are taken because those who are exposed find the benefits outweigh the disadvantages, and this dimension has to be incorporated into the risk assessment.

The ability to live with a risk has to be publicly tested unless the acceptance is implicit, such as in the case of motor transport. The benefits and disadvantages can be a trade-off involving many different aspects, depending on the issue at hand. It should be borne in mind, however, that the site of any benefits may not be the same as that of the disadvantages. Subnational, national or international considerations may have to be weighed. For example, a high-risk industry may bring direct local benefits, such as employment and an improved economy, but the risks may be much more widespread, either within the locality or further afield.

Risk evaluation can have one of three possible outcomes. It may be considered that a risk is unacceptable, that the disadvantages outweigh the advantages. In such circumstances, the environmental health services would need to take prompt action either to minimize or to eliminate the risk. On the other hand, it may be decided that the risk is acceptable, and that society can live with it without further precautions other than monitoring and surveillance. Third, it is possible to classify a risk as tolerable. This means that, while the risk can be lived with, all efforts and precautions must be taken to control it. Tolerable risks are often those related to nuclear power stations. The precautionary principle is applied, whereby a substance or activity is afforded all possible safeguards until the true risk has been quantified. This approach can only be adopted where there is a strong economy to support such a policy.

Through the full process of risk assessment, environmental health services can determine where their efforts can be directed most effectively. Routine inspection and monitoring schedules, although covering all identified sites of interest, can be heavily weighted towards those areas that present the greatest risk to the population or to the environment. The services can monitor and inspect more frequently those sites that present the greatest risk, and service managers can plan capital-intensive programmes more effectively.
Risk assessment can be made into an extremely complex science. It need not be, however; to well trained environmental health professionals, risk assessment for day-to-day purposes can become second nature.

Linked to risk assessment is environmental health impact assessment. This is another science that can be made to appear extremely difficult and complex, and expertise is certainly needed depending on the depth of assessment required. Environmental health impact assessment is now becoming generally accepted as an important tool in planning new developments. The potential effects on human health must be fully taken into account in such work, and staff in environmental health and other disciplines involved in the development process may require training. This process could easily be built into legislation. To have optimum practical value, the reports of such assessments should contain appropriate recommendations for follow-up studies during the construction, operation and, where applicable, closing down of facilities. These might include monitoring and epidemiological studies, and the results should be used as a continuing basis for decision-making.

**Social factors**

While the environmental health situation within a certain geographical area is being assessed, information on the population of that area must also be gathered and analysed. Real and perceived needs can vary widely across different social, educational and age groups, and it is the task of the environmental health services to ensure that their work is tailored to the needs of those groups (20). Following the principle of equity, all members of society should receive a level of service appropriate to their needs. It therefore follows that environmental health services will have to concentrate their efforts in areas that are socially and educationally deprived, and to focus on the more vulnerable populations.

Information on and representation of vulnerable groups may be more easily obtained when a municipality is responsible for its environmental health services. Elected representatives of different areas within the municipality will carry with them the needs and desires of their constituents. It will thus be possible for policy and strategy to be directly formulated by those people, leading to more responsive and equitable services.
Data and information sources
During the process of assessing the current situation, environmental health services should make full use of the various information and data sources available. Monitoring data, records of ill health, results of toxicological and epidemiological studies and academic research, data from geographical information systems and other statistical data all provide valuable sources of information on which value judgements can be made for the needs of the particular locality being dealt with. If the appropriate baseline information does not exist, then the environmental health services should consider either carrying out the necessary studies themselves or commissioning others to carry them out on their behalf. Such baseline information can be pooled nationally or regionally to assist in strategy formulation elsewhere. Comparative data will assist in determining reference points, which can then be used to measure the effectiveness of the various strategies developed.

PLANNING AND PRIORITY SETTING

Planning is the process of determining in advance an ordered methodology. For environmental health services, such a process is normally carried out within a framework of constraints. These include the policies that have been made and the prevailing conditions in the field of environmental health. Resources are also a limiting factor.

The mix of policies that environmental health services have to work with will provide the objectives of any strategy, and these need to be considered at the beginning of the planning process. Fig. 2 sets out the way in which various types of policy and information can interact to influence the development of strategic plans and ultimately the targets set.

Many factors, including the results of comprehensive analysis, need to be taken into account when planning an environmental health service. Fig. 2 shows that, as a government responsibility, the initiative for environmental health policy lies initially at national level. This is a broad statement of intent, providing a general commitment to protect the natural environment and to promote healthy living conditions. Addressing the various areas at national level may result in a framework of policies on the various sector-specific topics such as safe and wholesome food and
clean air. Moreover, an overall enforcement policy will be formulated at national level, which will establish some of the methodologies for dealing with environmental health problems. It is at this stage that choices can be made between national and local inspectorates and institutions or the operation of a two-tier system.

At local level, information on hazards and risks that the environmental health services have gathered in assessing the existing situation can be placed in order of priority and cross-referenced to national sector-specific objectives. By comparing the local and national policies and reaching, where possible, a position of compromise, local sector-specific objectives can be developed. Such a procedure allows the local authority flexibility in the planning of its services.
Once the local objectives are in place, the way in which they are to be achieved has to be determined by considering both national and local policies. National legislation will normally stipulate various requirements, and may provide enforcement tools and options. Occasionally, these may be statutory and the local environmental health services will therefore be obliged to use them. This may occur where a matter is of national importance, or where consistency in approach is desirable. Objectives may well be the same at both national and local levels, or even between different local services, but the methods adopted to achieve them need not be. As stated earlier, there are several ways of implementing environmental health policy. Consideration of national legislation together with the local approach to enforcement will result in the formulation of a local enforcement policy.

Once this policy has been integrated with the local sector-specific objectives, a local strategic plan can be developed that integrates the various objectives with the means of approach adopted. This may, for example, result in an educative approach to food control or strict enforcement for polluting emissions. Various mixes and hybrid plans can also be developed.

The ultimate constraint on the planning of local services is their resources and capabilities. If resources are particularly scarce or vulnerable, they may have to be considered earlier when determining enforcement approaches. They should also be considered, however, once the strategic plans have been drawn up. The level of resources in terms of funds, personnel and equipment will determine the feasibility of the plan and thereby the practical targets that can be set and the time scales for their achievement. Mechanisms can be developed that allow the national level to gain information on and an understanding of the local situation, thus allowing realistic planning.

The description given here of the planning process is rather simplistic. Various contributing factors such as public involvement and other external pressures have also to be considered, and mechanisms set up to take them into account. Some of these matters are discussed later in this chapter. In general, however, the constraints and processes of policy integration outlined here can serve as an extremely valuable model for the strategic planning of environmental health services.
Priority Setting

Priority setting is basically the process of ranking future actions in such a way that they will achieve the greatest gain relative to objectives and available resources. There are many methods of establishing priorities and several factors influence the process of determining them. In terms of priority setting for environmental health, work carried out to assess basic risks in a certain area can serve as the starting point. Risk assessment is not, however, the only factor that needs to be considered; political, social and financial benefits can all be incorporated into the process (20). A particular problem may, for example, present a significantly high risk to a small population group but have a low impact in terms of cost. On the other hand, a minor risk may affect a large population and thus be extremely costly. It might be decided, therefore, that in such circumstances greater attention should be paid to the latter situation.

Priorities constantly change, and work will move from one topic to another. Nevertheless, once a particular problem has been controlled to an acceptable level, efforts must be made to maintain what has already been achieved. This requires a re-evaluation of strategies and plans to assess the resources required to monitor and maintain that level of achievement, and the resources that will remain for addressing the next priorities. A balance is needed between new priorities and the work necessary to maintain existing baselines, so as to ensure that resources are used efficiently while at the same time the health of the population continues to improve.

Planning

There are several elements that can be considered in the development of a local strategic environmental health plan. At this stage, the baseline information will have been collected and the priority setting completed. The planning process will determine how the problems already identified are to be dealt with.

First, key supporters of particular local objectives should be identified. These may be local or regional authorities, NGOs or even sectors of private industry. Environmental health services, in developing their strategic plans, should liaise closely with such groups to facilitate teamwork and to identify complementary roles. Working groups and liaison committees can be established to monitor progress on specific issues, and to coordinate the technical input to the decision-making process.
The main opponents and barriers to the achievement of objectives should also be clearly identified. Depending on the problem, opposing groups can either be singled out for action or education programmes or they can be avoided altogether. Barriers do not, however, necessarily take the form of institutions or groups. Legislation, or the lack of it, can also act as a barrier to the achievement of objectives. In such circumstances, the first action under the local plan will be to lobby for a change in or introduction of legislation to deal with the problem in the most appropriate manner. The level of resources available to the environmental health services may also prevent the achievement of a particular objective. It is important that the full extent of such barriers is known at the outset, so that the appropriate measures can be built into the planning process (17).

From the process of policy integration between national and local concerns (Fig. 2), a local intervention plan can be developed. This plan can set out measurable targets to be achieved in a set time. Targets can be based on risk assessment principles, mortality and morbidity data and potentially high-risk scenarios. Targets can also be set that do not necessarily relate to measurements of health improvement but reflect the level of activity of the environmental health services. These can include the number of inspections carried out, the number of complaints dealt with, the amount of taxes or fines collected or the number of legal notices issued. These, however, as indicators of activity rather than performance, cannot be relied on to indicate the effectiveness of the services provided. For example, an increase in the number of complaints could be an indication that standards in the service have dropped and that the problem has reached an unacceptable level. On the other hand, it could be viewed as a success in raising public awareness. Such dual interpretations can prove to be misleading, and services should take care not to rely too heavily on such indicators of performance. The WHO health for all and Healthy Cities indicators can also be used as barometers of change (10,21).

Once the various interventions have been agreed on and adopted, various protocols can be developed to ensure that policies are effectively translated into practice. Documentation could be produced on a wide range of subjects such as risk assessment, routine investigation and monitoring. Contingency plans, educational programmes, enforcement activities and risk communication guidelines could all be produced for professional
staff. Such guidance will ensure not only that the strategies are carried out as intended, but that they are also completed in a consistent manner.

The implementation of the strategic plan will of course depend on the available resources, and any limitations must be fully recognized. There are, however, areas of expenditure that are essential for a workable strategy. Staff training, for example, may be required to provide a workforce that is able to respond effectively to the demands placed upon it, and the planning of any strategy should include an element of staff training. Similarly, a strategy can be very effective if it is supported by a programme of communication. Communication of objectives and strategies will assist in the development of links with other interested partners, and may encourage other service providers to support environmental health programmes.

PUBLIC PARTICIPATION

Public participation is crucial for both strategy and action. The right to participate in the political process is one of the most fundamental of human rights. Participation also serves to promote health and environmental quality in two other respects: first as a means of stimulating action and motivating individuals and communities to contribute to the improvement of health and a good environment; and second as a check on abuse of the environment. Citizens with clear rights and knowledge, and who have access to a legal system that makes speedy redress possible, are a powerful constraint on the contravention of health and environmental regulations.

Communications

A communications strategy should form an integral and fundamental part of the programme of work of any environmental health service. Declared intentions regarding the transparency of policy formulation and the availability of collected data should be supported with actual mechanisms to ensure that these intentions are fulfilled.

The communication of environmental health information to the public brings many benefits. Information and education allow members of the public to participate more confidently in policy-making. They also allow
those who are already involved in the various processes to distinguish among relative risks, and to sort through the often conflicting claims of the different actors in the field of environmental health.

Environmental health policies, issues and laws can be complex. The full impact of environmental health actions can sometimes spread wider than intended, and occasionally action has to be taken in one sector in order to have an effect on another. The dissemination of such concepts requires time and a considered approach if the public is fully to understand the intentions behind the actions. A communications strategy demands careful planning.

Public participation is required to ensure the success of any environmental health programme. Not only does it allow people to understand the issues that the services are attempting to deal with, but it gives them an opportunity to promote social change through their own actions. Public interest in environmental and associated concepts has increased greatly in recent years. Although this interest has somewhat declined in the eastern countries of the European Region of late, owing to the greater attention being paid to economic reforms, it will not disappear altogether. Environmental health services, in designing their strategies, need to be fully aware of this interest and to nurture, develop and manage it. Recognizing the value of public participation is not enough; environmental health services must actively communicate with the public to encourage that participation (15,17,20).

Both the quantity and the quality of the information communicated to the public must be analysed. The method of communication also needs to be considered, so that the most cost-effective strategy can be developed. The target audience may largely determine the way in which information is delivered.

Journalists and other media professionals are important partners in the development of communication strategies. They should be singled out by environmental health services to receive information and educational programmes with a view to encouraging good relationships and providing them with a better understanding of the issues and constraints involved (17).

Finally, the role of NGOs should not be forgotten. Environmental health services have to work together with appropriate responsible NGOs
to increase public understanding. NGOs will often have access to a knowledge base and information networks that the environmental health services have not yet developed. The services should attempt to tap those resources and work in partnership with NGOs to promote their mutual interests.

**STRATEGY MANAGEMENT**

*Once a strategy has been formulated and is ready for implementation, certain management structures will need to be in place. The roles and procedures in the management process can be built into legislative frameworks. These systems rely mainly on recording levels of activity and other basic indicators that reflect the work of environmental health services rather than their impact. In terms of day-to-day management, and in setting and reaching targets, such systems of recording can be extremely useful.*

**Monitoring and quality assurance**

Monitoring of environmental parameters is a fundamental task of environmental health services. Equipment and laboratories are used extensively in determining pollution levels and the toxicity of substances and in epidemiological studies. The result of such monitoring will often determine the action subsequently taken, and may serve to indicate whether or not a legal standard has been contravened. It is therefore vital that such work is carried out consistently, not only within the service itself but also at national and international levels. Standards or guidelines for pollution levels are very often set at international level, and it therefore follows that procedures for monitoring those levels must follow international protocols where they exist. Where national standards are used, the accompanying protocols also need to be produced.

Equipment used to measure environmental parameters can be expensive and complex. When planning strategies that make use of such equipment, it will be necessary to budget for quality control, calibration and maintenance. If such considerations are not built into the strategy, the results may be at worst valueless and at best unreliable. Management systems that ensure quality of performance are also needed. Managers
of services should monitor the activities of their staff by such means as reference laboratories and validation inspections. Either a local or a central reference authority or laboratory could be used to confirm the quality of results or interventions.

Audits of performance can be carried out within the service, though external audits, either by a ministry department or by a central auditing body, will prove more effective. If environmental health services utilize private companies to carry out some of their functions, they will naturally set up an audit procedure to ensure that the terms of the contract are fulfilled. These principles should also apply to the work of the environmental health services themselves.

**Complaint management**
Complaints by the general public can, in some cases, generate most of the work of environmental health services, and as a public service they need to respond effectively to such complaints. Service managers need to develop protocols for this work, developing clear reporting structures and identifying the responsible personnel. Recording systems, response times and the outcome of the complaint should all be considered. The public should be aware of these protocols, and the appeals procedure if a complaint has not been effectively dealt with.

**Contingency management**
Environmental health problems cannot always be predicted. The frequency with which various types of natural and man-made disaster occur demands that systems be provided to cope with such eventualities and to ensure that the threat to public health is reduced. Most major accidents have their most significant impact at local level, and the local services must therefore be prepared for such eventualities.

In an emergency, the services will have to adopt roles in addition to their normal everyday functions. This will involve three phases: preparation of plans, dealing with the emergency and returning to normality. The objective throughout will be to protect the public and the environment from any additional risk caused by the intervention of other emergency services. Environmental health services will already have a comprehensive database of information relating to potentially hazardous sites and likely eventualities, and will have close links with other public and emergency services. They are thus well placed to develop and coordinate the
emergency plan for their particular administrative area. Disasters do not, however, respect lines on a map, and therefore good coordination will be needed with neighbouring services and even with other countries.

In drawing up emergency plans, the services need to appreciate fully the roles and interrelationships of the various agencies at central, regional and local levels. Five principles can form the basis of any plan; a plan:

1. should be in writing and simple to read;
2. should ensure that all those responsible for putting it into effect have been notified and understand their role;
3. should be comprehensive;
4. must make advance arrangements for effective operational control; and
5. should make provision for the use of facilities during an emergency.

These principles should be applied to each of the following essential components common to all plans.

