

## Urban Planning and Sustainable Development

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**ABSTRACT** *Following the discourse about sustainable development based on the Brundtland Commission's report and the processes in the UN Committee on Environment and Development, a sustainable urban development would require considerably more ambitious policies than today in order to limit energy consumption, reduce pollution and protect natural areas and arable land. Re-use of urban areas and more effective utilization of building sites is a possible strategy to this end. However, continuous growth in the building stock will make it increasingly difficult to bring urban development in wealthy countries within the frames of what is ecologically sustainable and equitable in a global perspective. Planning for a sustainable urban development must be oriented towards long-term goals and utilize knowledge about the environmental consequences of different solutions, but should not be based solely on means-ends rationality. Rather than aiming at consensus including all stakeholder groups, planning for sustainability should facilitate alliance-building among those population groups who can support the basic equity and environmental values of a sustainable development.*

### 1. If Sustainability is Everything, Maybe it's Nothing?

Since the report from the UN World Commission on Environment and Development (the Brundtland Commission) was published in 1987, the concept of sustainable development has become an important part of the vocabulary of politicians, administrators and planners.<sup>1</sup> Nowadays, many planners believe that the most important challenge facing the profession today is to replace current resource-consuming and environmentally straining activities within their respective fields of planning, with a sustainable development. Environmental sustainability appears to be emerging as one of the competing rationales for planning in Western democracies.

Compared to the large number of books, articles and conference papers about the spatial and physical features of sustainable cities, the environmental and sustainability aspects have not been much in focus in the literature on procedural planning theory. Gradually, some contributions have come, but most of these deal with environmental issues only partially or indirectly. Most often, the authors discussing planning procedures and sustainability do not clarify what they consider to be the substantive content of a sustainable spatial planning. The detachment of planning theories from the actual subject areas is a common trait of much of contemporary planning literature (Yiftachel & Huxley, 2000). In the case of sustainable

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development such a separation appears to be particularly inappropriate, as the recommendable procedures will most likely depend on the goals and policy issues dealt with. For example, if the goals of development are consistent with the prevailing lifestyles and consumer demands of local residents, the applicability of bottom-up strategies will probably be higher than in a situation where these lifestyles and consumption patterns are thought to be a main part of the very problem.

As the saying goes, a pet child gets many names. Concerning the use of the concept of sustainable development, one might perhaps as well say, “a pet name gets many children”. Today, a manifold range of strategies and projects are promoted with the claim that they are derived from the very concept of sustainable development. It has become politically impossible not to be a supporter of a sustainable development, so there is a clear danger that the concept will be watered out.<sup>2</sup>

The discourse about sustainable development based on the Brundtland Commission’s report and the processes in the UN Committee on Environment and Development could be interpreted as a discourse in opposition to the dominating growth discourse in industrial countries.<sup>3</sup> A common technique of dominance a prevailing discourse can employ in order to retain its hegemony, is to try to manipulate and change the object of the alternative discourse, among other things through de-radicalizing and re-definition (Van Dijk, 1996). The attempts to extend the concept of sustainable development to include a range of concerns not included in the concept as understood by the Brundtland Commission and the Rio de Janeiro conference could be taken as examples of such a strategy.<sup>4</sup>

## **2. Sustainable Development According to the Brundtland Commission**

Distinct from such a ‘broadened’ concept, my discussion below is based on an interpretation of the term of sustainable development in line with the Brundtland Commission’s report, the 1992 conference on Environment and Development in Rio de Janeiro, and the subsequent work of the UN Committee on Environment and Development. Understood this way, the concept combines ethical norms of welfare, distribution and democracy while recognizing that nature’s ability to absorb human-made encroachments and pollution is limited. The Brundtland Commission’s report devotes one of its chapters (Brundtland Commission, 1987, chapter 2) to a description and discussion of the concept of sustainable development. The Commission here makes it clear that a sustainable development is first and foremost about ensuring that everybody—both in poor and rich countries, and today as well as in future generations—can have their basic needs met. This must be obtained without jeopardizing the natural systems on which life on earth is dependent. Furthermore, the decision processes leading to such a result must be democratic and legitimate.

Meeting vital needs is thus a key element of a sustainable development. But the notion of needs is in itself a diffuse and problematic concept. The most affluent groups of society are often models and trendsetters, creating ideals and desires that broad parts of the population strive to fulfil. However, it is not this type of needs that are to be satisfied in a sustainable development. The Brundtland Commission mentions food, water, clothes, shelter, work, energy and hygiene as examples of what is termed ‘basic needs’, and continues with the following (1987, p. 44):

Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long term sustainability. Yet many of us live beyond the world’s ecological means, for instance in our patterns of energy use.

Meeting basic needs for everybody within the constraints set by the earth’s ecological carrying

capacity has two important implications. Firstly, in order to secure the possibilities for future generations to meet their needs, present-day humans must limit their encroachments on the natural environment and consumption of non-renewable natural resources. Secondly, increased material consumption in developing countries, which can be necessary in order to meet the basic needs of the poor, must be accompanied by reduced material consumption levels in the industrial countries if the environmental load on the planet as a whole is to be kept within sustainable limits (Haavelmo & Hansen, 1991).

Thus, the concept of sustainable development comprises a strong element of distributive ethics, focusing on the distribution of benefits and burdens over time (across generations) as well as spatially (within generations).<sup>5</sup>

Although the Brundtland Commission is primarily occupied with the natural environment as a life support system for humans, also ideas about an intrinsic value of nature are expressed. The commission writes (p. 57):

The conservation of nature should not rest only with developmental goals. It is part of our moral obligations to *other living beings* and future generations. (emphasis added)

In addition to the ethical principles concerning the results of a sustainable development, also the procedures leading to this outcome must be ethically acceptable. Basic needs of course also include, among other things, freedom from torture, slavery, coercion and suppression, and a possibility to influence on one's own situation. Here, the Brundtland Commission concludes that a sustainable development requires a political system that can secure its citizens a real influence on decisions. The report emphasizes the need to support grassroots initiatives, give more power to non-governmental organizations and strengthen local democracy. These recommendations are repeated in the Agenda 21 document of the Rio de Janeiro conference in 1992, where local authorities are encouraged to initiate processes where, among others, young people, women, and enterprises are involved in local work to promote a sustainable development.

### **3. Criteria of a Sustainable Spatial Planning<sup>6</sup>**

The content of a sustainable development, as understood by the World Commission on Environment and Development, is far from 'business as usual'. It would be surprising if spatial planning, in such a situation, could be able to continue along the same main trajectories as today. The subject matter of the spatial planning—land use and development of buildings and infrastructure—causes a number of direct and indirect environmental impacts which, with current priorities, are clearly at odds with the requirements of a sustainable development (see, for example, UN/ECE, 1998). The challenges raised by the imperative of sustainable development will be different for urban planning in poor developing countries than in the European Union and other wealthy regions of the world. Whereas improvement of the residential and hygienic standard will be among the main tasks of a sustainable urban planning in the former countries, reducing the per capita expenditure of natural and environmental resources must be a central topic in the latter.

