Sustainable Development and Monument Conservation Planning: a Case Study on Olympia

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Abstract

This paper deals with some critical issues concerning the concept of sustainable environmental and cultural-economic development. It proposes a new methodology for the evaluation of such a development. Since the concept of sustainable development has become the corner stone of environmental-ecological economics, the present study aims to present both a conceptual and opèrational basis for sustainable development. The analysis is illustrated by means of a case study for the ancient town of Olympia in Greece.

Introduction

The recent history of conservation planning has clearly shown that the issue of development and conservation is not only politically relevant, but also analytically interesting (see among others Lichfield, 1990 and Nijkamp, 1990). Several attempts have been made at fostering an understanding of the challenges to current conservation planning strategies. In recent years many – mainly descriptive – contributions have been made to analyse prevailing policies, strategies and measures in policy situations marked by conflicts between development and conservation. Furthermore, much attention has been devoted to conservation impact analysis which tries to assess the foreseeable physical, social and economic effects of conservation strategies by using appropriate analytical tools for integrating conservation into development planning.

The attention for conservation issues is clearly present in both developing countries (e.g., Thailand, Mexico, Indonesia) and developed countries (e.g., Italy, the Netherlands, Greece). Especially in the framework of urban restructuring (e.g., urban renewal, transformation of urban functions, gentrification of urban environments) the conservation issue has become an important one, as here the conflict between 'high tech' versus 'high touch' developments is at stake. For instance, in various cities the threat of urban degradation requires a physical and economic restructuring which very often is to the detriment of the historico-cultural heritage of the city. Despite many debates in this field, so far no uniformly acceptable urban development planning paradigm has emerged. While it is generally acknowledged that urban development means the creation of new assets in terms of physical, social and economic structures, it is at the same time recognized that each development process often also destroys traditional physical, social and cultural assets derived from our common heritage. Clearly, although not always immediately computable, all cultural assets represent an economic value which has to be considered in any urban transformation process. Unfortunately, in most cases the inclusion of such assets in the planning process cannot be left to the market mechanism, as most urban historico-cultural assets represent 'unpriced goods' characterized by external effects which are not included in the conventional 'measuring rod of money'. Thus the development of appropriate evaluation methods is of paramount importance here, as otherwise a careful and balanced nurturing of cultural assets will never be realized.

Conventional Economic Methodology

The operational assessment of the socioeconomic and historico-cultural value of monuments - or the impacts of monument policy – is fraught with many difficulties. Monuments represent part of the historical, architectural and cultural heritage of a country or city, and do not usually offer a direct productive contribution to the economy. Clearly, tourist revenues sometimes may be regarded as a partial representation of economic values of culture and nature, but such computations provide as best a biased and incomplete measure, so that monument policy can hardly be based on tourist values (or environmental policy on option values). On the contrary, in various places one may even observe a situation in which large-scale tourism (sometimes accompanied by congestion) sometimes affects the quality of a cultural heritage (Venice or Florence, for example).

The foregoing problems are especially relevant, because in the current period of budgetary constraints there is a risk that budget cuts in the public sector first will affect the 'less productive' or 'soft' sectors such as monument conservation, arts, and so forth. Therefore, it is necessary to pay due attention to the socioeconomic and historico-cultural significance of our heritage.

In the past, many economists have adopted the economic viewpoint that the economic meaning of a certain good can be derived in a proper way from the revealed preferences of economic agents who express their desires on an artificial market. It is, however, increasingly recognized that the socioeconomic and historical-artistic value of a cultural good is a multidimensional (or compound) indicator which cannot be reduced to one common denominator (such as the measuring rod of money). In fact, we are – from a planning viewpoint – much more interested in the 'complex social value' of cultural resources. This implies that the meaning of historico-cultural resources is not in the first place dependent on its absolute quantities, but on its constituent qualitative attributes or features (such as age, uniqueness, historical meaning, visual beauty, physical condition, artistic value, style etc.). For instance, cities such as Venice, Florence, Siena or Padua would never have received an international reputation without the presence of intangible values inherent in their cultural monuments.

In order to clarify the meaning of our multidimensional approach, some general background observations on the preservation of our cultural heritage will be given first. The 1960s and 1970s showed a strong dominance of economic evaluation tools in public planning (for example, cost benefit analysis, cost effectiveness analysis). A major stimulus to the use of such tools was given by the United Nations Industrial Development Organization (UNIDO), the Organization for Economic Cooperation and Development (OECD), and the World Bank. It was a widely held belief that a systematic application of rigorous economic thinking in evaluating and selecting public projects or plans would be a major instrument in improving the performance of the public sector.

This conventional economic appraisal methodology found mainly its basis in welfare economics and was originally normative and prescriptive in nature, but it also implied various restrictive value judgements such as the emphasis on efficiency and the suppression of equity. Besides, the use of 'fictitious' shadow prices to assess benefits foregone was a major source of uncertainty in such project evaluations. Especially the aim to transform all relevant impacts into one common denominator, viz. the 'measuring rod of money', has become a source of major criticism.

It is evident, however, that a compound evaluation of collective goods – and especially public capital goods such as chruches, palaces, parks landscapes, 'cityscapes', etc. – is far from easy and cannot be undertaken by the exclusive consideration of the tourist and recreation sector (see also Lichfield, 1990). Especially in the Anglo-Saxon literature the expenditures made in visiting recreational destinations are often used as a proxy value for assessing the financial or economic meaning of natural parks, palaces, museums, etc. A geographically complicating problem here is the fact that such recreational commodities and the various users are distributed unequally over space. This means that recreational expenditures are codetermined by distance frictions, so that the evaluation of recreation oportunities has to take into account the transportation costs inherent in recreational and tourist visits. Consequently, the socio-economic value of such recreational opportunities depends both on their indigenous attractiveness and on their location in geographic space. Therefore, increase of accessibility might then become an instrument in enhancing the socioeconomic value of cultural heritage. On the other hand, the indigenous historic-cultural value of monuments is usually invariant with respect to geographical location (apart from the scale economies emanating from a 'socio-cultural complex'), so that we are still left with the problem of a compound evaluation. In order to provide a solid background for a further discussion of the social impacts of our cultural heritage, we will first outline a methodology that may serve as an alternative analytical framework for evaluating the social value of our cultural and natural heritage. For a critical review on the same issue we refer to the article of Pearce (1992) and Brennan (1992).

Sustainability in a Three-Layer System

In the previous section we have expressed the need for an alternative methodological frame which can take into account the complexity involved in evaluating the social value of cultural assets or that of ecological systems.