The plan must identify the key personnel in each department and the roles they undertake. It should provide information on contacting these personnel both during and after office hours, and on contacting back-up staff if they are not available. The plan should identify those responsible for maintaining and keeping it up to date.

The plan must lay down a management structure that will be in operation during the incident. It must identify who can make decisions and at what levels the various decisions will be made. It must identify lines of communication and the ways in which requests for information and assistance will be handled. If the plan fails to do this, chaos and confusion will severely hamper the operation.

The plan should identify all available resources that may be of use during an incident, and should provide daytime and out-of-hours contact names and telephone numbers, along with information on any restrictions on availability.

The plan should provide for regular liaison among the key personnel. It is essential that this includes personnel from other agencies involved
in the plan, so that effective working relationships are established before any incident occurs.

The plan must be written concisely and simply, so that, if necessary, someone unfamiliar with the plan can put it into action.

Once the plan has been written, it should be tested theoretically against a number of different scenarios. It should also be regularly tested by means of full-scale exercises to ensure that it is effective in dealing with a real incident.

These exercises, together with the regular liaison between the key personnel, will lead to review and revision of the plan. The date of the latest update should be clearly shown at the beginning of the plan.
In 1993, the Lucerne Conference on an Environmental Action Programme for Central and Eastern Europe (22) suggested that the greatest contribution to improved environmental management is likely to come from the strengthening of local and regional institutions within countries and, in particular, from improving their capacities for financial and economic management.

Once an environmental health policy has been established, a country has to set about implementing it. This will undoubtedly involve the utilization of environmental health services. These services are normally formed around institutional structures suitably located, both geographically and governmentally, for the level of service required.

Very often, the location of these institutions will have been determined historically in an unplanned organic manner, though occasionally direct intervention and planning will have resulted in the creation of service delivery bodies.

The institutional development of environmental health services relies on a number of different factors, all of which are interconnected. The nature of environmental health as a subject depends on an intersectoral approach, as described in Chapter 1. This chapter explores the organizational structures of service institutions, both internal and external.
Environmental health service institutions do not work purely within government networks. The use of private services and links with private enterprise, the general public and communities also determines the institutional development of these services. All of these aspects are examined in this chapter and various options for development are suggested.

Finally, this chapter considers the various support mechanisms required for the effective operation of environmental health service institutions. This includes an examination of the necessary legislative bases, the financial mechanisms and the information support required to ensure such institutions can operate adequately and develop further.

**Organizational Structures**

**National level**

*It has already been demonstrated that the primary responsibility for environmental health policy and therefore for the operation of the environmental health services in any country lies with the national government. When this role is established, its precise nature and the institutional framework and infrastructures needed to carry it out must be developed.*

One of the essential functions of national governments in the implementation of any strategy is systematic and effective planning. They must take the responsibility for coordination and the setting of priorities. It has clearly been shown that environmental health is a widely diverse field whose effective management requires an intersectoral approach. It is therefore essential that national institutions and structures are created in such a way that they can operate in an intersectoral manner. The national level also plays a role in providing scientific advice and disseminating the results of research, information that should be available both within and outside the environmental health services.

In many of the eastern countries of the European Region, the move from a centrally controlled economy to one led by market forces has resulted in significant changes in the system of government. This is especially true in the field of environmental health. Rather than dictating through decrees, governments now find themselves having to achieve
effective control through a range of softer tools such as incentives, persuasion, negotiation and compromise. They can no longer plan centrally, but must set parameters within which market and social forces can determine what is acceptable or unacceptable.

In addition to the economic reforms currently taking place in eastern countries, countries throughout the Region are going through a process of decentralization. The transfer of decision-making from the centre to the regions and districts of a country is fundamental to the success of a democratic society, and as such must be encouraged. The delegation of power from national to local government, however, has not always been accompanied by the necessary resources. This can lead to local decisions being made without the capacity to make effective and positive changes to the environment, a situation that can in fact encourage misuse of the environment and local natural resources.

With such a multifaceted subject as environmental health, questions will arise as to which authority should take the lead at national level. Should it be the health or the environment ministry? There is no simple answer, but fundamentally the two must work in partnership. It can be argued that health must play a central role in decision-making and programmes on matters relating to the environment and development. If this is not the case, then the required improvements in the levels of human health will probably not be achieved. In most of the countries in the European Region, the health ministries are well established and have a long tradition of public health work. In terms of the younger concept of environmental health, however, health ministries have been slower to take a leading role.

Most of the countries in the Region have environment ministries at national level. In eastern countries, however, environment ministries are relatively new and in many respects are still establishing themselves and their organization and structure. Nevertheless, this can work to their advantage. Their fresh approach and dynamic outlook on environmental issues, together with their ability to concentrate their efforts and budgets solely on environmental concerns, ensure that they will play an important role in the delivery of environmental health services in partnership with the health sector.

While it is evident that environmental health is a function of national government, it is clearly the concern of more than just these two
ministries. A comprehensive and effective environmental health policy relies on all government ministries taking an active interest in their impact on the environment and its relationship to human health. This common responsibility must be reflected in the structure and infrastructures of central government. Systems of communication and broad policy-making forums are needed to ensure that all ministries understand how they affect environmental health policy and how it affects them.

It is the role of national governments to plan and coordinate the work of the environmental health services. National governments do not, therefore, actually provide the services themselves. It is important that this distinction is clearly set out and that the responsibilities and functions of the various authorities are well understood. To support the services, the national authorities must provide various functional elements such as staff training, information sources and communication links.

**Basic considerations for institutional development**

A government must take account of several fundamental considerations before developing structures for the administration of environmental health services. These are not options, but the foundations on which any effective environmental health policy should be based. There may, however, be several means by which these requirements can be met.

Countries must establish a national policy, plan or code on environmental health that recognizes the pivotal role of the environmental health services. This principle was endorsed by the Helsinki Conference.

In many eastern countries of the Region, measures are being taken to decentralize decision-making to regions and districts. It is, nevertheless, necessary for national governments to retain responsibility for the overall planning and coordination of environmental health services.

A clear and public definition of government responsibilities and functions in relation to environmental health, and those of regional and local authorities, should be published to ensure that all those involved in the delivery of environmental health services clearly understand their roles and functions.

National governments must recognize the importance of intersectoral work and collective responsibility.
National governments must establish appropriate support mechanisms for the environmental health services. These will include staff training, reference centres, consultancy services and the facilitation of interdepartmental cooperation. All of these should be provided for in legislation.

**Options for institutional reform**

At national level there are three main areas that can be effectively worked on to improve the institutional arrangements for the delivery and support of environmental health services.

1. Is the understanding of environmental health as a concept an issue of national importance?
2. Is the reform of the environmental health services consistent with reforms currently taking place in other sectors, particularly in relation to the decentralization of managerial responsibilities from central to local level?
3. Is the intersectoral nature of environmental health being addressed, and are institutional frameworks being designed to facilitate such work at national level?

Table 2 shows existing situations that have been identified as requiring attention, the associated needs and options for action. They are by no means either prescriptive or comprehensive. They nevertheless give an indication of the types of issue that need to be considered and the practical options for supportive institutional development at national level.

**Decentralization**

Decentralization of administrative and political responsibilities is being carried out throughout Europe, either as part of reforms or as a result of increasing regionalization in countries. In terms of environmental health services, emphasis has been placed on assigning responsibility for environmental management to local government.

Decentralization is taking two principal forms. First, there is vertical decentralization whereby the central authorities strengthen their regional or local representation. In this situation, primary responsibility does not change significantly, but the degree of activity at local and regional levels will increase. The second process transfers both activities and
### Table 2. Options for institutional reform

<table>
<thead>
<tr>
<th>Existing situation</th>
<th>Need</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from centralized to market economy</td>
<td>Integration and use of economic factors for the control of environmental factors</td>
<td>Establishment of financial and economic input into environmental health decision-making</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of economic advisory units and “think tanks” in the health and/or environment ministries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of economic advisory units within the finance ministry to consider environmental health issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishment of an institutional structure to administer an environmental fund</td>
</tr>
<tr>
<td>Rigid multisectoral approach to environmental health problems</td>
<td>Establishment of broad understanding in all sections of national government of their roles in environmental health management</td>
<td>Creation of a permanent policy forum at cabinet level to consider environmental health issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation of departments within the health ministry to liaise with the environment ministry and vice versa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation of a department within the finance ministry to deal with economic aspects of environmental health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation of environmental health forums/departments in all relevant ministries, e.g. industry, tourism, agriculture</td>
</tr>
</tbody>
</table>
responsibilities to the regional or local level. Unfortunately, this trans-ference of major responsibility is not always supported by the necessary mechanisms and infrastructures to ensure effective operation at local level. Before such a policy is adopted, institutional support must be in place at national level.

Table 3 portrays existing situations or problems, the associated needs, and the options available for assisting the process of decentralization.

<table>
<thead>
<tr>
<th>Existing situation</th>
<th>Need</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial and vertical decentralization</td>
<td>Balanced and effectively controlled decentralization</td>
<td>Establishment of an institutional framework at national level to provide guidance and controls that permit decentralized services to make informed decisions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comprehensive and prescriptive guidance and supporting infrastructures that will enable the local level to provide a service conforming to the needs of the population</td>
</tr>
<tr>
<td>Full decentralization</td>
<td>Supporting infrastructures</td>
<td>Technical support from a central centre of excellence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legal basis and support for the establishment of decentralized institutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Institutional arrangements to ensure financial support for decentralized responsibilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support for training and educational institutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research institutions to support decentralized work</td>
</tr>
</tbody>
</table>
Creating intersectoral work

Effective management and control require a comprehensive and coordinated commitment from all ministries concerned in some way with environmental health. They also require support and assistance from the various national economic and financial institutions. In the eastern countries of the European Region, ministries other than those concerned directly with health or the environment have tended not to take full account of environmental health issues. As a result, these ministries have based their decisions on macroeconomic goals with little consideration of their impact on the environment.

Environmental health is a subject that is determined by, and impinges on, so many different areas of government work that intersectoral collaboration is imperative if services are to be effectively delivered. Even in countries where the concept of environmental health is well established, truly integrated intersectoral collaboration is difficult to find. The vested interests of the health and environment ministries occasionally mean that even the two ministries at the heart of environmental health do not work in partnership. This relationship is crucial to creating intersectorality at national level, and institutional frameworks must ensure that it exists and develops.

Table 4 sets out the existing situation or problems, the associated needs, and the options available for fostering the process of intersectoral work at national level through the development of institutional structures.

Regional and local level

In environmental health, the actual services are normally delivered at a level other than the national level. In the European Region, there are several different systems for the delivery of such services. Many countries in the Region have previously been dominated by centralized planning, but the current trend is to shift this power base to regional and local administrations. Although many countries are attempting this transfer, in several cases the necessary support mechanisms have not yet been put in place. Environmental health services are one of these support mechanisms.

The regional administration of environmental health services varies widely across Europe, as does the definition of what constitutes a regional
Table 4. Options for intersectoral working

<table>
<thead>
<tr>
<th>Existing situation</th>
<th>Need</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical structures for decision-making</td>
<td>Integrated decision-making structures</td>
<td>Establishment of intersectoral policy forums and mechanisms with a legal basis between all ministries concerned with environmental health issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishment of permanent links between health and environment ministries with internal focal points for close collaboration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establishment of environmental health departments in all relevant ministries to act as focal points on all matters having an impact on environmental health</td>
</tr>
<tr>
<td>Vertical support, control and implementation structures</td>
<td>Intersectoral work throughout national-level structures and functions</td>
<td>Creation of supporting institutions that reflect an intersectoral approach, such as reference centres and research institutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation of permanent intersectoral forums for vertical support mechanisms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creation of intersectoral forums within the health and environment systems</td>
</tr>
</tbody>
</table>

authority. For the purposes of this book, a regional authority is a controlling body that is responsible for a geographical area smaller than the country itself but larger than municipalities or communes. Several municipalities or communes will therefore normally comprise a region. Although each country differs in its approach to organizing its regional services, basic structures
can be identified depending on whether central government retains direct, partial or indirect control over the activities of the regional administration.

Municipalities form the basic unit of local government throughout the European Region. Municipalities or communes are normally removed from direct control by central government and, as local democratic bodies, can claim to represent the wishes of the local community. The status and functions of municipalities, however, vary tremendously throughout the Region, depending largely on their legal responsibilities and their financial and other resource capacities.

Before the various problems, needs and options for the institutional development of environmental health services at regional and local levels are discussed, the current systems of local administration must be fully understood.

Centralized systems of government are still largely in place in the countries of the Region, although many reforms are currently under way. This system, whereby central government retains control over the main service providers at regional level, is shown in Fig. 3. Municipalities are also controlled through financial mechanisms and by the fact that they have extremely limited powers and responsibilities.

As can be seen from Fig. 3, there is no formal mechanism in this centralized approach for intersectoral work prior to the delivery of the services. Individual ministries have their network of regional offices, which are not linked directly with the regional offices of other ministries. In terms of environmental health, it is only through ad hoc arrangements at the regional level that the services concerned with health and the environment will meet to discuss matters of mutual interest. It should also be noted that there are no established links between the regional services and those of the municipalities.

Decentralized systems of control over local government are mainly found in parts of western Europe. In this case, controls from one level to another are carried out through a framework of legislation and statutory guidance that is flexible enough to be tailored to the individual needs of the region or locality.

Fig. 4 shows the independent nature of the local and regional administrative units, the broken line representing a relationship of guidance
Fig. 3. Centralized control of local government

NATIONAL LEVEL  Ministry of the Interior  Ministries

REGIONAL LEVEL  Regional offices

LOCAL LEVEL  Municipalities

PUBLIC SERVICES

Fig. 4. Decentralized control of local government

NATIONAL LEVEL  Ministries

REGIONAL LEVEL  Regional councils

LOCAL LEVEL  Local councils

PUBLIC SERVICES
and liaison. Responsibilities between the different tiers in this system are determined by the significance of the issue and its relevance to geographical or administrative boundaries. For example, transboundary pollution matters would be dealt with at national level, while an issue such as waste disposal may be dealt with at regional level. Individual solutions at municipal level in these areas would not necessarily be cost-effective and might result in fragmentation of policy. Local municipalities will, however, deal with matters directly relevant to their own administrative areas and perhaps some that affect their immediate neighbours.

The partially decentralized system relies on both local democracy and state control (Fig. 5). The basis of this system can be found in several countries in western and southern Europe. It relies on the use of a prefect appointed by the government, who guides and influences the work of local government to ensure that decisions and policies follow government policy.

Both the decentralized and the partially decentralized systems provide an opportunity for intersectoral work at the point of service delivery.

---

**Fig. 5. Partially decentralized control of local government**

<table>
<thead>
<tr>
<th>NATIONAL LEVEL</th>
<th>Ministry of the Interior</th>
<th>Other ministries</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGIONAL LEVEL</td>
<td>Council</td>
<td>Prefect (coordinating power)</td>
</tr>
<tr>
<td>LOCAL LEVEL</td>
<td>Council, Mayor</td>
<td></td>
</tr>
</tbody>
</table>

PUBLIC SERVICES
The functions carried out under the responsibility of the different levels of government are all placed within the same administrative structure and are subject to the same decision-making processes.

Each of these systems has its advantages and disadvantages. All three have developed over centuries of local government and have evolved as a result of various social changes and needs. Obviously, a system that is satisfactory for one country will not necessarily suit the needs of another, but the basic frameworks described here provide guiding principles that could be adapted to those needs.

**Current changes to local government administration**

Local government throughout the European Region is currently undergoing changes and reforms. Local and regional administrations have always been concerned with environmental considerations, but have not always been empowered by central government to act on their concerns. Local government can play a key role in managing the environment within its sphere of influence. Local and regional authorities are well placed to make the difficult though necessary decisions to ensure that their environments are not exploited to the detriment of their populations.

Several changes are taking place in the European Region that have a direct impact on the manner in which local administrations must operate. It will therefore be necessary to review closely the institutional arrangements used to deliver environmental health services.

A current feature of local government across the whole of Europe is decentralization, a move widely accepted as satisfying the principle of self-government and, to a lesser degree, that of subsidiarity. It involves the transfer of responsibilities and functions from higher to lower levels of government and from the public to the private sector.

