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### Abstract

Ecologists often have an uneasy feeling about the way the results of their investigations are used in the planning practice. For the planners and to the public it very often appears that ecological proposals say no to plans in which there seems to be "no choice".

In order to bridge this gap a strategy for environmental planning is discussed.

First some general conditions are formulated for alternative plans, designed to promote public and specialist discussion on facts and values of the relation between society and the environment.

Then two basic principles are proposed for such alternative plans:

1. It is necessary to reduce the dynamics of the socio-ecological systems.
2. The dialogue with nature should be re-animated.

Next, three further guidelines are given in order to make it possible to work with the principles in planning practice; notably in urbanized areas:

1. Study the ways in which systems can be made less dependent on input and output.
2. It is desirable to integrate activities rather than concentrating them separately.
3. Planning of integration should start with the weakest link.

To demonstrate how the strategy can generate planning alternatives and the corresponding research priorities, two examples are given: surface water management and agriculture, both in an urban fringe situation.

### Introduction

Discussing the plan to construct a new road one could ask three basic questions. 1. Whether to build a road or not. 2. Where should it be located. And 3. How can it be constructed. These questions can be considered relevant to activities with environmental impacts in general.

The time I worked with the Kromme Rijn Project (Kromme Rijn Projekt 1974, Tjallingii, 1974) we prepared a landscape ecological evaluation map. This map was meant to serve for the regional planning in the rural area subject to urbanisation near Utrecht. The question of the planners was essentially where? This attitude and the corresponding behaviour of the planning agencies left us with severe doubts. Our intention was primarily to let the map work as a warning, showing the impact of many expansive plans and trying to urge a new discussion on the whether or not question. Apart from a few exceptions our idea did not work, first because, as the planners and authorities told the public and us, there was "no choice" and secondly because we were just treated as one of the groups engaged in the conflict of interests.

Later I went to work at the Delft University of Technology, where the ecological training of townplanners and architects is my task. Here the main question to deal with in most study projects is how. Mostly the question whether to build or not is left out of discussion but sometimes it becomes possible to touch on more fundamental questions such as private or

public transport or preventing much transport by planning living quarters and working places integrated or very close to each other. But in the real town planning, alternatives based on for instance a reduced consumption of water and energy, usually are held back in an early stage because "it is necessary to supply what is needed". The question whether or not is left out of discussion as "there is no choice".

In this paper I will start with the assumption that the public and the planners cannot judge whether they have a choice or not, unless practical alternative designs or plans are worked out and then discussed. The alternatives I have in mind aim generally speaking at a more balanced interaction between society and nature. The question investigated in this paper is: Is it possible to design a strategy useful in generating planning alternatives relevant to fundamental environmental problems?

First some general considerations and conditions are given, then a possible strategy is formulated which is worked out into some guidelines for regional physical planning. Finally two examples are briefly dealt with: water management and agriculture in an urban fringe situation.

The paper is an attempt to bring some structure in the practical and theoretical ideas emerging from the experience of ecological guidance of training projects in architecture, town- and regional planning (i.e. mainly on the how,-whether or not interaction line).

#### General considerations, the alternative activity approach

Some critical observations are made first, primarily in order to obtain a set of conditions to be realised in "alternative activities". i.e. other ways of town building, agriculture, water management, transport etc.

There are at least three reasons to concentrate on activities rather than on landscape evaluation.

1. In the interaction between society and nature the activities are the true variables which can be influenced by planning.
2. Only a more fundamental change in human activity will create conditions essential to the preservation of natural areas.
3. Increasing exploitation of nature, increasing energy consumption, leads to more rules in industrialised societies which means less freedom for people and less chances for a dialogue with nature (see for instance Marcuse, 1968; Habermas, 1968, Illich, 1973).

This means there are cultural and social reasons to criticize the human actions threatening nature, and not only economical and ecological arguments. The word activities is used here and not needs. It may be possible to meet basic needs with other activities and adapting activities to a more balanced interaction with nature may also cause us to revise our standards about real needs.

As a consequence of this, value statements are involved. They are introduced here explicitly because a public discussion about environmental problems in my opinion should include facts and values. Alternative plans cannot be made dependent wholly on political or technocratic apriori's. If they are, "no choice" arguments frequently make it impossible to escape from the real problems.

This means that for instance a landscape ecologist, taking part in preparing planning alternatives, can take the side of a group of environmentalists and become an "advocacy planner". Another possibility is that the scientist holds the point of view that comparison of fundamental alternatives is essential for public discussion and therefore he prepares several alternatives based on different sets of values. Habermas (1968) -speaking about the relation between politicians and scientists- distinguishes be-

tween a decisionistic model (power for the politicians, scientists only to provide them with facts) a technocratic model (technocrats have the power, values considered less important) and a pragmatic model in which facts and values belong to the competence of politicians and of scientists. The approach proposed here is an attempt to elaborate the pragmatic model.