The systems theory, and especially Passet's interpretation (Passet, 1979) of the systems theory related to environmental issues, seems to be a fruitful tool for analyzing this problem. We will briefly present here the main characteristics of this theory, not only by using Passet's approach but also those of other scientists (Bertalanffy. 1972) and finally our own interpretation of this framework. The main feature of Passet's work is the existence of three systems – economic, human, natural – surrounding each other in a cascade form (see Figure 1). the internal system is the economic system which comprises all economic activities of man. The intermediate system is the human system which includes all human activities and attributes, while the external system, the biosphere system, is formed by the whole natural environment of our planet and the layers of the atmosphere. For the sake of simplicity we call this system the environmental or natural system.

The following questions are relevant now:

(*a*) Why does each of these systems constitute a real system?

(*b*) Which are the elements of each one?

(*c*) Which is the role of each of them and which are the dominating rules?

(*d*) And finally, which is the hierarchy of these systems (e.g. in terms of subsystem relation)?

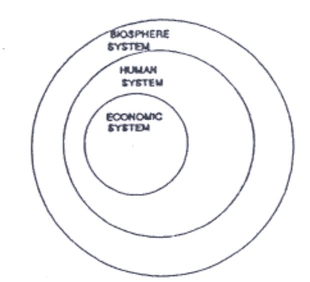

Figure 1: GLOBAL SYSTEM REPRESENTATION

According to the founder of systems theory (Bertalanffy, 1972) a system can be defined as a group of elements with mutual relations. Subgroups of the elements may form subsystems in the largest system, provided that there is a relationship between the elements of these subgroups.

In our case, the economic system includes the economic elements of human life. These elements refer to economic units (such as households, enterprises, individuals, etc.) and their relationships. The economic elements are connected under the regime of the production, exchange and consumption of so-called economic goods. The economic system aims at producing economic goods in an efficient way under the pressure of the existing scarcity of the necessary production means and an infinite number of alternative uses of these means, given the hypothesis of infinity of human economic needs (although this hypothesis is questionable nowadays). It is obvious that flows, stock and relationships of the economic system are oriented to the efficiency and effectiveness of the performance of the system. Under such conditions the economic system is dominated by the scarcity phenomenon (Robbins, 1940).

The next system, the human system, comprises all activities of human beings on our planet. by definition this includes the spheres of biological human elements, of inspiration of aesthetics, and of morality which constitute the frame of human life. In general, the human system may be subdivided into two categories. The first one includes the natural elements of mankind and the second one the acquired features. Thus habits, ethics, culture, historical and artistic monuments, and lifestyle pertain to the second category. It is thus plausible to consider the economic system as a subsystem of the human system, because economic activity is a substantial part of human activity (as the former provides the latter with essential materials for its functioning). Since it is clear however, that the economic system does not constitute the entire human system, or may assume that the economic system is a subsystem of the human system (Mishan, 1980). The main targets of the human system seem to be the satisfaction of the multidimensional needs of all human beings (Scitovsky, 1976).

Finally, the natural system includes both the human system and the economic system. It is often called a life-support or environmental system (Nijkamp, 1990) and this name demonstrates that the life system (or human system in our terminology) is a subsystem of the natural system. As far as the rules of the natural system are concerned, these are governed by natural sciences (such as physics, biology, etc.). Here it is worth mentioning that the rules of the natural system are not fully known because there remain many uncertainties on the mechanism of that system, at least as far as it concerns its evolution over time (Popper, 1959).

According to the systems theory each hypersystem includes all elements of each subsystem, but all elements of its subsystems do not necessarily constitute the whole range of the hypersystem's elements. The same holds for the rules of these systems. The rules of each subsystem are subject to the rules of the hypersystem: the opposite does not hold. Consequently, in our case the rules of the economic system are subject to the rules of both the human system and the natural system. In turn, the rules of the human system are subject to the rules of the environmental system. The above necessity is needed for a harmonic functioning of all systems and their reproduction over time (Passet, 1979). Given the above observations, we are now able to propose an alternative definition of sustainable development. The idea of sustainability of an economic system has two main dimensions, viz. sustainability in respect to a natural system and sustainability in respect to a human system.

The first dimension implies that economic development should minimize the negative impacts on the functioning of the biosphere system, at least to an extent that ensures that econonmic development does not destroy natural functions (or its elements) nor disturb the biosphere system's rules. Unless these necessary conditions are secured, the economic system will face serious problems imposed by the disfunctioning of the biosphere system as the hypersystem. Examples of some of these potential threats are: pollution affecting economic production factors, exhaustion of resources, extinction of crucial species, energy shortage, etc.

The second dimension refers to the relationships between the human and the economic system, and especially to constraints imposed by the human system, e.g. those securing its evolution. These constraints emerge from the two main functions of the human system. viz. the biological function of human beings and the cultural function. By violating the rules or the biological function of the human system serious negative health and psychological effects will come into existence. By disturbing the cultural system of a society, social unrest, cultural impoverishment and psychological problems may be likely results.

Consequently, economic development should respect the rules of the human system and the biosphere system, if we wish economic development to continue in the long run.

Systemic Impact analysis

General.– Impact analysis is a scientific tool that is widely used to assess the results of policies or projects at national, regional or local levels (Chatterji, 1982: Nijkamp, 1989; Nijkamp et al., 1990). It is a flexible tool as it permits us to use several types of analytical methods like econometric models, input-output models, goal achievement methods and conceptual qualitative models.

In our study, spatial impact analysis will be used to look into effects caused by economic decisions concerning economic development in a broad sense. These effects are spreading over the above mentioned systems and such effects determine the possibilities for economic deveopment to be sustainable. Therefore, we need to consider all of them in decision-making framework.

As a first step, we have to develop a complete picture, called impact scheme, which includes all information derived from a coherent system's representation. This means that the main elements of the human, natural and economic systems will have to be identified, while also their relationships will have to be depicted.

Economic development affects each system at different levels of the system's organizatin (Tinbergen, 1967). Therefore, it is useful to make a classfication of these levels. A useful classification is:

(a) A technical-quantitative level. This comprises the quantitative effects of economic development in one system. For example, a paticular development might increase the inflation (economic system), decrease unemployment (human system) and decrease the stock of a certain natural species (natural system).

(b) An institutional level. This comprises the influences on the Institutional orgnaization of a system. For example, a specific development type may change the legal framework of the economy (ecomomic system), induce changes in the political structure of society (human system) and disturb the biological equilibrium of some ecosystems.

