Developing World, is dependent upon establishing sustainable patterns of consumption and production in the Developed World, which in part is related to the way in which we build and use cities.

FOOD PRODUCTION

Barring catastrophe, the global population over the next thirty years will grow from 6 billion to 8 billion people. Most of this growth will be in cities of the Developing World. Bongaarts (2002) believes that the demand for feeding this extra population, will be a great challenge: 'The ability of agriculturists to meet this challenge remains uncertain'. He goes on to say that, '... the technological optimists are probably correct in claiming that the overall food production can be increased substantially over the next few decades'. This agricultural expansion will be costly. The expansion will probably take place on soils of poor quality, located in places less favourable for irrigation, than existing intensively farmed land. Water – as we read constantly in our daily newspapers – is in increasingly short supply, while its demand grows not only for purposes of irrigation. The environmental cost of this increased food production, again according to Bongaarts, could be severe. 'A large expansion of agriculture to provide growing populations with improved diets is likely to lead to further deforestation, loss of species, soil erosion and pollution from pesticides and fertilizer runoff as farming intensifies and new land is brought into production.' It would seem prudent for countries like our own, to maintain our potential for food production and limit the extent to which our cities encroach upon agricultural land. It may also be both wise and profitable to explore ways in which food production within city limits can be maximized.

ENVIRONMENTAL PROBLEMS

The nature and extent of global environmental problems have been discussed fully in many texts, so they will be dealt with only in summary here, and only where they have some bearing on the development of sustainable urban form and structure. One major threat to the quality of life is pollution, which can, in part, be related to the ways in which cities are structured and used. Atmospheric pollution includes damage to the ozone layer, acid rain and the greenhouse effect. Depletion of the Earth's stratospheric ozone layer allows dangerous ultraviolet light from the sun to penetrate to the surface of the planet. This increase in radiation has the potential to cause adverse effects upon plants, animals and human beings. Acid rain can do immense harm, particularly to forest areas. There is some evidence of improvements in both of these areas, though much still remains to be achieved. As Lovejoy (2002) points out, '... things improve because of the efforts of environmentalists to flag a particular problem, investigate it and suggest policies to remedy it'. It is also true that problems that have immediate political appeal or obvious economic gain are most likely to receive the most immediate attention. For example, the European and North American middle-class holidaymakers

fearing skin cancer from exposure to the sun are a vocal and powerful political lobby for change. The greenhouse effect upon climate change is one area, which has not so far received such powerful popular support. The economic pain from curbing atmospheric pollution is all too apparent, while the gains are not immediately appreciated. In global terms, we continue with economic policies and land use practices which increase atmospheric emissions, particularly greenhouse gases.

ENERGY AND THE CITY

Much of the atmospheric pollution is caused by the burning of fossil fuels in the creation of energy to support city life. This energy is used: in the building of city structures (energy capital); during the lifetime of the structure; and in the transportation of people and goods between and within cities (energy revenue). Therefore, the design of cities and the ways in which they are used have a great impact on the natural environment. Few serious environmental scientists believe that we are running out of energy to sustain our civilization. 'The energy problem' – and there is an energy problem – 'is not primarily a matter of depletion of resources in any global sense but rather of environmental impacts and socio-political risks – and, potentially, of rising monetary costs for energy when its environmental and socio-political hazards are adequately internalised and insured against' (Holdren, 2002). Oil is the most versatile and most valuable of the conventional fuels that has long provided for all our city-building energy needs: it remains today the largest contributor to world energy supply, accounting for nearly all the energy used in transport. However, the bulk of recoverable conventional oil resources appear to lie in the Middle East, a politically unstable part of the world, as the recent war in Iraq demonstrates. Much of the rest of the recoverable resources lies offshore and in other difficult or environmentally fragile locations. Nuclear energy, which currently contributes about 6 percent of global energy production, has long-term problems of pollution and the storage of waste material. There are also other problems with nuclear energy. Breeder reactors produce large amounts of plutonium that can be used for weapons production – a security problem so significant that it may preclude the use of this technology. Problems with both oil and nuclear power presents urban designers with the challenge of developing urban structures less dependent upon these conventional sources of energy for their continuing existence.

BIODIVERSITY

There is a danger that losses to biodiversity resulting from man's activities could 'reduce the resilience of ecosystems to withstand climatic variations and air pollution damage. Atmospheric changes can affect forests, biodiversity, freshwater and marine ecosystems, and economic activity such as agriculture' (UN, 1992). Peter Shirley deals more thoroughly with biodiversity in Chapter 5, 'The Urban Park'. It is sufficient to note here that, since 1992, on the whole, conditions have deteriorated: still many species are becoming extinct or endangered. Habitat loss continues, including the great forests of the world, which are being exploited and cleared for development (See,