On an overall and general scale, the requirement to a sustainable development of land use, building stock and technical infrastructure might perhaps be formulated as follows:

In order for the development of land use, patterns of built-up land and infrastructure in an area to be characterized as sustainable, it must secure that the inhabitants of the area can have their vital needs met in a way that can be sustained in the future, and is not in conflict with sustainable development at a global level.

It is, of course, possible to operationalize such an overall goal in many different ways.

However, in much of the literature on sustainable urban development and spatial planning in wealthy industrial countries (e.g. OECD/CEMAT, 1994; UN/ECE, 1998; Næss, 1997) the following five elements are emphasized:

- (1) Reduction of the energy use and emissions per capita in the area (city, municipality, or region) down to a level compatible with the ecological and distributional criteria for sustainable development at a global level.
- (2) A minimizing of the conversion of and encroachments on natural areas, ecosystems and soil resources for food production.
- (3) A minimizing of the consumption of environmentally harmful construction materials.
- (4) A replacement of open-ended flows, where natural resources are transformed into waste, with closed loops relying to a higher extent on local resources.
- (5) A sound environment for the city's inhabitants, without pollution and noise damaging to the inhabitants' health, and with sufficient green areas to give opportunities for the population to experience and become emotionally related to nature.

A high energy use contributes to a range of serious environmental problems, both when the energy is extracted/produced, transported and used. A sustainable level of energy use and emissions in European countries must consider both a goal of reducing the global-level energy use and related emissions, and a goal of increasing the material standard of living in developing countries. For example, the United Nation Climate Panel has suggested that the global carbon dioxide emissions should be reduced by at least 60% as soon as possible. Based on present technology, the amount of carbon dioxide emissions is proportional to the amount of fossil fuel combustion. In practice, such a reduction would therefore imply that the annual consumption of fossil fuels be reduced by at least 60%. Some of this reduction could be obtained by shifting to other energy sources than oil, coal and gas. However, it is hardly realistic to achieve all of the desirable reduction in emissions by concentrating on alternative sources of energy. In addition, also renewable energy sources are encumbered with environmental problems, both in relation to the sustainability goals of biodiversity and nature conservation, and in relation to other environmental concerns like outdoor recreation opportunities and the protection of landscape amenities.<sup>7</sup> Instead, the Brundtland Commission emphasizes the need for both a shift to renewable energy sources and a development in the direction of a 'low-energy future'. If at the same time an increase in the material standard of living is going to take place in developing countries, this will most likely imply substantial increases in the energy consumption of these countries. For such an increase to be possible within the frames of a total level of emissions that does not aggravate the greenhouse effect, industrial countries must reduce their emissions by considerably more than the 60% suggested by the UN Climate Panel for the planet as a whole.<sup>8</sup>

The need to protect natural ecosystems and biological resources is strongly underlined in the Brundtland Commission's report. In part, this is grounded on an assumption that these environmental resources constitute a 'life support system' necessary for the future health and survival of human beings. In addition, the commission to some extent also points at moral obligations associated with the concept of nature's intrinsic value (see earlier). Loss of habitats is a main cause of extinction of species, and habitat loss and fragmentation are increasingly the direct results of urban development (Beatley, 2000).

The goal of protecting arable land is based on the reasoning that meeting the needs for food for a future global population of 10 billion will limit the possibilities for Europe to import food from other parts of the world. According to the 1997 State of the World report (Brown *et al.*, 1997), the global population increases faster than food production. There is reason to believe that a sustainable and less polluting agricultural sector would depend on larger cultivated areas to maintain a given output of food products. Increased regional self-supply is

also a strategy to limit the energy use and emissions associated with intercontinental transport of foodstuffs.

The materials used in buildings and infrastructure can to a higher or lesser degree imply negative environmental impacts. In a sustainability perspective, it is of particular importance to curb the consumption of building materials made from non-renewable or scarce, conditionally renewable natural resources; materials requiring a high energy use to be processed and/or transported to the construction site; and materials causing serious encroachments on ecosystems in the localities where they are extracted. By choosing plot ratios and dwelling types and by means of regulations in local development plans on the use of materials, planners can influence the amount of materials needed, and to some extent also their composition.

'Open' flows of substances imply a continuous need for extraction of natural resources, and that steadily increasing amounts of wastes have to be dealt with. Closing the cycles of substances has for a long time been recognized as a basic ecological principle (cf. Commoner, 1972). If the loops can be closed locally, the need to transport raw materials and wastes will be reduced. Land use planning can influence the possibilities for local recycling schemes for, among others, water and foodstuffs.

The need for the urban environment to satisfy its inhabitants' basic material needs in terms of, among others, housing and hygiene, without causing health risks to its residents, is strongly underlined in the Brundtland Commission's chapter on the 'Urban challenge' (1987, chapter 9). In addition to needs concerning physical survival and the satisfaction of a minimum level of material consumption, some authors have argued that also some contact with nature must be considered a basic human need. For instance, the philosopher Warwick Fox (1990) holds that we have a genetically inherited need for contact with nature, and that it is of importance to our psychological health to have this need met. Possibilities to experience nature have also been pointed out as a pedagogical means to create environmental awareness. The likelihood of rising generations to develop a more responsible attitude to nature than the one characterizing our generation will perhaps be higher if people from childhood onwards experience nature and get related to it not only intellectually, but also emotionally (cf., among others, Arne Næss, 1989). However, the Brundtland Commission does not focus on these aspects, which, according to some authors, make up a 'post-material' dimension of the concept of sustainability (Owens, 1994).

There may be some contradictions between the above five criteria. They reflect two different focal points in urban environmental policy: 'ecology within the city' and the 'city in ecology'. Traditional policies on urban environmental issues could largely be placed under the former of the two categories, with their focus on the importance of parks, greenfields and non-polluted air and drinking water to the inhabitants' health and quality of life. Such local environmental concerns are of course still important. However, the recommendations of the Brundtland commission imply that the focus must be expanded to encompass also the city as a part of the larger natural ecosystem. What must be taken into consideration is not only the city's relationship to its nearest hinterland, but also its 'ecological footprints' in an international and global context.

