Sustainable health in a globalised world

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Sustainable health in a globalised world*

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Abstract. It is clear that in making the concept of sustainable development concrete, one has to take into account a number of practical elements and obstacles. There is little doubt that integrated approaches are required to support sustainable development. Therefore, a new research paradigm is needed that is better able to reflect the complexity and the multidimensional character of sustainable development. The new paradigm, referred to as sustainability science, must be able to encompass different magnitudes of scales (of time, space, and function), multiple balances (dynamics), multiple actors (interests) and multiple failures (systemic faults). To illustrate the above, we described potential health transitions in a globalised world.

1. WHAT IS SUSTAINABLE DEVELOPMENT?

The essence of sustainable development is simply this: to provide for the fundamental needs of mankind without doing violence to the natural system of life on earth. This idea arose in the early eighties of the last century and came out of a scientific look at the relationship between nature and society. The concept of sustainable development reflected the struggle of the world population for peace, freedom, better living conditions and a healthy environment (Council 1999). During the latter half of the 20th century, these four goals recurred regularly as world-wide, basic ideals.

With the end of the Second World War in 1945, it was widely believed that the first goal of peace had actually been achieved. But then came the arms race and, although a kind of global peace was maintained, the Cold War led to a range of conflicts fought out at the local level. When one looks today at many parts of the world – the Middle East, Middle Africa, for example – it is all too evident that peace is still a long way off.

Under the banner of freedom, people fought for the extension of human rights and for national independence. Today, the poorest two thirds of the world population sees 'development' as the most important goal, by means of which they hope to achieve the same material well-being as the wealthy one third.

But this ideal, upon which so much emphasis has been laid recently, has to reckon with the earth itself. This reckoning began with concern over the exhaustion of our natural resources and only later did it dawn on us that a disturbance of the complex systems upon which our lives depend can have enormous consequences.

The last twenty five years have been characterized by an attempt to link together the four ideals cited above – peace, freedom, improved living conditions and a healthy environment (Council 1999), an ambition which stems from the realization that striving for one of these ideals often means that the others must necessarily also be striven for. This struggle for 'sustainable development' is one of the great challenges for today's society.

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Sustainable development is a complex idea that can neither be unequivocally described nor simply applied. There are scores of different definitions, but we shall restrict ourselves to the most frequently quoted, that of the Brundtland Committee (1987) (WCED 1987):

"Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs."

If we look at the lowest common denominator of the different definitions and interpretations of sustainable development, we note four common characteristics (Rotmans, Grosskurth et al. 2001). The first indicates that sustainable development is an intergenerational phenomenon: It is a process of transference from one to another generation. So, if we wish to say anything meaningful about sustainable development, we have to take into account a time-span of at least two generations. The time period appropriate to sustainable development is thus around 25 to 50 years.

The second common characteristic is the level of scale. Sustainable development is a process played out on several levels, ranging from the global to the regional and the local. What may be seen as sustainable at the national level, however, is not necessarily sustainable at an international level. This is due to shunting mechanisms, as a result of which negative consequences for a particular country or region are moved on to other countries or regions.

The third common characteristic is that of multiple domains. Sustainable development consists of at least three: the economic, the ecological and the socio-cultural domains. Although sustainable development can be defined in terms of each of these domains alone, the significance of the concept lies precisely in the interrelation between them.

The aim of sustainable social development is to influence the development of people and societies in such a way that justice, living conditions and health play an important role. In sustainable ecological development the growth of natural systems is the main focus of concern and the maintenance of our natural resources is of primary importance.

What is at issue here are three different aspects of sustainable development which in theory need not conflict but which in practice often conflict. The underlying principles are also essentially different: with sustainable economic development the concept of efficiency has a primary role, whereas with sustainable social development the same may be said of the concept of justice and with sustainable ecological development it is the concepts of resilience or capacity for recovery that are basic.

The fourth common characteristic concerns the multiple interpretation of sustainable development. Each definition demands a projection of current and future social needs and how these can be provided for. But no such estimation can be really objective and, furthermore, any such estimation is inevitably surrounded by uncertainties. As a consequence, the idea of sustainable development can be interpreted and applied from a variety of perspectives.