(c) A foundation's level. This influences the basis of economic development in a system. For example, a change in socio-political systems may alter the economic organisation (market economy, centrally planned economy), impact on the moral matrix of society or induce considerable geo-climatological changes.

As a result, the impact scheme can be characterized for our purposes as a 'multi-facet impact scheme': each of the above levels forms a facet of our impact scheme in Figure 2, which mirrors effects of economic decisions – in terms of economic development – on the system at hand. An economic decision may concern here an economic development alternative. e.g. a development scenario, an environmental management decision, a project choice, a monument conservation plan. etc.

In order to include in a more operational way all relevant effects of different policy scenarios, we can construct a so-called impact matrix (see Table 1).

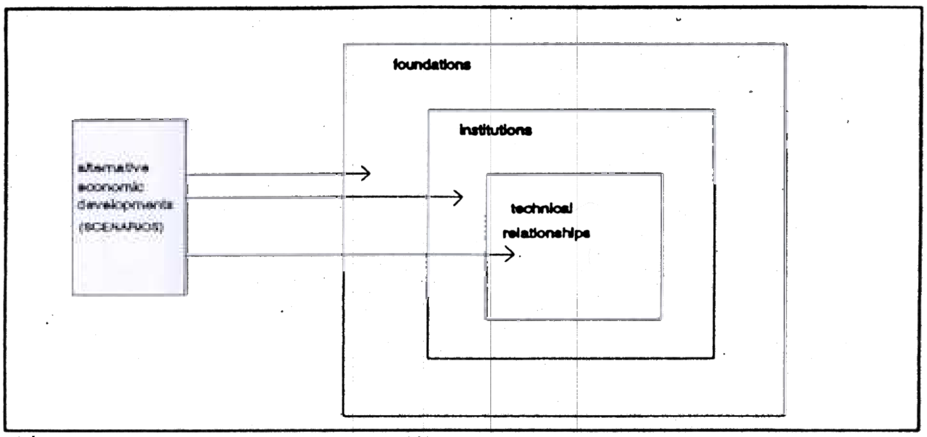

Figure 2: MULTI-FACET IMPACT ANALYSIS

SCENARIOS / IMPACTS	scenario A	scenario B	scenario N
element X_1	X_{1A}	X_{1B}	X_{1N}
element X_2	X_{2A}	X_{2B}	X_{2N}
element X_3	X_{3A}	X_{3B}	X_{3N}
.	.	.	.
element X_n	X_{nA}	X_{nB}	X_{nN}

TABLE 1: IMPACT MATRIX.

On the horizontal axis we list the alternatives of socio-economic policies (scenarios) under consideration. On the vertical axis are listed the relevant impact elements of our system; they can be classified according to the subsystems they pertain to. Each entry of the impact matrix represents the impact of an economic strategy (scenario) on any element of the system, for example; point X_{1A} represents the effects of the A_{th} development strategy on system element X_1;

Dynamic impact analysis.– Policy decisions regarding economic development are often dynamic in nature. This means that such decisions affect a system in successive interlinked time intervals. Often economic instruments, which form the basis of economic policy, are designed in such a way that they influence the behaviour of the system in the long run. Aa a result, an impact analysis must be able to assess the impacts over time, and under successive development polices.

An operational dynamic impact method is the stepwise approach proposed by Nijkamp and Van Pelt (1989). The characteristic of this method is that the impacts of a policy are asessed in successive time intervals, taking into account new emerging policies in each time period (or step). In Figure 3 we illustrate the stepwise approach.

This figure illustrates in an illustrative way the effects of a certain policy over time. Modules A, B, C, D represent components of our system; the figures x, y, z, v, n represent the impact of a given policy on the system's elements during the time period concerned. In the third step we assume that a new element. E. emerges. The impact of each step

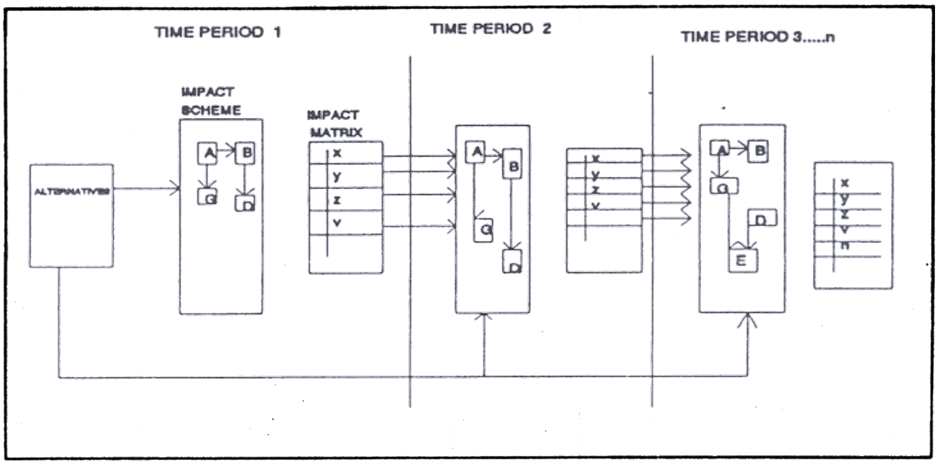

Figure 3: STEPWISE IMPACT APPROACH

constitutes the stimulus for the next step. together with new policies introduced in each step. etc.

Multi-dimensional impact analysis.– The impact analysis in our study contains elements of three different systems (economic, human, natural). There are different dimensions in the measurement of variables and the assessment of each system. That is why the impact analysis in our study can be characterized as 'multi-dimensional impact analysis'. The advantage of this type of analysis is that – in contrast to traditional analysis which only takes account of phenomena that can be measured in monetary units – this new analytical framework permits us to consider phenomena that are unmeasurable in monetary units. In this way we are able to take into account relevant non-monetary phenomena and impacts related to a policy decision (see Section 2).

This advantage becomes more significant if one works in the framework of a sustainable economic system, since this involves many effects of economic decisions which cannot be quantified according to the measuring rod of money. As a result, different dimensions such as money units, physical units, historical unique values, cultural values etc. can in principles be included.

Measurement issues.– In the framework of an assessment of the impacts on a system caused by economic decisions, two kinds of information may be distinguished: hard information and soft information (Nijkamp et al., 1990). Hard information refers to data measured on a cardinal scale; soft information is used to denote qualitative data (measured on an ordinal or nominal scale). Often an impact analysis includes both types of information (mixed information). Clearly, the components of the impact matrix may be evaluated on the basis of either hard or soft information (Nijkamp et al., 1986).