In the eastern countries of the Region, decentralization has occurred partly as a reaction to the end of central control. Many administrative units that had been merged have reverted to their previous status, resulting in an increased number of smaller municipalities and communes. Decentralization also encompasses the transition to market economies.
in eastern countries and the privatization of government services in several western countries. The motivation for decentralization is different in each country, but it generally includes cost cutting and a desire to improve the level of service and create competition.

The movement is not, however, purely one way. Centralization processes are occurring in certain countries through the creation of national agencies and the development of larger local administrative institutions. The size of local administrative units varies widely across the Region. Municipalities can vary in population from 1000 to 30,000, and can be much larger in Ireland and the United Kingdom. The geographical boundaries of local administrative units also vary in size and catchment area.

Development in the European Region over the past 30 years has been characterized by increased urbanization. So rapid has been the expansion that, in some countries, urban sprawl has overtaken the administrative boundaries of the traditional unit of local government. This can result in the “under-bounded” structure represented in Fig. 6. The effect of such development leaves the various units of local government unable to provide suitable services for the population. It is essential in such cases for there to be close collaboration among those authorities that have a vested interest in the activity area, and such groups of authorities may pool resources (if legal frameworks allow) to provide cohesive services.

“Over-bounding” can occur when extremely large administrative areas are designed. If such areas contain both urban and rural components, this can lead to confusion of priorities and problems of community participation. Despite appearing to provide the ideal scenario, truly bounded administrative areas are extremely difficult to establish and sustain. Drawing up activity areas and determining what constitutes the activity are the major obstacles to providing such structures. In the design of institutional reforms for the delivery of environment health services, these models can provide a guide as to where services can be located for optimum impact.

Traditionally in Europe, local government has been looked on as a mainly political body representing local views and needs. It has also provided some community services. In the European Region today, local
authorities, while retaining their political role, are becoming primarily service providers. This not only reorients the staff and leaders of local government to a new kind of professionalism but also changes the location and nature of local government institutions. In general, local government has become more publicly accountable for its actions and services. Stronger political leadership has emerged as a result of these demands, and local democracy features strongly in many of the systems of local government in the Region. Various tools have been developed to measure the efficiency and performance of local government services. Local authorities must now orient themselves to service management and client bases. Environmental health services must, however, remain independent to allow unbiased assessment and intervention.

**Basic considerations for institutional development**

Several fundamental considerations must be taken into account before structures can be developed for the administration of environmental health services at regional and local levels. These cannot in themselves be considered options, but should be thought of as basic principles on which subsequent decisions can be made. These principles can be established by several alternative means (23).
Regional and local authorities should be created within a legal framework that provides for their existence and role. Such a legal basis should give them certain rights and powers to act in respect of environmental health issues.

A clear and public definition of the responsibilities and functions of regional and local authorities in relation to environmental health should be published, to ensure that all involved in the delivery of environmental health services clearly understand their roles and functions.

Provision for local public participation must be built in to any decision-making processes at regional or local level.

Authorities at regional and local levels must have adequate financial and legal means to fulfil their obligations.

Regional and local authorities, although working within a national policy framework, must be able to respond and adapt policy to the needs of the local population.

**Options for institutional reform**

At regional and local levels, several factors must be taken into consideration when reforming environmental health services. The processes of decentralization occurring in the majority of European countries require to be managed and tailored to the needs of the individual communities that the local authorities are to serve. The first option to be considered, therefore, is whether to decentralize in the first place. Many countries, particularly those in the eastern half of the Region, are now firmly committed to this course through their reforms from centralist to market economies. Nevertheless, it is worth while highlighting the advantages and disadvantages of the various systems. Options for reform also exist in the geographical location of regional and local authorities. It is important that such decisions are not taken lightly and that their full consequences are realized. Support mechanisms and the financing of regional and local authorities are also of vital importance to their effective operation, and these aspects are discussed later in this chapter.

**Decentralization**

The processes of decentralization offer many options for the delivery of environmental health services. The needs and wishes of the people to be
served may vary considerably within a country, not only between urban and rural communities but also between different cultural and social groups within those communities. In this respect, therefore, decentralization of services can have distinct advantages, although improvement in service has not always been the driving force behind the desire for decentralization. Too often, in order to reduce the burden on the national authorities, responsibility has been delegated to lower levels without the necessary support mechanisms in place, thus causing a net reduction in the capacity of the services. Sometimes decentralization has been carried out too quickly, resulting in ineffective institutional arrangements.

Table 5 sets out the various situations identified as being of current importance and the various needs and options for suggested actions. Advantages and disadvantages are also outlined. These are by no means prescriptive or comprehensive. Nevertheless, they indicate the types of issue that need to be considered and the practical options that can be followed to create effective and responsive environmental health services at the local level.

**Geographical location**

During the process of reforming local government structures, and in particular when considering the location of local environmental health services, several factors should be borne in mind. Traditionally, administrative boundaries have been established around settlements, following natural boundaries such as rivers and mountains and, more recently, man-made boundaries such as roads and railways. Such areas, however, may not necessarily provide suitable units for effective and efficient environmental health control.

River basins have been used in several countries as administrative units, normally on a regional basis, for control over the water cycle. Such units have obvious advantages, in that they can deal comprehensively with all aspects of a certain problem rather than relying on several administrative units working together. The control of water is one area in which such a regional unit can be of value. It may also be necessary to form larger administrative units to deal with issues that can affect wider areas, such as the control of air pollution or potentially dangerous industries. Regional environmental health authorities may also be of value when dealing with issues that, although originating locally, require a strategic authority for their control; waste management is a prime example of such a function.
### Table 5. Options for decentralization

<table>
<thead>
<tr>
<th>Need</th>
<th>Options</th>
<th>Advantages (√) and disadvantages (✖)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced and controlled decentralization to provide effective environmental health services</td>
<td>Individual regional or local offices of the relevant ministry, dealing only with sectoral issues, to implement national policies at local level</td>
<td>✓ Strong central control over policy ❌ No intersectoral work ❌ No local decision-making ❌ No local public accountability ❌ Not responsive</td>
</tr>
<tr>
<td></td>
<td>Regional government offices, containing personnel of all relevant ministries coordinated by a regional governor or prefect, to implement national policies</td>
<td>✓ Intersectoral work ✓ Elements of local decision-making ✓ Responsive ❌ No public accountability ❌ Inability to make policy reflect local conditions</td>
</tr>
<tr>
<td></td>
<td>Local municipalities and communes to implement environmental health policy within the framework of national guidelines and legislation</td>
<td>✓ Local decision- and policy-making ✓ Community accountability and involvement ✓ Intersectoral work ✓ Adaptable ❌ Policy fragmentation ❌ No standardization or consistency ❌ Variation in priorities and capacities ❌ No independence</td>
</tr>
<tr>
<td></td>
<td>A mix of municipalities and central government regional offices, the former being responsible for local concerns and the latter for strategic national issues</td>
<td>✓ Balance between local independence and central control ✓ Issues dealt with at appropriate levels ✓ Responsive ❌ Possible public confusion over &quot;who does what&quot;</td>
</tr>
</tbody>
</table>

The needs and aspirations of different communities demand different units of local government for the delivery of environmental health services. Rural communities require different types of service than do city dwellers, and the institutions providing these services will have to be formed differently to satisfy these needs. Most people in Europe live, work and play in cities. When reorganizing decentralized services in urban areas, therefore, one should consider the overall living patterns of
the community and establish the best type of administrative unit for the effective delivery of environmental health services. Those concerned with local government reform should consider whether it is desirable to have an entire urban area under the control of one administration. This would certainly have advantages, but such large administrative units can be extremely difficult to manage and might not be able to respond adequately to public need. Alternatively, they might wish to consider creating several administrative units to cover different areas of the urban environment, perhaps even splitting administrations into zones of activity, such as residential, commercial and industrial. This, however, has the disadvantage of uncoordinated action with different parts of the same urban environment, as well as problems along border areas. The best solution is probably a mix of the two. This would entail a sharing of responsibilities between the local and regional authorities, with the region taking more of a policy and coordination role.

**EXTERNAL PARTNERSHIPS**

**Private services and industry**

Although primary responsibility for environmental health control must and should lie with the public sector, this does not mean that the private sector cannot participate in the provision of environmental health services. Indeed, in many countries in the European Region, the benefits of utilizing private services and establishing relationships with private industry can be clearly seen. Institutional developments in environmental health services should therefore not be limited purely to the public sector. Frameworks to encourage responsible participation of private services and industry should be developed.

There are several ways in which environmental health services can utilize private services and industry in their work. Although the ultimate legal responsibility for environmental health must lie with the recognized public body, there can be many advantages in privatizing various elements of the work and these should be explored. For example, it may be possible for environmental health services to contract out laboratory analysis to an accredited and independent laboratory, thereby relieving them of the capital and running costs of such a facility. It is vitally important, however, that the laboratory employed is accredited to a
recognized standard and that it is independent of those who are to be subject to analysis. These are not insurmountable problems. The use of private services need not be limited purely to analysis, but can also apply to inspection services.

Public authorities may not always have sufficient manpower or expertise to carry out certain functions on either a short- or long-term basis. It is possible in such situations that private consultants or offices may be authorized and employed to carry out specific or routine functions. The use of private services, particularly where the public services do not have the technical expertise, will avoid protracted problems. Again, their accreditation and impartiality must be checked thoroughly before they are employed.

As well as utilizing private services, public environmental health services can also market their own talents and expertise. Public laboratories, for example, can work with private industry to assist in achieving environmental health standards. Any conflict of interests should be carefully avoided, but again such problems are not insurmountable. It may also be possible, depending on the policies adopted by a country, for the environmental health services to charge directly for their services and advice once they go beyond the remit of law enforcement. For example, a business person does not expect a tax inspector to assist with the accounts, yet a factory owner may well expect an environmental health official to have a solution to a noise problem. In such circumstances, public environmental health services may well consider entering the market-place along with other consultants in the same field. One potential disadvantage of such involvement is where a dispute may subsequently arise and legal action is necessary; this possibility should therefore be considered before such a policy is adopted. Privatization must always be carried out in moderation, and be done for the benefit of environmental health. Environmental health services should not rely solely on the private sector.

**Involving the public and NGOs**

_Environmental health services are provided for the benefit of the public. It is therefore essential that the institutions developed for the delivery of those services are accessible and responsive to the needs of communities. Public participation is not an option for the effective operation of environmental health services; it is an essential element that must be designed at the outset._
Environmental health services must be physically available to the general public and must make positive efforts to encourage public participation in their work. Communication with the general public can be achieved in several ways. The use of the mass media can be effective providing the coverage given is fair and accurate. Recent reporting of environmental issues has not always been accurate, so the environmental health services should not only inform the public but also educate the media on the most effective reporting of such issues. Apart from the mass media, environmental health services can communicate with the public through such means as newsletters and exhibitions.

NGOs can make a significant contribution to the work of environmental health services. Properly nurtured and encouraged, NGOs can actually carry out some of the work themselves. Environmental health NGOs very often comprise members of various professions who, when brought together, can provide a unique blend of talents. Suitably accredited NGOs can carry out research, information gathering or even monitoring on behalf of the public environmental health services. They can also make an extremely valuable contribution to the decision- and policy-making processes at local level. The institutional development of environmental health services should not be carried out in isolation, therefore, but in recognition of the fact that the institutions formed will work with a variety of private and public bodies.

**Legislative basis**

*Control over environmental health factors cannot be achieved purely by market forces and persuasion. Legislation is required to ensure certain parameters are adequately controlled. Environmental health services require a recognized position and status in law, whether statutory or constitutional. This not only gives them authority and respect in the public eye, but also allows them to have confidence that their activities are fully backed by the legal system of the country.*

Several types of legislation are available for the control of environmental health parameters, details of which are discussed in Chapter 4. Only the main categories are summarized here.

Direct prescriptive legislation dealing with specific requirements can be of value, as it normally removes any room for doubt. Because it is so
specific, however, it often becomes quickly out of date and is by nature inflexible. Legislation that sets out general principles or frameworks can be more adaptable, yet these have the disadvantage of being open to interpretation. This can be overcome by introducing secondary legislation under the framework law relating to certain specific areas. Non-statutory guidance or codes of practice can also be used in this manner. Legislation that requires a licence or prior authorization can be extremely valuable in that it allows conditions to be set and approved before problems arise, thereby avoiding costly remedial action later. It can also serve to establish at the outset a solid working relationship between the environmental health services and their clients.

A trend is growing throughout Europe for legislation based upon the self-regulation principle. This legislation places the onus on those undertaking an activity or business to prove that they are not breaching regulations or standards. In theory, this should relieve the environmental health services of some of their inspection work. At least initially, however, more work may be needed to ensure that the principles of self-regulation are being followed and maintained. Also, it is extremely difficult to maintain standards through self-regulation during economic crises.

One of the most important aspects of legislative control for environmental health services is the possibility of adapting national or regional legislation to requirements. Some legislation clearly requires equitable enforcement throughout a country, but situations will arise where local circumstances make national laws unworkable or where national legislation is not available. It is important, therefore, that environmental health services at local level have access to by-laws that apply to their own circumstances.

The choice of legislation will largely depend on the situation. In considering types of legislation, it is essential that those services that must subsequently use the legislation to achieve policy goals are fully consulted. This will not only guarantee that the legislation is acceptable but will also help to ensure its effectiveness.

Financial capacities

Public services can only function in so far as they have funds at their disposal. Public-sector financing is a vast subject that cannot be covered effectively here, although certain aspects related to the funding of environmental health services are
addressed elsewhere in this book. In terms of institutional development, sufficient funding must be budgeted every year to ensure that predetermined basic levels of service can be offered. Mechanisms can also be created and legislation provided to allow services to raise additional income for developing their own programmes.

Environmental health services can raise funds in two main ways. The first is the collection of local taxes. Property taxes are extremely popular with administrations across Europe, as they give a relatively constant revenue and are related to some extent to the size of population for which services are provided. Other taxes can also be imposed, though care should be taken that the correct items are taxed.

Taxation policies on the financing of local environmental health services can also be used as incentives or disincentives in controlling environmental health parameters. Taxation policies can thus be formulated to tax the bad and not the good. Shifting the industrial tax base away from profit and on to pollution and energy use can offer real incentives for industry to cut discharges and increase efficiency. Similarly, if a particular locality has significant air quality problems associated with the use of motor vehicles, taxes can be imposed on such items as fuel, the purchase of new cars, and vehicles without catalytic converters. It is important that the majority of taxes collected are retained and spent locally, and that they finance the services provided.

Fines have also been used to finance local services, though care must be taken if they are to form a significant source of income. Some countries have a sliding scale of fines, whereby the higher the level of pollution or the greater the offence, the larger the sum that has to be paid. It is important that the money thus collected is not seen as a main source of income, since there would be little incentive for the environmental health services to assist in resolving the problem.

Support mechanisms
Environmental health services are essentially delivery services, and therefore do not always have access to the most up-to-date information or research results. Worthwhile institutions for delivering environmental health services must be supported by information and research centres. Similarly, information from national centres of excellence on policy
issues and current research is essential if the services are to keep up to date with current developments. Information networks are also required to ensure the effective dissemination of such advice. Of the several methods by which information can be relayed, electronic mail allows for fast and easy passage of information and can be used at national level to monitor activities and the results of services.

Support for environmental health services is also available through international networks. The WHO Healthy Cities network illustrates how participating cities can have access to concepts and technologies that would take far longer to be developed through national programmes. In this way, cities belonging to the network can circumvent the policy void that often exists between the national and local levels.
Functions of Environmental Health Services

This publication has analysed in sequence the various steps necessary to establish and develop environmental health services. In Chapter 1, the basic concepts of environmental health were considered. Chapter 2 set out the various strategies available to environmental health services for implementing policy frameworks, while Chapter 3 gave options and guidance for the location of environmental health services at the most appropriate level. It is now time to examine the services they should actually deliver, and their possible objectives and functions.

OBJECTIVES

Before setting about determining their day-to-day functions, environmental health services should first consider what their objectives are. These will obviously vary, depending on the needs of the individual locality and the political influences and infrastructures within which they must work. Chapter 1 sets out the theoretical objectives of environmental health services which, at their most basic, are to control and promote environmental health. Their primary objective is to ensure improvement in all living environments in order to promote human health.

The diversity of environments and aspirations of populations in the European Region must be respected by the environmental health services.
One of their main objectives must be continually to promote and develop those aspirations to ensure a progressive improvement in local, national and international environments, within a framework of realistic targets.