As will be apparent from the above, a concept like sustainable development is difficult to pin down. Because it is by its nature complex, normative, subjective and ambiguous, it has been criticized both from a social and from a scientific point of view. One way of escaping from the 'sustainability dilemma' is to begin from the opposite position: that of non-sustainable development. Non-sustainable or unsustainable development is only too visible in a number of intractable problems entrenched in our social systems and which cannot be solved through current policies. These intractable problems are characterized by the involvement of multiple interests as well as their great complexity, lack of structure, structural uncertainty and apparent uncontrollability.

Such problems can be recognized in many national and global economic sectors. One sees them in agriculture, for example, with its many facets of unsustainability becoming manifest in the form of protein-related diseases such as BSE (mad cow disease), and in foot-and-mouth disease. The water sector has to deal with such symptoms as flooding, droughts and problems related to water quality, while the energy sector produces energy in a one-sided manner and – as a direct result – affects the environment. One sees the same symptoms in traffic and transport systems, where atmospheric pollution and traffic queues can be seen as symptoms of unsustainability; and as far as our health is concerned,

the spread of SARS, the global increase in the incidence of malaria, malnutrition and its counterpart – the increase in obesity – are all far from sustainable.

These unsustainable developments reflect systemic faults embedded in our society. In contrast to market faults, systemic faults derive from deep-seated lacks or imbalances in society. They cannot be corrected through the 'market' and form a serious impediment to the optimal functioning of our social system. Systemic faults operate at various levels and can be of an economic, social or institutional nature. If such intractable problems are a sign of an unsustainable development, they can only be solved through fundamental changes in our society. Only thus can non-sustainable conditions be transformed and put on a more sustainable basis.

2. INTEGRATED ANALYSIS OF SUSTAINABILITY

This new paradigm has far-reaching consequences for the methods and techniques that need to be developed before an integrated analysis of sustainability can be carried out. These new methods and techniques can also be characterized as follows:

- from supply- to demand-driven
- from technocratic to participant
- from objective to subjective
- from predictive to exploratory
- from certain to uncertain.

In short, the character of our instruments of integrated analysis is changing. Whereas previous generations of these instruments were considered as 'truth machines', the current and future generations will be seen more as heuristic instruments, as aids in the acquisition of better insight into complex problems of sustainability. At each stage in the research of sustainability science, new methods and techniques will need to be used, extended or invented. The methodologies that are used and developed in the integrated assessment community are highly suitable for this purpose.

Roughly, there are a number of different kinds of methods for the integrated assessment of sustainability: analytic methods, participative methods and more managerial methods. Analytic methods mainly look at the nature of sustainable development, employing among other approaches the theory of complexity. In participative research approaches, non-scientists such as policy-makers, representatives from the business world, social organizations and citizens also play an active role. The more managerial methods are used to investigate the policy aspects and the controllability of sustainable transitions.

An example of an analytic instrument for the assessment of sustainability is the integrated assessment model which allows one to describe and explain changes between periods of dynamic balance. This model consists of a system-dynamic representation of the driving forces, system changes, consequences, feed-backs, potential lock-ins and lock-outs of a particular development in a specific area. Another analytic instrument is the scenario that describes sustainable and unsustainable developments, including unexpected events, changes and lines of fracture.

Participatory methods differ according to the aim of the study and its participants. Thus negotiation processes are mimicked in so-called policy exercises, whether or not these are supported by simulations. In the method of mutual learning, the analysis is enriched by the integration of the knowledge possessed by participants from diverse areas of expertise.

An example of a new kind of policy instrument is provided by transition management (Rotmans 2003). Transition management is a visionary, evolutionary learning process that is progressively constructed by the undertaking following steps:

(i) develop a long-term vision of sustainable development and a common agenda (macro-scale)
(ii) formulate and execute a local experiment in renewal that could perhaps contribute to the transition to sustainability (micro-scale)

(iii) evaluate and learn from these experiments
(iv) put together the vision and the strategy for sustainability, based on what has been learned (this boils down to a cyclical search and learn process that one might call evolutionary steering: a new kind of planning with understanding, based on learning by doing and doing through learning).

But now that the first steps towards an integrated sustainability science have been taken, there is a prospect of making some major leaps forward. In the next section we explore some of the above in more detail, while looking at past a future health transitions.

