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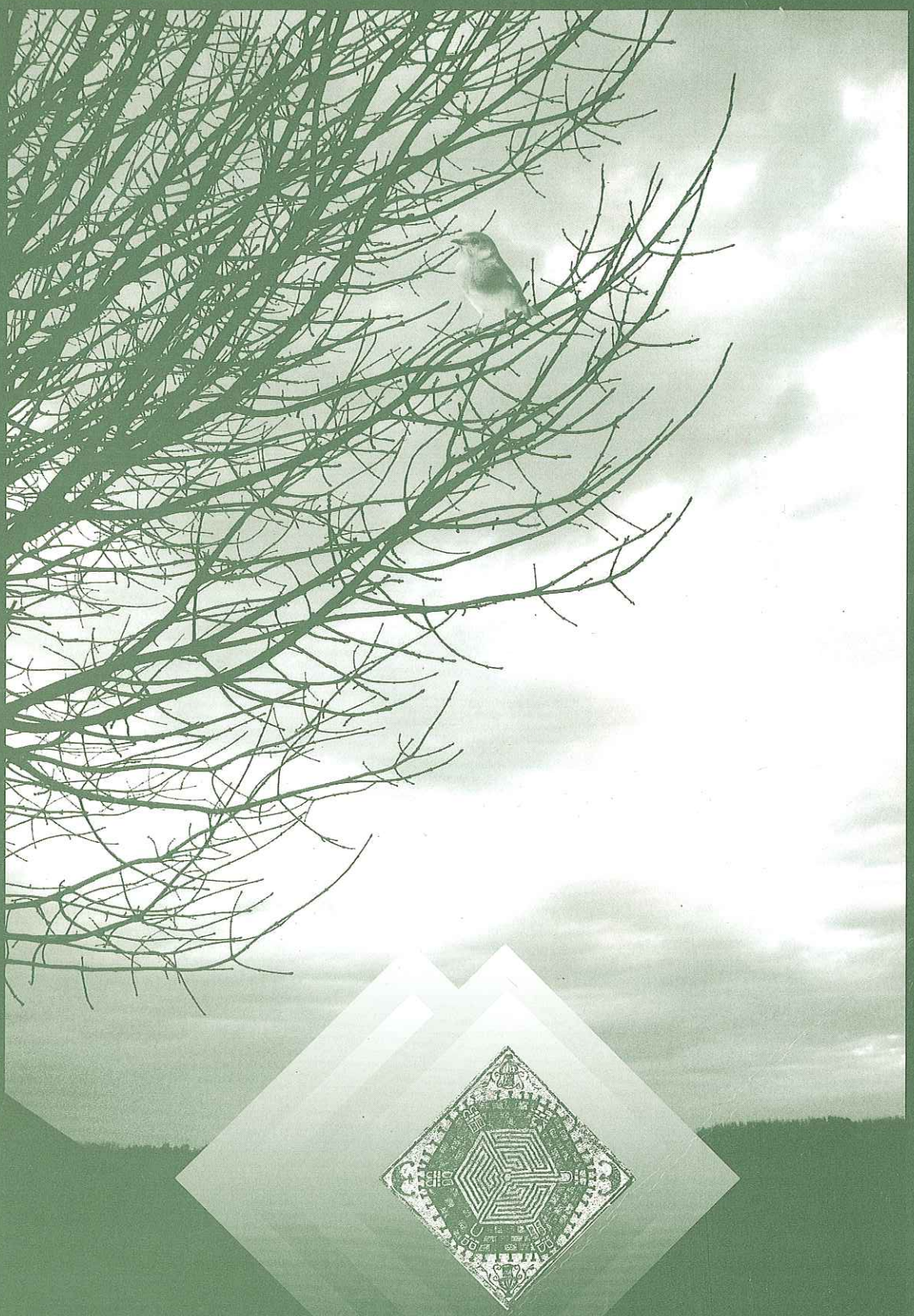

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CONTENTS

This year marks the 50th anniversary of the Institute of Architecture and Urban and Spatial Planning of Serbia's work and existence. On this occasion, the Scientific Congress with a topic 'Sustainable Spatial, Urban, and Rural Development of Serbia' will be held in Belgrade on the 6th and 7th December 2004.

As a contribution to this 'golden jubilee', the International Review 'SPATIUM' dedicates this issue to the sustainable development theory, with a special emphasis on sustainability of urban areas.

Editorial Board

SUSTAINABLE DEVELOPMENT AND URBAN IDENTITY: A SOCIAL CONTEXT

Ljubinko Pušić

The most attractive idea within the scope of the present considerations of global future is the planning of sustainable development. The recent treatments of this idea have established a new paradigm of urban and territorial development. Presently, however, the thesis of sustainable development is acquiring negative connotations because it is being exploited for various manipulations.

To demonstrate fully its value in the sphere of urban projecting, the theory of sustainable development should include a clearly expressed component of cultural-urban pluralism. In other words, the global strategy should retain the important local characteristics, to a measure and in a way that would contribute to the coherence of (European) urban system. In an urban-cultural context sustainable development implies a satisfying of social needs on a higher level of aspirations than is the case in a vulgar interpretation of the economic, urbanistic and ecological assumptions of sustainability for a community. In this it is assumed that the natural and necessary needs of the individual have been previously meet. For a holistic concept of sustainable development cannot be based only on strategies which insist on a full stomach for the world population, on normative approaches to the economic measuring of the growth and development of a society, on the premises of ecological purism or on the comprehensive urban planning.

The main idea within the framework of general concern about urban future may be condensed to the following two questions: (a) how much are the social upheavals which characterize the modern world and which involve all European cities a prearranged framework and (b) how much are they a conceivable framework for urban future?

Despite of holistic concept of sustainable development, reduction of the problems of the prospective city to geopolitical and cultural planes is not only possible and reasonable but necessary. This, however, does not mean that the apparently narrower view will make the search for possible answers any easier. The urban reality operates with a widely accepted syntagm about a large set of specific but unessential social and spatial characteristics of the (East European) city. But the reality is that these cities deserve all attributes that make them a full-fledged factor of the European urban milieu.

Key words: Sustainable development, identity, urban pluralism, Eastern Europe, global society, culture, future

It is the cultural context that represents the focal point for each contemporary urbanological and sociological analysis on the way to understanding urban reality. It is a well-known theory that there is strong inter-relatedness between cultural identity and geographic areas, a link that is of great importance for man's well-being, his emotional stability and his attachment to local, regional and national groups (1). Cultural identity certainly represents one of the leading principles of the concept of sustainable development. The urban-cultural identity emerges as the crucial factor in a series of highest-quality matrices that participate in the entire cultural profiling of a society. It is, at the same time, an extremely important factor in defining the urban component of sustainable development.

The understanding of the cultural framework of urban societies not only helps clarify the essence of social diversities, but it also serves as the basis for all predictions about urban questions – naturally, also for questions found in the search for sustainable urban development. Thus, what make cities and urban societies different are the characteristics of their own cultural beings. So far nothing has been said that is already not well known in the urbanological and urban-sociological mode of thinking. Why are we, then, nevertheless, insistent on this matter? It is because of the fact that the concept of sustainable development is inconceivable in a way other than one based on profound knowledge and recognition of diversities, which determine individual urban societies.

If the urban world is so strongly interwoven with such intense cultural influences, a question might be posed as to the possibilities of the conceptual objectivization of urban sustainability. It is exactly these diversities that prove that the idea of sustainable development has to place a strong accent on the cultural

features of societies, regardless of the type of sustainability paradigms. In such circumstances, national policies in organizing spatial relations and the implementation of the Agenda 21 are of utmost importance. Taking into consideration the fact that cities, in their urbanistic articulation, demonstrate all features of social particularities, it is exactly urbanism that emerges as a strong element in the operationalization of the idea of sustainability. Something that is appropriate for the urban space of a developed city in the West can prove completely useless in some cities in the undeveloped parts of the world. At the same time, this should represent a corrective measure in most of the past endeavors to perceive the idea of sustainable development in the dominant economic or political context.

The main group of attitudes toward the method of urban development planning includes those facts which may be characterized as speculative. Perhaps the single most important attitude is the one which draws the equal sign between the needs for a coherent European urban future and universal egalitarianism. Concerning the prospective of the "non Western" urban areas in the prevailing conditions, the main question seems to be the following: what prerequisites are needed to minimize the uncertainties associated with the prospective of the city in this cultural zone. In seeking for an answer two alternative approaches may be taken: the first one considers the global circumstances for human living in this geopolitical area, while the second is concerned with the specific characteristics of each individual social reality and urban milieu.

The first approach to the global social changes, that provides room for considerations about a transformation of the city in the former East Europe, is concerned with a question: what happens to the city after the social stage, in which the city had taken part, has toppled of the political scene? Francis Fukuyama, in his 1989 article “The end of history”, claimed that the wave of reforms in the Soviet Union and East Europe and the expansion of consumerism is in a way “a triumph of the West and the Western ideology - the end of history that we know: the ultimate accomplishment of the ideological evolution of the mankind and the universalization of Western liberal democracy as the final social “form”. If this apocalyptical version of civilization development is taken as a standard of measure, i.e., if the end of history is in fact "the end of human deliberations about the primary principles", then where can we place the ideology of urban reality/future of a relatively insignificant cultural-urban area such as the East European city? Does it mean that the course of its future transformation has been predestined by the fate of the capitalist city of the Western civilization? Perhaps, everything is not as simple as Fukuyama forecasts. It is an irrefutable fact that the main civilization course runs right through the center of urban. Today, this is clear than ever before, maybe because we are carried by the swiftest of its currents. There is also no doubt that social relation, having a firm foothold in institutional relations, control the process of urban transformation. However, it is a historical fact that the complexity of transformation of the city exceeds the scope of transformations dictated by the global changes. No matter how radical and sudden, even when the reality turns, into its own inverted mirror image, these changes are incapable of inducing automatic transformation of the city. Urban transformations recognize innumerable nuances of gradation and adaptability which defend the historical self-sustainable substance of the city.

The second approach to the global social changes falls within the realm of political speculations about urban future. Recognizing a need for different avenues of cultural development in different parts of Europe, Johan Galtung asks a belated question: What is going to happen, after the vehement political changes that have taken place, when Europe becomes dominated by the junk civilization in all segments of the society? Obviously, the focal point of this phenomenon is in the city. We should be concerned about the pervading concepts of globalization which threaten to instate in all Europe the false thesis which says that the planning of sustainable development is more important than cultural-urban pluralism. A form of resistance to the indiscriminate globalization is various forms of nostalgia for the social security and cultural identity of the past. It may be expected that these sentiments will escalate into specific forms of urban unrest which the “non-Eastern” Europe will try to hide through special social programs. Also, there is not doubt that urban movements, oriented either left ore right, will be invariably caused by the process of social leaven for the emergence, development, and escalation of ideological ideas. It is obvious that the shadow already covers “the rest of Europe”, in the form of peripheral capitalism (a variant of the Third World neocapitalism adapted for Europe). Social diversification is more than obvious in the East European city. That it is not a case of the process of stabilization and coherence is demonstrated by the fate of most European cities which are presently passing through the period of primitive imitation of peripheral capitalist relation.

If the planning of sustainable development does not establish itself as a paradigm of cultural-urban development, the future of the “non Western” cities is also open to other speculative variants. The possible scenarios of urban changes would in fact be sub-variants of the transformation of the postindustrial/capitalist city. Nevertheless, it appears that such variant of urban transformation won't be a complete incarnation of M. Castell’s thesis, which says that “the global society and its predominant production method are the factors which determine the character of living in an urban community”, simply because the dynamism of changes imposed in front of the modern society functions on the principle of ascending time spiral, i.e., calls for global changes in the urban sphere will repeat over and over. It would not be realistic to expect the forms of social organization in some of the former socialist countries to be in perfect harmony with the requested capitalist post industrialization. It is very likely that the discrepancy will be most evident in the sphere of the cultural urban transformation. Just like any globalism in the social or ecological sphere, Europe will have to grant legality to the cities east and south of the Alps for a number of specific characteristics. On the other side, these cities will have to realize that in a long run, they have nothing to regret about. In order to become a full-fledged member of the European urban network, Belgrade does not have to strive to adopt the cosmopolitanism of Amsterdam or Brussels. Conversely, Bucharest may not try to regain its image of “Little Paris” without having to share the teletopic vision of future with Paris itself.

To be in tune with the "contemporary" forms of transformation, the "non-Western" cities are expected to transform into full-fledged members of the European urban network practically overnight, i.e., in a period which is too short when compared with the period that gave them their present social profile. In this context, there exists at least four major problems: (a) Their spiritual transformation into the cosmopolitan environment that would be attractive to the modern man will not be feasible for an extended period because of the non-cosmopolitan heritage bestowed on them by the past half century, (b) Time is required for their institutions, economies, and finally, citizens to establish a continual active relationship with the process of dynamic urban changes (the so-called "continual urban progress"), (c) A need for establishing a stable urban network: each city within the network should have a clearly defined regional role and a stable and differentiated economic position, (d) A need for defining a new model of urbanization which would replace the worn out patterns of unbridled demographic and territorial expansion.

Any of the possible concepts of urban development in the Eastern and/or Central European context must necessarily involve information of political processes which are going to rule the fate of the people and the territory. A possibility of adhering to indigenous cultural and historical models is bound to be an accepted direction of urban development. Endeavors to rapidly adopt Western European urban models will be limited by the pace of social transformations. The city is phenomenon which changes much slower than it is the case with global social or technological transformations. Urban changes take a roundabout way. Considering the European integrating process, what may be expected to happen to the city which we have recognized up to yesterday as Eastern European city?

The first prerequisite for a possible future of the "non-Western European cities" is to solve major conflicts which determine their present situation. Most conflicts results from the typical lack of political foresight and willingness of people (including urban planners and decision makers) to take an active part in solving these problems.

To be able to face the European challenge of integration in and harmonization with its urban network, "non-Western" European cities must solve the problem of their *internationalization*. Is it possible at all, and if it is, what degree of internationalization is needed for their future prosperity? Extreme policies of self-sufficiency and ethnocentrism, which have led to their provincialization, have been devised at the expense of traditional culture which has been a predominantly positive potential of these cities. Hopefully, this attitude is very likely to be quickly abandoned. It is clear that internationalization is an inevitable part of the scenario inherent to the development of western cities. To take part in such a scenario "non-Western" European cities should respond positively to question like the following ones: are we ready to become an integral part of the world? Are we capable of attaining a position which will be accepted by the world? Although the components of this scenario of possible urban development seem to be a series of general statements, the fact remains that many cities in yesterday's Eastern Europe pass through an imitative phase misinterpreted international forms by organizing uneconomic and culturally debatable events.

Some western models of future urban development insist on *communicational* performances of the city. This scenario has recently attracted much attention because of revolutionary communication technologies play a fundamental role in urban transformations. Unaccustomed to the challenge of the information future, inhabitants of the yesterday's Eastern European city are skeptics whose experience says that novelty does not necessarily imply improvement.

The negative effects of a long-continued indoctrination of urban planners, decision makers, even scientists, may be seen on the fronts of practically all large and medium-sized yesterday's Eastern European cities. From the advent of modern trends in architecture and urban planning, i.e., for some six decades, the urban entity in its material and spiritual sense has been steadily corrupted. Therefore, it is reasonable to expect that reconstruction will be an important direction of future urban development. The following prerequisites are needed for this to happen: evolution of political consciousness until the concept of "former socialist city" is recognized as an ideological blunder, evolution in attitudes of urban planners who must accept that city is no mere agglomeration of houses, rediscovery and reaffirmation of the lost architectural and planning context founded on regional values, and finally, decades of patient waiting to perceive improvement in the material and spiritual qualities of the city.

