

## LAND USE PLANNING

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### Summary

Land is finite in extent, whereas more and more people compete for land. In order to avoid that this competition turns into conflicts, firm agreements must be made on how and by whom the available space will be used. Land use planning is a tool to support the orderly occupation and use of land and the avoidance of adverse developments.

Modern land use planning is always focused on one or more specific objectives, and is closely linked to the concepts of efficiency, equity and sustainability. For a land use plan to be successful three conditions must be met: (a) there must be a need for a change; (b) there must be a political will and ability to put the proposed land use plan into effect; and (c) stakeholders must be convinced about the benefits of the plan, and their participation in the plan must be motivated by clear incentives.

A land use plan (and the policy related to it) is based on three major elements: long-term objectives which set the overall target of the plan, strategies for achieving these objectives, and programs and projects for implementing the chosen strategies. Land use plans often provide the basis for a national soil or land policy. This paper describes the objectives of modern land use planning, the elements of planning and the procedures of

the planning process.

The procedure of planning follows a stepwise approach, but as planning without implementation is a waste of time and energy, these steps must regularly be revised and adjusted when necessary. An example is given of a planning approach in ten consecutive steps. The paper concludes with a few examples of planning at different levels: international, national and regional or local planning and land use policies.

## **1. Introduction**

The connotation of land use planning includes three major components: (1) land; (2) the way land is used; and (3) the rational organization of that use in the future.

Land is the basis of our living. It provides food and shelter, filters and stores water, and supplies space for urban and industrial development, leisure and many other social activities. Land is a vital resource and an expression of power and wealth (See: *The Value and Price of Land*). In a predominantly rural society, people who own (productive) land are considered relatively rich and wealthy; landless people are poor, underfed, and often remain dependent on others for their livelihood.

Civilizations have grown and expanded, or have declined as a direct result of their land use potential. The political power of the former USSR was largely based on its immense agricultural production potential. The decline of the Mesopotamian Empire and of the Mayas and other native Indian civilizations in the Andes were due to the silting / salting or the erosion of their croplands.

Land is, however, limited in extent and the amount of cultivable land in particular is finite, while the pressure on it is increasing, both as a result of the growing population (and its needs for more food and space) and of the increasing number of functions of land. Overexploitation and mismanagement of land lead moreover to soil degradation and to a reduction of the finite land reserves. This situation results in a growing competition for land.

In order to avoid that this competition turns into conflicts, firm agreements must be made on how and by whom the available space will be used. This means that land use has to be regulated and that choices have to be made among alternative options. Those choices may depend on both technical and social criteria, or on a combination of both.

Land use planning is a tool to support the orderly occupation and use of land and to avoid adverse developments. It primarily relies on an evaluation of the land potential and on the alternative patterns of its use - including the physical, social and economic conditions which affect that use - for the purpose of selecting the most appropriate use. Its main aim is to select and choose the option(s) which meet(s) best the needs, and to draw up a policy for its sustained use.

Land use planning does not stand on its own, but constitutes an intermediate step between land evaluation and land management. While land evaluation primarily identifies and rates the land potential and recommends alternative use scenarios, land

use planning focuses more on effective choices, with the basic information at hand amongst the options provided by the land evaluation process. The selection of these options is not necessarily determined by rational criteria only, but takes into consideration as well human, economic and environmental aspects. Implementing these scenarios is mainly achieved by land use management techniques. Hence, while land evaluation and land use management operate mainly on technical criteria, land use planning deals with decision making, and this is mainly a political action.

There might be some confusion between land evaluation and land use planning. Land evaluation forms the preparatory step in providing alternative scenarios of use, and makes recommendations in that respect, but takes no decisions. These are made at the land use planning level by decision makers, and these are often not the same people as those who have prepared the land evaluation. In some land evaluation approaches, however - as is the case in the USDA Land Capability Classification and in the Papadakis system of Agro-Climatic Land Evaluation (see: *Agro-Climate-Based Land Evaluation Systems* and *Other Land Evaluation Systems*) - the recommendations are so straightforward that they might give the impression of presenting already the effective planning solution. In reality, as decision making is a political option, it is not uncommon that priority is given to only the second or third best technical solution because it complies better with the social reality of the moment.