3. THE HEALTH TRANSITION**

The shifts that have taken place in the patterns and causes of death in many countries, and that were described in the precious sections, can be described and explained within a conceptual framework known as the health transition. Previously, the health transition has been covered by two separate terms: 'demographic transition', describing the change from high fertility and mortality rates in less developed societies to low fertility and low mortality rates in 'modern' societies, and 'epidemiological transition', which was introduced to describe the changes in mortality and morbidity patterns (from infectious to chronic diseases) as societies' demographic, economic and social structures changes (Omran 1983). The health transition is a more appropriate term, as it covers the full range of social, economic and ecological changes driving the epidemiological and demographic transition (Caldwell 1978; Beaglehole and Bonita 1997). It comprises several stages characterised by categories in which fertility levels and causes of death are grouped (Omran 1998). Despite its limitations (Mackenbach 1994), the health transition is a useful tool for understanding current health trends and exploring future developments. Below, we use this concept to explore the general trends related to the main forces determining human health.

The age of pestilence and famine

This first stage of the health transition stage (the age of pestilence and famine) is characterised by the kind of mortality that has prevailed throughout most of human history. Epidemic, famines and wars cause huge numbers of deaths. The provision of basic ecological resources, i.e. food and fresh water, is inadequate. The lack of economic means to provide a sufficient infrastructure for adequate health services, schooling and sewage systems leads to low levels of literacy, and high levels of mortality and fertility. Infectious diseases are dominant, causing high mortality rates, especially among children. In this stage, women of childbearing age also face considerable risks due to the complications associated with pregnancy and childbirth (Omran 1983). The combination of a wide range of health risks with the lack of health-care facilities results in very low levels of life expectancy: in Indonesia in 1950, for example, this was as low as age 40. Population growth, improvements in health, and advances in socio-economic development are all limited by the local carrying capacity of the environment. Some developing countries are still in this stage.

The age of receding pandemics

This stage (the age of receding pandemics) began in the mid-19th century in many of what are now developed countries. It involved a reduction in the prevalence of infectious diseases, and a fall in mortality rates. As a consequence, life expectancy at birth climbed rapidly from about 35 to 50. Due to increased economic growth, the first phase of this stage is marked by the improved use of natural

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resources; typically, this leads to a sharp fall in deaths from water-borne and food-borne infectious diseases, and from diseases related to malnutrition (e.g. typhoid fever, diarrhoea and measles).

In tandem with these improvements in population health, social factors become increasingly important. Improved social circumstances (e.g. improved hygiene) and community health services causes a further decline in infectious diseases, giving an extra boost to economic development. Finally, the introduction of modern healthcare and health technologies, e.g. immunisation programmes and the introduction of antibiotics enable the control and elimination of group of infectious diseases such as acute bronchitis, influenza and syphilis.

As fertility rates are high, a population grows rapidly at this stage of the health transition. Without moving to the next stage, the carrying capacity of the local ecosystem may be exceeded (McMichael 1993). As population and ecological pressures increase, food and water become scarcer, and the lack of ecological and social resources may cause economic development to stagnate. If there is a surplus of available resources, the transition may be accelerated, but if they are lacking, the transition may slow, or even stagnate in this phase.

The age of chronic diseases

In the third stage (the age of chronic diseases), the elimination of infectious diseases makes way for chronic diseases among the elderly. While improved healthcare means that these are less lethal than infectious diseases, they nonetheless cause relatively high levels of morbidity. Increasingly, health patterns depend on social and cultural behaviour, such as patterns of food consumption and drinking behaviour (McMichael and Powles 1999). Due to low levels of mortality and fertility, there is little population growth. When the health transition is at an advanced stage, life expectancy may exceed 80 years. However, the prevalence of one or more diseases means that such a long life also includes, on average, a relatively long period of morbidity.

This stage occurs at different rates in different nations: in both developed and developing countries, mortality rates are driven by socially determined factors; in developed nations they are also driven by medical technology. In such situations, the aim is not only to reduce mortality rates via the optimised deployment of ecological and social capital, but also to use advance medical technologies for the reduction of morbidity. It becomes necessary to ensure sufficient social and health-care investment for all age groups. At the same time, there is increased demand for healthcare related to the diseases of older people.

Currently, most developed countries are in the third stage of the health transition: fertility rates are low, and the causes of diseases and deaths have shifted from infectious to chronic diseases. All developed countries in Europe, North America and Asia are seen as having arrived in the latter stage of the health transition in the 1970s, although there were large differences with regard to timing, particularly in the onset the decline in fertility (Hilderink 2000). In these countries, declining fertility rates and increased life expectancy have led to the ageing, or so-called ‘greying’, of the population.