It is a grave fact that the networks of urban centers in Central and Eastern Europe reflect a situation in which the territory is sharply divided between the center and the periphery. This is a consequence of the political idea that people, assets and territory are efficiently controlled by methods and techniques of strict centralization. To be rational, the city should accept to operate within a *decentralized regional network*. To realize this model, it is necessary to reconsider and transform the ruling political doctrines and to decentralize the political power to equitably distributed regional centers. In other words, it implies a rationalization of management. When talking of concentration, it is essential to keep in mind that this is not a mere physical concentration of people and assets although the area its visible expression. We shall mention only two out of several important components of concentration. These two components, which are important for the urban system of Eastern Europe, may govern the development of regions in a wide vicinity of an urban center. The first is on the concentration of status and power, i.e., politics, management and information. The second component is the cultural concentration which may be a powerful tool in developed and underdeveloped regions alike. Only after those two categories there comes the physical concentration as a technically and technologically preferable framework of the urban way of life.

The reviewed hypotheses of future urban development of the Eastern and Central European city obviously follow a line of indispensable changes of the currently prevailing mental processes and make room for a more social approach to sustainable development. What could be the effects of the transformation of an urban society if ideas about this are derived from environments which do not understand the cultural context of the community?

If it can be considered that the idea of social transformation, as the framework for sustainable development, has been ostracized on the supranational level (as in the case of the European Union or in any other case when there is a formal equalization of cultural regions for the purpose of economic and political unification and integration), the effects for different areas of these regions vary quite extensively, but they are always very significant and inevitably painful. All the effects manifest themselves on several common levels:

1) Changes in the economic structure

One of the basic assumptions for realizing the concept of sustainable development concerns adapting the economic structure of society to greater efficiency and utilization of resource potentials, in all of its segments. As a rule, an urban society is an aggregate which most quickly, powerfully and extremely sensitively reacts to every outer and inner demand for social change. Finally, all the elements of the economic performance of a society such as production, consumption and ecological conditions derive to a great extent from the demands of the urban environment. Urban systems and cities in Third World and East European countries are very telling examples of the extent to which supranational demands for an egalitarian application of the liberal capitalism and market economy model strongly affect the reshaping of traditional cultural models of urban living, the urban and urbanistic identity of the community. The economic models of the western world, often to imaginary levels and forms of well being, follow along paths which irremediably undermine the distinctive traits of autochthonous urban (and not only urban) cultures. Economic efficiency and progressive economic growth need not necessarily be a prerequisite for the culturally and urban sustainable development of a community.

2) Changes in the social structure

The social structure of society is one of its most dynamic factors and, at the same time, exponent of the greatest number of traits of a society. Despite of this fact, the stability of a society is also measured by the steadiness of its social structure. When external demands are made for social change, this automatically also calls for such changes in a society's social structure which are profiled in a long term process. It could be claimed that the "urban profiles" of most of urban centers in Europe (in all its regions) were developed over a long period of time. In addition to this, in each European country the dominant segment of the social structure is constituted by the middle-class layer of society. This is the layer toward which the social challenges are addressed and, at the same time, it is a "transformer" toward the other layers of society. The quantitative and qualitative challenges of sustainable development in the spheres of production, consumption and utilization of space are most extensively realized in this middle layer. The spaces and functions of every city are, in the largest number of cases, adapted to the requirements and demands of this layer: housing (manifested as the distribution of forms of housing, the structure and quality of houses), the network of institutions (education, health, culture, administration), employment positions, transportation infrastructure (for this is the layer from which greatest number of the work force is recruited and which has a need for daily mass migrations within the city or area), outdoor and indoor spaces for recreation, and so on. It is clear that demands for social change induce changes in the way of life of these most numerous portions of urban society. In periods of widespread social transition, such as, in the 90s, the countries of former Eastern and partly Central Europe are undergoing, this erosion of social structure is the best visible. Whole social layers are disappearing (primarily the middle class), and some new ones are taking shape, which will eventually play a dominant role in contouring the urban profile of the whole society. The decomposition of a society's social structure need not necessarily also imply advancement toward a better form of community, since a society's traditional social structure is an essential factor of its stability. When a system of values has been established, and when, in the meantime, another one is not developed through evolution, what then happens is that the gaps created by transition are filled by an ad hoc system. The sudden entrance of a market economy and market thinking into the everyday life of urban societies in transition is causing gaps in their social structure. One of the most important effects is that traditional forms of urbanality are being decomposed at the same time.

3) Changes in the urban structure

The concept of urban sustainability in the described cultural context, exposed to the interpretation of architects and urban planners, is, at the same time, exposed to great temptation. Naturally, their sensibility for spatial structures is manifested to a greater extent than with other experts who are involved in the study of sustainable development. It can happen very easily that the feeling for the value of what has already been created and its cultural evaluation turn into spatial determinism.

Through the focus on social and urban reality of new social structures created by transition, in most of the large cities of the former political East, dramatic changes are taking place in their inherited urban structure. This means that the urban-morphological matrix, which is an important identification demarcation in the life of the most numerous layer of citizens (and of other inhabitants as well,) is being altered. New rules of the game in the planning and utilization of space are being adapted to the social layer which holds the levers of political and economic power. In this case, these two are most often overlapping. The face of the city which takes shape in such conditions results from the current redistribution of social wealth, which is passing into private hands. In countries of the former socialist order, this is what is termed "the selling of the state", in which speculations with urban real estate are the most attractive, that is, most profitable. Since the right to ownership is one of the fundamental values and impetuses for western democracies, this is what countries in transition are tending toward. This right, linked with organized urban regulations in a process of evolution (where the monetarization of society and administrative and legislative trends are concurrent), it is well known, has given rise to the recognizable and functionally differentiated cities of western society. Many cities in Western Europe are examples, in the general case, of “desirable and good” urban structures. It cannot, however, be expected that in the process of social transition such a transformation can take place without serious

effects for urbanality. The larger and medium size cities of the European east and a segment of them in its central region are today being deconstructed. Appearing on the scene is a great European wave of "Osmanization", which is rapidly erasing the marks of former times. The concept of sustainable development must be based on strategies which respect the patterns of urbanality originating in the long process of the historical constitution of the urban morphology. This does not mean that there should be an obligatory and required (nor is it possible) return to or insistence on "authentic" architectural forms, such as we have in Berlin today, which is attempting, at any cost, to return to the look it had in the 30s, by remodeling some of its central areas.

What shape can, in the simplest case, this attack on established values of urban culture take? For instance, in cities whose traditional centers of marketing are bazaars or open air markets (cities in the Mediterranean region or those in the East), when there is a new approach and insistence on large indoor markets, whose economic efficiency is measured by a quick turnover of money and a consumer mentality of the western type. Or, when in the construction of new traffic communications across old city centers, the network of historical urban patterns is disrupted. This also occurs when the construction of new housing projects (usually on the outskirts) establishes no organic link with the important morphological features of the urban past or when patterns established by tradition are not raised to an adequate semantic level.

Culture of space in the modern city begins with the culture of making decisions on spatial matters. Without doubt, the culture of urban space is created in the sphere of urban policy. This is nothing new. Each system strives to organize its relations (including spatial ones) in such a way that it is capable of successfully controlling it (2).

The problem of spatial planning of culture is of utmost importance for the strategy of urban sustainability. Urban cultural policy is much more than sporadic presentational "happenings" in the city space. What we are dealing with in this case is a new mode of thinking and the creation of cultural strategies that would, in the long run, enrich the lasting urban space with attributes of the cultural. Three directions of such a new mode of thinking are of special importance in the process of re-shaping the cultural climate of space: (a) the development of such free spaces in the city, which would enhance social interactions and the creation of "porous" borders between different parts of the city; (b) the encouragement of multiculturalism and inter-cultural permeation via space and (c) the development of cultural projects emphasizing the participation of citizens, as integral parts of the strategy of sustainable urban development (3).

4) Changes in living patterns

If the thesis that "urbanism manifests itself as a way of life" (L. Wirth) is correct, then the urbanality of any space is given by the patterns of its being lived through. Since patterns of living are exponents of certain cultural and social features of a society, changes in them also affect the acquired values of the community. Sustainable urban-cultural development has to take into account the actual differences which exist in various geographical and cultural-genetic zones. The patterns of urban living in a Mediterranean city and in one north of the Alps are essentially different. The homogenization of the "urban mass" of Europe (or of any other space characterized by differences) should not simply be a process of unification.

The urban identity of a community is an exceptionally valuable component of sustainable urban-cultural development. The wealth of a civilization is measured by the variety of its manifest forms; the wealth and vitality of an urban civilization is expressed by the multitude of its different forms of urbanality. The urban identity of a community can be expressed by the term *city-making*. Some of the fundamental elements of its complexity can be considered to be: the manner of social organization within the community (which can be inefficient in the economic sense, but is always typical), the temporality of the community, the characteristics of its urban structures (its urban morphology), the atmosphere of the city/community as a quality of its historical duration, a specific form of its social structure (which need not mean that it is also the desired one), the retaining of a certain type of social segregation and spatial differentiation (which cannot be obliterated by any model of social and urban development, and so, in the social concept of sustainable development one should not even insist on their elimination), etc.

The notion of maintaining a certain level of urban identity in a community is not, however, without dangers which are opposed to rational forms of social development. Some of the most important ones of these are: Romanization and emphasized exclusiveness of one's own culture; separation from other urban communities of the broader region or continent; withdrawal into the shell of a national state, that is to say, state-national egotism; the seeking of development patterns in nostalgic historicism, which transforms an idealized past into dogma; the dominance of political ideologies and religious exclusiveness which employ traditional values in order to promote conservativism, nationalism, ethnocentrism and intolerance. The spiritual categories which are the very essence of the urban identity of a community cannot be valued by material criteria, and should not be close to the growth of other authentic cultural values of another provenance. Sustainable urban-cultural development is in one of its essential aspects also urban pluralism. (This should not be equated with so-called multicultural society which, some believe, is the future of global development and which is, supposedly, the marker of the degree of a society's democracy). It is certain, however, that value relations in urban communities/cities, which are established only within the framework of given cultural patterns and the spiritual quality of the accumulated past, should not be closed to innovated (enriched) but also authentic cultural patterns. In any case, this is what constitutes the positive difference between, for instance, the southern, central and western regions of Europe.

Sustainable urban development by all means includes the preservation, promotion and development of cultural heritage, which resides in urban heritage. Cultural heritage abounds not only in material artifacts, but it also represents a range of layers of spiritual nature that are interwoven with man's immediate surroundings. What is needed when the development of the construct of sustainable urban development is concerned is an exceptionally

refined feeling that would make the urban and cultural heritages fit together. Here objective evaluation runs counter to the usually too intense local feelings for tradition. As always when the cultural component manifests itself as a creator of a wider idea, the danger of straying into passeism exists in this case, as well. It is not possible to expect that urban future can be developed without a rich urban-cultural heritage, which includes true respect for the cultural achievements of all groups. The way of life, modes and forms of constructional development, the use of space and communication between people in space and with space – all these represent the minimum of patterns that have to have a well-balanced relationship with what urban planners and creators of local and national development strategies consider important. The unity of the spirit and matter of urban spaces that is capable of enduring the challenges of time and of the existence of the same values in other places, regions and environments, represents a strong component of the overall sustainability of human communities.

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SUSTAINABLE URBAN ENVIRONMENTAL QUALITY

Dobrivoje Tošković

MEANING as the essential element of urban quality. The role of the three main factors for the urban quality achievement: PLANNING, DEVELOPMENT and PEOPLE. Next to that, it is important to assume the identity of the local CONTEXT as the essential base for designing and shaping of form development.

The problems of the quality achievements in the situation of the permanent changes. In such an environment - the RENEWAL of the towns become the basic strategic orientation requiring - evaluation of the development policy instruments. On the road of changes there are PROBLEMS of a strategic nature which should be, firstly, defined and, then, solved before entering in the process of structuring and arrangement. One of these problems is NEW versus OLD. Transition to a new policy of urbanism relying, first of all, on the private investors and international funds of the local authorities - call for a NEW STRATEGY in urbanism, in the context of the sustainability of environment. The sustainability of quality and the categories of the influencing factors. The sustainability of quality as a twofold process of urban design. The quality of environment as an aesthetic phenomenon. The urban situation and environmental quality: feasibility of changes and effects; the environmental capacity as an indicator and quality determinant. The urban quality and international experience. The evaluation of our urban situation. INSTEAD OF CONCLUSION: A general review on the visions and urban quality policy and planning. Toward an evaluation of urban environmental quality: negative and positive indicators; sustainable communities: environmental ruling and urban quality planning.

INTRODUCTION

Meaning of urban quality

An essential element of urban environmental quality is not something easily measured, or, completely identified, because it arises from a combination of the factors related to "feeling" of the place such as collective memory and built up environment of historic continuum, as well as, from a number of the contextual conditions and influences. In addition should be added today "inclusiveness" and "diversity" in a pluralistic society. Here, we are talking about a feeling of the place through the "identity" of the place and urban context, more in term of direct emotional relation with our built up environment, through an uncatchable element of the quality, while a more detailed talking on the phenomenon of the "identity" will be presented in the following item. It is clear, that, this relation, predominantly, includes our feelings, so that in such a context, exists an emotional "answer" among our personal (and collective) psyche and environmental form and its source.

It guides us to the identification of the first and the most important factor of the urban quality - THE MEANING of it. The element of the meaning, within our surroundings, is essential one for our psyche and well-being.

An insignificant environment is the right antithesis to what we need and what we are excepting of an urban environment to be. Without the meaning we get lost, while the life is empty. For, the absence of coherence, lack of clarity, intention or structure (illegibility), or the absence of evidence of the source and way of growth (organic or formally designed) - all these aspects are manifestations of an insignificant environment which produce a negative reaction to people. Hence the full meaning of the environmental quality of our towns, is the essence of urban quality too. But how to achieve it?

First, we can draw out some useful lessons from history in the terms of circumstances and solutions. After all, the urban changes and growth problems and their relevant physical-designing components, should be put down in the same basic assignment of considerations such as: economic, social and cultural imperatives, plus administrative, locational historic and technological attributes.

Secondly, taking into account the above mentioned considerations, we can examine the role of the three main "arenas" for the achievement and implementation of the urban quality such as: PLANNING, DEVELOPMENT and PEOPLE. Within these aspects there are the segments of policy, planning control and urban design.

Underlining these elements we are pointing out on twofold factors (very often in contradiction) making, from one hand, MAN'S POWER, and, on the other hand, DECISIVENESS of economic power.

These factors are, naturally, reflected permeating of public and private sectors, what is more and more the reflection of the pluralistic society we are gravitating to (or it should be so).

Today, our best hope to achieve an urban quality is the useful use of URBAN DESIGN, as

far as possible, related to the concept of a mixed building, enabling more possibilities for an imaginative but realistic approach to a development necessary for the creation of the true urban quality.

It is excessively to simplify seeing on an urban design as something more than a pragmatic activity, aiming to solve problems, because the emotional aspects typical for the top quality environment - calls for something more fundamental. To come to the heart of the matter, we need, and we expect urban quality from, it depends on the perspective of the MEANING incarnation. In today's market oriented development, more and more is asked to accept economic arguments and imperatives, but, of course, not unlimited. Certainly is, to tell the truth, that the "quality" of an environment can't be changed unless the restrictive and outdated aspects of the planning process are improved. The new approaches in land use policy, should replace the existing planning procedure. It is an imperative of conceive that the planning must operate on a qualitatively, different way in the coming future. For example, through a new organizational procedure and policy, incorporating views of people plus a larger cooperation among public and private sectors.