In case of hard information, one can make cardinal assessments. Several methods are well-known for such type of impact assessment (e.g. econometric methods, input-output tales, etc.). Qualitative measurements are less known and deserve more attention. Since we will use qualitative assessments in our case study, we give some more informaiton on these methodss here. Qualitative masurements have an ordinal or nominal information content.

Oridnal assessment means that the impacts are measured in a relative scale which permits only relative comparisons between impacts. Then the impacts may be assessed on one of the following scales:

(*a*) qualitative symbols such as ++, + 0, –, – – and?, which indicate respectively a relatively high positive impact, a relatively small positive impact, a negligible impact, a small negative impact, a strongly negative impact, and an unknown impact.

(*b*) a numerical point system, for example, a ten point system ranking from 0 to 10: (0. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. These numbers are used with an ordinal interpretation, so that 0 1 2 3 ...... This method has the advantage of being able to measure cumulative effects over time.

The nominal assessment is used in cases where much uncertainty exists in the data. In these cases the only reasonable assessment which could be drawn from the impact scheme, is of the form of a 'negative' or 'positive' impact. Such information may be symbolized by the sings + and −, respectively.

Multi-criteria Methods

There are two main characteristics of a proper methodology for an evaluation of environmental or monument conservation plans. The first is that a decision framework and its related evaluation method should be able to consider multiple objectives, because each economic decision concerns all three above mentioned systems, while each decision concern system requires the fulfilment of various targets for the achievement of sustainable development (Nijkamp, 1989). As a result, the evaluation methodology should be a multi-objective decision framework in contrast to a traditional framework, which normally focusses only on impacts related to economic efficiency in terms of benefits or costs foregone (e.g., cost of diseases caused by economic development), lost economic opportunities due to environemntal degradation, etc.).

The second feature is that the effects and the information concerning economic decisions are in general multi-dimensional in nature with different levels of measurement. The selected methodology should then be able to take into account the multi-dimensionality of effects.

Multi-objective evaluation serves to meet to a large extent the above requirements to a large extent, as this methodology takes into account different and conflicting objectives, while it is able to evaluate soft qualitative data; hence it forms a suitable tool for conservation studies. For more details about multi-objective decision methods we refer to Rietveld (1980) or Nijkamp et al. (1990).

The general format of a multi-objective optimization methods is:

$$\max W_j, (x), x \; k \; j=1, 2, 3 \ldots\ldots J,$$

Where W_j is a set of objectives (W_1, W_2, W_3, ... W_j) and x the vector of decision arguments, while K is the feasible space of x. The vector x denotes in our case the various development scenarios to be evaluated. Each scenario generates an effect on each objective. K. denotes the total feasible spectrum of all potential alternatives or of all potential instrument-policies which are used for desinging the development alternatives (scenarios).

Generally, there are two types of multi-objective optimization models: (1) continuous models which have a continuous range for the decision arguments x; in our case that would mean an infinite number of development strategies (alterantives); (2) discrete models which have a distinct finite number of feasible development alternatives; they are usually called multi-criteria models, Multi-criteria models seem to be a suitable framework for our study, as we have in many practical situations a finite number of scenrios. More technicalities will not be discussed here, but can be found in the extensive literature quoted in Rietveld (1980) and Nijkamp et al. (1990).

In our empirical analysis we will use the so-called regime method. Regime analysis has become a popular multi-criteria method, based on a pairwise comparison of alternatives or scenarios. The central concept in the regime analysis is the so-called concordance index C_{AB}. This index represents the extent to which alternative A is better than alternative B. This index may be defined as the sum of the weights attached to the criteria (objectives) included in the so-called concordance set C_{AB} (i.e., the set of all evaluation criteria for which alternative A in the multi-objective matrix is at least equally attractive as alternative B). Clearly, this set can be determined irrespective of the level of information on the impact matrix. Regime analysis focuses on the sign of this index rather than on its size. It can be shown that in certain cases, ordinal information on weights is sufficient to determine this sign, so that a final ranking of alternatives can be derived from the pairwise comparison matrix, consisting of values +1 and −1. In other cases this sign cannot be determined unambiguously. It can be shown that in such cases a partitioning of the set of cardinal weights can be derived, that is in agreement with the ordinal information on the weights (see for details Nijkamp et al., 1990). The final result of this method is a complete and transitive ranking of all alternatives for each set of weights. This method will now be applied to our study area of Olympia.

Description of the Study area

Our case study on sustainable development concerns the ancient region of Olympia. Olympia is located in the western part of the Peloponnese which forms the southern part of Greece's mainland. The name "province of Olympia" goes back to the days of Ancient Greece, since the Olympic games used to take place in this area. In our case study we are only concerned with a part of the province, namely the mountainous and the semi-mountainous part.

This region covers a space of 264.000 km^2, constituting 10% of the total area of the Nomos Ilias (the overlapping administrative region). The area contains nineteen communities, while in the town of Andritsaina the administrative center and capital are situated. The population amounts to about 6.300 people (census 1981).

Geographical characteristics.– The region is a relatively closed geographical area surrounded by the Alfios river at the east and the mountains "Minthy" and "Lykio" at the west. In fact, the region is a large watershed which descends to the Alfios river. Because of the relatively high mountains the area shows a landscape with much variety. The highest point is located at 1224m above sea level, while the lowest point reaches to 300m. The latter is situated near the Alfios river in a relatively large valley where agriculture is the dominating economic activity. The remaining part is mountainous and livestock production is the dominating activity there.

Climatic characteristics.– Generaly, the climate in the area is mild. Because of the gradualy increasing altitude, there are dominating western winds, which bring relatively strong rainfalls along. The humidity level reaches 75%. The average rate of sunshine hours is 3.000 hours per year. The average temperature ranges from 10-15 °C during the winter to 20-25 °C during the summer.

Economic characteristics.– The region has an economic orientation towrds agricultural production (58%) and industsial processing of agricultural products (30%). Since economic development is lagging behind the national trends, the region is characterized by the government as a region needing economic aid and incentives.

Social characteristics.– The region hosts traditional Greek communities. In the area, socio-public facilities are mostly lagging behind; this concerns areas such as health care, education, communication and other facilities.

Special elements.– The region is characterized by a unique scenic beauty which is threatened by social and economic activities such as use of pesticides and fertilizers for agricultural production, and hunting and fishing. There are several ancient monuments deserving attention and protection. The most important of them is the "temple of Epicurus Apolon", which is considered after the Acropolis as the most important ancient temple in Greece. This temple was designed by the same architects that were responsible for the construction of the Acropolis. Another important ancient site is the ancient town of Alifira.