## **2. Need for Land Use Planning**

Land use planning finds its origin in the increasing scarcity of land, the competition for that land by a growing number of users, and the risk that this situation might lead to conflicts. It is equally associated with the growing concern for a protection of the environment and a more sustainable use of space. Farmers have been planning the use of their land for thousands of years. The application of scientific principles to the land use planning process is relatively recent.

### **2.1. Scarcity and Competition for Land**

The problem of land scarcity has many reasons. Its primary cause has a physical origin and is related to the limited availability of (productive) land in the world, in combination with the problem of creeping land loss and land degradation. Overall, the total land surface, and in particular the potentially cultivable land, is limited in extent, though this situation may change from one area to another. Part of this land is, moreover, subject to erosion and land degradation (see: *Human-Induced Land Degradation and Soil Conservation*).

Under conditions of tribal land use, as in colonial times in the Americas and Africa, population densities were low, and land was freely available. Every member of the tribe was assured of sufficiently available land to grow crops and to satisfy the food requirements for the family. With more people competing for food and space this initial situation has changed, and most of this formerly free land is now taken into permanent cultivation.

In *Land Use Changes during the Past 300 Years* the adverse effects of deforestation

have been illustrated in different parts of the world. The eastern Mediterranean coast, from Turkey to Lebanon and North Israel, was once densely forested but, as a result of high demands for timber, it has now almost completely been denuded. This was due to the demands either for fuel wood for the local iron smelting furnaces (7th-5th centuries BC), for timber by the Phoenician shipyards (between 5th and 2nd centuries BC), or for the export of wood as building material for the cities in coastal Palestine and Egypt (between 2nd century BC and first century AD). It is noteworthy to state that the only 20 or 21 remaining cedar trees on Mount Lebanon (Figure 1) have now received the status of a national symbol.



Figure 1: The Cedar Forest on Mount Lebanon, a national symbol

Land scarcity has also a social dimension in that the world population continues to grow and that more food has to be produced. Even if part of this increased demand can be covered through improved technology and higher yields, some of it has still to come from an extension of the cultivated area. Over the past 300 years the acreage of cropland has worldwide increased by more than 400 % - most often at the expense of former forests - but still the average land available per head (or the so-called land/man ratio) continues to decline and has already reached a critical level in some Third World countries.

A third reason which creates a relative land scarcity is embedded in the changing perception on land ownership. While land was formerly a public good, it is now largely privatized, and its access is often determined by land tenure regulations. Hence, land which is physically accessible might not necessarily be open to the public because of land tenure restrictions. People in search of land for food production often turn to

squatting or illegal land occupations as a last alternative for survival. The origin of many wars and tribal conflicts goes back to problems over land and water. Present-day problems of land squatting in the Philippines and Brazil have occurred because desperately poor landless farmers look for food and survival. The underlying reasons for many tribal conflicts in Africa - including the genocide in Rwanda - are related to land and land property rights. Problems of land ownership nowadays create still political unrest in Zimbabwe, Namibia and Sudan.

With an increase in living standards and modern lifestyles the function of land has become much more diverse than a few hundred years ago. Land is no more exclusively used for agriculture, but has to meet new demands, in the sense that people's aspirations lead to a greater need for space: for residence, urbanization, industrial and infrastructure development, leisure, etc. The competition between those new uses brings additional conflicts between individuals and interest groups.

Land taken for towns and industry is no longer available for farming; agricultural development into forest areas disrupts the ecological equilibrium in terms of water and wildlife populations. In Java, Indonesia, more than 40,000 ha per year of good rice land is lost because of city expansion. In order to compensate the production loss of this first class land, approximately 3 times more land has to be taken into cultivation elsewhere, obviously in less densely populated and mainly forested areas. The present rate of deforestation in the country is estimated between 9,000 and 12,000 km<sup>2</sup>/year. Besides a net surface loss of forest land, the irresponsible clearance of forests or improper land management leads to soil degradation and the quality loss of land (UNEP-FAO, 1994).

## 2.2. International Concern

Since the mid-1980s land problems have received major attention, in particular because the need for meeting the food demands for a growing world population has been linked to concerns about the deterioration of natural resources, and to environmental considerations in general. Hence, land use planning has become closely associated with concepts like rural development, sustainable production and protection of the environment.