Philosophy of urban context

In every time, throughout history, a form of the positive planning has been axiomatic for a successful achievement of urban quality, be that through the local rules such as types of mixed land use allowed in a particular locality, or, through the stimulus of some specific forms of buildings, naturally, related to the spectrum of local materials, or, by controlling of built up and height of buildings. Next to that, not less important, is to become conscious of the visual art design creation, where the buildings are composed within milieu in such a way, so that they make a relationship with each other, as well as, with the streets and spaces complementary to them, what, as a whole, fall into the field of the urban design.

In all such situations, where an urban quality is achieved - a common and indispensable factor has to, in a way, be present: acceptable identity of the local urban context (what usually we call "feeling of place") as an essential base for designing and shaping of development forms. This can be achieved in one of the two following ways:

- by organic adding of buildings in a way of filling out or increasing it in order to change their image "by sort" and by degree, or
- by full replacement of the outdated and inadequate buildings or planning solutions in a creative and imaginative, as well as, compatible way.

Consideration of the local urban context must be the essential first step of ability to adapt urban development to the situation. All other, in the term of urban quality will come from that.

The "answer" on "urban context" will be, mainly, in the terms of harmony with the existing forms of buildings or ensemble, without relating to the historic styles. Alternatively, the circumstances may, actually, give right too the contrastive elements than harmony (as Pompidou center in Paris). In some cases, where the existing context is inadequate, to the authentic needs - the new dimension or "key" must be set through a new development, in order to achieve a successful future urban "image".

In some way, there are opportunities for the innovation through the richness and diversity of the urban entity inheritance, while in some way the justification for total changes will evolve from the absence of any valuable characteristics within the urban milieu. But there is always a question of the identity of place, in any extent that it exist, in the terms of span usage and their physical expression which should "set up, milieu". Fortunately, it should guide and inform investors, urban designers or planners to such a solution of the design which is more compatible than imposed on the valuable inheritance.

As we have, already, seen, there are a lot of examples of successful application of this basic principle. Next to some exceptions, the urban places have not been created in one original moment, but, they began by the development process.

Historic evolution first of all, represents a process the identity of place arised through. That evolution includes, also, today's moment, so that, an appraisal must, as well as, encircle all various physical results (past and existing) relating to efficient work, uncertainly of purpose, exaggerated ambition, as well as, manifestation of farsightedness, opportunity of location and land use, sensitivity and feeling of consistency, balance, moderation and proportion - unusual qualities in these days of maximum developed opportunities at the expense of the urban character cohesion.

So, the urban context we have inherited through the process of historic evolution is almost an incomplete "decorated table" showing both pressure and challenge to those we are talking about. From the contextual conditions and influences it can be seen that a number of examples fit into our "philosophy of context". In essence, the several factors are common: social needs which accelerated and influenced the settlements and their gradual evolution, then, physical nature of the soil, as well as, the new and changeable economic circumstances). Out of these, only the physical setting up of settlements has its constant steadiness, although this is, also a subject of opportunity and limitation as the original settlement is developing towards outside, creating new land requirements, and so, the new models of living and activities.

It is clear, the extent of changes which could happen without "flooding" of urban context, as well as, without losing, of character, will depend not only of the extent and type of the proposed development, but also from the scale and nature of the urban context, the proposed development was intended to. Large towns are, almost always, "more president" so that they will easier bear development changes than smaller towns. These smaller towns more and more are suffering from a "paradox of needs", from one hand, to preserve an adequate degree of economic stability in order to avoid some kind of stagnation, while, on the other hand, they require a great attention during the implementation of the changes growth, actually, they require a protection against some radical changes.

The most partitions, often, the most harmful influence on an urban context is that of traffic, and its requirements in the terms of moving, accesses and lodging needs. The expansion of the use of private cars (what is against public transport) and the extension of the main road

network, have a direct implication to place of this traffic wave into the road space, with additional effects on a pollution, what altogether, tells, that the growth of traffic must be priority in the regulation and safe guiding of an urban context.

The modern building forms are less desirable within an established/inherited urban context, although, of course, they are more favorable for presenting of some commercial contents than are the traditional architectural forms and method of building.

"Principle of context" can be applied on any kind of appraisal of the development disregarding the proposed size and scale of an urban context. Finally the decisive aspect will be that of quality - for example, proposed quality in relation to quality of the urban context.

PROBLEMS OF QUALITY ACHIEVEMENT IN THE SITUATION OF THE PERMANENT CHANGES

No doubt that the urban environment of many towns, particularly those in the transition, find them self in a state of changes. In such a milieu the renewal of towns became the essential strategic orientation requiring reexamination of instruments and development policy which should enable the realization of that strategy. On the road of changes, a number of PROBLEMS appear which, first, should be defined and then solved, before entering into the process of shaping.

New versus OLD

In any time, there existed a natural tendency of people to tie strongly with the architectural forms of the past, on the other hand, to have a kind of hostility to all aspects opposite to that opinion. This is understandable and sometimes justified, particularly, when the problem of urbanism consists in adding or inserting of a new building into the territory assumed by the special cohesion's scale and quality, where some "strange" form of the design, could disturb totality of a territory.

In such cases, it would be normal to express these existing characteristics of the urban context, into a new work or structure in a very direct way. In the cases of the territories intended for conservation, where the urban context is fully cohesive, by the scale or style, or it is a mixture of the distinguished quality - the new buildings can repeat existing styles, or "what is preferable) should be designed sensitively in order to fit into the individual character of the buildings in a satisfactory way. The essence is to keep a balance by which the existing general character is not prejudiced, but, where these exist a space for maneuver as are the new forms of urbanism. Before issuing a recipe, too specific for every case, in the detailed terms of urbanism - the best approach for a good design is, probably, that one expressed through three principles according to the modern terminology: CONVENIENT TO CONTEXT, CLARITY OF FORM IN RELATION TO FUNCTION, and GENERAL RELY ON OUR FEELING OF BEAUTY.

But, there are situations when the old structures do not satisfy present requirements. Everybody knows today, that this unparallel growth of population, connected with the traffic chaotic situation, within the core of towns - force us to make RADICAL CHANGES.

Problems of town's structure change and environmental quality

If a town, is aiming to keep its existence, today, then such a town must change its structure, this time, by the pressure of the determined social and technical conditions, as it was earlier made by the methods of guiding a war.

But, in the man's nature parallelly, exist, the tendency towards changes and wish towards a permanence. Hence, come resistances against changes, which do not come only due to the private interests. This opposition should be found, also, in the emotional causes. It can be seen from the various proposals aiming to free towns from any rigidity, although, the common tendency is the kind of an organic planning (5).

Attention is given to the differences in the proposed concepts. So, Giedion in his review on the proposals of decentralization (who, instead of today's concentration of population into the giant agglomerations, conceive towns life as another extreme: by small settlements consisting of half to one hectar) underlines:

> "Such a decentralization would change all our life, converting the inhabitants of towns into the village inhabitants, living at a mechanized farm, what would bring to the balance between, rural and industrial work. It would be, absolutely, and conscious destruction of town, as well as, in a certain way, it would undermine some social differences our civilization exist at" (6).

Remarks on the concept of the total decentralization could be given, also from the aspect of the relation MAN-SPACE. So, a small settlement of one hectar, where the basic aim is production, affirms only the private existential man's space, where such a space does not mean part of a larger whole, by which man does not groups into a social context, so that, in such a case, he does not become a part of his "socious". For, an alive and incorporated physical environment, capable to provoke a certain picture, play, also a very significant social role. That could be achieved only by the town in full sense of the word, were the companionship is being developed, parallel with the development of the existential space. That relation SHULC described in this way: "So, the internal urban structure is the resultant of complex of the individual and social functions which are "happening". Behind these functions, stand up certain needs, which a small settlement - neither village nor town, would not satisfy, by its size, conditioning a certain level and kind of function. The example of the neighborhood units that confirms in the best way.

On the other hand, stand those who do not oppose that the existing state of metropolis is inhuman but they think that the town, as an entity, should be transformed. A kind of solution they see in the change of the town's structure, next to all respectation of the contact with nature (8). In this view some historic experiences could be useful for orientation. While, in Paris of the 19th century, have been mixed reciprocally, the functions of the traffic and housing, that far, simultaneously, the London's squares are an example that MAN for his existence need peace and greenery.

But, times have been changed. Both the greenery and peace, in an urban environment, are today more necessary than ever. How to achieve such a need in a way that the town keep its identity, as well as, that the town is not eliminated, because of accumulated difficulties? The concept of the high-rise buildings,

free distributed in greenery, has not had produced expected results. It can be seen by that as the contemporary town became an amorphous environment. The character of the street is lost and converted into a "town's line of communications" without its architectural face. Next to that - it confirms, that the natural milieu will never be sufficient in order to concretize an urban environment satisfying man, who in it, not only use to work and reside, but also emotionally experience it.

It means, that, the problem of the structure change in towns is not so easy to solve. In this case, also, it is useful to remember the historic evolution of the town's development. In the beginning, the knowledge about town was related to the State, then, we have seen the occurrance of "POLIS" as the association of free citizens, in whose center the AGORA has been formed as a democratic way of opinion. ROME gave the name for the first world's empire, giving its contribution to further wealth of the towns structure.

The development of productive relations in the Middle Ages in the first place launched the handicrafts by which the communal authority of the free towns was strengthened, imposing itself on the surrounding environment so that, the notion of town got much larger frameworks.

The Renaissance in towns, by its individual characteristics, left high cultural achievements. But, in the 19th century we already, noticed the political deprives of towns. In his review of this problem GIEDION says: "If we are looking for the roots of the today's difficulties, it can be found in the 19th century - Already, in that time, due to the production for the international market is arised the original, economically defined concept of town. Already in that time began chaos, although, not in today's dimensions (9).

If in the 19th century the unlimited production became an aim itself - it is today the unlimited power of the technological era, deepening much more the social disorder, and, at the same time, increasing the inequality, as a result of the social and economic conditions. But, it brought to towns another trouble: the shortage of measures or criterions, as well as, the clash between emotions (dropping, back) and the improvement of the technology. So, each man's action, is unconsciously formed under the influence of the certain emotional background, for "people can't plan a society without projecting themselve", and that enters deeply into the present state of culture (10).

The proposals for the transformation of the town should be seen, in that light,: how much they are taking into account the satisfaction of cultural needs of the contemporary man, beside the demographic and technical force.

Certainly, this is moment of the transition from the two-dimensional urban planning into the three - dimensional one - supposing the building in layers, where the dynamics of the traffic and the dynamics of changes are incorporated into one whole, as natural conditions, in a positive sense of shaping (11).

If a change is the creative element, then, probably, the next way to the solution of problems brought by the industrialization process, would be: that each change, as a result of need, can be included into the project, under the condition to leave untouched that what was, built earlier. That is a kind of anti-thesis of the "New Vavilon" concept, telling that in any case, the "place", will be changed in the meantime and become something else.

These are problems tormenting "developed". The town's of the under developed world, came into the phase of the transition. The ideas that the structured reorganization of towns could be implemented within the conditions of the "directive" economy on the account of, exclusively, State funds, are absolute, as it became clear, that it is inefficient way in the new conditions of the market economy.

AN ENVIRONMENTAL SUSTAINABILITY AND THE ESTABLISHMENT OF NEW STRATEGIC FRAMEWORK FOR URBANISM

The transition to a new policy of urbanism relying, first of all, on the private investors and internal towns funds, next to certain State support - call for the establishment of a new strategy of urbanism, essentially different in relation to the earlier one.

That strategy should rely on the law regulation, including, also, some under law ordinances formulated by the town according to its specific condition (norms etc.).

The new strategy should have an unique approach in similar urban situations. From the aspect of the urban design, at MEGA level, it is necessary to define a position to the market extension of the town area, generally, as well as, particularly, when the subject is a building land. This is because, at one side, it leads to a non proportional growth of towns, and on the other swallowing of the surrounding settlements.

Earlier, the conception were created by the deductive approach, without relying on the contextual environmental conditions, so that, the plans were unrealistic. Today, it is an imperative, that, in the formulating for a new strategy we start from below", that is inductively, relying on the influencing factors and resources of a concrete environment. All these things, lead to the need to modernize the urban methodology, taking into account the restorable resources, leading to a SUSTAINABLE development of towns.

It is understandable, that a general plan, in the contemporary condition presumes that we think about a PROCESS, per phases, and not about a forecasted fixed picture. In relation with the private sector, the local authority and town planning institutes, still have resources on their own disposal, to create, control and partially design a model of the main development. In that context, it should be taken into account, the public opinion, as well as, the participation of the citizens. These two processes are relevant and central in the sense of the urban quality. A consultation, as a whole, presumes the representation of the predominated options before the public in order to know their commentary and desirability. A participation of citizens in formulating the ideas and plans, as a creative part of the planning process and designing is presumed.

All these ideas tell us, that, it is necessary to formulate some STRATEGIC FRAMEWORK incorporating the action to changes. Action and reaction, cause and effect are the integral part of such a framework of the strategic changes. This FRAMEWORK does not issue an individual mechanism for the implementation, some final form, or some preferable visual character for all urban areas.

Because of that, it promotes an important feature of the urban development: POWER to

stimulate other preferable actions. The focus is an interaction of the new and existing elements and their influence on the future urban form, but not an approximation of the predetermined physical ideal.

Institutional, citizen's and political actions put that process in movement and make a key factor of the urban design. But, there is, also, one danger in that urban development, not only because of a possible failure to influence, but, because of a real prevention of the new development through non acceptable actions. It is also possible, to have a negative direction of changes as much as a positive one. A development can act as a sponge-absorbing resources and activities distributing the surrounding areas. It can, also, act without a success to inspire "answers" requiring a certain situation. It can, from the other side, to motivate others to contribute time, efforts and financial funds. Program, strategy and design should be correctly imagined, if we are expecting a dynamic and productive process of urban changes to happen.

Contrary to the opportunist opinion resting on the short-term assumptions ("exploit advantages of a loan": "buy when prices are low"; build whatever is profitable) - a better guarantee of the urban quality can be attained from a strategic determination at the long-term. Therefore, an urban design must be based on methods, principles and programs.

And that is the Program of the Master planning, setting up the general and detailed tasks, as well as, the identification of the ways for their achievement, often, alternatively, depending on circumstances. Such plan set up intentions and methods, but not solutions shaping an environment. For, the key of the strategic sustainable design, as a process of changes we can influence on, lies more in the comprehensive than in the one-sided views on future. Each step of the General, Program of actions is determined and depends from the earlier stadium and real circumstances, and does not accept some fixed-model for the far future.

What is happening and when - is far more important, than a fixed picture of some final product. That supposes a development in sequences. However, is should be taken into account, that, although, the formation of the development sequences is the key characteristic of the strategic urban design process - in an urban arrangement the events can be rarely controlled. Probably, it is more realistic to think about a design strategy as a complex series or network of opportunities having been created and exploited more than spontaneously offering some linear development.

It should be, also, underlined, that by such strategic concept of the trajectory of changes - the urban changes retain their identity. It is not sacrificed when it becomes a part of some larger whole. The survival of the individual identities (many owners, users, architects) enriches the town.