#### **4. Ecology within the City, the City in Ecology, or Ecology without Cities?**

The core of the discussion on the possibilities for spatial planning to contribute to a sustainable urban development and land use has differed somewhat across national borders. In some countries, including Norway, Great Britain and Germany, much of the discussion has focused on the negative environmental consequences of a land-consuming and sprawling urban development in terms of, among others, loss of natural and agricultural areas and a high energy use for transport and in buildings. To a large extent, the predominant ideas of a

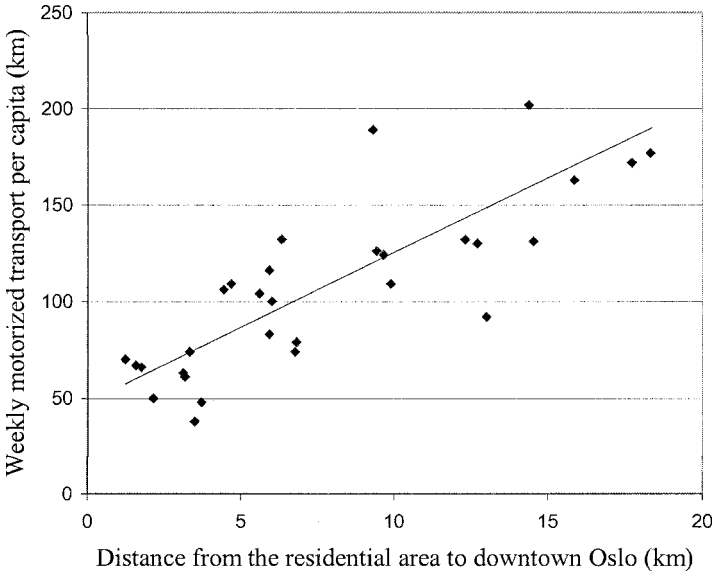
sustainable urban development in these countries appear to converge on the ideal of the 'compact city'. In its "Green paper on the urban environment" of 1990, the European Commission has advocated such an urban model as the most sustainable, indeed with just as much emphasis on architectural 'urban design' criteria as on the arguments of ecological sustainability. In Denmark, the Netherlands and partly in Sweden, the discussion has been focused more on the possibility of establishing ecological cycles of water and sewage within the separate neighbourhood or even at the individual site, and how land use could contribute to a higher local self-support of agricultural products. These camps of professionals have advocated the 'green city' as the sustainable model. Some of the proponents of local self-support and local solutions for closed cycles of substances have gone so far as to reject cities as a settlement type in a sustainable society. Instead, they point out eco-villages in rural surroundings as an alternative.

The existing building stock and land use implies that ideal models for how urban structures ought to be must necessarily be considerably modified in practice (unless a large-scale demolishing is carried out in order to bring the present urban structure in accordance with the ideal). Nevertheless, it cannot be denied that the two models of sustainable cities provide us with very different guidelines for action concerning the desirable location and structuring of new built-up areas. Whereas the 'compact city' model implies that future needs for development should primarily be met through densification within present urban area demarcations, the consequence of the 'green city' model is that new development should rather take place as a spatial extension of the city.

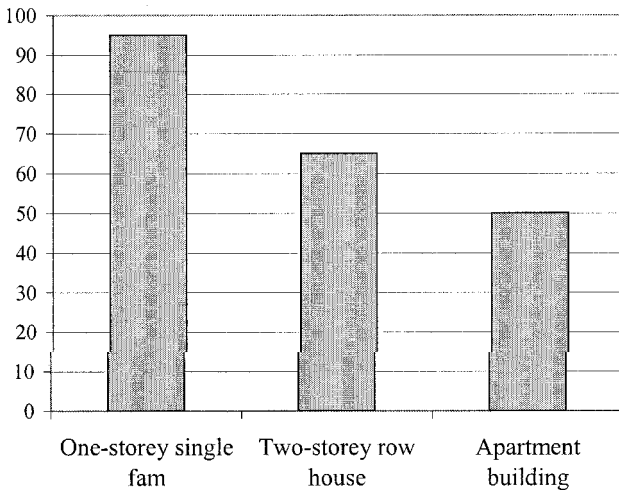
Principles of an energy-conscious spatial planning point rather unambiguously in the direction of relatively dense developmental patterns with a low proportion of detached single-family houses (Owens, 1986; Næss, 1997; Newman & Kenworthy, 1999). A high population density implies shorter distances between functions and facilitates the use of public and non-motorized means of transport, thus contributing to lower energy use and lower emissions (Newman & Kenworthy, 1989, 1999; Næss *et al.*, 1996). Investigations in a number of cities, ranging from 30,000 inhabitants to metropolises like Paris and London, have also shown that inner-city residents travel considerably less by motorized modes than their outer-area counterparts, also when socio-economic differences are taken into account<sup>9</sup> (Figure 1) (see, among others, Næss *et al.*, 1995; Fouchier, 1998; Næss, 2000). Except for local service functions like grocery stores, primary schools and kindergartens, and workplaces creating much goods transport, a location of jobs close to the city centre will also usually be environmentally favourable. At least in cities over a certain size, the proportion commuting by car is considerably higher at workplaces on the urban fringe than in the inner city (Næss & Sandberg, 1996; Hartoft-Nielsen, 1997).

Besides limiting the needs of transport by means of land use planning, it will be important in a sustainable urban development to avoid encouraging increased use of cars by providing a high road and parking capacity. In cities with congestion on the road network, the commuters' choice of mode of transportation is influenced by how easily a parking place can be found at the place of work, and by the relative speeds of car and public transport, measured from door-to-door. Road extensions in order to reduce rush-hour congestion will therefore usually cause a higher proportion of the commuters to choose the car mode (Mogridge, 1997; Næss *et al.*, 2001).

In addition to contributing to a population density that may reduce the use of cars, concentrated types of housing (apartment buildings and row houses) have lower needs for space heating per square metre than detached single-family houses, cf. Figure 2 (Duun *et al.*, 1988). Besides, the floor area of a single family home is usually larger than in apartments and row house dwellings. This implies a further increase in the differential in space heating requirement between concentrated and area-demanding housing types.



**Figure 1.** Average motorized weekly transport within the Greater Oslo region among respondents from residential areas located at different distances from downtown Oslo. Official trips not included. The regression line shows the relationship when controlling for a number of socio-economic factors. Source: Næss *et al.* (1995).



**Figure 2.** Variation in energy requirement for space heating (kW h per square metre) between different housing types, given a dwelling size of 120 square metre of residential floor area. The figure applies to climate conditions like in Oslo. Source: Dunn *et al.* (1988).

A high utilization of the built-up areas also reduces the need to convert natural areas or farmland into developmental areas. In this sense, a high density is favourable to the protection of biodiversity and biological productive resources (Fouchier, 1995; Beatley, 2000). The

demand of the outdoor recreational interests for large, continuous areas for hiking and walking point in the same direction.