In an initial stage this international concern was channeled by the different UN agencies. This is reflected in publications like FAO's *World Soil Charter* in 1981, UNEP's *World Soil Conservation Policy* in 1983, and a series of guidelines for a more sustainable land use in subsequent years. These gave rise to a number of technical and scientific discussion groups and to the organization of international meetings which all emphasized the need for a more coordinated world soils policy and a protection of the environment. This topic is documented in more detail in *Land Use Planning for Sustainable Development*.

The UNCED Conference in Rio de Janeiro (1992) reiterated these needs by focusing on soil inventories and the development of national soils policies. At present, most countries have a National Environmental Action Plan (NEAP), which constitutes an inventory of the country's natural resources and a strategy for future land use management and land zoning. FAO and UNEP have adapted the current approaches and

made them more demand-driven and stakeholder friendly (FAO-UNEP, 1996, 1997 and 1999)

Along the conceptual road to land use planning and sustainable development five milestones can be identified (*See also: Land Use Planning for Sustainable Development*):

- The UN Conference on the Human Environment, known as the Stockholm Conference (1972) where, for the first time, due concern was expressed about the shrinking of the world's natural resources. Hence, the need was formulated for a strong environmental action-oriented approach to sustainable development.
- The publication of the World Conservation Strategy (IUCN, 1980), where governments were urged to use their natural resources for promoting human welfare while respecting the carrying capacity of ecosystems.
- The resolutions and recommendations of the World Commission on Environment and Development (known as the Brundtland Commission), disseminated through its report "Our Common Future" (Anon., 1989), and the important political lobbying on the subject. These findings emphasized that it is the present generation's responsibility to safeguard future generation's options and opportunities for development by protecting the planet's environment and natural resources.
- The United Nations Conference on Environment and Development (UNCED, 1992) known as the Earth Summit of Rio de Janeiro. At this forum the international community formally embraced sustainable development as the standard for measuring development objectives and performance in both North and South. It emphasized the need for both economic development and a respect for the environment. The output of the Rio Conference is immense and includes, amongst others: a set of global conventions on climatic change and biodiversity, a set of principles for governments and people (in the Earth Charter), an action program to promote sustainability (Agenda 21), institutional arrangements to implement programs (the Commission on Sustainable Development), and awareness creation amongst policy makers at the highest level.
- The Millennium Development Declaration and the recent Johannesburg meeting (2002) where a major additional emphasis was given to poverty eradication, aiming to reduce by half the proportion of people suffering from hunger between 1990 and 2015, and to a more efficient use of land, water and other natural resources.

### **2.3. A Modern Tool for the Rational Organization of Space**

Over time, land use planning has undergone a number of conceptual changes. In the 1980s and early 1990s land use planning was generally considered a direct follow up of land evaluation. Planning of future land use was mainly done by a team of qualified technical experts, using a top-down approach, and providing recommendations for the various sectors or line ministries. The poor results and follow-up of a number of those projects - in particular those related to soil conservation operated at high costs and efforts by national and international organizations - urged international donors to reconsider these approaches. As a result of the lessons learnt in the past a completely new, more participative approach was introduced based on the following considerations

(Verheye *et al.*, 1997):

1. Land use planning should abstain from being a **too technical approach**. A typical project in the past identified a problem, and then sent a team of experts who provided a sound technical solution, that had imperatively to be adopted by farmers and other stakeholders; even if not convinced the latter people had to accept because of the bonus of a compensation, either in the form of “food for work” or in cash. Once the project came to an end (and thus also the compensation stopped), the people quietly returned to their old practices.

Today it is clear that target populations might not be favorable to a specific project for a variety of reasons: they may have other and more pressing priorities; benefits might not be perceived as being commensurate with the time and energy spent in the project; or recommended technologies are not adapted to the farming systems and resources of the farmers; etc.

It is now evident that, in order to be successful, programs which seek to introduce improved land practices should primarily be driven by demands and needs of the stakeholders, and sometimes these can only be obtained after a series of demonstrations, or after an intensive information and awareness creation campaign.

2. Land use planning should avoid a **too top-down approach**. Most land use programs are relatively complex and are therefore designed and implemented by development agencies, governments and (inter)national consulting firms or contractors, which hold the experience and material capacities. It is therefore not unusual for them to identify and handle problems as a function of their own expertise and interests. Though a process of consultation may take place with the stakeholders, the interests of the latter group are often not sufficiently voiced. The result is that many stakeholders do not feel concerned, and that the proposed solutions are not a direct priority for those for whom the project is effectively designed. In other words, the stakeholders feel that, despite the best intentions at the start, the project is not properly “owned” by them but is a government project. As a logical follow-up of this attitude, they consider that the successful implementation of the project is more a government’s responsibility than theirs.