This consideration of urban architecture changes process, would not be a complete one, without the references about people making it to happen. The urban development is an integral one with the process of changes affecting that. The effective people are important in that process in the same way as a well imagined and conveniently operative development. The people are those accelerating a process. So, in a town, the instrument can be an executive organ of the local authority, in an other town it can be the very respected individual, a popular mayor, or some association of citizens, for example, some ecological associations giving ideas and suggestions to town authorities as a kind of the fresh perspective. If the above presented strategic framework is a sustainable one for the creative conceptualization of an urban environment - it is necessary to know the contextual conditions and influences of a town shaping.

A SUSTAINABILITY OF QUALITY AND CATEGORIES OF INFLUENCING FACTORS

Here, we are intending to express those human needs related to the settlements as "influencing factors", hoping that a way can be found on how to arrange them mutually, or perhaps, even, to measure them. However, the spatial man's needs and conditions can be expressed as the spatial influencing factors only. Others - general factors, which usually, could not be expressed spatially are of economic, social, political or cultural nature. In such cases, however, we will not be in a position to express them as spatial influencing factors. A population requesting better architecture, possesses a great power but not the spatial power.

According to Doxiadis, however, there are some cases within which, even, these general forces (thus, influencing factors) can be expressed spatially. The first is when these general factors are interested to solve a problem which can be expressed spatially. In that case we can give a support or resistance to these forces. The second case is when, even, the views of these general influencing factors have no spatial expression, but, however, these groups can be identified as belonging to one locality. In this case, these general factors, could help us to understand or, eventually, to solve the problems of this locality by adding them or by subtracting them from the total influence on that locality (12).

Spatial influencing factors are those having the biggest influence on the formation of the human settlements existing elsewhere, from the smallest urban units to the biggest wholes. We have to think about them, no matter if they are visible (as when they are expressed through the movement of people and cars) or, not visible (for example, the negative factors created by the proximity of a factory).

All in all, they are expressed through the functions of settlements and can be recognized by their physical formations, but only if factors form functions and functions lead to some physical forms of objects or networks.

Even, if, in some case, do not come to the right, correspondence among factors and functions, in that case, can come to a confusion. Therefore, it is better to consider the spatial influencing factors separately, even, if we are going to take the functions, and structure of settlements as an indicator of their existence (13).

It can be said, that, the relationship among spatial factors, function and structure of settlements is as follows:

- influencing factors of all kinds lead to the formation of human settlements;
- spatial influencing factors are those giving the physical meaning and some forms to functions;
- functions lead to the structure of settlements through the shaping of objects and networks;
- structure of settlements lead to its form;
- texture and density are the result of spatial factors actions within the structure and form (14).

A systematic investigation of spatial factors call for a knowledge of their nature, direction, intensity and quality, as well as, ways by which they, can be incorporated, influence on other and formed into system of factors.

These, non-oriented factors, in space, according to DOXIADIS, can be subdivided into two kinds: physiology of spatial factors expressed through space needed for individuals normal functioning and TEXTURE of factors expressed through individual as a factor of connections conditioning models, form and their distances in spaces (15).

On the basis of these considerations three categories of spatial influencing factors can be determined:
- physiology factors
- non-oriented in space
- texture of urban fabric
- oriented in space.

PHYSIOLOGY spatial factors according to the above, are non-oriented. Air we need should has a determined volume, but not necessary to be equally distributed around our head, a garden needed to surround a house does not need to have previously defined space, while the territory of district needed for a village can have any shape under the condition that a certain number of hectars corresponds to every household, as well as, the territory supplied by a port, can have any form, under the condition that it can absorb enough trade exchange, and so, enable that port to be profitable. There is no any specific form or direction for these spatial factors.

TEXTURA, as a factor, also, is a non-oriented one. It holds all elements or their parts in certain models and in a determined distance one from others. People sitting in a room, houses built in a settlement, cars at express-way, towns of the same category, distributed in an open plain - form models defined by physiology factors and factors of texture.

We can, for example, have such factors attracting every person willing to listen to an orator to a certain point. These are centripetal factors (forces), but, it does not mean that all persons in an auditorium will be near the orator. When people stand up - they need a certain space, while when they are sitting - they need much more space. But, contrary to oriented factors in space, physiology influencing factors and forces of texture do not gravitate far from certain spaces, for, their tendency is to occupy space. "These factors, as forces, do not have any direction in space, but they gravitate to widen enough providing space in the range from certain minimum to certain maximum, to all their elements (persons, cars, houses, plants). Beyond these points, texture is liable to decay, because there exist a limit of widening. If we wish to avoid such a decay, then, we should go to some solutions at multi levels.

But, people do not need no physiology space and right relationship with others only. They also need, to be, as near as possible, to the localities of their interest attracting them to the factors which are oriented in space. Oriented factors in space can be subdivided into several kinds depending on their focus. This focus can be a point (crossing of roads, water tower, etc.) or a line (highway, coastal line) or a surface (plain attracting agriculture etc.), or, perhaps, a volume (church visible from all surroundings).

Some basic kind can be extracted from above, such as:
- central factors have some focus point
- linear factors have some line as focus
- surfaces factors, have some surface as a focus point
- volume factors are uncommon.

It is possible that physiology factors and forces of texture, can be so large requesting as much as possible territory for their widening, that the settlement is forced to divide over the uneven land, occupying valley where the linear factors are intensified due to the new negative factors conditioned by the form of a landscape. It is completely clear, that the intensity of factors is so important as their direction in space and, that, altogether, they form a system having considerable importance for human settlements generally, and for urban environmental quality, in particular.

Only in several cases, the measure of influencing factors is done systematically today. For example, in motorcar traffic eventual problems can be shown by so called "traffic picture" and therefore revealed. This is very important, specially for new settlements.

However, as such studies do not take into consideration the influence of settlements texture, they, often, use to predict a general picture, and, usually, do not lead to the solution of complex problems. The systematic measuring of influencing factors is being undertaken today by various economic, technological, sociological analysis of urban situations, extracting from them some indicators and generators of influence on the quality of the environment, but this be treated later in a separate chapter.

Changeability of influencing factors shape

Taking as a whole, that, the factors shaping a settlement, and having into account direction, intensity and quality, they are forming a structure of influencing factors of settlements which we could call the changing factors of influence, with regard to neither direction, intensity nor quality of these factors do not remain in a state of stability (18). Changeability of influencing factors is related, also, to individual elements of the system. We shall take the traffic system as an example to illustrate the above opinion. During the peak up hours the largest number of cars are moving along several main streets, within specific territories, which are created by linear factors. During the night, happenings are opposite: the most problems are evolving due to the texture influence - from a need for parking. The system is changing continually.

It is important to find out a method enabling to take all influencing factors into consideration, in such a way, that, we can follow their changes, and so, to form an opinion about the whole structure of influencing factors or the changing influencing forces. Such a method could be based on a set of tables as the one showing the total amount of influences in any given moment, for any given settlement or its part.

After defining the factors attracting or refusing the elements of some settlements to certain points, we can measure influencing factors connecting them. In that way, we will have the actual changeable factors of the influence in an operative state. If in that state we put changing factors in detail, then, perhaps, we can include all important influencing factors in our settlement.

Because of the fact, that in the larger urban units, the probability of correct predictions are increased, then, we can conclude that the

Table 1.- Spatial forces within the framework of driving force

Challenger of forces		CATEGORIES OF FORCES										
		FORCES OF DIRECTION							Forces texture		Physiology	
		Centre	Linear		Surface		Volume					
			geom.	non-geom.	geom.	non-geom.	geom.	non-geom.	people	houses		
CONDITIONS	Geogr.											
	Topogr.											
	Climate											
	Econ.											
	Social.											
	Politic.											
	Techno.											
	Culture.											
	Etc.											

wider territory of investigation, the better we can operate by changing influencing factors.

From changing influencing factors to structure and form

Having considered the nature of changing influencing factors, we can continue now to the analysis of the settlement structure, bearaing in mind that the changing influencing factor is an essential part of this analysis. If correctly formulated, that factor incorporates all the influencing factors created by man (physiology, texture, direction) as well as, those created by the existing conditions which we have to convert into the adequate influencing factors.

There are cases "when a changing factor from given factors is not sufficient to define a structure" (19). This occurs when the conditions do not create enough possibities (for example in a plain) and when there are not enough influencing factors (highway, big factory etc) which are first of all created by man settlements. In that cases, even, the basic structure can't be achieved by changing factors, but, it must be formed from those creating settlement which must be combined with the existing and needed changing factors. This is more obvious going to the lower urban units.

The most entangle aspect of this process is the definition of relationship of different kinds, of influencing factors. This definition depends on many factors: economy, sociological structure, political conditions, technological and cultural level. These relationships can be defined only on the ground of the criterions or values which are assumed by the citizens. By knowing the criterion we can develop, from the structure of the influencing factors, a model which will be the valuable model leading to the definition of the structure and form.

SUSTAINABILITY OF QUALITY AS A TWOFOLD DESIGN PROCESS

Relationship between a man and his environment is a complex one. Taste of people, culture, styles in architecture varies by time, but the SPACE REMAIN CONSTANT. Because of that, here is an accent on spatial arrangement, composition and perception of values. And that comes in the domain of the urban design which should incorporate both FUNCTION and BEAUTY into a coherent whole.

We are, thus, talking about the process of the urban design. It can be within a micro whole, for example when the subject is a square, street, then, it can encompass a grouping, that is a block as, for example, town centre or a housing area - neighborhood unit. Finally that process can be observed as a MEGA whole making to total town.

Concerning the size or the character of the urban environment, we should, first question: Which kind of urban environment we are willing to achieve? That is a very complex and key question. The answer is not so simple, if we are going to achieve a clear conception of what we are intending to plan, and shape and for whom. From our earlier critique review on the existing practice, we realized, that, it was, often, done "FROM ABOVE" to below, without taking into account such factors as nature and man - they we made conditions of a locality. Today, in the changed social, political and economic conditions the vector of a design must take a reversed direction, that is to say, this process must be developed in an inductive way going "from BELOW" to above. In other words, the main accent, today, should be put on the theme: how to achieve a character of the human environment by the design? So, the priority is given, to the promotion of the local environment design at a micro and group level. Both levels have a function and that should be shaped in an artistic way. It means that the urban design of a certain environment, in order to be truly successful, must be perceived as a twofold process.

This aspect represents the key matter which should be dissolved in the long debate on the nature of the urban form and urban process. In spite of their obvious connection, the arguments about the town form and process, often, show a shortage of the consciousness, whatever the relationship is there.

As a result, the decision on a design is hardly related to the context of buildings. Similarly, it seems, the planners, have little understanding about urban form.

However, in the wider MEGA context, the towns become a battlefield of fighting among the followers of an idea about the town as a "big chance" and those keeping the prospectus of "vision on town", based more on a citizen's philosophy. In the first case the followers see a developing town on the basis of the land, as a "buying and selling goods". In the second case, the followers of the "vision of town" see a land more in the terms of their "usability values".

A we have seen earlier, in all spheres of the creative thinking, as in this process too, series of movements and contra movements have arised expressed through a first idea followed by another, getting some distinguished place in the sense of the meaning. What is clear, is that, before we attempt to fuse a concept of urban form and urban process in any significant way, first we have to achieve better agreement than it exist today.

For the moment, we have to go back into the historic context, and remind ourselves of some values extracted from certain messages. We

have seen that every town is a unique phenomenon. Culture, functions and history have given its own individual stamp to a town appeared from special series of circumstances.

Often, this simple fact is being ignored, because the towns find their context on the drawing boards of planners, architects and enterprisers. This is why today's circumstances should give their own stamp. First, should be learnt from the lessons, existing practice, in the domain of housing occupying the two third of the town's territory.

Earlier, from the critique review on the housing spatial organization, we have seen, that the idea of the subdivision into blocks as "neighborhood units" have had both positive and negative effects. In a positive sense, the neighborhood units have got their own validity by accepting social arguments into their framework. The negative side of this idea, lies in its superficial application. When it was already accepted in a wide extent, the planners began this idea to apply anywhere, whether at a green uncultivated land, or in the town centre, old or new quarter. It is ironical, that the perfect solutions have produced opposite effects in relation to wishes.

What are lessons for the sustainable urban quality in the contemporary housing conditions?

The idea of the "neighborhood units" has its valid background either by what is offered, or by what is represented. Among other things it can be seen, in its role to protect individuality, as a defender against the trend called "mass society". At the same time, such a concept of settlements enables "structural communal spirit" or, in other words, "capability to create and to identify from inside".

But, regardless of the valid background and, as such proved respection, in today's market conditions, it remains to us to fight against rigidity. While the concept of settlements, according to the previous practice, and as a product of the design idea, has been perceived as the first step of investigation of the town concept structure and form - it is very important to continue further research towards the formulation of a "theory of town process". It is, therefore, important to make distinction between "PLANNED" towns wholes - communities and "PLANNING" of these communities. Some principles are, of course, common for both concepts, as, for example, "identity" and "stability". They are the key matters, because of the support to the four elements, essential for the town culture: 1. common memory, 2. intensity of towns energy, 3. communications, 4. point of stability.

From these considerations arise an idea showing that, today, we need a theory explaining HOW TO PRODUCE A TOWN FORM.

How to begin?

From the experience within "planned community" we have seen that the most power has been given to the politicians and professionals. As a contrary, the principles of "planning" (of neighborhood units, blocks or settlements) refer to us, the citizens should have a kind of control of their own destiny, inother words they should be included into decisions influencing their life on, as well as, should be treated with respect from those making decisions in the name of others. This is not only a principle expressing some satisfaction of participation in the town's life, but, it is founded n a belief, that the people themselves represent an enormous resource waiting to be reactivated.

An example from London during the time of "Thatcherism" shows the clash between those making decisions and those to whom an urban environment is devoted to that are the citizens. The job of the third actor - the planners - was brought down only to the level of "development control". The result, according to G.Nicholson (director of planning London fund) is a "total absence of any vision", then adding: "it is achieved a culmination of lacking of ideas" (20).

From these and similar reasons, the PLANNING AS A PROCESS, should be a reaction against the long term fixed models guiding to non impression. There is a number of ideas which should be tested before the process of planning, as a practice, can be converted into the planning as a theory.

What first should be done is the investigation of some territory, in order to test certain ideas. These ideas are: 1. people have their feelings of PLACE which is important for them, 2. people have their conception of community they live in. 3. people can consciously notice limits of place; 4. that the locality and community are inter-related; 5. that it is possible to plan localities in full sense of the meaning; 6. that is possible to establish a process of decision making respecting locality and community, and 7. when localities are fully expressed, they will make easier taking into the process of planning and urban design.

After such an investigation work, the examining comes; how any of these findings can be fit into the existing organizational structure, what can be a block, neighborhood unit or some territory having an historic identity. Then a consideration of the problems: should be done which territory will be determined as a "BASIC PLANNING UNIT". The following step is, to begin the process of the spatial conceptualization, that is, to make an expression of shaping.

The third phase of this work, is related to the establishment of the "planning standards" list. Standards have been, to a certain extent, discredited until recently, mainly because of criticism of their non inflected nature. Although it is true that standards can drive away the first desirable intentions, if applied at an empty space, however, they are essential, in order to achieve any sensitivity in the process of making decision.