At the same time, some sustainability and environmental concerns speak against too dense urban structures. In particular, this applies to the wishes of some environmentalists for ecological recycling schemes for foodstuff and sewage in the local area (neighbourhood or even within the individual site). Some planners hold that such solutions will increase the residents' understanding of the importance of ecological processes, hence contributing to more positive attitudes to environment protection (see, for example, Knudsen, 1994). In order to facilitate such solutions, a relatively open urban structure is recommended, where built-up areas, farmland and other green areas make up a mosaic-like pattern (Ornskog, 1993, see also Breheny, 1992). Moreover, a high density will easily conflict with the wish of the outdoor recreational interests for ample green areas close to the residence. In some cases, the areas within the urban area demarcation also comprise localities of importance to biodiversity for the urban region as a whole, and sometimes also of a high national protection value. Yet, for several reasons, the loss of biodiversity is often more serious when construction takes place in natural areas outside the city than inside. Because the site utilization is usually higher in central than in peripheral parts of an urban region, more undeveloped land is usually converted into built-up areas when development takes place as spatial expansion of the city than by densification. The diversity of species is also usually higher in large, continuous natural areas (Mörtberg, 1989). Furthermore, a number of urban ecological projects have shown that it is possible to implement principles for greywater recycling and local treatment of organic wastes even in dense built-up areas (Hahn, 1990; Ebler & Ebler, 1995).

Evaluated against the five criteria listed above, concentrated and area-saving urban structures appear to be clearly preferable, compared to scattered and open patterns of urban development. This does not imply that the city ought to be compact right through in the sense of a concentric 'core city' with no green wedges. Densities at neighbourhood and district level should, however, be high enough to facilitate local services and public transport as well as to reduce the need for new greenfield development. According to Frey (1999), district-level gross population densities of about 60 persons per hectare would provide a good basis for local provision centres within walking distances. In larger cities, the accessibility for inhabitants to green areas and the possibilities of 'symbiotic metabolism' between the city and the countryside speak against a too high degree of compactness at a metropolitan area level. Still, in order to limit travelling distances, residences should not be located too far away from the concentration of workplaces, administration centres, specialized service functions and cultural facilities usually found in the downtown area, cf. Figure 1.

The arguments for the dispersed urban model, with large internal green areas and a considerable agricultural production within urban area demarcations, seem to neglect some of the most central goals of a sustainable urban development in industrial countries: the need to limit the use of energy, and the goal of preventing continuous natural and agricultural areas from being built down. There also seems to be poor empirical support of the argument that gardening and composting possibilities on the resident's own site contribute to increase environmental awareness.<sup>10</sup>

Those who claim that low-density, dispersed cities can be energy efficient and sustainable seem to presuppose rather profound changes in people's lifestyles. If the inhabitants consider high accessibility to a multitude of various functions as an important, positive trait of cities and are not willing to renounce this quality, the dispersed urban model can hardly be compatible with goals of reducing the amount of transport and the use of cars. Regardless of lifestyle changes, spatial expansion of cities implies increased conversion of natural and arable areas, and energy use for space heating increases from a high proportion of single-family houses.

The conversion of undeveloped land is to an even higher extent an argument against the



anti-urban eco-village model. Apart from being highly unrealistic<sup>11</sup> as an answer to the environmental and sustainability problems of cities, it is open to the gravest doubt whether such an 'ecology without cities' would be environmentally sustainable, given the present size of the human population. What would, for example, be the consequences to ecosystems, fauna and areas for food production in France if all Parisians moved out to settle in dispersed eco-villages?

Earlier, I mentioned that planners who aim to contribute to a sustainable urban development must direct their attention towards both 'ecology within the city' and the 'city in ecology'. The 'green city' model belongs mainly within the former of these two perspectives. Indeed, the focus on recycling and local self-support implies that proponents are concerned about environmental issues beyond the immediate well-being of local inhabitants, but the use of sustainability arguments is selective. Those aspects of a sustainable development that appear to be fitting into a dispersed urban model are embraced, whereas sustainability criteria pointing in the opposite direction are ignored. It might therefore seem as though the fundamental values behind the 'green city' model are not the concerns of a sustainable development, but rather landscape-esthetical and architectural ideals, coupled with an ideology of decentralization. While the proponents of the garden suburb previously justified their ideas by welfare and esthetical reasons, the present argumentation for this urban ideal has been adapted to a situation where the issue of a sustainable urban development has entered the agenda.

### **5. Is Eco-efficiency and Re-use Sufficient?**

In order to make urban development more in line with the requirements of a sustainable development, it seems important to avoid further urban sprawl and further expansion of the road and parking capacity. Instead, most construction should take place within existing built-up boundaries, in particular in areas not far from the urban centre. Most of the densification should be channelled to areas already technically affected in order to save urban green areas. In addition, restrictions should be put on the use of cars, while improving public transport.

The question still remains whether a re-use of urban areas and more effective utilization of building sites is sufficient to bring urban development in wealthy countries within the frames of what is ecologically sustainable, as long as the building stock continues to grow.

For a number of environmental aspects, the total environmental load of the building stock continues to increase as long as its size increases, even if the additional load per new building is reduced. Growth in the building stock implies, among other things, that larger volumes have to be heated, also if the new buildings are given an energy-conscious location and design. Unless the new houses are built as a replacement for existing, more environmentally straining buildings, new construction based on environmentally favourable solutions are seldom environmentally friendly in an absolute sense. If the new buildings come in addition to the already existing building stock, they will at best be ecologically favourable in a relative sense, i.e. compared to other, more environmentally straining solutions. The construction of buildings is basically an endeavour putting a load on the natural environment, even if the extent of negative environmental impacts may be significantly affected by the choice of solutions.

This leads us to the question whether it can at all be said to be consistent with a sustainable development to increase the building stock considerably above present levels in wealthy countries like, for instance, the countries of Northern Europe. During the period since World War II there has been a steady and significant growth in the floor area per inhabitant, in dwellings as well as in other types of buildings. Some of this increase is a result of the fact that the number of households and jobs has increased more rapidly than the general

population growth. But this can only explain a small proportion of the growth in the building stock. Simultaneous with a decrease in the number of occupants per dwelling, the average size of dwellings has increased. Except from agriculture, where the building stock (barns of different types etc.) has decreased due to, among others, closing down and mergers of farms, the stock of non-residential buildings has also increased, both in absolute figures and measured as floor area per employee. This has happened in spite of the fact that a steadily increasing proportion of the workforce is employed within the service and office trades, where the number of square metres per employee has traditionally been lower than in manufacturing industries.

The Nordic countries belong to the nations where the size of the building stock, compared to the population size, is among the highest. Today, each Norwegian and Dane has on average more than 50 square metre of residential floor area at his/her disposal. This is twice as much as 30–35 years ago and about 70% more than in contemporary, affluent Japan. Compared to poor developing countries the difference is much larger. What would be the ecological consequences if poorer countries like China and India reached the North European consumption level in the housing sector? Can it be defended ethically to aim at a continual increase in Northern Europe resulting in a residential consumption level that we, for the sake of the planet's ecological carrying capacity, must hope will never be realized in the world's poor countries?