To be realistic one should admit that it is impossible to deny the ruling power structure within which possible alternatives should be designed. However just as you can make yourself more or less independent of the automotive power structure by selling your car, so I will demonstrate that it is possible to start small-scale experiments less dependent of systems in which they legally exist.

Such experiments can influence public opinion and with these the decisionmaking process, serving as "building stones" for new approaches (Tjaltingii, 1978). Substantial alternative designs in planning are becoming very important if they can be evaluated within the framework of an Environmental Impact Statement. Thus they could become an important tool for the so called "offensive school" in Dutch applied landscape ecology (v.d. Weijden and v.d. Zande, 1980). Emphasising alternative activities more than nature protection, this approach differs from the "defensive" landscape evaluations as those, reviewed by v.d. Ploeg and Vlijm (1978). Both approaches consider landscape-analysis essential.

The General Ecological Model (GEM, v.d. Maarel & Dauvellier, 1978) can be considered "defensive" too, as it tries to support the role of natural areas in physical planning by elaborating the information- and regulation functions of these areas for society. The production and carrying functions of landscape however are neglected and it is exactly with these functions that an alternative activity approach should start.

The GEM procedure fits in the competition model philosophy as found for instance in the Third Report on National Physical Planning, part III: Rural Areas (Derde Nota, 3a, 1977). The competition of conflicting interests seems to lead to a planning of compromises and eventually to a compartment policy in regional planning. Instead new ways of integration should be looked for on the basis of other activities.

Summarizing the following conditions to be realised in our alternatives can be listed.

1. In order to promote a fundamental public discussion about possible solutions to environmental problems political, economical and technocratic values should not be taken as facts.
2. A realistic approach however should first concentrate on small-scale projects, if necessary as independent as possible. These projects should be able to serve as examples.
3. The possible use as alternatives in an EIS procedure should be kept in mind.
4. Special attention should be given to the possibilities of integrating alternative activities on a regional scale.

#### A possible strategy towards environmental problems, basic principles

We live on a spaceship with many non-renewable resources. Our productive management is limited by the fact that the earth is an ecosystem. Overpopulation, affluence and wasting technology are considered the most serious threats of the ecosphere (Commoner, 1971; Commoner et.al., 1972; Hardin, 1972 for example). This complex of problems may be called the material problem, characterized by the increasing exploitation of resources (input) and increasing production and pollution (output), in short: the increasing dynamics of the system as a whole.

But there are also immaterial problems: reduced landscape differentiation, less wildlife and fewer natural areas, more noise and annoyance by pollution, more health risks, more stress. These problems, showing aspects of alienation, may be referred to as the immaterial problem. But both sides of the environmental crises are intimately linked with each other. Two views on these interactions are worth noting in this context. First the relation between very dynamic conditions of processes and coarse-grained spatial patterns as stressed by van Leeuwen, (1966, 1980). According to this point of view, increasing the dynamics of human action in our environment necessarily leads to a loss of differentiation, which is in fact part of the immaterial problem. A second interesting view on interaction, mentioned already, is represented by for example Marcuse (1968), Habermas (1968) and Illich (1973): increasing the exploitation, losing the dialogue with nature out of sight, means that inevitably a complicated technocratic structure becomes necessary. As a result people become more alienated from nature and from each other. The "no choice" dilemma is only one aspect of this immaterial problem. It is impossible to discuss more details and backgrounds of this interpretation of environmental problems here. Important at this moment is to stress the view that they are a complex of socio-economic and ecological events, connected with the development of industrial societies in the east and west and in the north and south.

Two basis principles are chosen for a strategy designed to re-establish a more balanced relation between society and nature:

1. Reducing dynamics. In ecological terms, this means reducing input and output of ecosystems, in socio-economic terms the principle of self-reliance comes very close.
2. Re-animating the dialogue with nature.

This does not only refer to conservation but even more to human activities like water management, agriculture and town planning.

The 'principles' seem to be trivial and self-evident. The most relevant question is of course whether they are useful or not, and this largely depends on the possibility to find new practical approaches to daily planning problems. A first direction is indicated. Some further guidelines now have to be formulated.

#### Further guidelines in the urbanized landscape

It should be realized that working out more details necessarily means taking into account more regional and local conditions both landscape-ecological and socio-economical. The following considerations may have a more general meaning but they are based on the Dutch, notably the Randstad situation. The usefulness for this situation is open to discussion. For other conditions this holds even more.