QUALITY OF ENVIRONMENT AS AN AESTHETIC PHENOMENON

As we have seen earlier, our picture of the exterior environment is being modified by a number of spatial EXPRESSIONS as, for example, shelters, frames, marked places etc. Here, in the picture of the environment we also include FUNCTION, in order to get, according to LINCH'S criterions, a SPACE in reference to PLACE inducing pleasant emotions. Such a SPACE should:

1. not be (within the span of comfort): too warm; too noisy; too bright; too cool; too calm; too filled out or too empty; too steep; too dirty.
2. be diverse giving the inhabitants some choice of the environment desirable for someone in any time.
3. enable an action people willing to commit to.
4. have a clear formed identity such as:
   - recognizable
   - commemorative
   - impressive

- attractive
- different from other locations
- a "feeling of place" is the key of the emphasized appearance and the full meaning of an environment.

5. have its recognizable parts such:
   - arranged that any observer can see them in their mutual relations
   - to perceive their model in time and space
6. be visible in full meaning:
   - its visible parts, not only connected to each other, in time and space,
   - but connected with other aspects of life: functional activities, economic and political models
7. have an influence in the intellectual, emotional, and physical development of the individual, particularly, on the children age, but, also, on other ages.

So, in fact, by twofold process, we have formulated a basis for the form synthesis. But, it is still in a theoretical sphere. Our aim is an urban aesthetic and its application. The first step in that direction is making a typology of residential buildings, after that follows a process of grouping these building. Methodologically, there are several possibilities.

Making sense of such a process lies in ideas. The designer uses to synthesize the technical and aesthetic problems into one coherent whole - idea, and out of that appears form. The contemporary aesthetic clearly expresses the situation: there are two possibilities to observe an aesthetic form out of the phenomenon: the beauty of a form should be found in the object, what is at a trace of the old theory of imitation (MIMEZIS), or, it should be found in the subject guiding to a psychology of enjoyment, more exactly, to the theory of the autonomous creation (POIEZIS) (22).

If the designer neglects the above aesthetic criterions (mimesis and poesies) and assumes FUNCTION only, under the market influence for example, that is, then, a routine method, and the result is a certain failure.

However, it is enough, for the designer in considering a project task, to take into account the basic aesthetic principles, on by and a confirmation that he is on the right way of a true creation. In this way, he will be in a state to make a right choice of the design method, and so, find out a correct approach to problems, according to his capabilities and affinity: his ontology and anthology.

Enriched in such a way, he will realize that:

- Designing from the urban idea is a synthetic perceiving of the subject area (land, houses, streets, etc.) and the aesthetic stand points the unique idea originates from.
- In an urban design, the form should express the essential thing; the essence does not rests in the form (as in fire arts) but it is, as necessity, incorporated by its structure, opinion and art production.
- A building, by itself, has nothing common with beauty, since, in essence, it is a technique and function. And that is the feature - practical function inaugurating the aesthetic valid moment over the real mimesis or unreal poesies and composition. The function must be imprinted into a unique composition, so that it is appearing only in the realized object. That is where the beauty lies in relation to appearing. So, the form is expressed from the essence of the things: function and substance.
- A practical function and material of a building, or, their grouping, are put into the effect, in a real and construction way, and, as such, are presented to the observer. Only in a practical way it works organically and convincing. And, the essence of organic is a function.
- A conflict between the practical and beauty, the designer solves within their synthesis: functional composition (proportion) and dynamic composition (expressing of ideas).
- The starting point in architecture and urban design, is in a practical function. In that context, HARTMAN points out: "As the first, an architect composes a functional composition and going further backwards everything is related to that composition. From that, not forced, arises a relation of life true, or, untrue, according to that, the spatial and dynamic composition can be harmonically included in it, or it will be lost in non-organic appendix, embellishments, illusory forms" (23).
- Another aspect should be taken into account, in this process of synthesis: That the contemporary aesthetic, shortly, underlines, that, there is no an absolute criterion of beauty, but there are the objective possibilities in forming a judgment about it, is some idea achieved truly in the art's entity.
- We are talking, often, about the "spiritual validity" of something. The situation has cleared up, by bringing in into a connection with "the law of objectivism": every product producing the human spirit, or, an art creation, is the disclosure of some, spiritual content into a reality (24).
- When a building or, a grouping of buildings, get an aesthetic validity, - the prerequisite for that would be the value of mood, what is pleasant, and, if such a whole is fitted into an natural milieu, the feeling of a vital value. The validity, by HARTMAN, lies in the appearance itself" (25).

All that shows, that, the world of urbanism is a specific large universe, in which is within the present times abridged both past and future. And that speaks about a number of possibilities of an author, having in mind that the aesthetic of investigation has no and. It is in the best way expressed by KENZO TANGE who says:

> "In order to find out the new solutions satisfying human wishes, energy, and prediction, I am together with other architects of the young generation, gravitated toward prevailing over the imperfect state of our traditional way of building, and so called modernism, in such a way, attempting to find some new spatial shapes, which are better adapted to human emotions. That energy I would like to perceive as vitality" (26).

At the end of this common search toward BEAUTY, here are some more directing opinions. The designer - creator, in urban design, next to the knowledge from urban technique, must unavoidably possess also a knowledge of aesthetic, not as a canon, dogma, but as a critique of conscience and intuition, as a reliable support in discovering the most suitable solution, that is to say, critique as a moral imperative of creation in urbanism and architecture.

URBAN SITUATIONS AND ENVIRONMENTAL QUALITY

Feasibility of changes and effects on quality

In investigating the various types of urban situation, we have, to consider what changes are the most relevant and suitable. A change has, always, been unavoidable in any possible urban situation having been economically justifiable, but, also, at the some time, it must enable an urban quality.

The main types of urban situations which should be considered, in the terms of size of settlements and their realistic and acceptable potentials for changes, are as follows:
1. Large towns (including those having special character).
2. Medium and small size towns.
3. Historic towns and protected areas.
4. Suburbs.
5. New towns.
6. External edges.

Considering wider sense, the most kinds of urban changes occurre within the town's centre or within the frame of secondary centers for the categories (1) and (2) of the above mentioned. In these centers, changes, can be manifested in diverse forms including:

- urban restoration on a planned-integrated basis, with the specific plans of development, also, by the general policy of local planning, including certain implications of the radical terrain cleaning;
- new/locational development by filling in of empty land, on an integrated or "ad hoc" basis, occurring in any part within the territory of the current feasible economic or other activity;
- protection of urban environment, often, included into urban restoration, or other forms related to the approved changes of use;
- reconstruction/demolishing of the existing entity (where restoration and filling in are not feasible) arising from the entities of dilapidated houses or economically not profitable context.

Seeing from the aspect of the changes feasibility, we have, also, to consider the environmental capacity for a change. Very few places are fully immune on changes, but some places are, probably, more vulnerable than others. This can means not only more liability to a change, but, also, that these places will experience non pleasant state, if the effects of such change are hardly considered in advance. Observing the categories of urban situations earlier mentioned, we can formulate several conclusions.

In the centers (under 1) - the large town's contexts, there is a big probability, or, a state requiring unavoidable changes (due to the high degree of economic activity and adequate land value) but, at the same time, is increased a degree of "obliged care" for the protection of some revitalized and, also, humanized context. In some over populated and the neglected internal town's situations, the shortage of investment, reduced economic activities, can be corrected, only by certain action introducing funds, pragmatic planning and, in some way, by the power of particular circumstances.

On the other side, in the medium and small towns, the sphere of activity for a larger extent of the development, is considerable smaller, although this will not prevent some ambitious and competing investors. In the case of these towns, the local environment and character are more and more vulnerable in relation to changes, in various degrees, both in the form of opposite development (where local economy is active) and in the form of power loss (where the local economy is stagnant or falling). In most cases, usually, some new development is necessary, but, we are repeating again, this must be "in context" in the terms of scale, location and all-inclusive character. It will be important to insure keeping the traditional local purposes, in a form of the mixture "full of life", what is the essence of a real character in so many towns, dispate of size or configuration. Generaly, the smaller town "the more personable" character. Large towns can be very formless. So, we have seen the main types or scales of urban situations which would be, probable, touched by a change. A change in almost all such situations, is being manifested, normally, in the terms of an economic change or a functional role.

Reversely, it will determine to which extent an urban territory will grow, remain static or fall. This will then, have an effect on urban quality through the types of land use for those protection included in that process, then, level of activities and physical basis of a change, for example, planned/non planned or, cohesive/additionally arranged. The role of changes for towns can be complex or, a sensitive one, more exactly, a delicate one, as it is the case of a gradual transition of some historic town centre into a larger shopping/administrative centre, or changes can be simple, unexpected, and, even, brutal as it is the case of some non-planned achievement.

An environmental capacity as the indicator and determinant of quality

All factors, we have already seen, can be covered by the term "feasibility of changes". We have to consider the question of "capacity for changes" again, but, now, in the context of influences on urban quality. Here we introduce that as an important and very relevant means for control or urban quality, not only for historic towns, but, also, for urban environment generally. By series of representative examples, a methodology and identification of significant themes, can be formulated relevant to typical urban situation, according to the characteristic functions or changes and levels of activities.

Generally, the approach is such, that, from the identified situations and important points, we can identify a number of indications of "capacity of environment" suggesting, then, a level of activities or kinds of changes which could be adequately fitted into, or, alternatively. Some of the important analytical themes which could be applicable on studies of various towns include such as follow:
1. Size and form of place and how they contribute to character and surrounding.
2. Influence of public open space on character of a place.
3. Effect of large and high buildings on local landscape, historic buildings, "urban nature", silhouette and main look.
4. Quality of certain buildings and activities having certain effect on them.
5. Transport network and, its relationship with character of town, in terms of the created activities with an accent on then public transport advantages.
6. Appraisal of land development potentials.

From the preceding considerations, we have seen that there is a usual relationship and

some interaction among urban roles, changes and growths. This will have a strong effect on urban character and quality. We have seen, also, that there is a similar interaction between "state" and "indicators" when we take "capacity of environment" as the main means in regulating an urban quality. In examining the connection between state and indicators it should be clear, what is their meaning. The "state" in this context, is a normal situation of pressure on urban form or character. The "indicators" are an external manifestation of effects or influences of these pressures. It is important to know, that, they can arise eather in the form of facts about the nature or root of problems, or in terms of some identified needs for elements of control. Because of that, we can talk both in terms of indicators and environmental capacity regulators, as they are influencing urban quality.

Urban quality and foreign experiences

In a process of making decisions on urban design, it is interesting, that, public participation plays an important role in directing town's arrangement in Europe both in West as in East of that continent. This is because all countries experiences new or increased building activity according to the growth of their economy. Local authorities with its inhabitants, have their share in that process, in terms of the provisions of some degree of planning policy or principles for guiding and control of design, at least, as much as related to the relationship with urban context or, restrictions of planning. And without effective policy and actions on environmental management - the centers of rapidly growing population are becoming the focus of serious degradation of basic resources, all over the world.

In Britain, according to M. PERFECT, an inflected system, arised goading and controlling design (in accordance with the national character). For example, where exists, series of wide established development planning policy, have been formulated semi-specific directives for planning and development, up to the specific local conditions about such things as are appearance of shops and their publicity (27).

In Germany, as a contrast (in accordance to the national character) in the process of activities much more legal is connecting and the strict hierarchy of planning system - from regional planning to down, without bringing the organizer into a doubt on, what is allowed or not. As the result of such an approach, the German planners gravitate towards greater specialization and technical orientation, within a very definite and fixed policy, giving clear and specific directives for almost every situation. The product of that is the fact, that, some of the best examples of European town planning can be found in Germany. For example, the town pedestrian system and arrangement of communications (including public exhibit of visual forms), then, high density residential development, as well as, revitalization of buildings. This is, also, related to the strong architectural roots of majority of the German planners.

Comparatively, there are differences between the two systems: from those reflecting the influence of some system on people, development and urban environmental quality, up to the real design of buildings. While some of the fundamental differences in approaches are a result of social and cultural inequality, so far, it is not likely that all of them will disappear together.

On the contrary, each side of Lamansh (it is still a "big division" between Britain and Europe) has something to learn from each other, while the "ideological gap will, unavoidable, be made narrower".

From a presentation of B. STOJKOV we have seen that the most of European countries are undertaking steps towards changes of their planning systems, going from regional planning to down, all with the aim of a bigger adaptability on context.

In Britain, points out M. Perfect: as Europe is making progress in a constant way, we should not be exaggeratedly self-confident, that, our system is the best one. It is evident that we have much to learn from our European colleagues, and so, nothing less, when we have to answer the question how to come to urban quality (28).

All this speaks, that, we have, also, to fit into the system of the environmental management, and, particularly in the context of urban environmental quality through town planning.

An appraisal of our urban situation and quality of environment

In our country there is the law of planning and spaces arrangement regulating this matter from the country's level to regional planning and up to the urban design.

An "open wound" in our system of planning does not lie in a shortage of ideas about urban quality, but, in their implementation. This can be seen, first of all, in the hesitation of the authorities to keep strictly to the made decisions. If this is not corrected, we would enter into the 21 century with big burden arising from the lack of the settlement consciousness/about the need to live in a healthy and arranged environment. The problem of material poverty we have entered, is easier to solve than to raise a level of living, "where, beside the technical achievements, a great care is being given to the feeling of satisfaction within the spatial frame we are living in, where is the quality of urban environment is more expressive, intimate and attractive (29).

Therefore, before attempting to correct, improve or to convert some unhappy urban situation into one serving for well-being of people - we have, as a first, step to identify not only the weaknesses and shortages, but, also, and any existing level of quality and advantages. In other words, we have to make some kind of the constructive analysis of the situation, presenting all influencing factors acting for benefit or against the creation of urban quality, having in mind, the possibility to get benefit from the available physical and financial resources. An appraisal of our situation will, in essence, be some kind of identified action needed to achieve or to protect the urban quality over the perception of the external indications (indicators) and influencing factors (generators). This can be formulated by an adequate METHODOLOGICAL APPROACH.

INSTEAD OF A CONCLUSION

A general review on the various and policy of urban planning quality

Visions of urbanism future, certainly, will have their roots in the contemporary contextual conditions and influences incorporated and further developed into the NEW TRENDS of the spatial and urban planning.

That "NEW TRENDS" rests on the need for an effective planning, G.PICCINATO, in that sense, underlines, the innovation introducing more articulated recognition of all planning activities in a form of PROCESS. He brings that change with regard to the spatial organization explaining it by pointing out the two main reasons: 1. inefficiency of the traditional approach and 2. changing role of the main actors in that process: a progressive withdrawal of the State from the direct intervention on the economic and social field, and, at the same time, extension of the market influence. A conclusion is exerted, that "the new perspectives mean defining the rules respected by all actors, next to needed share in the aims and ways of development of a number of different actors in that process (30).

In Europe, it is perceived, that going to an effective planning we can't achieve that aim by the individual actions, but, as B. STOJKOV says: "by the dynamic integrative processes, per various lines, where the priority is given to the spatial one, encompassing network of towns, infrastructure, traffic, then, living environment, monuments of nature and culture, etc. According to his opinion: " The basic principles and aims of that document, recently assumed in Bratislav, are related to the increase of competitiveness, efficiency and successful development of towns and villages in 18 encompassed countries having balanced regional development and larger coherence in protecting living environment and, particularly, natural and cultural heritage, etc. (31)

However throwing light up on the way into the 21 century, from the aspect of this paper, it is particularly important to underline: what is the role of a territory in these processes of changes? It is certain, that a territory gives possible frame for the integrated actions, and in a sense incorporaties the resource: financial, human, from various sectors, projects and policy. Assuming a territory as some, fixed element of connection-that together understand a meaning of places and sustainability of the urban quality, we are talking in this paper. And this bring us closer to the basic theme of an urban deign where the term "place" means a complex context which could be interpreted by various keys: geographical, political, economical and cultural. As the territorial contexts are different it is logical that the different answers will be got on a number of problems bearing contemporary circumstances and conditions. It estrange us from the global dimension of the contemporary development, and bring closer to that orientation demanding changes of the imposed programs and dynamic building in order to be conforming with SPECIFIC CIRCUMSTANCES.