Population growth (which is modest in most European countries) and changes in the composition of households towards a higher number of small households imply that there will still be a need for a certain increase in the number of dwellings. Some population groups also live in substandard dwellings, even in the wealthy North European countries where the average standard is high. If a satisfaction of these needs is to be combined with a requirement for the nation as a whole to keep its consumption level within an 'ecological scope', it will be necessary to practice a principle of selective standard improvement. In a similar manner as the goal of raising the material standard of living in poor countries intensifies the need for industrial countries to reduce their carbon dioxide emissions, a national 'ceiling' for the total consumption of natural resources implies that increased floor space for those who already live in a spacious dwelling, comes in direct competition with the wish to build for those who are lacking a dwelling or live in a substandard residence. Previously, the residential standard for low-income groups has been substantially raised by a general elevation of the housing standard, e.g. as a result of moderate-price dwellings becoming vacant when people who can afford it, move into new high-standard dwellings. As already mentioned, such a continuous, general increase in consumption is problematic in an environmental and natural resources perspective. If we intend to secure a certain minimum standard for everyone, resources must be allocated to raise the residential quality for the most poorly situated instead of increasing the standard further for the affluent groups.

## **6. Planning Processes for a Sustainable Development**

In the later sections of the paper I shall focus on the implications of the challenges of sustainability to some of the topics of the contemporary debate on planning theory. Above, I commented on the fact that almost none of the (relatively few) debaters who discuss procedural planning theory from the perspective of sustainable development have clarified what they consider to be the substantive content of a sustainable spatial planning. In many cases, the authors seem to take for granted that the goals of sustainability are largely consistent with the prevailing lifestyles, consumption habits and perception of the environmental situation among the members of the local community. However, if the reasoning outlined above is correct, this will hardly be the case in affluent societies. Some of the most important

challenges of a sustainable development in such countries concern the need to reduce environmentally harmful activities which, viewed in isolation, can make life for the individual citizen more convenient, more enjoyable, or more prestigious. These activities at the same time represent resource consumption and a degradation of the natural environment that threaten the possibilities of future generations and the world's poor to meet their needs.

### *6.1 Neither Unbridled Market Forces nor Incrementalism can do the Job*

There is little reason for hope that a sustainable urban development will emerge as a result of unbridled market forces. Classical economic theory recognizes that market processes alone are not able to counteract so-called externalities. Externalities are social costs not included in the profitability analyses of the agents of the market, but shifted on to other people or the environment. Pollution is an example of such costs. Neither are sole market processes able to ensure a socially acceptable distribution of burdens and benefits. Thus, both the two key elements of a sustainable development—to meet vital needs and ensure an equitable distribution in time and space, and the condition of environmental sustainability—depend on planning and management by public authorities (see, for example, Klosterman, 1985).

A similar insufficiency with respect to the challenges of a sustainable development also applies to the incremental decision-making model (cf. Lindblom, 1959). According to the incremental model, alternatives for action are chosen in a way that deviate little from today's practice. If current practice is to consume non-renewable resources at a fast rate, none of the alternatives for actions considered will be able to change this negative development. Present development may also violate the interests of underprivileged groups in the present generation. By neglecting to examine alternatives differing much from the *status quo*, such alternatives lose the opportunity to become visualized and discussed. Furthermore, analyses of consequences are very limited in incremental planning, based on 'immediate' experiences with previous efforts, with little foundation in theory. Such 'non-analytical' evaluations of consequences are hardly very suited to illustrate where the aggregation of small steps will lead us. Incremental, 'one bite at a time' planning, using trial and error as a strategy, is fundamentally problematic regarding irreversible interferences with nature. An area is only protected as long as it is not being developed, while a realized development project physically prevents future conservation.

As action alternatives of incremental planning only represent small steps in relation to the present situation, it is possible to gain experiences quickly and implement these during evaluation of the next step. From an environmental point of view, this is favourable. Apart from this, incremental planning seems poorly suited to promote collective, instrumental goals, whether these address global or national environmental concerns, local environmental qualities, or a more just distribution among population groups.

### *6.2 Planning must be Goal-oriented, But ...*

There is little help in goal formulations about sustainability if the measures of the plans actually tend to move us further away from these goals. Thus, planning cannot disregard the goals. It has to be goal-oriented. The various means included in the plan must be efficient—or at least acceptable—judged from criteria of a sustainable development. Among the normative planning theories, the rational-comprehensive, synoptic model is the one with the strongest emphasis of finding efficient means in order to reach explicitly formulated goals.

However, the criticism of modernism's technology optimism and belief in progress has also affected the conception of rational and goal-oriented planning. This form of planning is rooted in the same technology optimistic way of thinking that has contributed to the environmental

problems of today. With its strong emphasis on professional expertise it has also a tendency to neglect informal knowledge, for example the knowledge of lay people about local environmental qualities. Proponents of the goal-rational planning model are apt to have a high faith in technical-economic methods of analysis, for example cost-benefit analysis. In practice, such methods have often contributed to neglect factors that cannot be quantified or expressed in monetary terms.

The rational-comprehensive planning model is based on a utilitarian tradition of social philosophy, where what counts is the total amount of utility, not the distribution between individuals or groups. This may easily lead to a pressure against the rights of minorities. Theoretically, a utilitarian calculus of utility and disadvantage might, e.g. conclude that the gladiatorial combats in ancient Rome were ethically defensible, provided that the number of onlookers was high enough that the pain and death of the gladiators could be outweighed by the spectators' excitement and entertainment! In our contemporary liberal democracies such extreme outcomes would be prevented by legislation established to protect individuals and minorities against infringements in the name of 'the common good'. Still, the rationalist model of planning has an inherent tendency towards 'majority tyranny' that can result in the sacrifice of a small minority's vital interests in order to bring about marginal improvements for a large majority.