Environmental health services are very often in a position to suggest policy issues that require action. They can therefore hold as one of their objectives the creation and development of responsibility among policy-makers at all levels of government to respond to the needs of environmental health.

In setting objectives, the past, present and future must be considered separately. In other words, objectives must include repair of past damage, protection and improvement of existing environments, and promotion and encouragement of good environmental practices in the future. In addition, environmental health services must continually evaluate their own performance against clear targets (24).

Secondary objectives include enforcement, training and research. These are considered in more detail later in this chapter.

**PLANNING AND POLICY FORMULATION**

It is a fundamental requirement that environmental health services carry out planning and policy formulation. This is true at all levels – national, regional and local. As demonstrated earlier, environmental health services are at the forefront of change in the needs and wishes of populations, and can therefore react most readily to the need for change in the services they provide. In particular, local and regional environmental health services must be capable of planning their own activities and setting policies within national frameworks.

Planning and policy formulation depend on a number of factors, which are explored in greater depth later in this chapter. Fig. 7, however, outlines the basic process of policy formulation that can be adopted for environmental health decision-making.

The first analysis, based on monitoring and surveillance work, is carried out internally by the services themselves before moving on to the second analysis, which is conducted with full public participation.
outcome of this process is then set against the various impact and risk assessment criteria before alternative strategies are outlined in an action plan. The process then moves on to the political decision-making forum, which should be separate from the services themselves.

The next stage is that of implementation, where the main work of environmental health services is performed. The outcomes of the implementation then complete the cycle, as services begin to monitor the effects of the adopted policy. The entire process is continuous and is completed on widely varying time scales depending on the issue addressed, the effectiveness of the adopted policies, and the means available for implementation. Although the three separate elements of internal, external and political review should be retained, the basic policy-making process outlined here can be readily adapted to local circumstances.

The sectoral interests of the services are essential both in the planning and policy-making processes and in formulating their actual functions.
WHO (2) has defined environmental health as comprising those aspects of human health and disease that are determined by factors in the environment. The definition also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health. From this, it is possible to determine the various sectoral interests and functions of environmental health services. Although factors of concern to the services are continually changing, they are nevertheless contained within a matrix formed by the various types of exposure, the different environments in which human activity occurs, and the categories of hazard to which that population is exposed (Fig. 8). The methods of exposure include ingestion, inhalation, absorption, and physical and social contact.

Priorities for the environmental health services will undoubtedly differ among countries and localities. Some fundamental sectoral elements, however, are not open to choice but are necessary for public health. These correspond to the basic requirements for sanitation and essential elements of health found in targets 20–25 of the WHO European health for all policy. Table 6 shows the appropriate health for all targets (10) together with the corresponding sectoral functions of environmental health services.
Table 6. Relevant health for all targets (*10*)

<table>
<thead>
<tr>
<th>Topic (target number)</th>
<th>Target text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water quality (target 20)</td>
<td>By the year 2000, all people should have access to adequate supplies of safe drinking-water and the pollution of groundwater sources, rivers, lakes and seas should no longer pose a threat to health.</td>
</tr>
<tr>
<td>Air quality (target 21)</td>
<td>By the year 2000, air quality in all countries should be improved to a point at which recognized air pollutants do not pose a threat to public health.</td>
</tr>
<tr>
<td>Food quality and safety (target 22)</td>
<td>By the year 2000, health risks due to microorganisms or their toxins, to chemicals and to radioactivity in food should have been significantly reduced in all Member States.</td>
</tr>
<tr>
<td>Waste management and soil pollution (target 23)</td>
<td>By the year 2000, public health risks caused by solid and hazardous wastes and soil pollution should be effectively controlled in all Member States.</td>
</tr>
<tr>
<td>Human ecology and settlements (target 24)</td>
<td>By the year 2000, cities, towns and rural communities throughout the Region should offer physical and social environments supportive to the health of their inhabitants.</td>
</tr>
<tr>
<td>Health of people at work (target 25)</td>
<td>By the year 2000, the health of workers in all Member States should be improved by making work environments more healthy, reducing work-related disease and injury, and promoting the wellbeing of people at work.</td>
</tr>
</tbody>
</table>

**Identifying problems**

The first stage of policy formulation and planning of environmental health services is the identification of problems by the services themselves. The services must therefore act as the interface between policy-makers and the people who are subject to control. They also directly deal with the public, who are the intended beneficiaries of environmental health policy. With these links, environmental health services are ideally placed to pick up on trends and changes in the needs of communities.
If an environmental health service intends to act proactively and to monitor changes in environmental health conditions, reporting systems will be required. There are several means by which information can be collected on potential environmental health problems within a community, and environmental health services are in an ideal position to take on that role.

The inspection staff of an environmental health service can monitor various measurable parameters in the environment that may indicate a likelihood of increased levels of disease or of complaints by the public. Adequate reporting systems have to be established for the collation and analysis of such data, and these may have to be networked among different services within the same geographical area to ensure a comprehensive picture. As well as identifying areas of potentially new environmental health hazards, inspection work can determine when a previous problem has been resolved and efforts are no longer required at the same level. While reporting systems may be formally established for some issues, and fixed periods set for the collation of data, it may also be useful to establish an ad hoc reporting forum through which new trends and problems may be identified.

Reporting systems and mechanisms need not necessarily be based on information collected by the environmental health services themselves. The reporting of diseases and conditions, which may or may not be statutory, can give a clear indication of trends and particular problems. Cooperating with other professionals within the health services can lead to the identification of populations at risk or of geographical areas where environmental health services may have to concentrate their efforts. Statutory reporting systems may already exist for certain infectious and foodborne diseases, and for accidents and ill health at work. Nonstatutory information, which is often equally useful, can often be obtained through general practitioners and hospital accident and emergency departments.

The recording of complaints is another system of reporting that can offer an indication of where efforts may be best directed. Very often a complaint does not justify action when compared to other priorities. Nevertheless, complaints can be used to indicate the public’s desire to act on an issue, and they should therefore be utilized as a means of identifying problems.

Various indicators can be developed and used to determine levels of health within a community, and these may also be used to identify
problems arising from environmental issues. Common indicators can be adopted by networks of environmental health services, and comparisons can then be made at national or regional level in an effort to distribute funding and other resources equitably.

When establishing mechanisms for identifying environmental health problems, services should look beyond their traditional areas of responsibility to ensure their efforts are directed appropriately. A condition or disease may be due to an activity beyond their control, and their existing work in this area may have little impact. In many western European countries, for example, action in the 1950s and 1960s to limit the burning of fossil fuel had a direct effect on health through a reduction in smog levels. The great deal of effort placed on controlling air pollution today, however, has an effect on the environment but not necessarily on health.

The most significant source of air pollution affecting health in the majority of towns and cities is now motor vehicle exhaust. Apart from monitoring air quality, however, environmental health services have at present very little influence on transport policies and strategies, and thus have largely failed to maintain control over the quality of the air in the communities they serve. Nevertheless, whether they are in control of a particular vector or not, environmental health services are still primarily responsible for monitoring that vector.

**Alternative solutions**

Once a problem has been clearly identified by an environmental health service, it will then be necessary to decide what action should be taken to address it. This process should begin within the service itself, so that realistic consideration can be given to the extent of the problem and the capabilities and capacities of the service to act on it.

The first option to be considered is the availability of an existing legal instrument to deal with the problem. In some cases, the legislation may not have been written with a particular situation in mind, but can nevertheless be applied to it. Statutes may also be drafted in such a manner as to cover any new situation that may arise.

It may be decided that existing legal provisions are inadequate, in which case one solution would be to introduce suitable legislation.
Unfortunately, the introduction of national legislation in any country is an extremely long and detailed process, and is very unlikely to provide a speedy solution to local problems. Nevertheless, if a particular problem can be identified in several parts of a country, it should be possible to recognize the need for legislative action.

Not all of the problems of local communities can be solved through national legislation. Occasions can arise where the situation is one of purely local concern, in which case local by-laws can be used. Environmental health services, if they decide that legal proceedings are necessary, should have the right either to initiate by-laws following consultation or to request the appropriate legislative body to pass them.

The various aspects of legal control are looked at more closely in Chapter 5. Legal intervention, however, is not the only means by which improvements in environmental health can be achieved. Incentive and disincentive policies can be equally as effective where legislation is not warranted, or where the introduction of legislation would only bring about confrontation and make the problem worse. Incentives and disincentives can be provided in many forms, including taxes and allowances.

**Estimating costs and financial planning**

As part of any planning and policy-making process, costs will need to be considered. In determining strategies and policies for environmental health, the actual costs involved in providing services may determine the approach taken. Financial planning can be complex, and traditional methods of establishing the costs and benefits of particular interventions do not always give the right results.

Environmental health services are normally financed through public funds, determined at a rate proportional to the size of the population served. Occasionally, additional funds may be allocated on the basis of environmental problems unique to the area in question. Environmental health services are therefore a cost to society, and as such they must be accountable to society for their operating methods and use of funds. Intervening in environmental health problems can be expensive, and services must weigh that expense against the benefits and services to the community they serve.

Very often, the effects of an action are unseen and therefore not truly appreciated. Continuous inspection, monitoring and enforcement work
to ensure that a standard is not broken will clearly be expensive, whereas the benefits to the community of such action can never be more than an estimate. Similarly, certain long-term actions may not produce benefits for a number of years. Again, the costs and benefits of such actions can be difficult to equate.

The cost–benefit relationship of environmental health policies cannot of course be calculated purely on the basis of finance. The wishes and needs of the public, and a determination of what is or is not acceptable to the community, will have a bearing on the cost–effectiveness of the services.

Environmental health services must also have the ability to raise funds for their own use. Legislative frameworks can allow services to charge for certain activities or to recover local taxes, which can then supplement their central funds. This is particularly important in enabling services to develop in areas where they could not otherwise afford to operate. Such mechanisms should be controlled to ensure that self-generated revenue does not become the main source of income for the core functions of the environmental health services.

Public consultation

Once the internal review of policy and strategy has been completed, a process of public consultation must be undertaken. This is essential to ensure that the policy adopted is recognized and respected, and because the public will be more willing to participate and cooperate if they feel a sense of ownership of the policy. Participation in policy-making must therefore be actively encouraged by the environmental health services. Consultation should not be carried out in a passive way; information should be presented in such a manner that it invites partnership and cooperation. Local communities, commerce, industry and interested NGOs should be given ample opportunity to participate in the policy-making process. Their involvement is not intended purely to endorse actions proposed as a result of the internal process, but actively to influence both the goals and the implementation of the strategy.

An environmental health service can use several methods to encourage public participation. The mass media can be used to inform the general public, but they cannot facilitate meaningful public participation. Depending on the type of issue to be decided on, exhibitions and public
meetings can be organized to give members of the community an opportunity to discuss their thoughts on a proposed course of action. Formal mechanisms of consultation can also be utilized. For example, a detailed proposal can be sent to interested parties, and to others on request, for comment. This form of proactive consultation will inevitably add expense to the initial process, but it will nevertheless provide a good indication of public reaction to a proposal and ultimately assist in achieving effective and workable strategies.

Introduction of controls
Once a process of policy formulation has been completed, the implementation phase must begin. To be truly effective, implementation should include an introductory stage, informing the target audience about the likely requirements or changes that they will have to accommodate. The policy may already have been published and approved, yet its actual implementation can be delayed or given a lead-in period. During this time, environmental health services can adopt a policy of information and education to make the actual implementation of the policy a great deal easier when it comes into force. It also allows a cooperative relationship to develop between the environmental health services and those subject to environmental health policy.

Enforcement

The enforcement of environmental health law and standards is a fundamental function of environmental health services. Indeed, many countries in the Region view it as the primary function of such services. Although the word enforcement implies compulsion, in practice there are several means of achieving it without the need for force.

The EU commentary document on the fifth action programme, Towards sustainability (19), calls for member states to establish enforcement bodies and procedures to ensure full and equal compliance with legislative and other requirements. This is clearly a role for the environmental health services. Environmental health policy and strategies may be based on various elements, including education, promotion, incentives or disincentives, and legal action. The choice of approach will be determined by the level of the risk, the number of people exposed to that risk and the
seriousness, both publicly and politically, attached to the issue. Whatever approach or combination of approaches is used, however, there will be a need for a back-up position whereby standards can be enforced. Any environmental health policy will be of little value if means to implement and enforce it are lacking.

Policies of self-regulation have been adopted and incorporated in legislation for several aspects of environmental health control throughout the Region, and indeed the principle of self-regulation is clearly implied in the concept of sustainability. In practice, however, policies that promote self-regulation have rarely operated satisfactorily. Several problems can occur if such a policy is introduced without the necessary initial stages of education and information.

Industry and commerce can use self-regulation policies for their own advantage. Because they are aware of the limit set by the legislative framework, they are likely to operate at just below that limit, and thus full compliance with the objectives of the policy is rarely achieved.

Also, self-regulation policies have not necessarily found favour with the general public and consumers. They doubt the ability of industry and commerce to regulate themselves effectively. The general public tends to feel more confident in an independent public arbitrator who can oversee the operations of industry and commerce. Self-regulation is not cheap, and it places the burden on industry itself, leading to resistance to the introduction of self-regulation policies. A balance needs to be found, whereby elements of self-regulation can be effectively implemented while a strong and trusted public regulating service is retained.

**Legal instruments and structures**

Environmental health services require a legal basis on which to operate. Without such backing, it is extremely difficult, if not impossible, for them to act with confidence and effectiveness. Legal instruments can take numerous forms and can have various levels of status. This section explores the values of those different forms and demonstrates how environmental health services can utilize them effectively.

In most of the countries of the European Region, legislation sets out the minimum that has to be complied with and allows for a clear understanding of when a law has been broken. In some countries, however,
the requirement set out in legislation is looked on as a standard to be worked towards, an approach that can lead to confusion and uncertainty.

Primary pieces of legislation are normally issued as acts or decrees. These are usually the highest form of law, from which everything else is developed and to which everything is referred. Such laws can be written in such a way as to provide a framework or umbrella for other, more specific laws. Framework legislation sets out general aims and objectives and the principles for their implementation. Statutory institutions may be referred to or even established by such legislation. Provision for secondary legislation to deal in detail with specific issues is normally built into these framework laws. For example, a framework law on pollution control might set out general principles, and this could be followed by several more prescriptive pieces of legislation to deal with air, water and noise pollution.

Prescriptive legislation will normally qualify and quantify the general requirements set out in the framework legislation. It is, however, relatively inflexible and can quickly become out of date, whereas framework legislation has the advantage that general principles will rarely change. The two types of legislation are not mutually exclusive; framework and prescriptive legislation can work in close harmony to create an infrastructure of laws.

The legislative base can be widened even more by the use of codes of practice and statutory guidance. These provide, in effect, a third level in the legislative infrastructure and give further, more practical details on compliance with the law. Very often such codes will not carry the same weight as a law and need not be adhered to, but compliance with them will be deemed to satisfy legal requirements. Codes are far more user-friendly instruments than legislation, outlining in understandable language and diagrams exactly what is required by law. Reference to technical standards can be used to further illustrate requirements. The legislative infrastructure is presented in Fig. 9.

Although the second tier of legislation has been described as prescriptive, this does not necessarily mean that it should be written in a prescriptive manner. It should, however, concentrate on one particular aspect of the matters dealt with in the framework legislation.
As mentioned earlier, environmental health services may have to deal with problems in the local environment that cannot be addressed effectively by national legislation. In such circumstances, the use of local by-laws can be extremely useful. By-laws cannot contradict national legislation, but should complement it and tailor it to local conditions.

The different types of law discussed are shown in Table 7, together with details of when they can be used and their relative advantages and disadvantages.

The type of legislation used is only one aspect of the various legal instruments and structures available to environmental health services. The mechanisms and structures that actually make an impact on environmental health are the powers and procedural systems for implementing legislation. These are the various notices and legal proceedings that can be involved for contraventions to environmental health law.

When a law has been broken, an environmental health service has several choices of action. The first option is to do nothing. Statutory legislation can be extremely detailed and sometimes trivial, and a situation
could arise whereby, although technically an offence was committed, the actual risk involved was minimal or nonexistent. In such circumstances, the environmental health services may choose to overlook the matter in order to maintain a good working relationship with business and industry. This would not, however, be the case where, although nobody was actually exposed to a risk, the potential for exposure was significant. In such circumstances, action would certainly be required and justified.