There are different climatic conditions and local building materials existing and special concepts of human settlements and social structure, specific and unique economy and demographic characteristics, then, cultural-ethnic features and spatial form values – which must enter into the structure of the synthesis and the concepts of the development programs and making of it a HUMAN ENVIRONMENT instead the imposed "models" and imitation of solution leaving difficult implication on the domestic man and his environment. In this context, the "visions" about Europe of the 21 century, should also be observed, as well as, the integrative movement being in the process. In any case, without connecting people, places and periods, simultaneously, the urban structure and forms of human settlements, would be an insignificant physical shelter, an abstract quantity of building (32).

An investigation of relations between MAN and SPACE within the wing of "developed" and "undeveloped", their "production and consumption of space" and all things arising from that in the process of urban environment development – will complete the picture of these different ways of living (33).

It can be said, that these factors will be reflected through PEOPLE having in mind their behavior showing a complex relationship with the characteristics of PLACE (distances, directions, locations, land use, groupings, etc) – which they use in their desire to organize and arrange a space. Underlining the meaning of place as a part of the human existential space, K.N. SHULZ says:

> "Even long ago, man perceived that different places have different character; that character can be so expressive that it, in fact, determine all basic forms of our surrounding, contributing that the majority of people living there – feel that all of them belong to one and the same place" (34).

At the same time, these factors, during the time, have been expressed in the form of the variety and quality, confirming the historic development of every environment: expressing man's conditions and achievements, in time and space – an urban environment is a true index of his civilization.

In other words, that is the "places" where town citizens live, move and work under the specific ecological, sociological, economical, and technological, conditions which, altogether, leave physiological and aesthetic consequences on the individual.

Perceived as a SYSTEM in which a large number of elements are in balance (or not), filling in each other (or not) within the frame of the urbanization process – an urban environment has its structure where processes are accruing, in which exist relations, can be added some measures of quality, can be subdivided into periods. It has its land uses and focal points, its form and scale, as well as, levels, while in the core of all these elements is MAN (35).

Towards an appraisal of urban environmental quality

In order to formulate needed analysis we have to decide which CRITERIONS are the most relevant for an urban situation, developing our basic approach to that situation from the relevant INDICATORS and GENERATORS. In that context, some basic criterions applicable to almost any situation can be emphasized, as, for example, capacity of environment. It can be found some auxiliary criterions which could be applied according to some specific situations (some significant presence of old buildings of high or low architectural/historic value).

Relevant "indicators" (positive or negative) can be in almost every form. Here, we are presenting them, in accordance to their occurrence with respect to form of the appearance:

Negative indications

- excessive influence requiring car traffic & parking on urban environment
- destruction of architectural cohesion
- presences of "bad neighbor" on the land
- erosion of previously established urban environmental forms

- shortage of urban greenery and suitable street equipment and light
- weak state of pedestrian communications and needs.

Positive indicators

- strong local architectural character in terms materials and attractive mixture of purpose
- obvious directed and controlled changes contrary to sporadic and non-controlled growth
- sensitive maximization of existing natural characteristics or advantages such as topography and elements of water
- balances between commercial and settlements needs and purposes
- feeling of "historic continuity" up to date.
- feeling of order, organization and well-being.

As far as "GENERATORS" are concerned, ones that can be established for such indicators, then, very valid facts for the identification of needed actions can be obtained. Identification of generators, by itself, include knowledge of local situation, investigations, including talks with local people having direct or indirect interest, for the whole situation, and, particularly, having in mind the power of analysis and going further from assumption.

In the light of the basic criterion, it is important to underline the difference among those criterions mainly of economic, social, physical, and "visual" character (although in practice they can be overlapped and be in an interaction. Purists will say, that the "visual" criterion (as, for example, town's landscape) is too simple or, even, superficial, and that, as such, does not encompass problems (as are socio-economic factors and various shortages) which, in essence, underline question of urban quality. Our answer is that the interaction of all of these criterions, is the most relevant for a "balanced environment".

Although, it seems, that is not fully correct to take any of these criterions isolated, however, it must be said, that the approach respecting landscape still has real validity, influencing over urban character on the everyday life and perception of people, in a general sense. This is evident from many public representations (formal or informal), as far as urban quality is concerned. Power, validity and a relevant spatial-physical and visual approach, should not be undermined, both from an academic critique or "right" professionals of planning (36).

Sustainable communities: environmental management and planning of urban quality

In the preceding chapter, we presented methodology, an appraisal of needs and environmental quality. Here, we are talking about environmental management in the context of the town planning and designing. These two aspects are interrelated or are, in an interaction. This can be observed separately only due to an easier presentation.

Shortage of a systematic methodology of the environmental quality management in spatial and town planning is not a case, because every space is characteristic by changeability, of state and a stochastic nature of process, what is, next to that, a characteristic of the complex systems. Management of such complex systems is based on the combined use of formal and non formal methods (37).

In that sense, B. STOJANOVIC proposed one functional concept model of living environment management in spatial and urban planning. The aim of this model is to suggest the essence of the model and the procedure for environmental quality analysis in a supposed spatial entity. This model presents relations between the subjects of management (State organ) expressing its interests through aims and policy of living environment protection, and means of management spatial and urban planning, and objects of management (elements of living environment) and position of management instruments: regulations, standards, norms, criterions and information (38).

Here, we take this opportunity to say, that in the further investigations, the effects of feed back, should also be considered, that is to say, the influence of living environment on some methodological changes in approaches to the planning of space as a cyclic process. An inclusion of environmental quality criterions in the phases of planning – understand changes and innovations, at least, in the following fields:
1. information system for planning needs
2. norms and standards
3. methods of work: spatial analysis and an appraisal of potentials
4. evaluation of proposed solutions of future state and actions in space
5. monitoring and forming of new "inputs" (39).

These changes aiming to achieve a better quality of life, should be arised at local level, from individuals, groups, and local governments, filling into the contemporary concept of sustainable development representing a wide span of forms of urban building and techniques with its social, fiscal and economic frames. In that context, urban design can also be included having an accent on "humanization", in relationship with the existing urban character, but, also, in an imaginative treatment of "themes" producing successful results in a way. Such results according to the concept of sustainability means:
- satisfaction of existing needs without destruction of changes of future generations
- increase and protection of social equality and equality in opportunities
- safe guiding and improvement of economic security
- protection and strengthening of natural environment.

A "sustainability" can't be achieved without the cooperation of both public and private sectors. That means that the aim should be the creation of a development which is democratically "useful" and opposing, to the individual feeling of self-confidence". Theoretically, it should be the product of the current situation where exist an increased happy relying on the cooperation between public and private sectors in a development. This cooperation can be realized in a number of forms including:

1. Participation in a common development, among the investor of a development and the local authorities, arising from the mutually agreed aims and the common funds for arrangement, without a State help.

2. The above case, but next to a State subvention through various programs.

3. A common action between the potential investor of a development and the local authorities (establishments etc) and various associations, etc., aiming to promote a higher standard both in their own development and in the development of those supporting them. Agency representing the associated investors who take care in that sense, that all their projects are

supporting a long term program for the achievement of the environmental quality by a good design, a sensitive town landscape and an adequate care for maintenance of these needs.

4. As far as housing is concerned, up to some ten years ago, the stiers was on so called collective building, financed from some government funds. Now, in the era of the privatization, it is already visible building of family houses in the private ownership. Between these two extremes, arised in specific circumstances, remained the field of the housing cooperatives which could experience some kind of "reincarnation", if adequate ways of the cooperation among some kind of mobilization of the private resources and the government leans could be found. Also, there will be, open opportunities, that the private investors promote building of housing accommodation in a renting way.

5. Another further form of possible "common" action, can be realized in a situation where the local authorities can achieve some "progress in planning" by the improvement of the local environment, as the "benefit" from a commercial development – under the condition, that, the element of the "progress in planning" is physically relevant to the terrain for development, as well as, to the content of the plan, which have to be realized at that terrain.

6. In any case, these and other ways of cooperation do contribute in the search of ways for getting urban quality in the period that bears a heavy burden of the market influences.

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SUSTAINABLE URBAN DEVELOPMENT OF METROPOLITAN JOHANNESBURG

The Lessons Learned From International Practice

A.C.Mosha, Branko I. Cavrić

This paper consists of an overview of programmes supporting sustainable planning and management in the City of Johannesburg one of the most important social and economic hubs of the transitional Republic of South Africa. Following from this is an analysis of the experience identified as most appropriate for Johannesburg City and its metropolitan region (Gauteng).

This case study is used to highlight efforts and lessons learned from the international project „Designing, Implementing and Measuring Sustainable Urban Development" (DIMSUD) which have intended to contribute to new solutions for sustainable urban development through a collaborative, multi-disciplinary, and participatory approach combining research, urban design, and capacity building.

DIMSUD (http://sustainability.ethz.ch) is carried out jointly by the Swiss Federal Institute of Technology (ETH), Massachusetts Institute of Technology (MIT), Chalmers University of Technology (Sweden), University of Botswana, University of the Witwatersrand (South Africa) and the Catholic University of Santiago de Chile. Another partner was the United Nations University (UNU) at Tokyo.

The project has enabled a global overview of core problems, providing a synthesis of realizable strategies and offering both a scientific forum and an "urban field laboratory" for joint learning. The strategies developed will not only help improve the conditions in the case study cities (Gaborone, Johannesburg, Santiago de Chile), but will also provide working examples so that other cities can learn from and adapt and adopt appropriate "best practices".

INTRODUCTION

The Sustainable Development paradigm and urban sustainability

The notion of sustainable development was first articulated at a global level through the work of the World Commission on Environment and Development (WCED). The Commission was tasked by the UN in 1984 to embark on a search and consultation process to help map the path towards development in context of environmental limits to the 21st century and beyond. The outcome of the process was the report titled *Our common future* (WCED 1987). It was this report that articulated a globally derived definition of sustainable development as: "…development that meets current needs without compromising the ability of future generations to meet their own needs." (WCED 1987:43).

As we all know, most of the developing countries are still going through urban transition, and will retain a significant rural population for many decades. This means that sustainable development programmes must reinforce urban-rural linkages, unlike in most highly industrialised countries where urban transformation has nearly stabilised, and cities no longer deal with the effects of rapid urbanisation, but with a combination of other demographic issues and the impacts of global trends.

Sustainable development therefore calls for an ecosystem approach with the following elements: Inclusion of people and their activities in the ecosystem; Viewing ecosystem structure and function at multiple scales; Use of ecological boundaries to define environmental planning, assessment and management of units; Adaptive management strategies, based on feedback from new information, to improve management and policy under conditions of uncertainty; Participatory management involving all stakeholder groups; Integration of science and human values in formulating goals for protecting ecosystem; Recognition of ecosystem limits to action i.e. defining and seeking sustainability; and finally Geographically comprehensive systems – levels of analyses of interactions among physical, chemical, biological, and social components.

Urban sustainability-Johannesburg

The apartheid political system of separate development created great injustices and disrespect for human rights in many spheres of South African society. With the introduction of

democracy in 1994, the country, with the support of the international community, began the task of reconstructing a society in which the previous system had intensified racist attitudes and practices. The entire government institutions had to be restructured, and the massive task of replacing unjust and racist-based laws began. Ironically, democracy has been the great leveler. City systems such as Johannesburg are coming under growing urbanisation pressures, as being currently experienced globally. Increasingly, populations seeking liberation from their impoverished conditions converge on the city, intensifying demands for access to economic activity, basic services and environmental amenities.

As shown in the Table 1, the driving forces and trends are mainly focused around social challenges, while the environmental concerns are not addressed in the same extent. The reason for this is that the social problems and inequalities are assessed to be of more direct interest for the transition into a sustainable development in Johannesburg. Without responding to the mentioned social challenges, it would be very difficult to achieve any long-term environmentally sustainable development.

In this chapter we examine the status of urban sustainability in the City of Johannesburg starting off first by giving a general overview of the city; secondly examining the challenges, goals and opportunities for urban sustainability in the city; thirdly looking at indicators of urban sustainability. The chapter concludes by examining the future prospects of achieving sustainability for this big metropolis.

JOHANNESBURG: LOCAL AND NATIONAL SETTING

The city of Johannesburg in South Africa is situated about 1800 metres above sea level on the plateau often referred to as the Highveld. This may well have been the home for the earliest ancestors, and for at least 100, 000 years the place has been inhabited by humans. The city was established in 1886 in follow up to the discovery of the gold reef of the Witwatersrand.

Through a period of just over a century, the area has been transformed from hunting and subsistence livelihoods, to commercial farms, to a gold-prospecting camp, mining town and a centre of manufacturing to its current status of a regional and global financial-services and trade hub of the continent and the world. It is now recognized as one of the cities under the *gama*-category of world-class cities (based on three key categories of alpha, beta and gama global-cities).

The municipality constitutes an area of 2 300 km^2, of which half is occupied by buildings and infrastructure. There are still some green reserves with bush land or trees, some wetland but very few and small water bodies. Through intensive care in private and public open spaces, the city suburbs are characterized by greenery of trees, shrubs and flowers which has translated to an artificial forest within the surrounding grasslands. The city experiences typical South African weather with comfortable summers (average temperature 24^0 C) and mild to cold winters (130^C). Snow and freezing temperatures are extremely rare. Droughts are common even though the average rainfall is 700 mm per annum. The Highveld region is famous for its summer afternoon thunderstorms.

According to the 2001 Population Census the population of the city today stands at 3.2 million people. This is about 7% of the national population (at 44.8 million). The number of households is about 1 million, which means that an average of 3.2 persons in each. Over the last 40 years, trends have been towards fewer young children (0-14) and aged (55-upwards) with majority of the population being between 19-39 years old. Population growth is estimated to slightly over 1.0 %(COJ 2002b), which is far below the standard replacement fertility rate. This has been attributed to the impact of HIV/AIDS and the decreasing fertility rate. Through its history, this great mining and industry city has always attracted migrants from a large hinterland, including other African countries. There is a considerable amount of illegal immigrants which makes it difficult to determine actual numbers of the immigrants and the population in general. Population distribution is rather skewed. The Soweto township alone holds a very large proportion of the city's population (estimates for the 90s, vary between one and six million: Musike 2000). However, given the more recent Census 2001 data of 3.2 million for the Greater Johannesburg, it is likely that Soweto's population could be between 1.5 and 2.0 million people.

Johannesburg is one of the world's most cosmopolitan cities. The gold rush of the late nineteenth century drew people from all the ethnic groups of the sub-continent, as well as Europeans, American and Australians. As the city grew, traders and entrepreneurs flocked in from India, China, Japan and Eastern Europe. In recent years, many West, East and Central Africans have also descended on the city to seek a better life in Johannesburg, putting their own distinctive stamp on the city's profile.

The racist ideology, which shaped the politics of the country until the power shift of 1994 when the country got independence, divided the population into four main groups. African/Black, Coloured, Indian and White. A little more than one decade after the apartheid policy, was abandoned; the city is still characterized by strong ethnic segregation.