The health situation in developing countries varies greatly from one country to another. In most, there is still very low life expectancy; this is due largely to malnutrition and the lack of safe drinking water, which are compounded by poor healthcare facilities. In other countries, however, particularly in Asia and Latin America, chronic diseases have now become more important than infectious diseases (Murray and Lopez 1996). The same large variation is reflected in the demographic situation. In countries such as China and Thailand fertility rates are very low; in others they are very high. Due to sub-national differences of an economic, social or ecological nature, there may also be large differences within a single country.

It is widely believed that, with increasing economic growth, developing countries will follow the same pattern of health transition as Europe and North America. However, although poverty is always a major force in the health transition, mortality levels in all but the very poor populations are determined more by social and ecological resources than by income. Many countries, especially the poorest, will

not 'trade' infectious diseases for chronic diseases; instead, they may even suffer a 'double burden' of disease.

In the next section we will explore how future health pathways may look like.

4. THE NEXT STAGE IN THE HEALTH TRANSITION

So what lies ahead? In order to explore possible future global health transitions we have made use of a set of scenarios. Scenarios do not predict the future, but rather paint pictures of possible futures and explore the various outcomes that might result if certain basic assumptions are changed. The scenarios used explore the global and regional dynamics that may result from changes at a political, economic, demographic, technological and social level, and are based on the recent efforts of the IPCC (IPCC 2000) (see Box). The distinction between classes of scenario was broadly structured by defining them ex ante along two dimensions. The first dimension relates to the extent both of economic convergence and of social and cultural interactions across regions; the second has to do with the balance between economic objectives and environmental and equity objectives. This process therefore led to the creation of four scenario 'families' or 'clusters', each containing a number of specific scenarios.

Box: The IPCC SRES scenarios (IPCC 2000).

The first group of scenarios [A1] is characterised by fast economic growth, low population growth and the accelerated introduction of new, cleaner and more effective technologies. Under this scenario, social concerns and the quality of the environment are subsidiary to the principal objective: the development of economic prosperity. Underlying themes combine economic and cultural convergence, and the development of economic capacity with a reduction in the difference between rich and poor, whereby regional differences in per capita income decrease in relative (but not necessarily absolute) terms.

The second group of scenarios [A2] also envisages a future in which economic prosperity is the principal goal, but this prosperity is then expressed in a more heterogeneous world. Underlying themes include the reinforcement of regional identity with an emphasis on family values and local traditions, and strong population growth. Technological changes take place more slowly and in a more fragmented fashion than in the other scenarios. This is a world with greater diversity and more differences across regions.

In the third group [B1], striving for economic prosperity is subordinate to the search for solutions to environmental and social problems (including problems of inequity). While the pursuit of global solutions results in a world characterised by increased globalisation and fast-changing economic structures, this is accompanied by the rapid introduction of clean technology and a shift away from materialism. There is a clear transformation towards a more service and information-based economy.

The fourth group [B2] sketches a world that advances local and regional solutions to social, economic and ecological problems. This is a heterogeneous world in which technological development is slower and more varied, and in which considerable emphasis is placed on initiatives and innovation from local communities. Due to higher than average levels of education and a considerable degree of organisation within communities, the pressure on natural systems is greatly reduced.

We describe developments in the health status of populations according to three potential future 'ages': the age of emerging infectious diseases, the age of medical technology and the age of sustained health. Of course, these stages are imaginary (although some features are already recognisable in some countries) and are not sharply delineated - there is always a continuum. There is also always the possibility that economic, political, social, or environmental crises will cause the process of transition to stagnate, or to go into reverse. Of course, each country follows its own route to the 'ages' in question, described in the sections below.

The age of emerging infectious diseases

In this stage (see also (Olshansky, Carnes et al. 1998)), the emergence of new infectious diseases or the re-emergence of 'old' ones will have a significant impact on health. A number of factors will influence this development: travel and trade, microbiological resistance, human behaviour, breakdowns in health systems, and increased pressure on the environment (Barrett, Kuzawa et al. 1998; Louria 2000). Social, political and economic factors that cause the movement of people will increase contact between people and microbes; environmental changes caused by human activity (for example, dam and road building, deforestation, irrigation, and, at the global level, climate change) will all contribute to the further spread of disease. The overuse of antibiotics and insecticides, combined with inadequate or deteriorating public health infrastructures will hamper or delay responses to increasing disease threats.