Thus the Olympia area is altogether a region with a high environmental, socio-cultural and historical value.

A System's Analysis for the Study Area

Following the methodology developed above, this section will present the components of the economic, human and environmental (watershed, terrestrial and atmospheric) systems which make up the total regional system in our area (see Figures 4-8). Next we will specify the basic relationships between these components. For each subsystem we will present a general concise figure that includes all relevant system's elements and their relatinships relevant to sustainaable development.

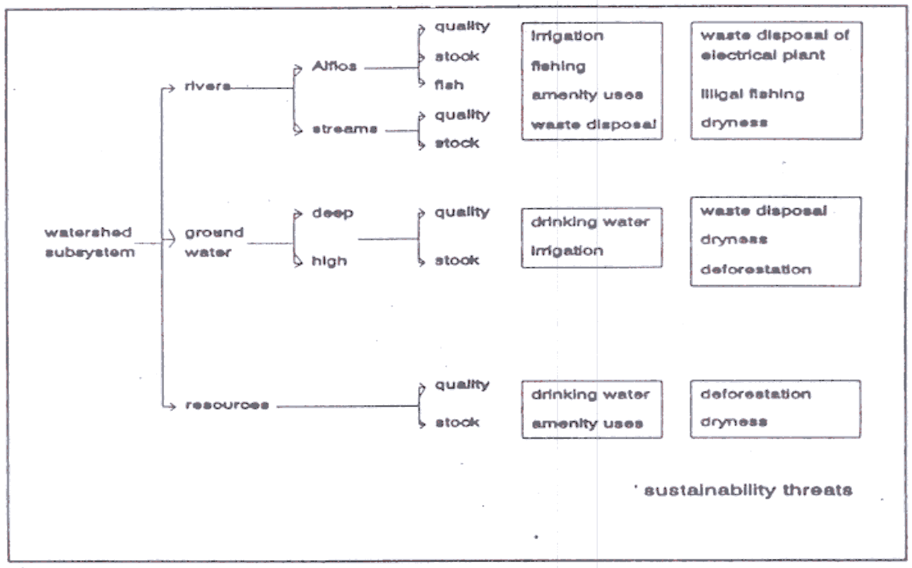

Figure 4: WATERSHED SYSTEM

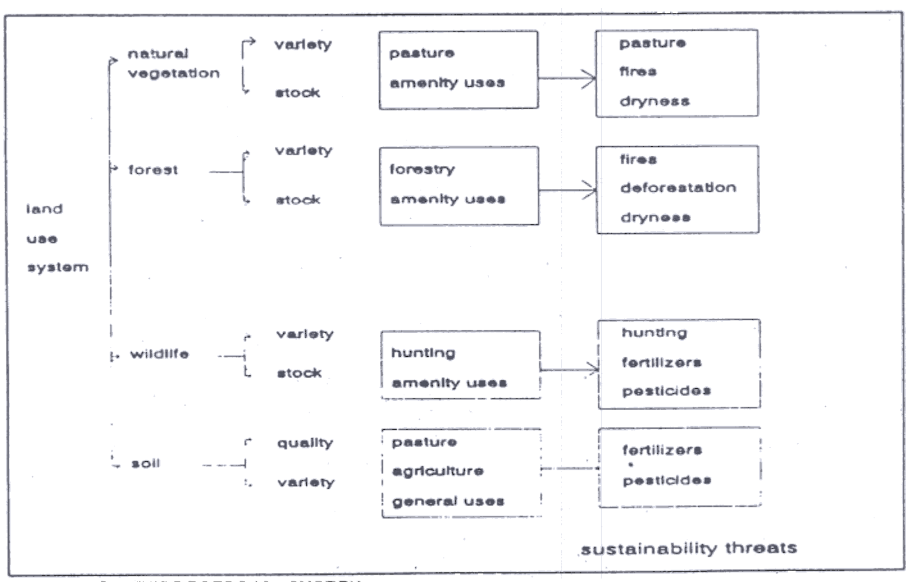

Figure 5 TERRESTRIAL SYSTEM

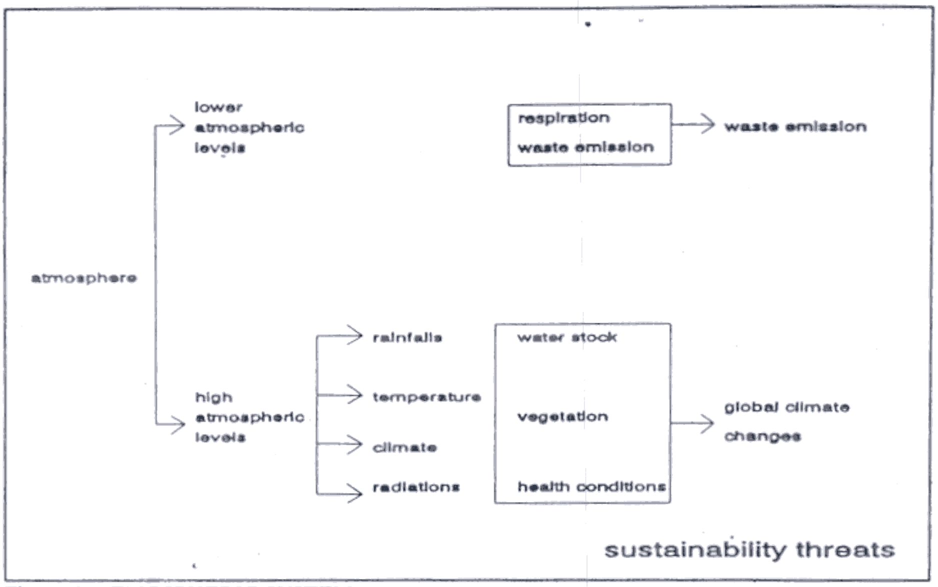

Figure 6: ATMOSPHERIC SYSTEM

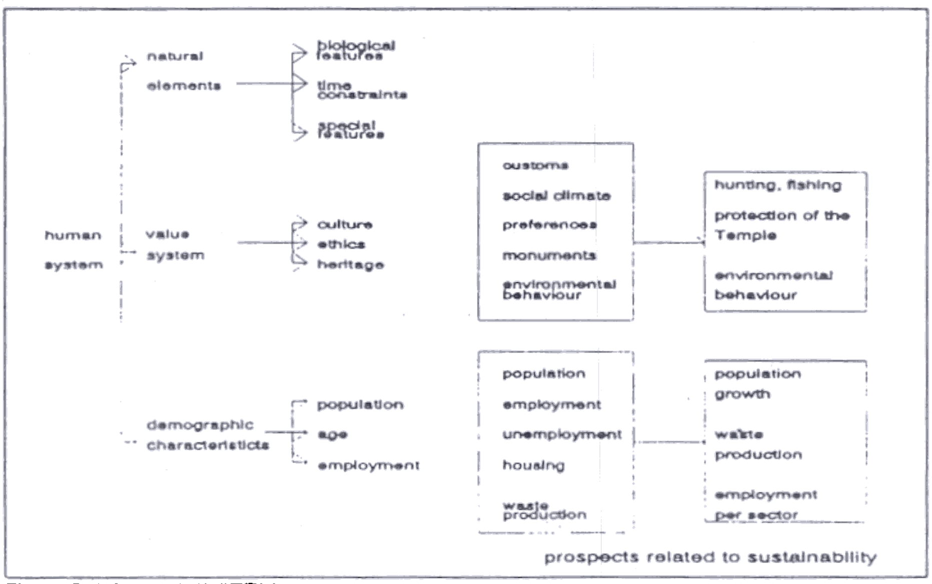

Figure 7: HUMAN SYSTEM

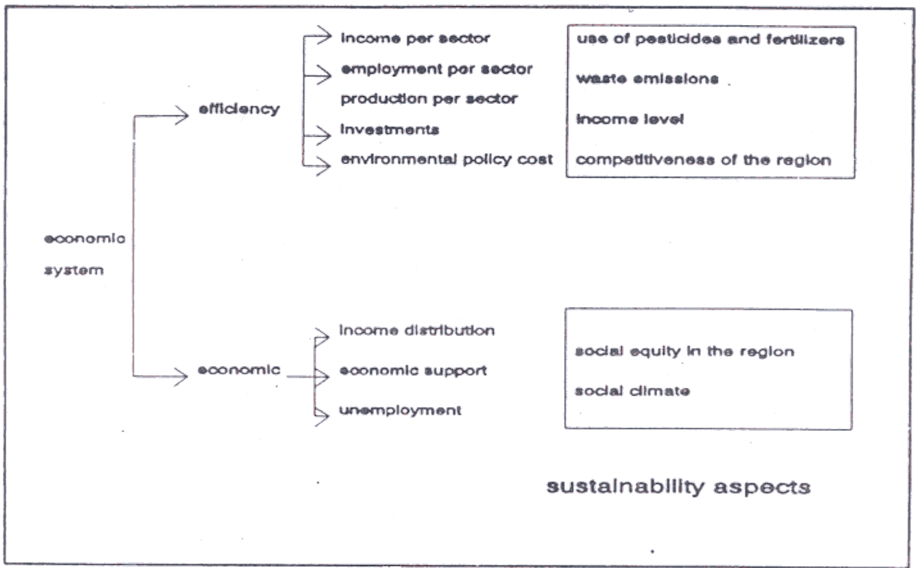

Figure 8: ECONOMIC SYSTEM

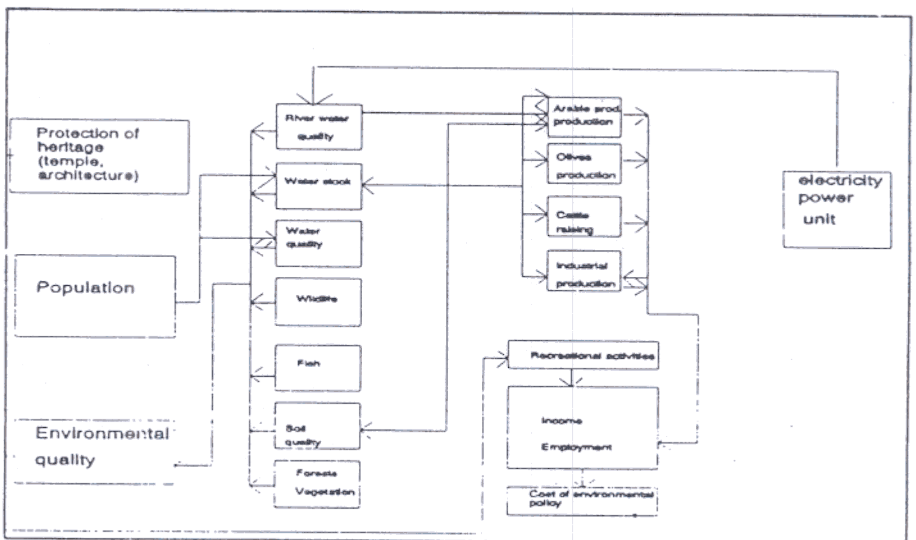

Figure 9: IMPACT SCHEME FOR OLYMPIA

The Impact Model

In our case study the impact analysis will mainly focus on the technical relationships of the regional system and only to a limited extent on institutional and foundational relations (see Section 4).

Figure 9 presents a concise impact scheme for the area under consideration.

Table 2 indicates the way in which a given endogenous variable (listed at the left-hand side) is influenced by other (exogenous) variables (listed at the top). The symbols of this table denote respectively: R river water quality, W water stock, w water