Table 1. - Eight driving forces challenging sustainable development in Johannesburg

Challenge	Environment	Social	Economy	Institution	Mind
City Patterns		X	X	X	
Values of exclusion		X		X	X
Poverty		X	X		
Health threats		X			
Urbanisation		X			
Globalisation			X	X	
Individualisation		X		X	X
Materialism	X				X

Even though ethnic mixing has started (for example through Africans moving to the inner city and the leafy, well maintained northern suburbs, with better access to the city's amenities) most people have remained in highly segregated areas and townships. For example the dense and deteriorated African areas of Soweto, Alexandra in north-east and Orange Farm in the south still have close to 100% Africans. There are also areas with about 90% Indians (Lenasia) or Coloureds (Eldorado Park) as well as 70-80% Whites (e.g. Roodepoort North, Randburg and Sandton) (Statistics SA 2003).

Institutional Framework

Since the crucial regime shift in 1994, both Johannesburg and the Republic of South Africa have gone through a process of institutional changes. The current constitution of South Africa was approved in 1996, two years after the first democratic elections when an ANC-led coalition came to power.

The country is divided into nine provinces and each province is divided into several authorities(municipalities and rural districts). Consequently, there are three tiers of governance with different legislatures which are independently elected (national, provincial and local authority).

At national level, planning and plan implementation systems is handled by the Department of Provincial and Local Government. This includes spatial, economic, administration and budgeting/financial plans. It is responsible for the enforcement of the Municipal Systems (2000) and Municipal Structures(1998) acts.

Johannesburg is the capital of the Gauteng Province, which is a small and densely populated, and highly urbanized area of South Africa. The responsibilities of the provincial legislature are a number of provincial concerns including formulation of laws, linking local stake holder's concerns to the national decision-making centre and improving the local influence in the national Parliament.

Besides the formal government structures, there are a variety of public-sector and NGO organizations which collaborate with the government structures. At city level it is found that

Table 2. - Key geographic, demographic and economic attributes of Johannesburg

GENERAL	
Population (mid 2000)	2 883 226 (estimate)***
Average annual population growth rate	0.9% (2000 – 10)
Daily commuter influx into inner city	800 000
Cross border shoppers a year (international)	300 000 – 400 000
Total area	2 300 square kilometres
2001/2 Budget	R9 billion
Total office space	± 6.52 million m^2
Share of national private office space	55%
Share of national corporate headquarters	74%
Concentration of 4 and 5 star hotels	Largest in Africa
Concentration of banking and financial services	Largest in Africa
Share of national banks	70%
Number of ASATA travel agents	±272 (±45% of national total)
Number of accountancy firms	±580 (±40% of national total)
Share of Financial Mail Top 100 companies	60% (was 65% in 1994)
EMPLOYMENT	
Employed	954 605
Unemployed	392 277
Unemployment	30% (2001 – was 27% in 1998)
PUBLIC SERVICES	
Hospitals	14 public, 46 private
Primary health facilities	125
Public schools	672
PRIVATE FACILITIES	
Private schools	160
Restaurants	±2000
Cinema screens	±165 (35% of national total)
Cinema seats	±26 800 (29% of national total)

*** Up to date figure from Census 2001 shows a population of 3.2 million people.

Source: Adapted from CDE 2000: 14).

Table 3. - Institutional levels relevant for planning in Johannesburg

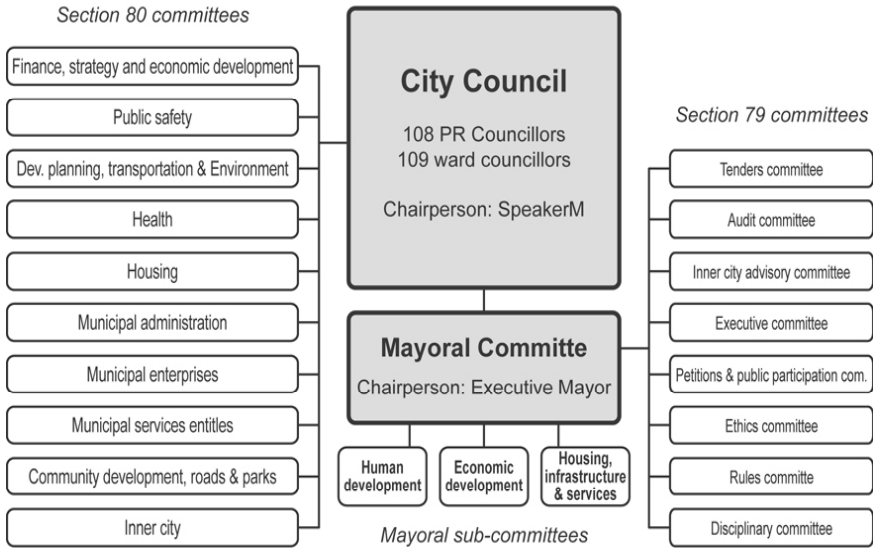
Institutional level	Johannesburg's context	Political organisations	Official administration	Examples of responsibilities	Examples of instruments
Nation	South Africa	Parliament, Government, Ministries	Government departments	Legislation, planning policies and frameworks	Legislation, Planning policies, taxes, subsidies
Province	Gauteng	Legislature, Provincial Government, Committees	Provincial departments	Education, health care, infrastructure planning	Legislation, Blue IQ, LED projects, other subsidies
Municipality	City of Johannesburg	City council, Committees	City departments	Public services, city planning	IDP, SDF, City Vision, tariffs, subsidies
Local Regions	11 Regions	–	Regional administration	Provision of certain services, monitoring and evaluating others	LIDPs, precinct plans
Electoral ward	109 Wards	Ward committees	–	Recommendations to the city council	–

the City of Johannesburg has gone through a series of institutional changes since the first democratic local elections of 1995. From being many independent municipalities with very diverse conditions, it became a federation of four local councils, and then after large financial losses it again transformed into today's "unicity" with one common tax base. Figure 1. shows a model of the institutional structure of the city.

Local level institutions

The city is composed of eleven regions with about 300,000 inhabitants each. Each region consists of a number of wards covering populations of between 5,000 and 35,000 people. Although the eleven regions are under the political administration of the central city council they have their own management structures. The regional administration is headed by a director who is appointed by the Council. The key regional responsibilities include: health, housing, libraries, sports and recreation, social services and a few other services. At the Ward level, there are committees formed headed by a Ward Councilor who represents the ward in the city council. In addition to the above there are also a variety of influential organizations operating in the city.

Figure 1. - Model of the institutional structure of the City of Johannesburg: the political system



Political structure

The city is headed by a mayor and locally elected councilors. There are also multitudes of committee responsible for various activities of the Council.

In terms of administrative structures, there is one city manager responsible for the running of the city. Certain core portfolios are handled at a centralized level. These include finance, planning, corporate services and contract management. The core administration is designed for optimal delivery of services through centrally distributed functions.

There are two departments with special importance for comprehensive city planning- the Department of Development Planning, Transportation and Environment and the Corporate Planning Unit.

Planning Framework and Planning practice

The policy framework for planning the city of Johannesburg is based on the Constitution of the Republic of South Africa 1996; the Municipal Structures Act 1998 which regulates how local government should work and the Municipal Systems Act 2000 which goes into details describing some of the planning procedures and an emphasis on community participation and the introduction of integrated development. And the Reconstruction and Development Programme(1994). In view of the need to address racial-spatial segregation and empower formerly disadvantaged populations, there has been a variety of legislation passed to guide overall planning and land-use practices under local authorities. A summary of these pieces of legislation is given hereunder.

Planning Practice

The main comprehensive planning instrument, decreed by national legislation, is the Integrated Development Planning (IDP). The IDP framework has been informed by the internationally agreed Agenda 21 Policies, with stakeholders' participation and multidimensional sustainability as key principles. The City Development Plan 2001-2002(CDP 2001/02) was carried out in the context of the IDP framework- a strategic plan for performance-oriented management of the city.

Urban Morphology and land use

The Witwatersrand gold reef has sustained a heavy belt of mines and other industries stretching from east to west through the city of Johannesburg. The old core of the city, the central business district (CBD), is situated close to where the first mining camp was located on the northern side of the ridge. From this point, the city was laid out on a classical grid pattern by the colonial planners.

Johannesburg has been shaped by nearly one century of racially-social engineering. The apartheid politics culminated with the Group Areas Act of 1950, which guided spatial segregation between the four identified racial groups. The early pattern of poorer residential areas in the south of the city and wealthier areas and well serviced areas in the north, was reinforced and consolidated as not only differentiated by class, but by ethnicity. The wealthy white middle and upper class created sparse, green suburbs for themselves along the northern and northwestern sectors, while other groups were dispossessed towards south west. The evacuation of Sophia town in 1955, then a vibrant freehold for Africans and Coloureds with a prosperous music and cultural life, is a well known example of the tough line from the authorities (Beavon, 1997, Beall 2002).

Besides the social segregation and inequities,

the apartheid era also left very tangible tracks in the physical environment. Like other South African cities, Johannesburg is characterized and well known by the typical "match-box" housing – large areas of townships on the outskirt, filled with rows of identical one-storey concrete-block type houses. In Soweto, the standard plot was set to 40 by 70 feet (260m^2) with the house in the centre. The floor area ratio in these areas can be estimated at 0.1-1.25 which is almost ten times lower than European inner cities (Vestbro &Algren 1999). But the population density is very high, with up to 300 people per hectare (COJ 2000- State of the Environment).

One of the urgent spatial and built environment issues today is the decay of the inner city. Many companies and services have already left the CBD and moved to new commercial centres to the north. High crime rates have been one of the driving forces of this trend.

A breakdown of the land use within the city is as seen on Fig 2. which shows the uses in percentage terms. As expected residential development tops the list followed by other land uses, small holdings, mines and quarrying etc.

The provision of Social and Economic Services

Housing and land ownership

Until 1986, Black South Africans were prohibited from owning property. As a result, individual ownership rights are now viewed as a matter of political redress. Leasehold and other alternative that have existed since long time ago, are often associated with ethnic discrimination. Therefore the government's strategies to provide housing and secure tenure are mainly based on subsidies for individual ownership (Royston and Ambertt 2002).

The dominant dwelling type in Johannesburg (as in most of South Africa) is the house on a separate stand/plot, making up half of the dwellings. Formal backyard dwellings –rooms, flat or houses- is the second largest type, followed by flats in block of buildings. Informal and illegal settlements is a big issue in Johannesburg as in other South African cities. The city has mapped 89 informal settlements with estimates of 170,000 families living there (Thale 2002). There is also a considerable number of people living in illegal dwellings in backyards. Official statistics show that more than one fifth of the population live in informal dwellings(MDB 2003).

Health, education and employment

The human development index (HDI) was utilized to assess the level of development within the city. The statistics show that while the HDI of black residents is far below the white counterparts the latter are at par with high income developed countries. According to the HDI it is theoretically better to live in Johannesburg than elsewhere in South Africa or Sub-Saharan Africa (Coj 2002b)

(a) Health

The health issue in Johannesburg, as in the rest of Sub-Saharan Africa, is dominated by impacts of the HIV/AIDS pandemic. It is estimated that more than 10% of the city's population is infected and the number will continue to increase by about 26,000 persons annually. The most exposed group is black

Figure 2. - Johannesburg: Current activity patterns

Source: Spatial Development Framework: COJ 2001, p. 19

women 25-29 years old. AIDS related diseases will most probably prevail as the greatest cause of mortality far in the future. This is an issue affecting not only the direct victims and their families, but also causing a huge damage on the economy and the society as a whole (Coj 2002b).

Since the apartheid era, high qualitative health care is very unevenly distributed in the city. There is an agglomeration of clinics in the CBD, while the Deep South hardly has any (Coj 2000- *State of the Environment*). The Johannesburg General Hospital, with 2000 beds in the city centre, is very modern and well-equipped. Baragwanath, situated in Soweto, is said to be the largest hospital in all of Africa serving 5000 patients a day, but with very limited resources (*Encyclopedia Britannica 2003).* There are several actors providing the city's health service. Recently, the province launched a new system for primary health care on a district level. The system was designed to address the problem of overcrowding at the public hospitals. Now, there are many local clinics, community health centres and mobile clinics run by the regional administration. There is also a central health information system to provide the planning and logistics (Coj 2003-Health). Finally, there are a large number of private hospitals, for those who can afford more expensive health-care services.

(b) Education

The school system in South Africa is administered through the national and provincial governments. Public financing provide basic services and salaries for teachers, but all public schools also charge varying types and amounts of fees for both capital and operational expenditure. Thus, there is a clear connection between the parent's financial means and the quality of their children's education. The vast majority of schools and universities are public, but the share of private ones is growing.

Among both private schools and universities, qualitative differences is huge (IMC 2003). However, there are ongoing initiatives to standardize the quality of education through the National Qualification Framework under the South African Qualifications Authority. Other initiatives are also being undertaken to restructure the education system with introduction of a new curriculum.

Low skills levels among Johannesburg's population is highlighted as a severe obstacle to increasing economic growth. To-date, 25% of the city's adult population is technically illiterate, another 39% have less than grade 12 education, and only 4% have a degree(Allan, Gotz and Joseph, 2001). The levels of skills in the city is much lower than what is required for the city to operate effectively. The city, and the country as a whole, has experienced a major brain drain in the last decade as some professionals have chosen to emigrate.

(c) Employment and income

A public survey done for the City Council of Johannesburg showed that job creation was regarded as the first priority problem (Coj 2002 - Joburg 2030). The unemployment level is about 30% and has been increasing over the last few years in particular due to ongoing retrenchments from the secondary and primary sectors as well as poor matching of skills and opportunities in the tertiary sector which is predominant.

Income distribution in South Africa is extremely unequal. The Gini coefficient is almost 60% which internationally is very high. Only three other countries in the world have a worse distribution compared to that of South Africa (CIA 2002). This aspect is significantly magnified within Johannesburg as the key hub for the generation of wealth and economic growth of the country and the region.

Transport

The city operates a municipal bus system and a separate private bus company serves the connections between Alexandra, the city centre and Soweto as part of a national transport subsidy programme (paid to private bus operators but excludes the taxi mini-buses). The buses cater for 13% of passenger transport and as much as 29% is catered for by the burgeoning mini-bus-taxi industry. Use of the private passenger vehicles is quite high. The average time is estimated at 72 minutes, which means that many people do spend many hours per day traveling between their homes to the work place (CoJ 2002b).

There is a rail system, operated by Metrorail (a parastatals), with trains connecting to some of the townships and surrounding cities like Pretoria and Ekurhuleni. The northern parts of the metropolitan areas are not covered by this system. Park Station, which is located at the centre of the city, is said to be the largest train station on the continent (CoJ, 2003).

Economy, public finance and economic planning

Johannesburg's economic development has followed the pattern of many advanced industrial countries after World War II. The recovery of Europe created a global demand for manufacturing industry products, which triggered a rapid employment growth in Johannesburg. The post-war boom lasted until the oil crisis in the mid-70s, but since then the growth never really recovered. Unlike many other developed countries, there was a dramatic decline in manufacturing while the tertiary industry progressed slower than for the high-income countries. Regardless of this, Johannesburg is still a leading industrial and economic city of South Africa and even on the African continent (Beall 2002).

With a GDP per capita of about US$9400(2001 estimates, according to CIA 2002), South Africa is at the top among African countries and close to the upper quarter of all countries in the world. Being the world's largest producer of platinum, gold and chromium, the mining industry has been the main growth driver during the 20th century, with Johannesburg as the natural centre.