As a result, infectious diseases will increase drastically, and life expectancy will fall (as is currently the case in many developing countries due to the AIDS pandemic). Ill health will lead to lower levels of economic activity, and poor countries will be caught in a downward spiral of environmental degradation, depressed incomes and bad health. Control of infectious diseases will be hampered by political and financial obstacles, and by an inability to use existing technologies.

The age of medical technology

To a large extent, increased health risks caused by changes in life-style and environmental changes will be offset by increased economic growth and technology improvements in the age of medical technology. To some extent, this might be comparable with other views on a fourth' stage, e.g. the 'hybristic' stage (Rogers and Hackenberg 1987), and the 'age of delayed degenerative diseases' (Olshansky and Ault 1986).

If there is no long-term, sustainable economic development, increased environmental pressure and social imbalance may propel poor societies into the age of emerging infectious diseases. On the other hand, if environmental and social resources are balanced with economic growth, sustained health may be achieved.

The age of sustained health

In the age of sustained health, investments in social services will lead to a sharp reduction in life-style related diseases, and most environmentally related infectious diseases are will be eradicated. Health policies will be designed to improve the health status of a population in such a way that the health of future generations is not compromised by, for example, the depletion of resources needed by future generations. Although there is only a minimal chance that infections will emerge, improved worldwide surveillance and monitoring systems will mean that any outbreak is properly dealt with. Despite the ageing of the world population, health systems will be well adjusted to an older population. Furthermore, disparities in health between rich and poor countries will eventually disappear.

Let us now look at how different development paths, as described by the four scenarios, can be linked to the 'ages' of human health described above.

A1 scenario group

In this group, a central role will be played by economic growth and technological developments. Populations will grow at a moderate rate and start to decline in the years around 2050, and the average age of the world's population will increase. In many societies, accelerated economic growth and technological advances will enhance health and life expectancy; in developing countries fertility rates will continue to fall. At least in the short-to-medium term, material advances, allied with social modernisation and various healthcare and public health programmes, will lead to gains in overall public health.

Although the high level of average income per capita will contribute to the improvement in the overall health of the majority, increased economic growth may lead to problems of 'social exclusion'.

In many places, income growth will put pressure on global resources and thus lead to environmental degradation. From a health perspective, we might see a divergence between the developed and parts of the developing world. In the developed world, increasing wealth and improvements in healthcare and technology will offset most of the emerging risks; the richest populations may experience particularly pronounced health improvements. The poorest countries, on the other hand, might not be able to advance to the stage of medical technology. As population growth and the depletion of resources increase environmental pressures, there may be a resurgence of old diseases and an increase in new infections.

A2 scenario group

In this group, health in the developed countries will to a large extent be left to individual choice and less of an issue for public policy. The greatest economic growth will take place in the developed regions, and technological advances will benefit only rich countries, as there will be less diffusion of knowledge and economic capital. Developed countries will make increasing investments in education and better welfare. However, globally, the gains in health brought about by increasing economic growth and technology will be partly offset by erosion of social and environmental capital, the global division of labour, the exacerbation of the rich-poor gap between and within countries, and the accelerating spread of consumerism. While some developed countries will be able to counteract part of the threat of emerging infectious diseases by increasing investment in public health and medical care (age of medical technology), the proportion of infectious diseases that contribute to the total burden of disease will increase. The situation will be fragile, and in some countries the burden of infectious disease may rise considerably, with the potential of falling back into the age of emerging infectious diseases. The developed world will experience 'a double burden of disease': an increase in chronic diseases brought about by a longer life expectancy, complicated by a resurgence of infectious diseases. Many developing countries suffer from this double burden now.

In developing countries, levels of health and welfare spending will either remain the same or decline. In poor countries, current barriers to the control of such major diseases as malaria are likely to remain, and the importance of adequate water and food supplies will increase. Fertility rates will decline relatively slowly. This combination of limited economic resources, high population growth, and increasing pressures on the local and global environments will increase the prevalence of infectious diseases, leading to the age of emerging infectious diseases.

B1 scenario group

A central element in the B1 scenario is a high level of environmental and social consciousness, combined with a global approach to sustainable development. In the developed world, life expectancy will be increased by an improved social structure (and the concomitant benefits to individual lifestyles), and by investments focused on decreasing pressure on ecological systems via the sustained management of resources. An extensive welfare net will prevent poverty-based social exclusion. Although the population will age, healthcare systems will be properly adjusted to an older population. Under this scenario, developed countries may well complete the transition towards the age of sustained health.