<table>
<thead>
<tr>
<th>Type of law</th>
<th>Purpose</th>
<th>Advantages (✓) and disadvantages (✗)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framework law</td>
<td>To outline general principles and actions required for the control of a set issue&lt;br&gt;To establish executive powers and institutions&lt;br&gt;To provide a framework for development&lt;br&gt;To detail penalties and basic enforcement powers</td>
<td>✓ Provides an overview&lt;br&gt;✓ Acts as a &quot;catch-all&quot;&lt;br&gt;✓ Provides a solid legal base&lt;br&gt;✓ Has potential for long life&lt;br&gt;✓ Is flexible&lt;br&gt;✗ Is vague and open to interpretation&lt;br&gt;✗ Can fail to be truly comprehensive</td>
</tr>
<tr>
<td>Prescriptive law</td>
<td>To deal with specific problems or environments&lt;br&gt;To set precise requirements implied by the framework law&lt;br&gt;To provide detailed enforcement procedures and penalties</td>
<td>✓ Is specific, and therefore can avoid confusion&lt;br&gt;✗ Provides little room for flexibility&lt;br&gt;✗ Can become quickly outdated&lt;br&gt;✗ Leads to adoption of minimal standards in practice</td>
</tr>
<tr>
<td>Code of practice</td>
<td>To offer non-statutory guidance on how to comply with laws, including technical standards&lt;br&gt;To provide a benchmark to assess compliance with legislation</td>
<td>✓ Provides practical assistance&lt;br&gt;✓ Can be easily updated&lt;br&gt;✓ Provides guidance to both enforcers and enforced&lt;br&gt;✗ Lacks full legal status</td>
</tr>
<tr>
<td>By-law</td>
<td>To provide for local situations that cannot be controlled by existing national legislation and available non-statutory mechanisms</td>
<td>✓ Provides legal solutions to otherwise insoluble problems&lt;br&gt;✗ Can overemphasize a local problem&lt;br&gt;✗ Can be expensive to formulate</td>
</tr>
</tbody>
</table>
When environmental health inspectors are confronted with a situation that warrants action, they must be confident of their powers and have full authorization to use them. Enforcement policy must ultimately be determined by each individual service following guidance issued by the national government. Nevertheless, there is room for flexibility of approach. It may be decided, for example, initially to adopt a policy of education and encouragement so as to facilitate voluntary cooperation and compliance with legislation. The use of more formal means of enforcement must nevertheless be available. An enforcement policy and procedure can be formulated and published, outlining the various actions that will be taken when certain offences occur. This can provide a clear indication to both the inspectors and the inspected of the matters of greatest importance. Such a policy can be reviewed periodically with a view to improving standards.

The first stage of enforcement available to environmental health services is a formal warning. This identifies the offence observed by an inspector and specifies the action that would be taken if the same offence were noted again. The warning may or may not set out the means by which the offence could be remedied or avoided.

A similar type of action can be taken in the form of a legal notice, but in this case a fixed period is given within which the offence must be remedied. Again, advice on how to remedy the offence may or may not be given. Failure to comply with such a notice leads to the next stage in the enforcement procedure.

A second formal notice can be used to prohibit an activity. The activity and the offence should be specified, together with the necessary information required to remedy the problem. Approval to restart the activity would have to be obtained from the inspectorate. Once more, contravention of the requirements of the notice leads to the next level of enforcement.

The use of warnings and notices can have several advantages. First, they are constructive in that they attempt to correct the problems identified. Second, they remove the need for long and expensive legal procedures, which can often deter enforcement agencies from taking appropriate action. They can also allow problems to be dealt with quickly and effectively. Appeals procedures, if they are included in the legal notice,
can facilitate an open dialogue and may permit negotiation on provisions or time scales.

Failure to comply with formal notices must be followed by proceedings at the next level of enforcement. In most cases, this will mean action in a court or tribunal. Different types of court can be used to deal with environmental health issues. First, an internal court or board can be established within the service itself where, if they accept their guilt, offenders would receive the appropriate penalty. Appeals to a higher court would again have to be available if the offender disagreed with the penalty or pleaded not guilty.

Technical courts or tribunals can be established to deal with purely environmental health issues. Although not fully legal courts, such bodies can explore in greater depth the practical and technical details of an offence. They can be operated by lay people and technical experts, assisted by appropriately trained legal professionals. The use of such courts or tribunals not only saves expensive court time but can also provide a more detailed and valuable hearing of the issues at hand.

Traditional courts have their rightful position at the top of the judicial tree, where the highest and most binding legal decisions can be made. Environmental health matters that come before such courts can, however, be difficult to present effectively, since the courts also have to deal with other criminal offences presented by the police and other enforcement agencies.

Outside the field of criminal law, systems can be established whereby individuals can personally raise environmental issues and seek compensation for environmental damage or damage to health through environmental effects. Citizens’ rights in this respect can be written into the legal frameworks, as can statutory compensation schemes for those who suffer through environmental exposures.

Table 8 sets out the different options for legal instruments, together with their advantages and disadvantages. The various options are not mutually exclusive, and can easily be used in combination as a hierarchy of controls.

**Licences and predevelopment controls**
Legal controls and their enforcement are not used only as reactive mechanisms to correct an established problem. Such mechanisms can also take
Table 8. Options for legal remedies

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Purpose</th>
<th>Advantages (✓) and disadvantages (✗)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning</td>
<td>To provide notice that the contravention noted must be attended to before the next inspection (non-statutory)</td>
<td>✓ Provides little chance of confusion ✓ Provides clear indication of the work required ✗ Is non-statutory</td>
</tr>
<tr>
<td>Notice to improve</td>
<td>To provide notice of the time limit for a contravention to be corrected (statutory)</td>
<td>✓ Begins legal process ✓ Avoids court procedures initially ✓ Is constructive</td>
</tr>
<tr>
<td>Notice to stop</td>
<td>To provide notice that an activity must cease until the contravention is corrected (statutory)</td>
<td>✓ Prevents dangerous situations ✓ Begins legal process ✓ Avoids court procedures ✗ Is expensive to industry and if used wrongly</td>
</tr>
<tr>
<td>Internal tribunal</td>
<td>To provide an internal procedure for administering lines</td>
<td>✓ Avoids court procedures ✗ Is open to possible abuse</td>
</tr>
<tr>
<td>Technical tribunal</td>
<td>To adjudicate environmental health issues and penalize contraventions</td>
<td>✓ Provides a sound hearing of the technical principles ✓ Is quicker than court proceedings</td>
</tr>
<tr>
<td>Criminal court</td>
<td>To adjudicate environmental health issues and penalize contraventions</td>
<td>✓ Provides authoritative decision ✓ Can administer appropriate punishments ✗ Is expensive and slow</td>
</tr>
<tr>
<td>Civil court</td>
<td>To deal with compensation for injury or damage</td>
<td>✓ Provides appropriate means for compensation ✗ Is expensive and slow</td>
</tr>
</tbody>
</table>

the form of predevelopment controls and licences, which can be effective for both established and potential environmental health problems.

There are three main categories of this type of control: predevelopment control, registration and licensing. Predevelopment control requires any specified development activity to be notified to the environmental health services before the activity begins. Such activities can be specified by each service but could include, for example, permission to build business premises or housing, to manufacture a certain material or to transport
a dangerous substance. This allows the environmental health services to set out the necessary conditions, together with the penalty if those conditions are not met. It therefore avoids the possibility of dealing with problems once the activity is under way. This is a cost-effective measure, both for the environmental health services and for those who request permission, as it saves time and expense in correcting problems at a later stage.

Registration systems require specified industries or commerce, or parts of them, to register with the environmental health services. This registration, as with predevelopment permissions, may be subject to a fee set by the environmental health service. Registration can take effect retroactively, i.e. on existing facilities, thus allowing a complete overview of the situation in specific areas of interest. Registration permits an environmental health service to make initial contact with those facilities that it is interested in, and to draw up a register of all similar facilities. It could, for example, keep a register of all wet cooling towers within its administrative area. It would then be able to contact all the operators of such towers to advise them of the precautions they should take to avoid a build-up of Legionella bacteria. It would also know the exact location of all the towers in the event of an outbreak of legionellosis.

Licensing differs from registration in that conditions may be imposed that go beyond the normal legal requirements. Licences are normally reserved for activities covered by many different pieces of legislation, and it is convenient to condense the relevant legislative requirements into the terms of one licence. Licensing may also be used where local circumstances require a different approach than that provided for in law. Licences have the additional advantage that they can be withdrawn if the conditions are not met. It is often easier to cancel or withdraw a licence than to use traditional legal means to stop a dangerous or unsafe activity.

Table 9 sets out the various forms of control and their advantages and disadvantages. These options are not mutually exclusive, although it is unlikely that any activity would be subject to both registration and licensing.

**Economic sanctions and penalties**
The ultimate aim of law enforcement is to ensure that standards are achieved and maintained. The traditional method has been to punish
Table 9. Options for licences and predevelopment controls

<table>
<thead>
<tr>
<th>Control</th>
<th>Purpose</th>
<th>Advantages (✓) and disadvantages (✖)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predevelopment control</td>
<td>To set conditions prior to the operation of an activity</td>
<td>✓ Allows comprehensive conditions to be set at the outset&lt;br&gt; ✓ Avoids expensive remedial work later&lt;br&gt; ✓ Provides possibility of supplementing income&lt;br&gt; ✖ Difficulty of correcting mistakes once permission is given</td>
</tr>
<tr>
<td>Registration</td>
<td>To provide a register of certain classes of activity</td>
<td>✓ Provides initial contact for future control&lt;br&gt; ✓ Collates information on hazardous activities&lt;br&gt; ✓ Provides possible source of income</td>
</tr>
<tr>
<td>Licence</td>
<td>To control certain activities through one comprehensive mechanism</td>
<td>✓ Collates information on hazardous activities&lt;br&gt; ✓ Provides initial contact&lt;br&gt; ✓ Allows setting of conditions&lt;br&gt; ✓ Provides possibility of revoking licence and stopping activity&lt;br&gt; ✓ Provides possible source of income&lt;br&gt; ✖ Need to maintain heavy administrative work&lt;br&gt; ✖ Need to be kept up to date</td>
</tr>
</tbody>
</table>

those who fail to comply with legislation and the standards set. Alternative approaches are discussed in Chapter 2.

Any penalty imposed for a contravention of environmental health law must be such that it will act as a deterrent against the same offence recurring. Normally this deterrent is in the form of a fiscal tax or fine. Many such systems of environmental health make use of the “polluter (or offender) pays” principle, whereby the amount to be paid must cover the cost not only of cleaning up or repairing the damage caused but also of preventing a recurrence of the problem. This latter element is vital in such fiscal strategies; without investment in the cause of the problem, resources will always be used only for cleaning and repair.

Taxation on the negative aspects of industry and commerce can most definitely have a positive effect on the environment. For example, increased taxation on wastage of energy and raw materials, together with a reduced tax on profits, would certainly improve most business practices. The tax base could still be maintained by appropriate taxation on resource wastage.
Taxes can be used on a sliding scale to penalize most heavily the greatest polluters and wasters of resources. Environmental funds can be established to make direct use of the monies collected for environmental clean-up and monitoring activities. It is important, however, that environmental taxes do not become the main source of income, as improvements in the environment will lead to reduced income and remove the incentive for the environmental health services to act.

In general, fines are used purely as a means of punishing an offender; rarely is the money collected directed towards remedial or prevention work. This has the effect of increasing, perhaps doubling, the amount that the offender has to pay. Fines can also be set on sliding scales, depending on the severity of the offence or the amount of pollution that has been discharged.

Fines take many different forms. One is the fixed penalty, by which certain offences attract the same set fine irrespective of the individual circumstances. Such fines may be imposed on the spot without resorting to courts or tribunals, but a procedure must be built into such a system to prevent abuse. Fines must provide a suitable deterrent to a recurrence of the same problem. It may be necessary to introduce daily fines for continuing offences, or fines on an increasing sliding scale for subsequent offences.

The most common form of fine is administered through a court or tribunal and there is normally a statutory limit to the amount of the fine. Environmental health services can have little influence on the level of such fines. Ideally, punishments should match the severity of the offence and not necessarily the damage caused by the offence. Although in the field of environmental health the two will sometimes be inextricably linked, their separation would mean that suitable action could be taken before damage occurred rather than afterwards. Questions of compensation for damage to the environment or health should be kept separate from the statutory legal processes.

Financial penalties for environmental health offences can be substantial, and must be so if they are to prove an effective deterrent to very large commercial companies. Custodial sentences may be considered for offences where blatant disregard for environmental and human safety have occurred.
Penalties need not always be financial or custodial. In suitable circumstances, for example, a company director might be relieved of his or her position. This would most certainly act as a strong disincentive to breaking environmental protection laws. Similarly, certain tradespeople could have their licence to trade or right to register taken away, either for a certain period or indefinitely.

Table 10 sets out some of the economic sanctions and penalties available on environmental health issues. They are not mutually exclusive and can be operated successfully in parallel with each other.

<table>
<thead>
<tr>
<th>Sanction or penalty</th>
<th>Purpose</th>
<th>Advantages (✓) and disadvantages (✖)</th>
</tr>
</thead>
</table>
| Taxes                        | To penalize and recover costs for damage to environmental health conditions | ✓ If set correctly can provide a strong disincentive  
   |                             | ✓ Provide resources for environmental clean-up and prevention  
   |                             | ✖ May not be flexible  
   |                             | ✖ If set badly can act as a weak disincentive  
   |                             | ✖ Are expensive to administer                                          |
| Fines                        | To penalize offences against environmental health                      | ✓ Are straightforward to administer  
   |                             | ✓ Can act as a strong deterrent  
   |                             | ✓ Can be related to ability to pay                                     
   |                             | ✖ Can be inflexible  
   |                             | ✖ Can be slow to administer                                             |
| Compensation                 | To repay individuals for damage to the environment or to health         | ✓ Can cost the offender large amounts of money, and therefore act as a good deterrent  
   |                             | ✖ Can be very slow to administer                                         |
| Professional penalties       | To remove the ability of individuals to continue to operate certain business activities | ✓ Provides a strong disincentive at very little cost  
   |                             | ✓ Can be linked to licensing                                             
   |                             | ✖ Can be viewed as oppressive                                          |

**PROMOTIONAL ROLE**

*Improvements in environmental health will not be achieved by the efforts of the environmental health services alone. In their work, the environmental health services require the*
backing of the general public, as well as of other partners in health and environmental care and protection. The services must, however, also be ready to return this support to their partners. Environmental health is currently not well understood, even by many who work in the field. Promotional strategies need to be formulated to inform and educate the public, not only about the meaning of environmental health, but also how they can contribute towards local, national and global goals. In this way, the work of the environmental health services may be understood and communities will be encouraged to work with the services to improve the environment in which they live.

Local environmental health services are well placed to promote environmental health. They should therefore develop strategies that will improve or maintain awareness about the environment and related health issues. Publicity is sometimes free, but organizations often have no control over what is said and when or where events are publicized. To minimize the potential risk, therefore, publicity and promotion should form part of a planned community relations programme. The services need to be clear in their objectives and what they intend to accomplish with such strategies. They need to decide the best medium for their messages, and they need to identify clearly the main target audience for a particular campaign or event.

Promotion of environmental health issues can be split into a number of different elements, which can be used on their own or together to develop an overall strategy. These components can be classified as education, awareness, participation and partnership. Education is training in the fundamental elements of a topic; it is not a process to be entered into lightly, and requires a full understanding of principles and concepts. Awareness is an informed and conscious state of mind that does not necessarily require a complete understanding of all the issues, but it does require an understanding of the basic assumptions. A sense of participation and partnership between environmental health services and communities will lead to an open understanding of principles and mutual goals, which can be pursued in an integrated manner. All these elements can form part of an environmental health promotion strategy.

Public education
Education requires a fundamental understanding of basic concepts, and to be truly effective should begin at an early age. Environmental health
education should therefore form part of the school curriculum. Basic materials can be produced for environmental health education, from primary school right through to secondary education. Various aspects of environmental health could be developed, such as ecology, pollution studies and epidemiology. The adoption of such principles at an early age enables them to be translated into practice. Actions conducive to the efficient use and conservation of resources are more likely to be initiated by those who are educated in the principles of such actions. Furthermore, children can easily act as the conscience and educators of older generations.