3. Land use planning is a multidisciplinary exercise and should avoid being conceived in **too sectoral** a context. Farmers will, for example, seldom devote time and efforts to conservation measures if their land rights are not secured, nor will they produce more than their own needs if market prices for the selling of excess production are unattractive. Sustainable land use requires that all of the many relevant factors linked to production incentives and benefits should be addressed.

The question of who will take the lead over an integrated land use project is always critical. Traditionally, the Ministry of Agriculture puts a claim on decision making over land, but under those conditions issues related to alternative choices in favor of non-agricultural uses are difficult to get accepted. A similar situation occurs when the Ministries of Forestry, Environment or Urban Planning are involved as line agencies, because also in these cases, priorities, problems and development solutions will always

tend towards the interests of the lead agency. Obviously such a situation is always at the expense of a holistic integrated approach. In other words, each of the major disciplines, viz. line ministries tends to see themselves as the starting point and the center of the process.

Driven by institution-vested interests, each of these line ministries tries to expand its terms of reference and legitimizes acquisition of additional expertise to cover all of the other aspects as well. By-products of this process are additional inefficiency due to inter-institutional competition and mushrooming institutional overlap. Experience of the author in land use projects over the world has shown that the institutional problem is often the main bottleneck for an integrated approach to land use planning.

Overall, the considerations above all lead to the same conclusion that land use planning is for people and by people. It is therefore crucial that modern land use projects should be initiated by consultations with the stakeholders and that both the development strategies and the anticipated results be discussed, negotiated and agreed on by all stakeholders involved. These initial negotiations have a double function, in the sense that they allow the grass-root stakeholders to express their needs and explain their problems and priorities, while they give the planners the possibility to identify and adjust the objectives, develop and explain the strategies and check to what extent the anticipated results meet the expectations of the people. The principles of this new participatory approach to land use planning have been discussed in more detail in *The FAO Guidelines for Land Evaluation, Land Use Planning for Sustainable Development, The ILUS Integrated Land Use Planning Approach, and The Impact of the Participative Approach to Land Use Planning*.

This form of stakeholders' participation should however not be a "free entry" for unrealistic planning and short-term gains, but should focus on a mutual benefit for all participants. The plan should also take into consideration long-term aspects of sustainable production, yields and benefits in a context of protecting the natural resources. Such a situation automatically implies that land use plans should be supported by a legislative framework, and that besides benefits and incentives there exist also rules and restrictions of use.

In this context, land use planning has become a modern tool for optimizing the use of land and for providing an optimal sustainable benefit to its users. It has become a systematic way of addressing the problems of land scarcity and land competition at national and international levels. It fits moreover in the modern concepts of a more sustainable use of space. For a land use plan to be operational and successful, three conditions must be met:

- There must be a need for change in land use, or there must be an action to prevent some unwanted change, acceptable by the people involved;
- There must be a political will and ability to put the proposed land use plan into effect;
- Stakeholders must have the feeling that they "own" the plan, and they must be convinced about the incentives and benefits to motivate their continued participation in the project design, implementation and follow-up activities.



### 3. Objectives of Modern Land Use Planning

Initially, land use planning was mainly focused on agricultural development, and in this context older literature refers often to land use planning as a tool for (sustainable) rural development. Today, with the wide array of land uses involved, ranging from agricultural to urban, industrial, residential and environmental uses (including even environmental protection), land use planning deals with all types of uses.

Modern land use planning is always focused on one or more specific objectives, even if these objectives may change over time. It is also closely linked to the concepts of efficiency, equity and sustainability. In this respect, *FAO's Guidelines for Land Use Planning* (1989, 1993) make it clear that in the long run, land use must be economically viable and socially acceptable, and that one major goal of development planning is to make an efficient and productive use of the land. Note in this respect that the connotation of *productive use* should be interpreted in its broadest sense. A terrain which is taken out of agricultural production and is converted into a nature reserve, may have its value for leisure or moral relaxation of nature lovers. The different concepts of value, including the differences between material value and personal opportunity value, are discussed in *The Value and Price of Land*.