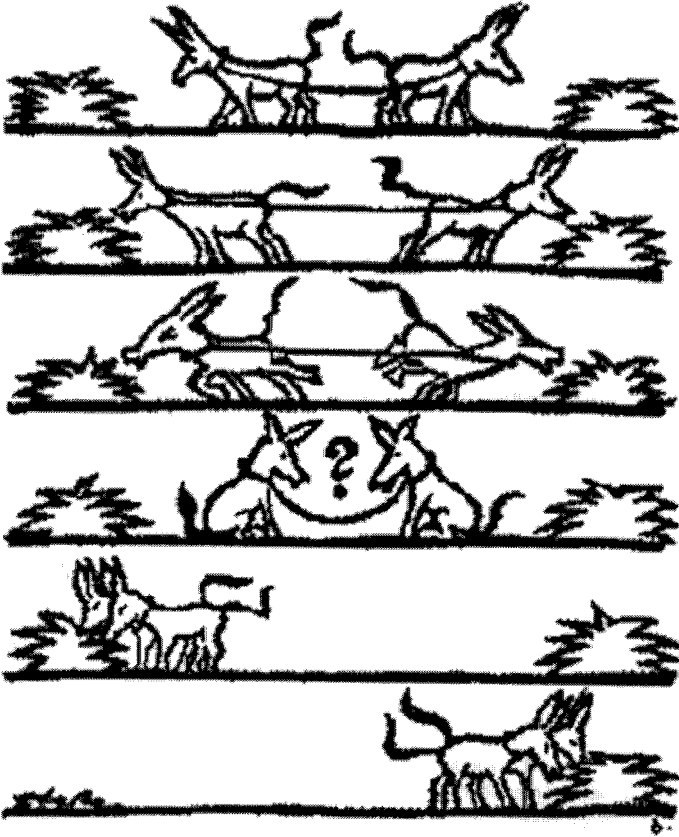
### *6.3 Communicative Planning*

As a reaction to the technocratic elements of the synoptic planning model, alternative models putting more emphasis on citizen participation have been launched. The effects of the planning process on people's self-esteem, values, behaviour, capacity for growth and cooperative skills are often considered more important than the merely instrumental consequences of a plan. With their emphasis on giving the local population as high an influence as possible on their own situation, supporters of this form of planning are usually skeptical to top-down management, for example in the form of national-government directives to the municipalities. Much of the literature on communicative planning has also been characterized by a strong belief that dialogue can transform conflicts of interests into situations where both sides win, and that it is possible by means of decentralized and broad planning processes to arrive at mutual understanding and agreement (Figure 3). In particular, this is true about the strands known as 'collaborative planning' (Healey, 1992/1996, 1997) and 'planning as consensus-building' (Innes, 1996).

One of the most prominent representatives of this school of thought, Patsy Healey (1992/1996, p. 246), goes far in the direction of putting brackets around the expert knowledge of planners as well as goals set by authorities outside the local community:

Knowledge is not preformulated but is specifically created anew in our communication through exchanging perceptions and understanding and through drawing on the stock of life experience and previously consolidated cultural and moral knowledge available to participants. We cannot, therefore, predefine a set of tasks that planning must address, since these must be specifically discovered, learnt about, and understood through intercommunicative processes.

Seen in relation to the challenges of a sustainable development, serious objections could be raised against this planning model. It is not at all certain—nor even probable—that an ecologically defensible and globally solidary land use or resource consumption will emerge spontaneously from the grassroots among the population in countries belonging to the world's most privileged nations. If a sustainable urban development were a matter of actions compatible with the dominating residential ideals and mobility preferences among the



**Figure 3.** Conflict resolution through dialogue. The collaborative and consensus-based planning models are characterized by a strong belief that dialogue can transform conflicts of interest into situations where both sides win. Unfortunately, not all conflicts are of this benign type (illustration: Bente Stensen).

population, then bottom-up grassroots planning might perhaps have functioned in line with the goals of sustainability. However, a sustainable development is to a high extent a matter of redistributing consumption levels from us who live *here* and *now* to those who live *there* and *then*, that is, from present-day inhabitants in the most affluent nations to people in future generations and in poor countries. Municipalities that might wish to act in a globally solidary way, for example by reducing their carbon dioxide emissions, may see such efforts as useless as long as they cannot trust that other municipalities will also do their part to reduce emissions. Similar to the way planning is necessary in order to solve common tasks within a municipality, higher level coordination is necessary at regional, national or international scale in order to resolve the 'prisoner's dilemma' facing individual local communities in relation to global and national environmental problems. Such planning is also necessary to avoid that the dispositions made by local authorities shift problems on to other local communities (whether the latter are located in the neighbour municipality or at the other side of the globe).

This does not mean that detailed control from above should replace local democracy in the municipalities. On the contrary, I consider vivid local planning processes as a precondition for developing the awareness about a sustainable development that is necessary if planning

with such a target is ever going to become politically applicable. The Brundtland Commission emphasizes the need to support grassroots initiatives, empower citizen organizations and strengthen local democracy. However, it is hardly reasonable to interpret these recommendations as a call for radical decentralizing of the powers of decision from national authorities to the municipalities (or to the various local communities within each municipality). Local dispositions—not the least concerning land use and development—often have consequences far beyond the municipal borders. This implies that the local level should not have full sovereignty over such dispositions. Local planning should therefore take place within frames ensuring that consequences primarily manifesting themselves at other scales than the local are also taken into consideration.

Within the literature on communicative planning there has also been a tendency to downplay the role of scientific knowledge about the relationship between goals and means. Often, such knowledge is considered to be of a limited or doubtful validity, since each planning situation is in principle unique. Instead, a consensus-based criterion for knowledge and truth is taken as the point of departure. What is considered valid knowledge, are these statements that one through debate and dialogue has agreed to hold as true. However, as a principle for diagnosing how the ecological situation is, or the consequences of various types of human activity to the natural environment, the consensus criterion for truth is hardly well suited. If the members of a local planning committee agree on the statement that car traffic does not represent any environmental problem, this conclusion will not for that reason be true! As pointed to by the Finnish philosopher and architect Kimmo Lapintie (1998, p. 90), the consensus criterion may lead to actions that will cause serious negative environmental consequences:

Thus we may imagine a communicative situation where, for social or cultural reasons, no one wishes to create a controversial situation ... It is perfectly possible for such a community to end up, for instance, in a development that will cause disastrous environmental consequences.

Drawing the focus away from public goals and the efficiency of means is hardly conducive to a sustainable urban development. Even if the planning authority abstains from goal formulation, the various stakeholders are of course very well aware of what outcome they want. A weaker focus on goals in planning therefore implies that it is the public goals that are downplayed, not those of powerful interest groups. Likewise, reduced focus by the public authorities on expert knowledge does not imply that such knowledge is replaced in the planning process by the 'life-world' knowledge of ordinary people. Instead, the expertise will then be serving only those stakeholder groups who can pay for it. The banks have their experts advising how to act, and so have the property developers and the road construction segment. Thus, when planners draw their attention away from the relationship between means and ends, this tends to weaken the political influence on the outcome and increase the influence from the market and the strongest stakeholder groups. Rather than rejecting expert knowledge, planning for a sustainable development should make use of both expert and layman knowledge, and involve perspectives from natural, technological and social as well as human science.

Because of its strong belief that it is always possible to come to an agreement, communicative planning theory—especially in its collaborative and consensus-based versions—has been accused for naiveté about the power relations of the world (see, among others, Flyvbjerg, 1998; Tewdwr-Jones & Allmendinger, 1998). It is no accident that the present development implies a fast draining of natural resources, reduction of natural areas and high emissions of pollutants—some people have wanted it this way because these processes also yield profit and contribute to economic growth. For business life, continued growth in consumption levels, e.g.

in the form of higher mobility and larger residences, provides a base for increased sales, and hence for profit. A planning model that does not recognize the right of a majority to make decisions against the interests of a minority, is poorly suited to secure sustainability considerations in the face of actors with an economic interest in the present non-sustainable development. The need to make decisions across the interests of privileged groups is increased by the fact that retaining the national consumption level within an 'ecological scope' would most likely lead to sharpened conflicts between the social classes about the distribution of the limited resources available for consumption.