Let us first take the process aspect of the systems on a regional level. Industrial or agricultural areas, living-quarters but also the individual factory, firm or dwelling can be taken as examples of such systems. Such a system can be represented by an ecocodevice model as is given in figure 1. For the background of this model I refer to van Wirdum (1979) and van Leeuwen (1980). This model illustrates the four regulation principles which enables us to focus on the regulation inside the system and on it's relation with other systems.

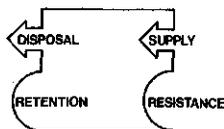


Figure 1.

For a factory generally speaking industrialisation means increasing the input and output levels. The availability of cheap energy has facilitated the increase of the energy flow which is used to produce more (output) with less labour (less labour retention). The disposal of wastes is also increased. The system is highly dependent on capital investment and on transport which has developed rapidly causing considerable extra energy-consumption. Resistance to external perturbations as rising energy prices and problems on the export market is relatively low, it is a vulnerable system. Dynamics are high and there is only a very weak dialogue with local conditions, not to speak about a dialogue with local natural resources and the local landscape. Of course this very schematic picture is not applicable in the same way to every factory or every industrial area. But the tendencies can be observed in many cases and can be analysed mutatis mutandis in agriculture and in urban dwellings as well.

A first strategy guideline can be formulated from this analysis: an attempt should be made to change the overemphasis on input and output into more attention to the retention and resistance regulation principles. (In fact this is a practical translation of the reducing dynamics principle.)

Practical elaboration of this idea can be found in the intermediate technology initiatives, highly stimulated by the works of Schumacher (1973, 1980) and also in the further development of the idea of self-reliance, for example in Anderson (1978) and Tinbergen et.al. (1977). Self-reliance and intermediate technology should not only be applied as a guideline for underdeveloped but also for overdeveloped countries.

The question rises whether the model can be relevant to sites for extensive outdoor recreation and nature reserves. I doubt the usefulness of that interpretation but it is clear that also in these areas the capital investment is increasing. And certainly the vulnerability of these areas is very high because the proper management is endangered by the output of other systems and because the price we pay is high and it is uncertain how long we can afford to pay it under difficult economic conditions. Natural areas are no longer supported by a living landscape but they are tolerated at a high price.

Herewith we are already in the field where procedures affect the functional structure and the pattern of activities in the landscape. It is clear that activities at a high dynamic level cause much nuisance to each other. Activities are concentrated separately therefore, as can be observed in our urbanised areas where industry, recreation, living, agriculture and nature get their own, monofunctional territory. Once this spatial structure is established with high capital investment and supported by a strong infrastructure it fixates the landscape and, what is worse, it acts as a stimulus for further accelerated growth especially of the productive activities.

In view of these tendencies a second guideline can be formulated: it is desirable to integrate activities rather than concentrating them separately (in this way essential elements of the "reducing dynamics" and of the "dialogue with nature" principle are more operational).

Evidently integration is only possible in a satisfactory way in case the dynamic level of (productive) activities is reduced (first guideline).

Only then will it be possible to prevent mutual nuisance by subtle selection devices such as fences, hedges, ditches or walls and screens as they are found in town and country. In the Third Report on National Physical Planning (Derde Nota, 3a, 1977) it is tried to plan spatial integration, disregarding actually the functional ecological and economical basis, and this cannot be considered a fruitful approach. In fact this is one of the dilemmas of physical planning in general as has been clearly demonstra-

ted for the Dutch situation by Goedman (1978).

Planning the integration of activities has to deal with the problem caused by the dominance of activities with many external effects over the more vulnerable systems. The case of agriculture and nature is a good example. Even if we are successful in reducing the dynamic level of agriculture activities surrounding a natural area it will be necessary to protect the natural area effectively. The size of the area is important but, provided a minimal area exists, subtle selection devices as mentioned before, can play an important role. In a densely populated area a good use of selectors is more realistic than trying to oversize the area.

As an integration chain is as strong as its weakest link the third guideline is: planning integration of activities should start with the weakest link, and should study the possibilities of an active role of the weakest parts in the whole of the living landscape (though this is primarily a practical translation of the "dialogue with nature" principle it can set a standard for the dynamic level of the whole system).

Consequently the planning of a water management system for example, should start with the sources of unpolluted clean water, not by trying to isolate them as is done in swimming pools, but by studying the way they can play a role for the benefit of the whole landscape. This implies landscape mapping and a careful analysis of "horizontal" relations.