quality, s soil quality, F forest and natural vegetation, L wildlife, H fish stock and its veriety, A agricultural production, O olives production, R other agricultural activities, I industrial production, r recreational activities, E income/ employment, C environmental policy costs, T heritage protection, P population, Q environmental quality, and D income distribution.

	R	W	w	S	F	L	H	A	O	R	I	r	E	C	T	P	Q	D
R																		
W								-		-	-	-				-		
w											-					-		
S								-	-									
F																		
L																		
H																		
A	+	+		+														
O				+														
R		+		+														
I								+	+	+								
r																	+	
E								+	+	+	+	+		-				
C																	-	
T																		
P													+				+	
Q	+	+	+	+	+	+	+								+			
D													+					

TABLE 2: SIGNS OF RELATIONSHIPS.

Clearly, the available information necessitates us to use various types of information. the direction of influence is given by using + and – signs in the table, so that this is a clear case of qualitative information.

Scenario Orientations

Here we will present ten alternative policy orientations (scenarios) for the region in question. The assumptions made in each policy orientation concern alternative policy measures aiming at three different targets. The first target is economic efficiency (income and production), the second one is socio-economic equity (fair distribution of welfare increases) and cultural protection, while the third one is environmental protection. These three targets lead to various (single and compound) orientation scenarios.