## **7. What can Urban Planners do to Promote Sustainable Development?**

As already mentioned, giving consistent priority to the concerns for a sustainable development would be very controversial, and there is hardly much political support today in any single European country for ambitious steps in this direction. If the individual countries were to be forced by external conditions to follow a more sustainable policy, for example as a result of future follow-up of the Kyoto agreement with more ambitious and obliging requirements for reduced greenhouse gas emissions, then the prospects for a more ambitious sustainability-oriented planning might be better. Still, planners can already today contribute to increase the possibilities for promoting a sustainable development. This can be done by developing and communicating knowledge about what will be sustainable and environmentally friendly solutions, and by stimulating planning processes that can generate more debate about what values and interests we really want to promote.

The possibility for planners to act according to such a role is probably highest outside the public bureaucracy, for example in non-governmental organizations working for sustainability, or within the academic world. But there is scope for action also for planners working in governmental agencies at different levels or in private consultant companies. Even though the political context and historical background of the institutions in which planners work make up constraints on what is considered acceptable professional conduct, the ideas and skills of those working in these institutions matter.

Firstly, planners have a responsibility to point to the likely consequences of different proposed solutions, seen in the light of criteria for a sustainable development. Even though it is not possible to analyse all types of consequences from the plan proposals, the alternatives should be evaluated against the goals considered most important. If, for example, planning is supposed to contribute to energy conservation and protection of biodiversity, then it is of course necessary that energy and biodiversity consequences of the alternatives be assessed.

Such an information should be given to politicians as well as the population in general. Planners could also, from their own professional knowledge, try to formulate plan alternatives compatible with a sustainable development to as high an extent as possible, and try to initiate a debate about these alternatives among politicians, different sectors of the administration as well as among the citizens. In many municipalities, planners could legitimate such behaviour by referring to official goals of sustainability adopted by the municipality's elected officials. In some cases, municipal planners could also argue that increased emphasis on sustainability is necessary in order to follow up national goals and to reduce the risk that higher level environmental authorities overrule the municipal plans.

Realistically, though, planners who convey information to the public about unsustainable consequences of solutions preferred by powerful interest groups and politicians, may run the risk of being branded disloyal or even to be fired. In order to counteract the obvious danger that information about environmental and social consequences of planning alternatives is suppressed, legislation should be introduced, requiring local authorities to carry out impact analyses as well as subsequent monitoring of the consequences of their strategic-level plans

against a set of sustainability indicators. In particular, such a requirement seems appropriate concerning the master plans for land use and construction of buildings and transport infrastructure. The results of such impact analyses and monitoring should be publicly available, thus ensuring a higher degree of transparency in the decision-making and implementation process. Compared to the present situation in many European countries, where goals of sustainable development seem to co-exist peacefully with the implementation of unsustainable measures, such a reform might bring about a higher degree of accountability of planning and policies aiming at sustainable development (Flyvbjerg, 1994).

Even though I do not believe that dialogue can do away with fundamental conflicts of interests or values, dialogue surely can resolve pseudo-disagreement and also convey information that makes some participants of the debate change their mind. However, as argued above, dialogue cannot replace the decision mechanisms of representative democracy. Among proponents of communicative planning there has been a tendency to “impose assumptions upon the process, such as participatory democracy ‘good’, representative democracy ‘bad’” (Tewdwr-Jones & Allmendinger, 1998). Instead of such a polarization, I am of the opinion that both deliberation and voting have important functions in democratic decision-making processes. Deliberation and dialogue reach decisions by amalgamating arguments, while voting schemes lead to decisions by aggregating individual preferences. These two strategies could preferentially be combined in the same decision-making process (Sager, 2000). The subject matters of the plan can be discussed in various arenas (e.g. neighbourhood meetings, the press, meetings involving different sectors of the municipal administration, meetings between municipal and higher level authorities, advisory councils made up by different stakeholder representatives, political planning committees, the municipal council). These discussions would help clarifying the issues and interests at stake, and may sometimes identify solutions gaining broad support. During the process, voting in different political bodies, ranging in responsibility from preparatory (e.g. the planning committee) to final decision-making (e.g. the municipal council) can sort out the politically feasible alternatives of action. In some cases of special importance, a referendum among the inhabitants might also be organized.

In all the above-mentioned arenas of debate, John Forester’s (1980) advice to planners about how to counteract ‘distorted communication’, i.e. communication violating the norms of comprehensibility, sincerity, legitimacy or truth, should be brought to mind. Counteracting ‘distorted communication’ of course requires that the planners are aware of their own way of communicating. In addition, planners have a responsibility to correct and counteract manipulating and incorrect communication carried out by other participants of the planning process. In particular, there is a challenge for planners to restrain the possibilities of the most powerful and influential players of the game to dominate and manipulate the other participants. Without serious efforts by the planners to contain the strong and empower the weak, participatory planning processes run the risk of bringing ‘more power to the powerful’ (Naustdalslid, 1991), for example, those with vested interests in unsustainable ways of developing land use and mobility.

If a sustainable development of land use, building stock and infrastructure is ever going to be possible, a change in people’s value priorities will probably be required. Without changed value priorities in the general public, politicians with a platform placing a sustainable development at the top of the agenda will not achieve a position of power. However, if most people do not prioritize nature and environment values more strongly than is done today, a government or a municipal council attempting to implement an ecologically defensible and globally solidary urban development will quickly lose its legitimacy. In a sustainability perspective, it is therefore highly desirable with planning processes that can contribute to a higher environmental awareness and responsibility.



## 8. Scenarios and Alliance-building

A problem in this context is that the long-term and global environmental and distributive issues often appear to ordinary people as far and abstract. Also the overall principles of the municipal master plan will often be considered diffuse and intangible. For planners, a great challenge lies in 'translating' and visualizing how our choices regarding housing types, location of development, transportation solutions and land use affect the possibilities to obtain a sustainable development. The development of scenarios illustrating principally different strategies in these fields might perhaps be a way to create more debate about what kind of urban development and land use planning we want. In Norway, the research project 'Environmentally Sound Urban Development' (NAMIT) illustrated the considerably different environmental consequences of a 'trend' versus an 'environmental' scenario in three urban areas (Næss, 1993). The dissemination of results from this project has contributed to increase the awareness of urban planners—and to some extent also politicians—about environmental consequences of land use and development (Naustdalslid & Reitan, 1994). By influencing the ideas of planners and decision-makers, the project was probably also one of the factors contributing to the less sprawling urban developmental patterns seen in Norway in the 1990s.

A working process where the scenarios are developed in interdisciplinary project groups might contribute to increased understanding of traits of development, scope for action and available options. This way, planning can to a higher extent become a learning process. In Sweden, such interdisciplinary activities have been tried out with some success, among others in the regional planning at county level (Guttu, 1993). The educational role of scenario-building is also documented in a current Nordic project where researchers as well as practitioners and politicians from the transportation sector are involved in the development and discussion of scenarios of sustainable mobility (Hansen *et al.*, 2000). If different sectors and interest groups are involved in such work, the process can perhaps also create a higher degree of consensus among the participants about important common interests to be secured through the planning. At the same time, such a process can reveal where fundamental antagonisms in interests or values exist. Thereby, the processes can contribute to increase the participants' awareness about social realities.