#### Surface water management and the urban-rural relationship

Quality and quantity of surface water in the urbanised area of Rotterdam and Delft changed considerably during the last decades. Examples of quantitative change are the increased use, extension of indurated surface in combination with a low phreatic level in the new urban areas and in rural areas the lowering of the groundwater table. In terms of the hydrological cycle, the time the water rests in the land part of it became much shorter, because there is more consumption and less storage. In practice this means that rainwater of relatively good quality is quickly pumped out. In summer however, when there is a precipitation deficit, much water is needed and this can only be supplied then by pumping in new surface water, indirectly derived from the river Rhine. As a result serious quality problems rise, notably in dry summers as in 1976.

The general strategy proposed to meet these problems is to try to increase the storage capacity for good quality water, notably rainwater. In this context a number of alternative plans seem to be relevant (Tjallingii, 1981):

1. More efficient systems of catching, use and re-use of water inside the house are studied. Considering the matter technically savings up to 50% are not beyond reality. The consequences for regional and even national infrastructure planning are not easily overestimated.
2. Designs are made for parks with more water storage capacity where the effects on water management and the possibilities for public use can be studied. Temporarily inundated park areas for example can be used for skating in winter.
3. Recreation lakes in the urban fringe can be designed as independent systems storing the water in winter which is evaporated in summer. The precipitation surplus can flow into the urban water system. An interesting study is carried out to determine the carrying capacity for recreational use of an existing lake with this watersystem near Delft (den Blanken, 1975). In the northern fringe of Rotterdam a new park design for an existing area is made, based upon these ideas and in close concert with the

inhabitants concerned.

4. Plans are designed for new urban areas with a water system which takes more advantage of good-quality water sources, has more storage capacity and hence less necessity of flushing regularly the whole system.

5. A study is set up now for a wetland area in the countryside between Delft and Rotterdam to discover the water management possibilities based on these ideas and the functions of the area for conservation, fishery, agriculture and recreation.

The purpose of all these studies is to use the method of designing alternative plans first to analyse the possibilities of lowering dynamics by increasing the storage capacity for good quality surfacewater (retention) and thus making the systems less dependent on input of other usually polluted water. Secondly the functions such systems can have, are studied, possibly with participation of the people concerned. Special attention is given to the possibilities to integrate activities by using simple and subtle selectors. Thus operating in dialogue with nature was tried and this includes the functional and form qualities existing in the studied areas.

#### Agriculture in the urban fringe

The problem with agriculture in the urban fringe is that it is neglected by official agricultural policy and by the authorities of the urban concentrations. The fringe situation poses a number of difficulties to modern agriculture with a high input of energy, fertiliser and cattlefood and a high output of products for the (European) market.

Yet recently there is a new interest in parttime agriculture (OECD, 1978) and also in the role of allotment gardens. There are studies in which more attention is paid to the possibilities of linking agriculture production more directly to urban consumption in the same region and the resulting effects on transport, employment and the differentiated urban fringe environment (Tomasek, 1979).

Research projects should concentrate for example on:

1. The possible regional production - consumption structures in terms of food. For some farms for instance it is possible to shift from milkproduction to the manufacturing of cheese that can be sold directly to urban people.
2. The possibilities to use urban wastes as manure and for cattlefood.
3. The possibilities of creating production - consumption cooperations, operating independently of the official market.
4. The effects of parttime and small-scale agriculture on the local employment situations.
5. The relation between recreation and agriculture.
6. The possibilities of interaction of natural areas in the fringe with the help of "subtle selectors".

Only some of these problems can be dealt with by landscape ecologists and probably the best idea for scientific and practical integration is the starting of experimental farms where all questions can be studied. More important even is the fact that farmers can go there and look how it works. Such a proposal we made in the context of a bufferzone and re-allotment scheme planned for the area between Delft and Rotterdam. (van Oord en Tjaltingii, 1979). The proposal was discussed with farmers and planners, who used examples from other parts of the country as arguments. So far no practical project resulted, but discussions go on. For this moment we try to make study designs of practical situations, the function of which is both illustrative to the discussion and useful to focus on the research priorities. In some cases the ecocodevice model is a useful tool to formu-

late more precise questions that can be investigated.

### Conclusion

Returning to the question of facts and values it is clear that values before all are involved in the choice of priorities for research and in the way the results are applied. In the example given here, with the aid of the strategy developed, experiments are selected which themselves should be carried out according to the scientific and practical standards of truth and usefulness.

There is no doubt that the strategic-condition principles and guidelines as indicated in this paper, need a more sound theoretical basis. But more important is the fact that they seem to work as a set of ideas useful in generating alternative plans dealing with fundamental environmental problems.

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