Education in environmental health need not be limited to schools. Higher educational establishments such as universities and colleges, as well as offering degrees in environmental health, could introduce elements of the subject into other curricula. For example, engineering and science students who will go on to work in industry could be taught a basic understanding of environmental health principles so that they can take them into account in their working practices. Law students could also have a grounding in environmental health to help them understand the principles behind the various statutes.

Education need not be restricted to the young. Courses could also be offered as postgraduate studies or evening classes for adults who wish to become more familiar or actively involved with environmental health issues. Environmental health services must encourage all moves for such forms of educational policy, and can assist in the process by working with local schools and universities in developing the various curricula and syllabuses. They can develop their own public education materials and courses, and also take part themselves by lecturing at schools and universities.

**Awareness**

Awareness strategies require a different approach. They are not as intensive as educational programmes and they often relate to single issues. Media campaigns can be a very effective tool in such work, raising the consciousness of the population on a certain issue and providing feedback on the results of the initiative. Environmental health services can be active players in raising awareness. Awareness programmes and strategies can include public talks and meetings, the distribution of leaflets, community seminars and skills training programmes. Environmental health services can also set up a public information office offering
current information, access to professional periodicals and possibly library facilities.

Other means of improving awareness include the sponsoring of an environmental health week, with various events and information to focus people’s attention on environmental issues. Close working relationships with the local media are essential to this process. A weekly newspaper column on environmental health could be produced in conjunction with the local media, and attempts should be made to establish regular environmental health programmes on radio and television. An open and trusting relationship with the local media may not be easy to establish, but is essential if misinformation is to be avoided.

**Participation and partnership**

If a community is well informed and educated in the various environmental health issues, its interest in the work of the environmental health services will also be heightened. Any public willingness to participate in their activities should therefore be encouraged. An informed community is one that can understand global and local environmental issues and can contribute rationally to debate and to the decision-making process. The community will be more willing to act responsibly if it knows the benefits of sound environmental practices; it will also be more willing to report environmental problems and to assist in identifying areas that require attention.

Environmental health services have a major role to play in lobbying for change. They can seek to influence government, industry, the media, community groups and individuals to improve the local environment. They can ensure that local environmental health issues are placed on the agendas of political, community and industrial groups, and that they can influence any decisions made about the environment. Through partnership, environmental health services can encourage a coordinated response to environmental health problems.

There are several ways in which environmental health services can create a partnership approach. These include:

- facilitating community forums to present their views on new developments (this can unite the services and the local community on common environmental health issues);
• establishing an environmental health panel, with representatives from industry, commerce, the community and government, to discuss environmental health problems and solutions; and
• developing cooperative working agreements with other government authorities involved in environmental health provision or protection.

RESEARCH

*Environmental health services have a key role to play in research. Their daily work brings them into situations that offer a great deal of information useful for research. Although such information, once collated, may be valuable in subsequent decision-making, it is not the product of true research in the academic sense. Academic research is distinguished from simple information gathering by systematic inquiry and analysis as a means of advancing knowledge. Another feature is the intention to publish the results. Thus research goes well beyond describing the findings of a data gathering process and seeks explanations, comparisons, correlations and theories.*

Types of research

Basic research is often carried out by environmental health services to establish baselines against which future data can be compared. Such information can be used to draw up noise maps, or to establish air pollution levels or radiation profiles. This work normally relies on continuous monitoring of ambient conditions.

A second type of research takes the form of feasibility studies or trials. Examples occur where policies or interventions have been introduced on a trial basis and research is required to evaluate their effectiveness. This type of research could be used by environmental health services where there are several options for solving a particular problem or where the most cost-effective solution is sought.

Finally, applied research is concerned with wider issues, as opposed to specific problems of project feasibility or establishing baselines. This research explores in greater depth, and opens up for debate and discussion, issues that could well affect the entire profession.
Conducting research

Very often, environmental health services do not employ personnel specifically trained to carry out research. Environmental health professionals receive little in the way of training in research techniques. When designing a project, a literature search should first be carried out to establish the current level of knowledge. This will avoid possible repetition of work, and might even obviate the perceived need for research in the first place. Following that initial stage, environmental health services would be well advised to turn to a local university or other centre of learning for help with working methods and other practicalities. Very often research can be carried out in partnership between the environmental health services and an appropriate academic institution.

With a multidisciplinary profession such as environmental health, it would be easy to rely on other specialists to carry out research in the various sectors. Although such research is valuable in contributing to overall knowledge, however, sectoral research projects can often overlook the holistic approach that is one of the strengths of the environmental health discipline.

Research in environmental health is required to ensure that current techniques are applied to the most pressing and urgent problems, and to maintain a professional status and credibility. Mechanisms must therefore be built into the structures and functional frameworks of environmental health services to allow such research to be identified and subsequently carried out. Good coordination between research efforts is also necessary to ensure that a programme is well thought out and that there is little chance of duplication of effort. In addition, individual environmental health services should be able to carry out their own independent research and to publish the results. This type of activity can serve to maintain interest in their activities, and can lead to the development of services with specialist knowledge in certain fields.

Evaluation

*Once a policy has been implemented, it is necessary to evaluate that policy and the mechanisms used in its introduction. Measurements of the effectiveness of public policy must be available to the community, and independent*
assessments will be required periodically. Nevertheless, any evaluation of the activities of environmental health services must also be subject to internal review, to ensure that the aims and objectives are being met and that the strategies adopted are making the required impact (24).

**Measuring effectiveness and performance**

It is impossible to single out one measure of the effectiveness of environmental health services. Indeed, it would be very difficult to find a suitable indicator for the various sectoral elements of environmental health. So many factors contribute to environmental health that it is extremely difficult to determine the impact of the work of services on improving the environments in which we live.

It can be said that, in some areas of their work, environmental health services do not have a measurable effect but that they perform a holding function. That is, although they do not necessarily improve a certain situation, without them the situation would be much worse. The area of foodborne disease control provides an example: although the number of cases may not fall, despite considerable efforts by the environmental health services, it can be assumed that, without the work of the services, the number of cases would rise significantly. Although such performance is extremely difficult to assess, it should not be overlooked.

Despite these and other difficulties, some assessment of environmental health services can be made. Although some indicators can provide an insight into the effectiveness of the policies adopted, others can be used simply to monitor the performance of service delivery, rather than its effectiveness. Indicators such as the numbers of inspections carried out, of notices served and of complaints received could be used to indicate effectiveness, but they are more realistic as measurements of service delivery and efficiency (25).

Performance should be measured at four levels: needs, inputs, intermediate outputs and final outputs. Intermediate output measures, such as the time taken to react to complaints or the numbers of notices served or legal actions brought, provide useful information. There is still a need, however, for some measure of the final result of service activities. Services should guard against equating measures of activity with measures of output. Performance targets should, as far as possible,
focus on final outputs such as levels of health, rather than intermediate outputs. Fig. 10 demonstrates the cycle of performance measurement (25).

**Fig. 10. Measuring performance in environmental health services**

![Diagram](image)

Needs = No. of pollution sources, etc.
Inputs = No. of staff, inspections, etc.
Intermediate outputs = No. of notices served, etc.
Final outputs = No. of pollution outbreaks, etc.

The operation of environmental health services can suffer from several problems that can make evaluation of performance even more difficult. Lack of consistency in approach by inspectors and other staff can lead to discrepancies in the way in which services are delivered and corrective action is taken. Levels of risk can be considered differently by different inspectors, leading to different types of action being taken. This can be a common complaint of industry and commerce, who have difficulty in assessing where they stand in relation to environmental health control. Such inconsistency is often justified as individual professional judgement, which can use different approaches and
techniques to achieve the same goal. While professional judgement is a vital element in the operation of environmental health services, a degree of consistency is required in order to present a corporate image.

Inconsistency can also occur in recording and reporting mechanisms. Consistent and comprehensive recording is necessary for the efficient operation of environmental health services. It is not only required for internal evaluation, but is also useful in assessing the relative performance of different services.

These problems can all be avoided by effective operational management. Unfortunately, however, modern environmental health services often lack management skills. Traditionally, directors of services are appointed following years of service in the field. They therefore have little or no training or experience in the management and administration of a service organization. Emphasis thus tends to be placed on what environmental health services do rather than what they achieve.

Several steps can be taken to improve the ability of environmental health services to assess their own effectiveness. These include:

- the introduction of specific information systems to facilitate such operational activities as registers of premises and risk assessment categories;
- the creation of explicit procedures and protocols to sustain consistency;
- the monitoring of service effectiveness through management information systems and relevant output measures; and
- the assurance of work quality through systematic evaluation, including performance reviews of staff or services or both.

Table 11 sets out the various causes and solutions in relation to poor measurement of service effectiveness. The solutions can be used singly or in combination to produce the required effect.

**TRAINING**

*Environmental health is not a static subject; technology, legislation, social perspectives and policy direction are*
constantly being reviewed and updated. It is essential that environmental health service professionals be adequately trained for technical as well as management tasks. Training in this context is not the provision of fundamental knowledge, but rather of the information and skills required for updating knowledge (26).

Table 11. Causes of and solutions to inadequate measurement of service effectiveness

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate measurement of service effectiveness</td>
<td>Matching structure and staffing to need</td>
</tr>
<tr>
<td></td>
<td>Establishing registers, risk assessment, etc.</td>
</tr>
<tr>
<td></td>
<td>Codifying departmental wisdom</td>
</tr>
<tr>
<td></td>
<td>Setting up a staff time recording system</td>
</tr>
<tr>
<td></td>
<td>Seeking national standards on effectiveness</td>
</tr>
<tr>
<td></td>
<td>Applying principles of quality assurance</td>
</tr>
</tbody>
</table>

There are several ways to introduce training into environmental health services. Continuing professional development (CPD) schemes can be set up that require staff to attend a set number of training events in a set period. Such schemes could be administered by the service itself or by a professional organization. Compliance with CPD can be made a requirement of continued employment or increased pay, so as to provide an incentive to staff to participate.

Services themselves can operate suitable training events and provide materials to facilitate a CPD scheme. Various specialists could be invited to lecture, or staff themselves could undertake research and report
back to members at training sessions. Attendance at external seminars and courses should not be seen as the privilege of management; training budgets should be sufficient to give every member of staff the opportunity to attend such events. In addition, reviews of training needs could be carried out regularly to match training to the staff most in need of it.

Training activities by environmental health services need not be limited to the staff. Training can also be provided for members of the public, community groups, business and commerce and other professional groups. In this way an understanding of environmental health can be developed in all sectors of society.
Most countries in the European Region have adopted policies to deal with the different issues of environmental health. These policies are normally implemented through a range of mainly government agencies, both national and local. The staffing of these agencies, however, varies widely both within and between countries depending on the historical development of the environmental health services and the role they are expected to play.

Any public service has to operate within a financial framework. Environmental health services cannot function effectively without adequate financial resources and a fiscal mechanism that allows them to fulfil their various responsibilities. This chapter studies the place of environmental health services within macroeconomic policies, the taxation and penalty systems that they have utilized, and the mixture of national and local budgetary processes that finance them.

This chapter also looks at the legislative frameworks necessary for the operation of environmental health services. The use of legislation to deal with specific, sectoral environmental health issues has been dealt with earlier. The legal status of environmental health services and their position within government are discussed here. Harmonization with EU legislation is also considered.

Environmental health services ultimately rely on their personnel. We must consider who will provide and operate these services, and identify
which skills these people will require. Initial education of personnel, the management and decision-making capacities of the services, continuing professional development, international acceptance of qualifications, and profession building are dealt with in this chapter.

The final framework within which environmental health services require sufficient capacity is information. This chapter concentrates on the mechanisms of communication among the various partners in environmental health and the availability of research databases.

**FINANCIAL FRAMEWORK**

“Prevention is cheaper than cure” is a phrase often used in justifying the investment required to secure improvements in environmental health. It is an axiom that must be at the heart of investment policies for the development of environmental health services.

**Macroeconomics**

In the eastern countries of the European Region, contrary to expectations, public ownership and centrally planned economies have neither controlled pollution nor brought the anticipated benefits to the population. Although the value of many environmental assets is difficult to measure in monetary terms, validation, pricing and accounting mechanisms have a pivotal role to play in the achievement of sustainable development. It has now been recognized that, where market forces are relevant, prices should reflect the full cost to society of production and consumption, including environmental costs.

In this respect, it is important to understand how the health sector and in particular the environmental health services function as a part of the economy. This requires a macroeconomic approach to help in establishing relevant development policies and new financing schemes, and in reforming the health system. The advantages of such a system are threefold:

- it demonstrates to policy-makers the links between the economy and health;
- it helps them to anticipate problems of access to the health services by disadvantaged groups of the population; and
- it offers a comprehensive view of the resources available for health.
The market economy cannot be left entirely to run itself. It must be complemented by government intervention to prevent and control abuse, and to provide an environment whereby the benefits of the market process can be more equitably shared. These benefits include the objectives for environmental health. Decisions made in this area determine how far market freedom can go before intervention is necessary. They have a significant impact on environmental health policy, and thus determine the role of environmental health services. It is clear, therefore, that the environment and health sectors must be able to influence these decisions, and that they must take a leading role in:

- highlighting the priority that health should take at the macroeconomic level;
- fostering an understanding of the relationship between macroeconomic, social and sectoral policies on health and the environment; and
- expressing their views to other government agencies so that the appropriate intersectoral action is taken.

Environmental health services should therefore recognize and be recognized as being part of a wider macroeconomic policy. This should result in the services being able to offer a strategic overview, and may influence the development and implementation of policy at local level.

The potential impact of a proposed environmental health services intervention can be subjected to scrutiny at the macroeconomic level. Cost–benefit analysis should be used both to assist decision-making and to incorporate environmental health considerations into the formulation and implementation of specific projects or investment programmes.

**Funding for effectiveness**

One of the most basic issues related to the capacity of environmental health services is funding. The effectiveness of the services, and their ability to react to different situations, will be largely determined by the level of resources available. Having said that, the financial resources available to the services will not necessarily produce a directly proportional effect.

Initially, financing will be needed to establish the basic infrastructure and staffing levels. This is by necessity a capital-intensive phase of
environmental health services development. Once the services are in operation, financial resources can be used to address the various issues for which the services are responsible. The effect of allocating funds to environmental health problems will be different from one case to another. Environmental health problems can have such a wide range of causes that the strategies adopted to deal with them can call on many different techniques; some of these may be capital-intensive, others may not.

Several environmental problems are due to people’s interaction with, and abuse of, their surroundings. In such cases, it is not always best to invest heavily in an effort to find a solution. Very often the best intervention in such circumstances will also be the cheapest. The costing of proposed interventions should therefore be one of the main considerations in developing environmental health strategies.

As a general rule, the major capital expenditure each year will be staffing costs. It is through the activities of the staff of the environmental health services that the main interventions and monitoring work are carried out. Depending on the actions proposed, therefore, an increase in staffing can lead to an increase in the capacity and effectiveness of the service.

In some circumstances, strategies can be adopted whereby capital investment is proposed for improving or correcting an environmental health situation. This may require direct action by an environmental health service, or may require it to administer and/or control the use of a capital fund. In such cases, there will be an almost direct correlation between the funds available and the level of improvement achieved.

In many situations, there will come a time when the resources devoted to a certain issue outweigh the benefits to be gained. It is at this stage that the value to the community of continuing action at that level should be questioned, and other priorities should be considered. It should be borne in mind, however, that substantial funding may be needed simply to maintain an acceptable level, and this should be taken account of in any future funding requirements or allocations.

**Funding the services**

Policies and strategies designed to address environmental health conditions should always be supported by the necessary resources or a formal
mechanism by which they can be raised. This principle should be applied to strategies developed at both local and national levels. Resources for a proposed strategy should always be identified at the appropriate policy level. National policies should not rely on local financing without identifying alternative resources and vice versa.

There are a number of ways in which environmental health services can be funded. Local services in several European Member States rely on a combination of sources of funds, depending largely on the amount of autonomy that they enjoy from the national administration. The primary policies for environmental health are a matter for the government, but they are often implemented through local services. It therefore follows that, if the national authorities are responsible for environmental health policy, they must also take responsibility for financing the local services.