It is hardly likely that the directors of enterprises based on unsustainable interference with the environment, e.g. oil companies, will bend to argumentation of negative consequences from the combustion of fossil fuels and join a consensus about heavy restrictions on the use of cars. Several studies have also illustrated the frequent success of corporate interests like, for example, property brokers or the local chamber of commerce, in making coalitions with leading politicians and municipal administrators, effectively blocking environmental policies perceived to be unfavourable for the business climate (Flyvbjerg, 1994; Logan & Molotch, 1987). In order to counterbalance the power of such alliances, urban planners who take the environmental and sustainability goals seriously should consider which alliances might be built in support of these goals, and actively seek a dialogue with the relevant groups. Based on a study of the distorted implementation of a prize-awarded environmental project in the Danish city of Aalborg, Flyvbjerg (1994, p. 393) the following conclusion draws:

A municipal administration and its technicians, as well as an urban government and its politicians, may need influential alliance-partners and skills in strategic and tactic thinking, if their projects are ever going to succeed.

Hence, rather than the ideal of consensus-building across all stakeholder groups, as advocated by proponents of the collaborative planning model (Innes, 1996; Healey, 1997), *alliance-building* appears to be a more viable strategy in a world of fundamental conflicts. As

illustrated above, alliance-building is already an important feature of planning processes. Today, this strategy is mainly used by agents pursuing growth goals at the expense of environmental and equity considerations [a fact also realized by Healey (1997, pp. 162, 235–237) in her discussion of ‘entrepreneurial consensus’]. However, instead of relying on the wishful thinking that the participants in such coalitions will change their priorities if a more inclusionary planning process can be established, efforts should be made to foster alliance-building around the goals of a sustainable development. In my opinion, aiming to achieve consensus among *all* stakeholders is futile. What could be hoped for, is some consensus among those groups who do not have vested interests in the most environmentally harmful enterprises and sectors. *Within* groups who share some basic common values and interests, dialogue and deliberation can play an important role in creating consensus, and make those groups more powerful against their antagonists. Open and well-informed planning processes might then perhaps contribute to the emergence of common strategies for ecological sustainability and social justice, supported by a sufficient number of people to make a difference, and robust enough to withstand the pressure from those actors who harvest profit from the present non-sustainable development.

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### Notes

1. In the fall of 1999, a search on the Internet resulted in more than 50,000 references to the keywords ‘sustainable planning’, nearly 30,000 to ‘sustainable urban development’ and 25,000 to ‘sustainable land use planning’.
2. For a discussion of this tendency, see, among others, UN/ECE, 1998, pp. 13–14.
3. According to Dryzek (1997), five major strands of environmental discourse can be identified in contemporary modern societies: Prometheanism, environmental problem solving, sustainability, survivalism and green radicalism. Of these, the first mentioned one (named from Prometheus who according to Greek mythology stole fire from Zeus and thereby vastly increased human capacity to manipulate the world for human ends) denies that the natural environment poses any limits to the volume or content of economic growth. In spite of the emergence of alternative discourses placing more emphasis on environmental protection, the Promethean discourse must still be considered the dominant one, in particular with respect to the policies actually implemented. See also Colby (1989).
4. In one of the few papers discussing planning theory in the view of sustainability, Campbell (1996) locates the ideal of sustainable development *in the middle* between the three goals of profitability, fairness and environmental protection. Thus, the growth imperative is considered to be a pole in the concept of sustainable development on a level with the goals of social justice and environmental protection. Today, this is a quite common interpretation of the concept of sustainable development. Distinct from this, the World Commission on Environment and Development mentions economic growth as one among several *means* of a sustainable development, but not as a goal in itself. Growth is thought to be in line with the requirements of sustainable development, provided that the *content* of growth is changed by significantly reducing the resource input per unit produced, and by channelling the growth primarily into activities that are less energy and resource demanding (Brundtland Commission, 1987, p. 51). Placing growth—without any qualifications about its content—as a goal of sustainable development on a level with social equity and ecological sustainability, is hardly in line with the growth recommendation of the Brundtland Commission.
5. The concern of a fair distribution spatially (between wealthy and poor countries and between

- different population groups within a country) appears to have been downplayed in much of the later literature on sustainable development. Such a downplaying is at odds with one of the main principles of the Brundtland Commission's report, exemplified by the following statement (p. 43): "Even the narrow definition of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation."
6. The focus of this article on the role of spatial planning does of course not imply that I consider this to be the only or most important instrument to promote or prevent a sustainable development.
  7. Confer, for example, the strong opposition against hydroelectric development projects in countries like Norway, Chile and China, and the increasing opposition in Denmark and the Netherlands against windmill parks.
  8. The Brundtland Commission (1987, p. 171) has illustrated this by means of scenarios showing a possible implication of the combination of technological development in the Third World and a 'ceiling' for the total energy use at a global scale. In the 'low energy' example, the world's total energy use increases by 10% during the period 1980–2020, but distributed in such a way that the energy use in industrial countries is reduced by 45%, accompanied with a 120% increase in developing countries. Even after such redistribution the energy use per inhabitant in European Union countries would be much higher than the level in most developing countries. For example, energy use per capita in Denmark today is more than 200 times higher than in Burkina Faso.
  9. Admittedly, some authors have stated that the urban structure exerts little or no influence on the travel behaviour of the inhabitants. Frequently, such conclusions stem from model simulations where the results simply reflect that the assumptions of the model do not capture the actual influence of the urban structure on travel behavior (see, e.g. Dasgupta, 1994). In other cases, the lack of relationship between urban form and transport is the outcome of studies not including the variables that could from theoretical considerations be expected to influence each other. For example, some studies have focused on trip frequency (among others, Kitamura *et al.*, 1997; Boarnet & Sarmiento, 1998) or travel time (Gordon & Richardson, 1997; Snellen *et al.*, 1998) as transportation activity variables, without investigating the influence of urban structure on travel distances or modal split. In some other studies, including Breheny (1995), conclusions are made about an absent or insignificant relationship between urban structure and travel, based on a comparison of travel survey data from towns of varying population size. However, the number of inhabitants is hardly a good indicator in order to test whether urban structure affects travel behaviour. Among empirical studies where the influences on travel from urban densities and the location of residences within the urban area have been investigated, the converging conclusion is that dense and concentrated cities do contribute to reduce travelling distances and the use of cars.
  10. A study among households in Greater Oslo and a small Norwegian town (Førde) shows practically no difference between single-family homes and other housing types neither in the residents' environmental attitudes nor in their practice concerning the sorting different types of waste. This holds true also when controlling for a number of other factors that might influence actions and attitudes in these areas (Næss, 1999).
  11. The only known example from the recent century of a mass exodus of urbanites to rural areas is from the late 1970s in the Cambodia ruled by Pol Pot. The experiment hardly tempts to be repeated.

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