The nature and quality of land may change from place to place, and some areas are better suited than others for particular uses. Optimum **efficiency** is achieved by matching different land uses with the areas that will yield the greatest benefits at the least cost. Land for urban development has, for example, few requirements for soil depth, as would be the case for crop farming, but on the other hand its suitability might be hampered by too steep slopes (for easy road building) or by impermeable clayey soils which restrict water and sewage evacuation.

Besides its economic objectives, land use planning may also have important **social** objectives. Land improvements, resettlement and redistribution of land may be undertaken to reduce social inequality or, alternatively, to attack poverty. One way of doing this is to set a threshold standard of living. Standards may include levels of income, nutrition, food security and housing. Planning to achieve these standards involves often an assessment of land suitability.

There is, however, a danger in these types of operations when land is distributed to people without sufficient technical or other support to the new settlers. A good example of this is the Indonesian Transmigration Program which has re-settled a few million people from overcrowded Java into the outer islands of Kalimantan, Sumatra, or Irian Jaya. Despite major efforts to support the new farmers in their initial period of settling, many problems were still encountered, ranging from the lack of technical knowledge to cultivate soil types which they were not familiar with, to social and ethnic problems of adaptation and of integration with the original population.

Another objective linked to equity, might be to increase popular participation in decision-making, which may be achieved by involving the people at various stages of the planning process. Land use planning can help to resolve conflicts between

competing groups and individuals by revealing the rationale and information on which land use decisions are based.

Modern land use planning holds always an **environmental** component, and in this respect it is often restrictive in the kind of land uses permitted. The basic principle in this respect is that good quality land should be preserved and any form of land degradation should be avoided. In terms of sustainability, it is obvious that a community that destroys its land forfeits its future. This is a powerful stimulus to land use planning because conservation of soil, water and other land resources is often beyond the means of individual land users.

Based on these objectives two major types of land use planning can be differentiated, related to the conceptual planning in terms of land use improvements and to the structured organization of land use and space, respectively.

**Conceptual planning** focuses on the improvement of land use by ameliorating exploitation systems, with little or no focus on the spatial aspects of the operation. A good example of such planning is the re-allocation of land to its effective users by changing the critical land tenure and land ownership systems. This was introduced in some Eastern European countries and in parts of India in order to eliminate the too important impact of absentee-landlords and to stimulate private ownership for those who effectively farm the land. Quite often, this operation constitutes one of the best incentives for a more sustainable maintenance of the land.

Another example of conceptual land use planning are the attempts to replace the traditional slash-and-burn system in many African countries by a more effective and less space-consuming sedentary farming system. This topic is discussed in more detail in section 6.3 below.

The **structured organization of land use** focuses not only on an improved land use but also on the organization of space. It is often embedded in a regional or national soil (or land) policy. A policy is an act of intention, which lays down the basic principles for achieving long-term objectives. In the case of a soils policy this involves technical aspects related to the nature and production potential of the soil, social aspects with a focus on the people who work the land or depend on it, economic aspects related to the marketing and economic return from the land, and institutional aspects involving all agencies which administer and control land use activities.

There exist a number of examples of successful national policies, including the Green Revolution in India and its related policy for food self-sufficiency (see: *Dynamics of Land Use in Relation to the Green Revolution in India*). Over the past 15 years many countries have now developed a blueprint of a national soils policy. Many of these policy documents in developing countries were prepared after Agenda 21 had voiced an urgent demand for the establishment of such policies, and after the World Bank and UNEP had made funds available to assist developing countries in this activity. Sections 4, 5 and 6 in this paper hold numerous examples of relevant components of national and regional soil policies.

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### **Biographical Sketch**

**Willy Verheye** is an Emeritus Research Director at the National Science Foundation, Flanders, and a former Professor in the Geography Department, University of Ghent, Belgium. He holds an M.Sc. in Physical Geography (1961), a Ph.D. in soil science (1970) and a Post-Doctoral Degree in soil science and land use planning (1980).

He has been active for more than thirty-five years both in the academic world, as a professor/ research director in soil science, land evaluation, and land use planning, and as a technical and scientific advisor for rural development projects, especially in developing countries. His research has mainly focused on the field characterization of soils and soil potentials, and on the integration of socio-economic and environmental aspects in rural land use planning. He was a technical and scientific advisor in more than 100 development projects for international (UNDP, FAO, World Bank, African and Asian Development Banks, etc.) and national agencies, as well as for development companies and NGOs active in inter-tropical regions.