At local level, the needs and aspirations of an environmental health service will largely determine the policies and strategies that it adopts. These may vary from locality to locality, and budget allocations should therefore correspond to these different needs. Resources are finite and should therefore, in theory, be targeted to the areas of greatest need. The net health gain of investing a certain amount in an area of poor environmental health quality will clearly be considerably more than if the same amount were invested in an area where environmental health quality was high.

Local environmental health services will nearly always rely on some form of central funding. This normally involves the services determining their proposed programme of work and submitting it together with a draft budget. This programme will reflect the size and demography of the local population, the number of significant environmental issues identified and the currently available resources.

Following the development of a programme and costings, these can be submitted to central government for approval. In developing such a system, it must be decided whether the ministry of finance or the ministry directly responsible for environmental health should approve proposals. The latter ministry will normally be better placed to determine the value of a proposed programme and, if it does not determine allocations itself, should be heavily consulted throughout the process. Once a
decision is made, there are several mechanisms by which funding can be provided.

The total sum allocated may come directly from central government, made up of monies collected through national taxation.

Funds may be accumulated through local taxation, but held at national level. The services are then allocated a percentage of the money collected from their area. In this way the services receive a sum proportional to the population they serve.

A proportion of the necessary funding may be paid by central government, the shortfall being made up from local taxation.

Environmental health services may, once their budgets have been approved, be entirely responsible for funding their activities.

There are several ways by which environmental health services can raise money at the local level. Appropriate and independent funding mechanisms will greatly increase their capacity to address priorities. To facilitate the creation of such capacities, mechanisms backed by legislation should be introduced or developed. Legislation on the financing of local environmental health services can allow the creation of local taxation policies and charges. Legislation can also set controls and limits on such activities to prevent exploitation and corruption.

There are literally hundreds of items on which tax can be levied at local level. Property, land and income taxes are the most commonly used to generate income for local services generally. Different formulae can be developed to determine the amount that should be paid. In addition to raising revenue, taxation can be used as a disincentive. By changing the tax base and setting the rate appropriately, “negative taxation” can be introduced. For example, taxing a business on the amount of energy wasted or raw materials used, as opposed to how much profit it makes, would undoubtedly change its views of the benefit of environmental health. Such systems require extremely close supervision, and tax rates have to be kept under regular review to ensure that the income provided by such a system remains sufficient to support the services. Such taxation policies can also be applied to individuals, for example, by taxing petrol. The introduction of local taxation programmes must be carefully
considered so as not to prejudice economic development and employment in the area. If taxation varies widely across a country, areas with high taxation are likely to discourage further economic development.

Environmental health services are familiar with financial penalties as a deterrent to the breaking of laws or norms. In some countries, a percentage of pollution taxes and penalties for contraventions go to supplement the income of the services themselves. Although this may provide an income proportional to the current problems in the area, it may not always encourage services to seek solutions to problems. Such systems require to be closely managed.

Additional income can be obtained by local environmental health services by charging for authorizations, licences and registrations. Such charges could be set by national law to cover the administration and monitoring that must be carried out in relation to the activity in question. Charges for various extracurricular activities such as technical advice and inspection services could also supplement income at the local level. Under such circumstances, systems to monitor the quality of the services provided would have to be set up, and such activities should only be carried out once all the statutory work has been adequately covered.

**LEGISLATIVE FRAMEWORK**

*One of the primary functions of environmental health services is the administration and enforcement of laws. In some countries in the European Region, services are operating without a solid legal base. This undoubtedly compromises their position and jeopardizes their future capacities in this area of work.*

A strong legislative framework and legal status are required if environmental health services are to perform their work effectively. They should be established by statute and their role and functions should be clearly defined. Funding arrangements and mechanisms can also be included in the legislative provisions.

Such a foundation allows environmental health services to develop their capacities, confident in the knowledge that they are well supported by national legislation and that they have a clear remit and mission. The
legislative base can also give the services powers to carry out their functions. This may include the development of local by-laws to deal with issues peculiar to a certain area.

Once the services are legally established, it is important that suitable sectoral legislation is drawn up for them to administer and enforce. Services should have legal backing and an understanding of what their aims and objectives are, the means by which they can achieve them, and the penalties available to them when the legislation is breached. Services may try to improve environmental health conditions purely through political will and persuasion. Although this approach may enjoy some success, there can be no substitute for legal requirements that set out the conditions acceptable to the nation or locality.

Some eastern countries of the Region strongly desire to operate to the same standards and legislation as the members of the EU. EU directives may be useful for these countries as targets that can be worked towards, but EU legislation may not be appropriate to some of their problems and should therefore be considered closely before being adopted. A stepwise approach may be a more effective means of achieving integration with the principles of EU legislation than its direct imposition.

The capacity of an environmental health service to improve the environmental conditions under which people live will, in many situations, depend largely on the authority it has. A solid legal framework, that both recognizes its status and allows it to take appropriate action, will therefore significantly improve its ability to work towards this goal.

**Professional Framework**

*By far the most valuable resource of any environmental health service is its staff. Action to improve environmental health can only be carried out through their efforts. The quantity and quality of trained professionals will therefore have a direct impact on the ability of the service to take effective action.*

There are a great many different professionals employed by environmental health services throughout the European Region. These include
public health doctors, sanitary engineers, environmental health officers, environmental engineers and scientists, food hygienists, toxicologists, epidemiologists, veterinarians, laboratory personnel and many more. Despite their wide diversity and range of expertise, they all work towards the common goal of improving environmental health conditions. Environmental health is, as it has been illustrated throughout this book, a multidisciplinary subject consisting of a complex mix of biology, engineering, science and social interaction. It is therefore only correct that those who work in environmental health services reflect this diversity. Without such a professional profile, the full nature of environmental health problems could not be adequately studied and dealt with (27).

Fig. 11 illustrates how, as different types of disease become the focus of attention, different types of solution have to be sought. The different solutions will in turn rely on different skills. This can be demonstrated

![Fig. 11. Progression of solutions to environmental health diseases](image)
by comparing the professional profiles and skills employed by countries in the European Region against their declared main priorities in environmental health.

In reality, however, staffing in environmental health services does not follow the progressive flow illustrated in Fig. 11. Whereas this pattern allows for an evolutionary process to occur horizontally, several countries have developed separate vertical responses to the changing problems they face. This can result in large sections of a workforce becoming obsolete. It can also result in professional bastions, jealously defended against invasion by other areas of professional competence. This can lead to a misuse of resources and a loss of strategic vision and purpose, both of which are important for sustaining a holistic approach to environmental health.

This phenomenon can be seen in many eastern countries of the European Region where, despite the changes in disease profiles and the rise of lifestyle and environmental problems, health services are still largely dominated by medically trained professionals. Their response to increasing concerns in environmental issues has been to establish separate environmental agencies and ministries, with a distinct and unique identity, that do not readily integrate with the established health care services. This results in a large, technically well trained workforce addressing increasingly unimportant issues, while the fledgling environmental services struggle to cope with the sometimes overwhelming problems they have inherited.

This response is entirely understandable given the suddenness and speed of the political reforms that occurred in the late 1980s. In a sense, the eastern countries of the Region have not experienced a progression of disease curves as illustrated in Fig. 11, but have had to deal with all of the various issues at once. In effect, the curves sit on top of each other, all vying for attention.

As a result, the professional profiles of environmental health services in many parts of the European Region are entrenched in sector-specific responsibilities and a high level of specialization (27). The systems of control that have been adopted and the development of the public sector in these areas has perpetuated rigid institutional frameworks and professional capacities.
The establishment and development of environmental health services in the European Region is carried out within a complex framework of policies, existing institutions and professional profiles. Some of the resulting services are better equipped to respond and adapt to change than others. Without question, there is room for improvement in environmental health services in every country in the Region; none can be complacent.

The basis of this publication is a series of six simple yet fundamental elements that are crucial to the delivery of environmental health services. They relate to a series of questions, as illustrated in Fig. 12.

**Fig. 12. Elements fundamental to environmental health services**

Action to improve the delivery of environmental health services could be taken in all of these areas, but which of them is likely to have the greatest impact? In the past, much emphasis was placed on developing policies in the different sectoral and technical areas, while managerial and administrative capacities did not feature in the development of environmental health services.
Fig. 12 illustrates a closed circle in which only the evaluation process can alter the other elements. This, of course, does not represent reality, in which numerous influences can lead to developments and changes in policy. Environmental health services and institutions rely heavily on environmental health education mechanisms and vice versa. The two areas are interdependent and inextricably linked. The needs of the service institutions can mould the profiles of professionals, and the professionals can mould the shapes and functions of the institutions.

The immediate reaction to environmental problems in many countries has been to establish a new professional base and institutional framework. Educational systems are now being put in place to produce professionals that will serve the needs of that system (26). An alternative perspective might have been to reorient the existing public health staff to deal with environmental matters and thereby obtain a more integrated approach.

One of the problems that countries now face, therefore, is how to retrain the large numbers of existing public health professionals to assist with environmental health issues. Such action would not only integrate the efforts of the two sectors but would also result in the use of knowledge and skills that are trapped in outmoded institutions (26).

Environmental health has not been fully recognized as an identifiable subject in many European countries. This view has been sustained largely through the institutional frameworks that have been created and the strong professional boundaries that are so rigorously defended. By promoting environmental health as a discrete area of professional interest, it is not intended to claim established and acknowledged skills and expertise. It is a concept under which various professions can unite and work towards a common goal: protecting the living environment to promote human health. By building a professional understanding around such a goal, a wider, holistic approach can be obtained by a whole range of specialists (27).

One element in this process does, however, require the introduction of new and important skills. In the eastern countries of the European Region, decision-making and managerial capacities in the various environmental health services have not always been well developed. This is true in terms of both professional management and staff management.
Fundamental to the concept of environmental health is the ability to view issues in a wider sense, and to establish a strategic vision that allows for the management and coordination of the various professional disciplines.

Countries can consider several options in establishing a capacity-building programme for environmental health professionals. Because professionals of different disciplines may not normally meet, owing to the government structure, a professional association or club can be formed to discuss and develop an NGO on environmental health issues. Such institutions can provide a unique combination of professional views, and a powerful and useful voice in decision-making processes.

For existing staff, mechanisms will be required to reorient and update their already sound technical knowledge. Short training courses in environmental health principles and management could be produced for and offered to senior professionals and decision-makers from the existing environmental health services.

To support this training, additional options could be explored. In some countries in the European Region, environmental health education and training are well established. By identifying centres of excellence in this field and establishing dialogue and twinning relationships with such bodies, exchange programmes can be organized to assist in education and training. The TEMPUS programme of the EU specifically promotes links between universities in the east and west of Europe, and such a programme could be looked on to facilitate exchanges in the field of environmental health.

Such efforts as outlined above may assist in a period of transition, but longer-term investment will be required if sustainable changes are to be made to the capacities of environmental health professionals. The systems in which professionals are to work will, of course, influence their education. Nevertheless, there is a need to make the education of new professionals more adaptable to change. Environmental health is after all a moving target, and, without a flexible education, staff may be unable to deal with future issues that may arise. In many cases, this will require a change in educational curricula. Existing courses dealing with specialist areas of work could, for example, incorporate environmental health modules to provide an overview of the subject and to develop the
managerial and decision-making capacities of the students. Environmental health management could also be established as a discrete discipline, thereby developing a new profession with the ability to coordinate and plan the strategies of environmental health services.

Finally, in terms of the professional framework, it is essential that any graduate or postgraduate education is supplemented by a system of continuing professional development. Environmental health professionals will need constantly to review their knowledge base, to enable them to function effectively in the constantly changing world of environmental health. Attendance at training courses could be made compulsory by the environmental health services themselves, or by any professional association that is formed, as a prerequisite of membership.

**INFORMATION FRAMEWORK**

*Information and communication are of vital importance to effective environmental health services. The availability of up-to-date information and the free exchange of ideas and problems among professionals undoubtedly increase the capacity of these services.*

Several options can be explored for increasing the availability and exchange of information. Internationally, efforts can be made to forge links between identified partners in different countries and with the appropriate international organizations. Information exchange in this area can introduce new ideas on how to tackle environmental health problems.

At national level, networks can be established between different services and other related professionals. Electronic information systems can now be used to exchange ideas and problems, and to provide solutions that can be shared with the entire range of services. Such information may prevent considerable overlap in the work carried out by the services.

At local level, information can be shared between all the related services and professionals through local or regional meetings of any professional association that is established. It can also be shared though interagency collaboration.
Environmental health is such a diverse subject that it would be impossible for anyone to have the answers to all the problems that may arise. The establishment of a resource centre for environmental health could therefore provide a useful point of contact for professionals. As well as acting as an information resource, such an institution could readily act as a research centre or as a means of identifying research needs.
Evaluation of Environmental Health Services

Environmental health services, to be truly effective, need to be properly managed. A range of different methods and tools can be used to carry out the management process. In the cycle of policy implementation, a full period of review and reflection is required. The previous chapters explored the various aspects of environmental health services and the policy options available to them. This chapter discusses the evaluation of the value and impact of their work to determine the result of their efforts.

Assessment of the effectiveness of environmental health services is an inexact science. It has been demonstrated throughout this volume that the subject areas that make up the discipline of environmental health are so diverse and can combine with such synergy that it can be extremely difficult to quantify the net effects. Very often it seems obvious or apparent that action in one area will result in positive effects on the health of a population. Such assumptions, however, are rarely backed up by correlative studies and, perhaps for this reason, very few countries in the Region have developed well thought-out systems for evaluating their environmental health systems.

A thorough examination of the capabilities and effectiveness of environmental health services is required for a number of reasons. First, it can be used to assess whether the policies adopted were effective in achieving their objectives. The results of an evaluation may reveal
fundamental flaws in current policies and can thus be used in future policy-making.

A period of review may also give information on how the services themselves operate. An adopted policy may in itself be satisfactory to deal with a certain issue, but because of problems in its implementation it may have failed to achieve its objectives. In such circumstances, an evaluation will highlight the logistical problems of the adopted strategies; it may, for example, indicate that staffing levels need to be increased or that additional training is needed.

Environmental health services are at the forefront of change. They can therefore be used as barometers for measuring the change in public needs and wants. Environmental health cannot be restricted by the policies established for it by various government authorities and services. The environments in which we live are constantly changing, with the result that new problems and needs will be identified. The evaluation of environmental health services will therefore enable these changes to be recognized and the services adapted to address newly identified problems. Only by carrying out a proper review of the work of environmental health services can a full assessment of future needs be achieved.

**Review of Activities**

_Evaluation is an essential part of any system of management. Without the means to determine the outcome of an activity, it will remain impossible for services to progress and become adaptable to the needs of the communities that they are intended to serve._

An essential feature of service management is a period of performance review. The systematic review of work performance provides an opportunity to highlight positive effects of applying acquired knowledge, skills, qualifications and experience. An effective system of review will help identify individual strengths and weaknesses. Such a system needs to involve all levels of management, and provides a framework for:

- setting objectives and standards of performance
- measuring results
pinpointing strengths and weaknesses
identifying and meeting training needs.

The first step in any review process is to measure the actual activities carried out. This is the simple quantitative sum of their activity. There are, nevertheless, a number of different methods for the review of activities that are carried out by environmental health services.

Many environmental health services produce annual reports on their activities. These can be for the purposes of public information, internal assessment or national evaluation and comparison, and usually cover the activities undertaken in each area for which they are responsible.

It is essential that these statistics are recorded. They are one of the few clearly measurable parameters in environmental health work, and can be further used to show the active staff time and the material and financial resources of a services department. In effect, their measurement permits an indication of the contribution of the services to addressing environmental health problems.

The second step relates to the use of staff time and resources. For example, the number of visits by a member of staff to food premises can be accurately measured, but not until the nature of the visit is known can a clearer picture of the work be obtained. Perhaps 60% of these visits were to enforce legislation, and the other 40% used in training food handlers. The results of a visit should therefore also be recorded, because the net effect of different types of intervention will have different outcomes. There is little value in knowing that so many visits to premises resulted in a reduction of so many cases of food poisoning, if the nature of the visit is not also known.