The first (extreme) orientation aims exclusively at economic efficiency no matter how it would affect the two other targets. This scenario would favour high growth rates in agricultural, industrial and recreational sectors and also provide incentives for large investments in industrial and recreational sectors.

The second extreme orientation aims at improving socio-economic equity and protecting the cultural tradition (monuments and architecture). The rate of economic growth is then lower. Explicit measures concerning the protection of the temples and of architecture are undertaken as well.

The third single extreme orientation aims at favouring environmental protection.It assumes elimination of the use of pesticides and fertilizers in agriculture sector, and treatment of industrial and household waste whenever it is necessary, as well as drastic elimination of the waste emitted by the electivity plant on the Alfios River. Specific measures are undertaken against illegal hunting and fishing.

The fourth (compound) policy orientation focuses on maximizing economic efficiency, socio-economic equity and cultural protection. Clearly, its assumptions are based on a compromise between scenario 1 and 2. High rates of economic growth are pursued parallel with measures towards favouring socio-economic equity and cultural protection (monuments, architecture).

The fifth scenario is a compromise between scenarios 1 and 3, so that economic efficiency and environmental protection are pursued. No measures concerning socio-economic equity or cultural conservation are assumed.

The sixth orientation scenario aims at maximizing socio-economic equity, environmental protection and momument conservation. It can be regarded as a compromise between scenarios 2 and 3.

Scenario seven is a full compromise (compound) policy orientation, as it focuses on economic efficiency, socio-economic equity, monuments protection and environmental protection. Moderate growth in each production sector is assumed combined with an environmental policy concerning the use of pesticides and fertilizers, the treatment of industrial and households waste as well as the control of hunting and fishing. Special attention is given to the protection of cultural heritage (momuments and architecture conservation).

The eighth scenario is an additional one taking into consideration the long run impacts of the introduction of "clean technology" in agriculture. This assumption favours drastic decreases of pesticides and fetilizers in combination with scenario 7 production rates. It also assumes higher agricultural product prices due to the higher quality of the products. The assumptions concerning socio-economic equity, cultural protection and environmental policy are the same as for scenario 7.

Scenario nine is using the same assumptions as scenario 7, but it introduces an external shock to our region, viz. the phenomenon of droughts resulting from changes in the global climate. We assume a decrease of the annual precipitation with a yearly rate of approx. 1 – 2% lasting for about 10 years. In addition, we assume that no effective measures are undertaken against this shock.

Finally, the tenth scenario is a variant of scenario 9, as it assumes that an additional policy towards elimination of water consumption is introduced.

Having now concisely discussed out ten scenarios, we will in the next section assess and evaluate their consequences with respect to relevant policy objectives/criteria.

Impacts of Policy Orientations

Having presented now ten policy orientations or scenarios, we will next make an attempt at judging the desirability of each of these scenarios vis-a-vis the local-regional development potential of Olympia. This means that – as a first step – we have to estimate the ex post consequences of each of these ten scenarios for relevant variables in the area under investigation. Five different policy evaluation criteria will be used here:

- environmental quality (En)
- income and employment (In)
- income distribution (In.D)
- population (P)
- cost of environmental policy (Cs).

These five criteria are derived from the elements described in Table 2. Using the above mentioned qualitative impact analysis, we can in principle estimate the impacts of each scenario on the systems elements discussed above. to account for dynamics, we have assessed these impactts for four year periods starting in 1986 and ending in 2014. The choice of this period has been made in order to include both short and long run effects in our study.

We use in our assessments the above mentioned ten point system with an ordinal interpretation. We assume that the numbers from 0 to 4 denote negative impacts (or a negative state change), and the numbers from 6 to 10 denote positive impacts (or a positive state change) while 5 implies negligible impacts (or a neutral state change) for the element under consideration. For each scenario a multi-period impact table can be assessed. The impacts of each scenario can be demonstrated by a multi-period pattern, a typical example of which is illustrated in Appendix A at the end of the paper. These multi-period impact tables function now as impact metrices to be evaluated for our multi-criteria evaluation.

Evaluation of Policy Orientations

Using the scenario impacts gauged in the preceding section we can now evaluate the desirability or variability of each scenario and their effects on the sustainability of Olympia. We will carry out three types of evaluation experiments, denoted as A, B, and C, repectively, representing a policy priority attached to environmental quality, income and employment, and income distribution. In these evaluation experiments the above mentioned five different indicators – or criteria – are used in various combinations of importance (via a weighting system). The successive evaluations A, B and C assume as the most important criterion environmental quality (En), income and employment (In), and income disrtibution (In.D), respectively. These evaluations may be considered as a kind of sensitivity analysis of the decision framework revealing how the scenario rankings change when we change the criterion importance. It is clear that the main characteristics of our evaluation framework A (highest priority for En), B (highest priority for In) and C (highest priority for In.D) can be further refined by looking also at the weights attached to the remaining four criteria. Therefore, in addition, we also will perform another type of sensitivity analysis, as presented in cases 1, 2, 3 . . . for each evaluation A, B and C. This means that we will keep the most important criterion constant, while we change, in an alternating way, the importance of the remaining creteria. Each of the three main evaluation frameworks and their sensitivity analysis will briefly be dicussed here.

A. Evaluation based on environmental quality aspects. In this evaluation the criterion of "environmental quality" (En) is regarded as the most important one and hence it has the highest weight; the remaining criteria obtain thus lower weights. Several cases can now be examined in this evaluation A as a type of additional sensitivity analysis. Finally, a ranking of the ten scenarios can be obtained by means of the regime method discussed above. This ranking will be presented here only for the base year (1998).

In our analysis we have distinguished 8 sensitivity analysis for evaluation framework A, where environmental quality (En) has always the highest priority, but where the other four criteria may have different rankings. Each of the 10 scenarios (policy orientations) 1 to 10, presented in Section 9, can then be ranked for each of the 8 sentivity analyses. The various results, based on the use of the regime method, are summarized in Table 3.

	ranking of criteria	resulting ranking of scenarios
1	En>In>In.D>–P–Cs	6>8>2>4>5>7>1>9>10>3
2	En>In>In.D>P>Cs	8>5>6>7>4>2>9>10>3>1
3	En>In>In.D>–P	8>5>6>7>4>2>9>10>3>1
4	En>In>In.D>P	8>5>6>7>4>3>2>9>10>1
5	En>In>In.D	8>3>5>6>7>4>2>9>10>1
6	En>In.D>In	6>8>3>5>7>2>4>9>10>1
7	En>In–In.D>P	8>5>6>7>3>4>2>9>10>1
8	En>In.D>In>P	6>8>5>7>2>3>4>9>10>1

Table 3. Sensitivity of the ranking of the 10 scenarios for different weights (rankings) of evaluation criteria for evaluation framework A[1].