However, thanks to transfers of knowledge and technology, and a sharp decline in their national debt, the developing world will make it through the age of receding pandemics. Although some countries will arrive at the age of chronic diseases (i.e. the stage at which the developed world finds itself today), technology and knowledge transfer will enable most of them to skip this stage and approach the age of sustained health.

B2 scenario group

In the B2 scenario, there will be increased concern for environmental and social sustainability. Governments will therefore find policy-based solutions to environmental and health problems. Most governments will increase public spending, including that on public health. Environmentally aware

citizens will exercise a growing influence on national and local policy. There will be shift to local decision-making, with a high priority being given to human welfare, equality and environmental protection. Education and welfare programs will be widely pursued, thus reducing mortality, and, to a lesser extent, fertility. However, the rate of implementation will vary across regions and countries. Increased expenditure on 'health' and 'environment' will be implemented first in richer countries and it will take time for poorer countries to follow. However, the health transition will be slower than under A1. For developing countries, the situation may become more robust than under A2; developed countries may experience an increase in chronic diseases, moving slowly through the age of chronic diseases to the age of medical technology.

In conclusion, it is important to emphasis the following: future developments will not be the same for all countries, and developing countries are unlikely to follow the same transition path as the developed world. Although improvements in health may take place worldwide, differences in health status between the developing and developed world will to some extent remain, regardless of the future development path.

5. TOWARDS A STRATEGY FOR SUSTAINABLE DEVELOPMENT

The processes of globalisation in today's world - that include socio-economic change, demographic change and global environmental change - oblige us to broaden our conception of the determinants of population health. In recent decades, health conditions have improved and life expectancy has increased in almost all countries. Within many populations or communities, however, the prospects for health are being adversely affected by the diminution of social capital – i.e. the widening gaps between rich and poor and the weakening of public health systems. Furthermore, the biosphere's capacity to sustain healthy human life is beginning to be impaired by the loss of natural capital: this is manifested as climate change, downturns in food-producing systems, the depletion of freshwater supplies, and the loss of biodiversity (McMichael and Beaglehole 2000).

We must therefore be increasingly alert to the impact on health of larger-scale socio-economic processes and systemic environmental disturbances. Our vulnerability to disease could easily be increased by changes in environmental conditions or a breakdown in public health services. New diseases such as AIDS highlight the sharp divisions in our society. As global populations age, the burden imposed by chronic disease will inevitably increase. Poverty, poor nutrition, debt crises and environmental deterioration all demand attention – as does population growth, whose many interactions with poverty increase pressures on the environment. Increasingly, the factors that affect health are transcending national borders and, as they do so, the health needs of diverse countries are beginning to converge. At the same time, national health systems are increasingly being influenced by global processes. In a world where nations and economies are increasingly interdependent, ill health in any population affects all people, rich and poor alike.

Guiding the health transition towards the age of sustained health will require a development policy that includes social, environmental and economic sectors. Managing the health transition effectively will require a micro-approach, taking into account the social, cultural and behavioural determinants of health (beliefs and practices that account not just for illness and poor health, but also for good health). But this micro-approach will only ensure sustained better health in combination with a macro-approach. On the macro-level, the strong (and growing) evidence of the links between poverty reduction, education, lower fertility rates and better health makes a compelling case for programmes to reduce poverty and slow down population growth. A fall in mortality rates will be brought about not only by rapid macro-economic development, but also by policies designed to satisfy the basic needs of the majority of the population. Rapid progress through the health transition urgently requires substantial investments in education and a restructuring of health systems so that they provide better access to poor people. Simultaneously, international action needs to be undertaken to ensure that impacts of global

environmental changes on health will be minimal (e.g. reductions of the emission of greenhouse-gases to reduce the impacts on health caused by the anticipated climate change the coming decades).

However, the major determinants of ill health are beyond the direct control of health services (Woodward, Hales et al. 2000). Therefore, new integrated programmes are needed that combine poverty reduction, protection of the global environment, and economic and social policies more effectively. The responses of international health agencies will also have to be embedded within this broader context, a process that will in turn have consequences for health policies worldwide. Since 'sustained good health is a key indicator of how well we are managing our resources, our social relations, and the ecology of our way of life' (McMichael 1997), public health considerations must inform decisions and actions in all policy sectors.

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