Systems established to record the activities of environmental health services, if they are to be effective, must therefore take account of the different types of intervention made. They should also take account of planned activities and those that resulted from complaints or emergency situations. The relative proportions of responsive and proactive activities need to be the result of realistic policy decisions. Setting objectives in terms of the maximum time taken to respond to a complaint or inquiry can make matters worse, as response time is measurable and visible and its effect on the inquirer is easily understood. The effect of
scheduled activities is not always so apparent, and it is understandable
that priority is given to response work even though it is not necessarily
the most constructive approach. It is important that the objective is im-
proved public health, not just improved public relations.

Those who are responsible for the administration and management
of environmental health services must recognize the great need to de-
velop systems that accurately record their activities. This information
can be used internally by an individual service to help in assessing the
impact of its work and in reassessing its priorities. Similar measures can
also be developed at regional and national levels, to assist in strategic
planning and utilization of resources. A common system for the record-
ing of environmental health data would allow assessment of regional,
national or even international trends and impacts.

Throughout the process of evaluation, it is important to obtain infor-
mation on how the community feels about the services that are provided
and the issues that they believe are important. People’s perceptions of
the impact of the services and their concerns regarding environmental
factors and health are essential information for environmental health
managers.

Public perceptions may vary widely from the professional viewpoint.
Policy-makers need to take account of such differences and recognize
that they either are failing to tackle the needs of the community or need to
provide information and education to redress those views.

**Recording Mechanisms**

*A number of different mechanisms are available for measur-
ing the efforts and performance of environmental health
services. These go beyond the numerical sums of activity
discussed above. They are tools that can be used not only to
assess the impact of activities, but also to serve as indicators
of the state of environmental health within a particular geo-
graphical area. They are tools that are common to nearly all
countries in the Region, but which are not always used to
evaluate the effectiveness of the environmental health ser-
dices themselves.*
Monitoring
Monitoring of environmental health parameters can be used not only to indicate levels of compliance with a standard, but also to reveal trends over time. The work of the environmental health services may have a direct impact on those trends, and monitoring can therefore be used to gauge the effectiveness of that work.

There are a great many influences on environmental conditions. Since the objective of environmental health services is to improve environmental living conditions, their influence must therefore, in general, be looked on as a positive one. The point at which such a correlation becomes difficult to evaluate is when an environmental parameter achieves a socially acceptable level. At that point it is almost impossible to evaluate the work of the environmental health services in just maintaining the status quo.

Fig. 13 illustrates the efforts that environmental health services have to make in order to achieve and maintain acceptable environmental standards. If the efforts of the environmental health services are well
thought out, targeted and implemented, they will lead to a reduction in
the level of a particular parameter and may eventually achieve a socially
acceptable level. Once that level has been achieved, however, it must be
maintained. Many environmental health parameters are determined by a
range of factors that do not necessarily have permanent technical solu-
tions, and in such cases the environmental health services will need to
ensure that controls are maintained.

The rate at which a level is reduced before an acceptable level is
reached can be a good indication of the effectiveness of the strate-
gies and work of the environmental health services. Once the acceptable
level has been reached and the monitoring curve begins to flatten, how-
ever, the efforts required to maintain that level are far more difficult to
assess.

When the results of environmental monitoring are used, a level of
resources must be available simply to maintain an acceptable position.
This may lead to difficulties in assessing the true effectiveness of the
services, and can represent a distorted picture of present and future pri-
orities.

**Laboratories**

Laboratories are used extensively in the work of environmental health
services by providing the scientific basis for the interventions the services
carry out. They are therefore an essential part of any environmental health
strategy and a support mechanism for the environmental health services.
They can also be used to indicate improvements and problems in certain
environmental health conditions.

Both laboratory activities and monitoring practices require consistent
implementation to recognized standards. Measurement techniques must
attain a certain level of quality and consistency so that results can be
compared with confidence. This applies not only to individual practice
within one laboratory or service, but practice between related laborato-
ries responsible for the measurement of similar parameters.

Laboratories can also be used to evaluate the performance of
environmental health services. They will assist in measuring the impact
of the work of the services to reduce to acceptable levels the various
environmental health stressors.
Epidemiology
Epidemiology can be used to assess the impact on human health of various parameters and to determine the way in which disease develops and spreads in the community. Given a defined population, sufficient time and a common disease, epidemiology can provide an indication of trends in ill health. It can also be used to measure the effectiveness of the work of environmental health services.

Epidemiology and its methodology are of particular use in special environmental health campaigns or specific programmes. In some areas of environmental health, however, their use in assessing the effectiveness of environmental health services will be limited for the reasons shown in Fig. 13.

Performance Indicators

Very little work has been carried out to establish indicators for measuring the performance of environmental health services and their interventions. There can be no single measure of the effectiveness of an environmental health service. It is not easy to measure the effectiveness of activity in one specific area of environmental health, let alone the entire range of fields that now make up the subject.

The Audit Commission in the United Kingdom has carried out work on performance indicators under a government initiative known as the Citizen’s Charter. The Charter comprises a series of initiatives designed to improve the quality of public services and to make them more responsive to the needs of those who use them. One of these initiatives, whose legislative provisions are included in the Local Government Act of 1992, requires the Audit Commission to draw up a set of indicators for measuring the performance of local authority services. Under the Act, every local authority in England and Wales has to measure its performance against these indicators and publish the results in the local press. The Commission then compares and reports on the levels of performance achieved by the various authorities (25).

These indicators have therefore been developed to provide information for members of the general public. They have not been developed to
provide the local authority services, which include environmental health, with tools for measuring their effectiveness. The indicators that have been developed provide an analysis of the processes of service delivery rather than a measurement of outputs.

Indicators that relate to the effectiveness of service delivery do have some benefits, however. These indicators can assist both the public and the services themselves to compare their methodologies and achievements against their declared strategies and performance targets. They cannot, however, indicate how effective the adopted strategies have been.

Using such indicators for national comparisons can present problems. Because national attention is paid to the results, services might concentrate a disproportionate amount of effort in achieving good results in those areas that are monitored at the expense of other, perhaps more important, areas of work. To overcome this problem, it has been suggested that performance indicators should also reflect reactive work, which naturally follows local patterns and is therefore weighted to the local situation.

In some cases, performance indicators can be related to improvements in environmental conditions. This clearly depends on the nature of the intervention. For example, a positive correlation has been demonstrated between poor environmental conditions and the interval between certain types of inspection. More frequent inspections should therefore result in better conditions. According to the risk assessment approach, however, if the inspecting authority believes that the management of an establishment is capable of self-regulation, the inspection frequency is reduced. This is clearly a contradiction in approach, and an example of how difficult it can be to develop effective performance indicators for the management of environmental health services.

Environmental health services in all countries of the European Region are likely to face increasing workloads in the future. It is clearly impossible to maintain effectiveness indefinitely in the face of increasing demand and relatively static resources. It is essential, therefore, that services recognize that the demands made on them must be properly managed. Different areas of environmental health also compete among themselves for finite resources, against a pattern of growing and potentially almost infinite demands. In many countries, environmental
health services have developed organically, and management systems have not always been capable of meeting additional needs. It is essential that a greater effort is made to build strong management capacities, and that these are supported by a range of tools to assist decision-making. Efforts must therefore be devoted to establishing sound and reliable indicators of the performance of environmental health services.

Performance review should be an integral part of the planning and management of any environmental health service. It will become even more relevant as greater accountability and other quality-related issues become more important. Fig. 14 illustrates the place of performance review in the basic management cycle.

**Fig. 14. Cycle of management**

Planning for good management practice in the delivery of services requires the setting and pursuit of consistent, achievable objectives. In establishing such objectives and therefore a strategy for a service, a measurement system is needed to set achievements against targets. In this way, adjustment of future objectives can take place from the feedback gained. The simple loop diagram shown in Fig. 15 illustrates the mechanics of an efficient management system. It has to give valid,
accurate, clear and unbiased readings in order to reveal performance and allow for adjustment of the future direction.

In establishing a system of performance measurement of any service, there are only four basic factors to be considered: quantity, time, cost and quality. These can then be built into the following combinations:

- costs and resources (economy)
- use of resources outputs (efficiency
- value or benefit to the user (effectiveness).

These are terms that can be used in a system of performance measurement to establish indicators. The diverse nature of environmental health means that numerous indicators could be used to illustrate the work of the services. If too many indicators are used, the process becomes difficult to handle effectively. Too few indicators, however, can lead to an oversimplification of the complex nature of the work. The right number of representative indicators must therefore be found.
ECONOMIC ANALYSIS

In repairing the damage of the past, protecting the present environment and promoting good practice in the future, environmental health services must play not only a multi-disciplinary role but also one that must be accounted for in terms of time. This makes the task of evaluating the services, particularly in terms of costs, extremely difficult if not impossible.

The axiom that prevention is better (and cheaper) than cure is used repeatedly in environmental health circles. Because of the limited resources and sometimes conflicting priorities that face decision-makers today, however, the question is how much cheaper preventive action is, or alternatively which action will have the greatest preventive effect.

There is thus a dilemma for those who have to set priorities for environmental health interventions. This work is crucial to the establishment of worthwhile environmental health services, and must be founded on a strong base of information that gives a clear indication of the effectiveness of the proposed action. Cost–benefit analysis is therefore one type of methodology that should contribute to the evaluation of environmental health services.

When dealing with costs and benefits, it must be remembered that the health sector functions as part of the whole economy. Decision-makers therefore need to take a macroeconomic approach in establishing development policies and in designing health system reforms and new financing schemes. The advantages of such an approach can be threefold: it makes policy-makers aware of the link between the economy and health; it helps them to anticipate problems of access to the health services by disadvantaged groups; and it offers a comprehensive view of the available resources for health.

Macroeconomic and sectoral policies, which are typically established without consideration of the health consequences, may nevertheless be major determinants of health status. For example, trade, fiscal or agricultural policy may influence health, either directly by affecting income and its distribution or indirectly through effects on the quantity and quality of the environmental resources on which human health depends.
The structural reforms in the eastern countries of the European Region are a special case of macroeconomic policy reform. The adjustment process is widely accepted as a necessary condition for economic development and must therefore, in the long run, be beneficial to health. The free market cannot be left entirely to itself; it must be complemented by government action to control abuse and to ensure more equitable distribution of the social and economic benefits. This principle clearly applies to the achievement of both health and environmental objectives, and is a strategic role of environmental health services.

These kinds of decision – how far to encourage market liberalization, and when and how governments should intervene – have a great influence on environment and health outcomes. Yet only recently have health agencies had a voice in such decisions. Clearly, the health agencies themselves must take the lead in:

- demonstrating the priority that health should have at the macro and sectoral levels;
- fostering understanding of the relationships between macroeconomic, social and sectoral policies on health; and
- expressing their views to other government agencies so that appropriate action is taken.

Developing the skills to understand, act on and evaluate the causes of hazards to environmental health and their solutions requires a multidisciplinary effort to ensure that health and environmental considerations influence macroeconomic policy-making and the setting of priorities. Environmental health services, with their wide base of professional skills, are well placed to provide such an input to the decision-making process.

In dealing with environmental health services as a complete entity, it would be extremely difficult to apply the principles of cost–benefit analysis. For specific projects or investment programmes, however, such techniques can be used both to assist decision-makers and to incorporate environmental and health considerations in the formulation and implementation of such projects and programmes.

The evaluation of environmental health services will undoubtedly focus, in some minds, on the economic performance and benefits of
their work. In or out of times of recession and economic difficulties, this should always be a core element of environmental health interventions. Undoubtedly, the value of some environmental assets will be difficult to measure in monetary terms, and in some cases they should not be priced at all.

Valuation, pricing and accounting mechanisms have a pivotal role to play in the achievement of sustainable development. Economic valuations can help economic agents to take environmental impacts into account when they make investment or consumption decisions. Where market forces are relevant, prices should reflect the full cost to society of production and consumption, including the environmental costs.

In attempting to evaluate the effectiveness of environmental health services, it should be borne in mind that such services are acting only as one part of an environmental health policy. They may be the most visible or active part, but that fact should not lead to their being evaluated in isolation. Clearly, environmental health services must be accountable and their efforts should demonstrate positive progress towards their objectives. Nevertheless, the relationship between their interventions and the resulting improvements in environmental conditions or the health of a population cannot always be directly proportional. Any evaluation of the effectiveness of environmental health services must therefore be carried out with a fair degree of tolerance.
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### Countries surveyed, March 1993 to March 1994

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<td>October 1993</td>
<td>N. Wilson (United Kingdom)</td>
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<td>Kazakstan</td>
<td>February 1994</td>
<td>J. Ptashekas (Lithuania)</td>
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<td>Kyrgyzstan</td>
<td>June 1993</td>
<td>J. Duchmin (France)</td>
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<td>Latvia</td>
<td>February 1994</td>
<td>A. Johanessen (Norway)</td>
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<td>Lithuania</td>
<td>June 1993</td>
<td>G. Jukes (United Kingdom)</td>
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<td>Norway</td>
<td>February 1994</td>
<td>A. Jurevics (Latvia)</td>
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<tr>
<td>Poland</td>
<td>December 1992</td>
<td>G. Jukes &amp; B. Jukes (United Kingdom)</td>
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<tr>
<td>(first pilot survey)</td>
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<tr>
<td>Portugal</td>
<td>May 1993</td>
<td>I. MacArthur (WHO)</td>
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<tr>
<td>Country</td>
<td>Date of mission</td>
<td>Surveyor</td>
</tr>
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<tr>
<td>Republic of Moldova</td>
<td>March 1994</td>
<td>L. Shllaku (Federal Republic of Yugoslavia)</td>
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<td>Romania</td>
<td>May 1993</td>
<td>J.-L. Potelon (France)</td>
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<td>Russian Federation</td>
<td>May 1993</td>
<td>P. Marchandise (WHO)</td>
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<td>Slovakia</td>
<td>October 1993</td>
<td>L. Shllaku (Federal Republic of Yugoslavia)</td>
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<td>Tajikistan</td>
<td>August 1993</td>
<td>C. Tillier &amp; A. Vigouroux (France)</td>
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<td>Turkey</td>
<td>November 1993</td>
<td>L. Shllaku (Federal Republic of Yugoslavia)</td>
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<td>Turkmenistan</td>
<td>November 1993</td>
<td>M. Christiansen (Denmark)</td>
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<td>Ukraine</td>
<td>September 1993</td>
<td>J. Ptashekas (Lithuania)</td>
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<td>United Kingdom</td>
<td>June 1993</td>
<td>B. Moissonier (France)</td>
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<td>Uzbekistan</td>
<td>March 1994</td>
<td>P. Gavelin (Sweden)</td>
</tr>
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</table>
Participants in steering group meetings, 1992 – 1994

First Planning Meeting for Environmental Health Services Survey
Copenhagen, Denmark, 12–13 November 1992

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**Working Group on Environmental Health Services in Europe**
**Salindres, France, 9–10 August 1993**

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**Consultation Meeting on an Action Plan for Environmental Health Services in Central and Eastern Europe and the Newly Independent States**
**Sofia, Bulgaria, 19–22 October 1993**

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**Working Group on Environmental Health Services in Europe**
**London, United Kingdom, 25–27 April 1994**

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Second Consultation on Environmental Health Services
Vilnius, Lithuania, 28–30 November 1994

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Regional Office publications on environmental health services in Europe

This book, addressing policy options for environmental health services in the WHO European Region, is the second in a planned series of publications under the title *Environmental health services in Europe*. It is published together with its companion volume (WHO Regional Publications, European Series, No. 76), which provides an overview of current practice in environmental health. Other volumes in the series will deal with professional profiles, guidelines on curriculum development, evaluation, regulatory instruments and economic instruments.
Since the adoption of the European Charter on Environment and Health at Frankfurt/Main in 1989, the countries of the WHO European Region have been placing greater emphasis on the role of their environmental health services in the protection of public health and the environment. The introduction of the Environmental Health Action Plan for Europe at Helsinki in 1994, further enhanced the need for strong national and local environmental health services.

The WHO Regional Office for Europe has been deeply involved in working with its Member States in producing a wide range of guidance instruments to assist them in reforming their environmental health services and enhancing their capacities in environmental health management. This guidance is seen as vital to the reform process as it will assist countries in developing and strengthening their environmental health services, and will promote the harmonization and integration of national and international activities.

The projects that resulted in these guidance instruments were requested by Member States when gaps in the capacities of their environmental health services became apparent. In producing this series of books, the Regional Office has strived to identify the basic principles that must be followed to signify some of the obstacles and difficulties, and to provide options for the future development of the environmental health services of the Region.