[1]No ranking of a given criterion (cases 3-8) denotes that no information is available on the rank order of the criterion concerned. Multi-criteria analysis is also able to handle this no-information situation.

B. Evaluation based on the economic performance aspect. Here we will consider the ranking of scenarios from the view-point of income and employment (In) as the most important judgment criterion for the development of Olympia. The following results have been obtained by employing the above mentioned regime multi-criteria method for qualitaive evaluation (*see Table 4*)

	ranking of criteria	resulting ranking of scenarios
1	In>En>In.D>P>Cs	8>6>5>4>7>2>1>9>10>3
2	In–In.D>En>P>Cs	8>4>7>1>2>5>6>9>10>3
3	In>In.D>En>P–Cs	7>8>2>4>6>5>1>9>10>3
4	In>En–In.D>P–Cs	8>6>5>4>2>7>1>9>10>3
5	In>En>In.D>P	8>5>6>7>4>1>2>3>9>10
6	In>En>In.D	8>5>7>1>4>6>3>2>9>10
7	In>En–In.D	8>5>6>7>3>4>2>9>10>1

Table 4. Sensitivity of the Raking of the 10 Scenatios for Different Weights (Rankings) of Evaluation Framework B.

	ranking of criteria	resulting ranking of scenarios
1	In.D>En>In>P>Cs	6>2>8>7>4>5>9>10>1>3
2	In.D>In>En>P>Cs	6>2>8>4>7>5>9>10>1>3
3	In.D>En>In>P>–Cs	6>8>2>5>4>7>9>10>1>3
4	In.D>In>En>P–Cs	6>8>2>4>5>7>1>9>10>3
5	In.D>En>In>P	2>6>4>8>5>1>7>9>10>3
6	In.D>In>En>P	6>8>2>7>4>9>10>5>3>1
7	In.D>En>In	6>8>2>7>4>9>10>5>3>1
8	In.D>In>–En	6–8>7>2–5>4>3>9–10>1

Table 5. Sensitivity of the Ranking of the 10 Scenarios for Different Weights (Rankingso of Evaluation Criteria for Evalution Framework C.

Having accomplished the above three evaluations, it is now possible to make an overall ranking of the 10 scenarios, by creating three important classes for the scenario rankings pesented in tables 3, 4 and 5. The first group (I) includes the three highest ranking scenarios, the second one (II) contains the three intermediate scenarios, and the last one (III) the four lowest ranking scenarios. The occurrence of scenarios in the three above evaluation frameworks A, B and C can now easily be calculated (see Table 6). In case a scenario emerges with ties (i.e., in two groups), it is assigned to both groups.

The results of table 6 lead to interesting conclusions. First, in terms of elimination of irrelevant development scenarios it is evident that scenarios 1, 3, 9 and 10 are inferior; in almost all cases they are dominated by other scenarios. It is noteworthy that scenarios 1 and 3 assume extreme policy orientations: extreme economic growth and extreme environmental protection, respectively.

evaluation framework	I	II	III
A	8, 6, 5	4, 7, 2	9, 3, 10, 1
B	5, 8, 6	7, 4, 2	2, 1, 9, 10, 3
C	8, 2, 6	4, 5, 7	1, 10, 9, 3

Table 6: Occurrence in Importance Classes II, III by each of the ten scenarios for ten scenarios for 3 evaluation frameworks A, B and C.

It seems that both policies would be problematic whatever the justment criteria. On the other hand, the classification of scenarios 9 and 10 depicts the overall sensitivity of the regional system against serious external shocks like climatic changes.

Secondly, regarding a progressive identification and selection of feasible and desirable scenarios, it turns out that scenarios 8 and 6 – and to a lesser extent scenario 5 – are important serious candidates to be considered in more detail.

Generally, the previous evaluation system – based on qualitative impact analysis and multi-critieria analysis – appears to offer a fruitful analytical framework for ecologically sustainable development and monuments conservation planning in Olympia.

Concluding Remarks

We have presented here an alternative methodology which may be used in designing and decision-making for environmental and cultural conservation planning. This methodology should be perceived as a complement and not as a substitute of a traditional economic methodology (based mainly on economic cost and benefit considerations). It allows for considering some crucial evalution aspects which evade from the traditional evaluation methodology. On the other hand, it permits the use of non-economic measurement units as well as of qualitative information. Therefore, this approach is suitable for deciding for sustainable development in the framework of monument conservation, since such an issue usually involves non-quantitative critical parameters. This is once more important in areas where the availability of statistical data and of regional data banks lags behind that of developed nations. Our proposed new decision framework may also favour a more democratic decision-making, as it may incorporate the interests of different social groups in the form of different rankings of relevant decision criteria.

Appendix A

This appendix contains an illustration of the esimated effects of a given policy orientation or scenario on the elements of the regional system of Olympia. We present here only the assessment of the effects of scenario 1 (see Table 7). For all other scenarios similar assessments have been made using similar qualitative impact assessment techniques.

	1986	1990	1994	1998	2002	2006	2010	2014
RIVER QUALITY	4	4	4	3	3	2	2	2
WATER STOCK	6	5	5	4	3	4	4	4
WATER QUALITY	7	7	6	5	5	5	5	4
SOIL QUALITY	7	6	6	5	4	3	3	3
FORESTRY NAT. VEGET.	6	6	5	5	4	4	3	3
WILDLIFE	5	5	5	4	4	3	3	3
FISH	4	4	4	3	3	2	2	2
ARABLE PRODUCTION	5	6	8	9	10	8	7	7
OLIVES PRODUCTION	5	6	8	9	10	8	7	7
LIVESTOCK PRODUCTION	5	6	8	9	10	9	8	8
INDUSTRIAL PRODUCTION	4	5	7	8	8	7	7	7
RECREATIO-NAL ACTIVITIES	3	4	6	8	8	8	6	6
ENVIRONM. POLICY COSTS	10	10	10	10	10	10	10	10
TEMPLE AND ARCHITECT-URE	6	6	7	7	7	7	7	7
POPULATION	5	5	6	6	7	7	8	8
INCOME AND EMPLOYMENT	5	6	8	9	9	8	7	6
INCOME DISTRIBUT-ION	6	6	6	6	6	7	6	6
ENVIRON-MENTAL QUALITY	7	7	6	6	5	4	3	2

TABLE IMPACTS OF SCENARIO 1