Today, South Africa has a well developed tertiary economy most of which is centred around Gauteng conurbation (Johannesburg, Pretoria, Ekurhuleni and other smaller municipalities). Almost half of the employees in the formal sector work in the service sector, which contributes up to two thirds of the GDP. The primary sector represents only 3% of the GDP, even then it is still the main occupation for the large proportion of the population. Over 50% of the population still lives below the poverty line.

Johannesburg is seen as the economic hub of Sub-Saharan Africa. The city hosts a network of investment and support systems covering almost the whole continent. Its cross product represents about 16% of national GDP. Three out of four of all corporate headquarters include finance, business services, trade and manufacturing.

An annual growth rate of about 0.9% is expected over the next ten years, which is very low in international comparison. One possible explanation for the low growth rate is that Johannesburg does not include its informal sector in the GGP. The informal sector has grown significantly. In 1999 it was estimated to contribute 16% of the total employment, mainly in the retail trade sector. But there are other factors affecting the economic growth of the city. Low literacy-and skill-levels, high crime rates and inadequate infrastructure are highlighted as obstacles to growth (CoJ, 2000b).

Public finances

The government revenue in South Africa is fully based on taxes and duties. One third comes from personal income tax and a quarter from value added tax (VAT). In expenditure, education takes the largest share (about 20%) followed by social security and welfare (15%) and health (12%). Interest from loans, mainly domestic, stand for as much as 15% of the expenditure (RSA Budget 2003). Most services and development investment are paid through the provincial and local governments.

The Province of Gauteng has a budget of about R23 billion (US$1.8 bil). 95% of the revenue is from national allocation, but there is some revenue from gambling tax and vehicle licences. More than 80% of the provincial spending goes to education, health and social services. Different development projects like the Alexandra renewal and the Gautrain were budgeted to R2,2 billion for the financial year 2002/3 .

The city of Johannesburg has a budget of around R11 billion (US$ 0.8 billion) based mainly on service charges. The budget can be divided into two blocks: approximately 60% for the core administration and the rest of the twelve UACs (Utilities, Agencies and Corporate agencies). The core administration is financed mainly by property rates, regional service levies and other interests and charges. This finances the work at the municipal departments and regions. Some of the UACs are financed through their own charges, even if many are dependent on the council subsidies or grants which have limited opportunities of charging full service costs. This is expected to increase over the coming three years (CoJ 2002a).

Economic planning

The economy of Johannesburg reflects strongly successive waves of development and decline, which have seen the city move away from mining and industry production towards an economy fundamentally based on services and trade as well as some high value manufacturing. This trend is in line with global trends and the city's comparative advantages. While crime and unemployment are seen as major stumbling blocks for economic growth in the country, the city is promoting small and medium enterprises (SMMEs) as strategies to aid economic development in the city, reduce unemployment and help the citizens of Johannesburg become more market-connected.

Johannesburg has a rich history of developing and implementing sophisticated and advanced programmes, which deliver economies of localization. Unfortunately these economies of localization are in place for heavy, primary production sectors, most especially gold mining and iron and steel industries. As these industries decline and their contribution to GGP and employment growth decreases, so the economies of localization present in the city become more outdated(CoJ 2002a).

CHALLENGES, GOALS AND OPPORTUNITIES FOR SUSTAINABLE URBAN DEVELOPMENT IN JOHANNESBURG

Defining sustainable urban development for Johannesburg involves the synthesis of three major categories of challenges and opportunities to which the city's development will be responding in the 21st century.

Firstly, Johannesburg has articulated for itself the vision of a world class African city with the capacity to attract and retain international and local investment for economic survival of its citizen while ensuring its fair contribution to the economic development of South Africa (see for example *iGoli 2010, Johannesburg 2030* and CDE 2002). In this vision, the city management has reinvented its role from the former passive control and regulation of externally-determined development processes to being an active agent and catalyst for facilitation of the right mix/scale of private sector investment from local and international sources. World class infrastructure, a rich pool of relevant skills and strong institutional management capabilities are some of the critical issues identified. The central role of crime reduction in this vision has also been clearly identified.

Secondly, as a member of the global community of cities and nations grappling with unsustainability arising from past concerns with economic growth in disregard of environmental degradation and socio-economic inequalities, Johannesburg must shoulder its fair share of sustainable development responsibilities in the context of internationally- and nationally-agreed frameworks/legislation and policies. The key issues fall into the broad categories of bio-physical concerns (such as bio-diversity, energy and climate change, water scarcity and quality as well as general resource degradation/conservation) and socio-economic challenges such as poverty reduction, gender imbalances, distribution of wealth among developed and developing countries as well as equitable access to basic needs such as shelter, energy, water, sanitation, education, recreation and waste disposal.

Regional and national commitments on these issues must find actual translation into the development agenda and vision of Johannesburg in the 21st century. *Agenda 21* and related *Local Agenda 21,* Johannesburg WSSD outcomes and commitments, NEPAD and AU frameworks, South Africa's legislation and policies on environment, land use and socio-economic growth/development (in areas like municipal structures and responsibilities, housing and services, local economic development and equity (racial-, gender- and disability-based) are some of the key frameworks and commitments in this category.

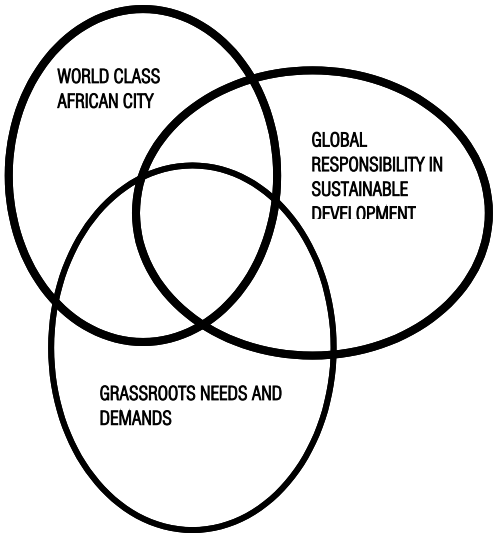
Thirdly, since Johannesburg lies at the local sphere of the governance system in South Africa, it shoulders the responsibility of ensuring the systematic translation of the visionary and global commitments to match the specific needs and resource constraints of the highly diversified and spatially segregated regions and citizen groups of the city. This grassroots factor is key to ensuring the critical support and ownership of the broader visionary and global commitment responses mentioned above. The spatial development framework

(SDF), integrated development plans (IDPs), and local economic development plans (LED) are some of the frameworks under this category.

In view of the above, sustainable urban development for Johannesburg can be defined as development which enhances the city's global and regional attractiveness (Johannesburg 2030 and other visionary planning documents), ensures that the city meets its fair contribution to the global, regional and national commitments in sustainable development while at the same time ensuring a sensitive response to the specific needs and resource opportunities/constraints of its diverse regions and citizen groups.

Based on the above focused-definition, the subsequent sections of this chapter provide a substantiation of each of the three categories with a view to identifying the key challenges and opportunities for sustainable urban development for Johannesburg as well as the related indicators. The intention is to provide a broad overview which will constitute the framework of deriving the necessary solutions for urban sustainability for Johannesburg.

Figure 3. - Interaction between the three categories of sustainable urban development issues for Johannesburg



OPPORTUNITIES AND CHALLENGES RELATED TO JOHANNESBURG AS A WORLD CLASS AFRICAN CITY

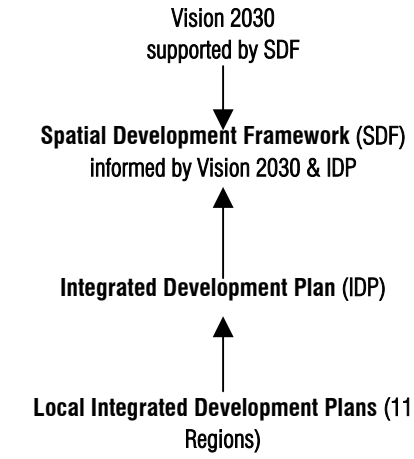
Johannesburg's efforts to meet global demands

In order to advance in its position as a world-class African city, Johannesburg must ensure that it can compete favourably with its counterparts in other parts of the world. It must occupy and sustain a strong position as a destination of choice for the location of corporations and skilled professionals. The city has been recognized for being at the forefront of economic activity on the continent. It generates more than 35% of South Africa's Gross Domestic Product (GDP) and 10% of Gross Geographic Product (GGP) of the Southern African Development Community (SADC). It is also the centre of transportation and shopping in the SADC region. Johannesburg, in its position as the foremost world-class city on the continent, bears the challenge of competing with other cities internationally (Centre for Development and Enterprise, 2002).

As South Africa directs its energies towards casting off the apartheid past, it has to similarly take cognizance of changing global demands. Neglecting the latter can result in it losing its competitive edge, particularly as globalization forces increasingly take effect across the globe. According to the Centre for Development and Enterprise (CDE 2002) the following criteria are necessary for cities to ensure success for achieving international status: Strong leadership; A vision supported by key stakeholder groups in the city; A unique and marketable image; Devolution of powers and authority from national governments; Establishment of partnerships between various stakeholders that will enable the city to adjust quickly to new global demands; Public services and business friendly environment to compete for foreign investment; Infrastructure, particularly transportation and communication; Educated, skilled and healthy citizens; Good urban governance that delivers social, economic and environmental sustainability and Creating strong neighbourhoods with good quality of life for its citizens and business enterprise.

How well does Johannesburg fit the profile for a world-class city? The city vision declares that this is the goal it has set itself for the next 30 years (City of Johannesburg, 2002b). Its "Vision 2030", in turn, is supported by a Spatial Development Framework that also links it to the Integrated Development Plan (IDP) of the city (City of Johannesburg, 2002a). The IDP is a recent statutory requirement that considers status quo information and community needs at grassroots level to inform the compilation of a development plan for the city. Social, economic and environmental needs are considered in an integrated way (Department of Provincial and Local Government, 2002).

Figure 4. - Interactions between Vision 2030 and the integrated development planning process in Johannesburg



These declarations will now be examined to ascertain to what extent the city meets the criteria for the world-class position it aspires to. In 1994, South Africa moved into the new democratic political dispensation. This meant that every city and town faced the challenge of replacing an institutional organisation that served the previous apartheid paradigm. During the period 1999 - 2000 Johannesburg commissioned an extensive status quo exercise, supported by public participation from various sectors in the city. The results were used to draw up the *'iGoli 2002'* plan for restructuring the local government institution, as well as a ten-year vision for the city, *'iGoli 2010'*.

Also during this period, new planning legislation was introduced that compelled local governments to work with their communities to develop a common vision. This 'Integrated

Development Plan' (IDP) process considers social, economic and environmental issues for prioritisation, and develops action plans to address them in the eleven regions of the city. Despite IDP processes being poorly attended, the overall priorities that were determined nevertheless cover broad concerns that almost all communities will identify with. The five strategic priorities of the IDP are listed in Table 4.

Table 4. - Inter-relationship between the IDP-strategic outcomes and Mayoral Priorities for Johannesburg

Strategic Outcomes	Mayoral Priorities
1. Affordable, sustainable customer-focused delivery	1. Service delivery excellence
2. Economic growth & development	2. Economic development and job creation
3. Safe & secure city	3. By-law enforcement and crime prevention
4. A quality built and natural environment	4. Inner city renewal
5.Citizens enjoy an improved quality of life	5. HIV/AIDS
6. Financial viability and strength. Organizational development & excellence	6. Good governance, customer care and *'Batho Pele'* ('People First')

This exercise culminated in the IDP formally being adopted by the city at the beginning of 2002. In addition, Key Performance Areas (KPAs) were determined for the IDPs, and these are to be monitored using Key Performance Indicators (KPIs). To-date the city has completed the annual review of the IDP as well as the formulation of the second cycle of IDP and SDF for 2003/04.

Recommendations of *iGoli 2002* on institutional restructuring have been implemented, with the objectives of correcting past inequitable access to basic services and to improve service provision in general. This will improve the quality of life of residents, particularly poorer communities. The city has instituted a policy that ensures households free access to basic levels of water and electricity. These deliverables go a long way towards achieving national priorities of reducing poverty and correcting inequalities, as captured in the Reconstruction and Development Programme (RDP: the primary overarching policy of the first democratic government of South Africa) (ANC, 1994).

iGoli 2010, however, was not implemented. It was agreed that ten years was too short a time frame to make significant changes. The city set out on a path to form a vision achievable in the next 30 years (City of Johannesburg, 2002b). The Vision 2030 exercise, however, was carried out in isolation from the IDP process. Further, although Vision 2030 has been informed by the research conducted for *iGoli 2010*, there is a bias towards economic issues.

The *Vision 2030* team conducted a household survey in October 2000 to determine the most pressing concerns in the city. Uppermost in the minds of citizens was the need for employment. Fifty percent of people surveyed asked that the Council prioritise job creation. This is not surprising, considering that the unemployment rate in the city has risen above 30%.

Vision 2030 is, unapologetically, an economic vision for the city. Focus is placed on improving efficiencies for business. It concedes that local government is directed largely by national policy processes, making it primarily a "policy taker", rather than a "policy maker". This has prompted the city to investigate how it can create supportive environments for fulfilling a role as an agent for economic growth. It is envisaged that increased GGP will result in better standards of living and an improved quality of life, as measured by the Human Development Index (HDI). Furthermore, the city wants to ensure that increased GGP is shared by all; increases in salary will therefore be accompanied by increased parity. Increased GGP will also mean increased revenue that will enable the city to provide better facilities.

It must be recognised that other factors, apart from the lack of disposable income, must be addressed to ensure that citizens pay for their city services. The Auditor-General's report released to the City Council in November 2002 shows an accumulated deficit of R1.45 billion, down from a surplus of R61m in 2000. Inner city decay, poverty and the culture of non-payment have been singled out as the key causes of this decline (*The Star*, 2002).

Other research conducted for Vision 2030 identified high levels of crime and inappropriate skills as the major impediments in investment decisions. *'Vision 2030'*, the 30 year goals for the city, has adopted these concerns as 5 star priorities, in order to achieve the outcomes of increased business confidence and increased investment. The high levels of crime have rendered the city as 'a place of fear' (Centre for Development and Enterprise, 2002), and has contributed negatively to the image of the city.

To provide safety and efficiency, city efforts must be directed towards enforcement of the by-laws and building codes. The types of crime that citizens, including business, are concerned with are, however, of a more serious nature. Only steps that effectively address crimes such as armed robbery, hijackings, murder and rape will win the confidence of citizenry and business. Joint strategies with the South African Police Services, using institutions such as Community Policing Fora, will have to be devised to reduce levels of serious crime. Vision 2030 recognises the limited powers of the Metro Police, and calls for partnerships with other government policing agencies, business and communities to effectively address the problem. Effective partnership efforts will instill a greater sense of security and improve the image of the city, both in the eyes of communities and business, locally and globally.

Vision 2030 will put in place strategies that will ensure an improved labour force with appropriate skills, as measured by increased numeracy and technological literacy. It is anticipated that literacy and numeracy levels of 100% will be achieved by 2030. The need for critical strategies towards creating skilled citizens for future skills-demand in the city has been consistently highlighted. However, little attention is given to addressing employment needs of the "inappropriately skilled" populations currently unemployed or being retrenched by the formal sector. Efforts to meet education and employment needs must be initiated sooner than later as the spin-offs would benefit the city both in the short- and long-term. The empowerment of the currently unemployed and illiterate will enable them to better participate and contribute in the realization of a revived world class Johannesburg.

The city will have to actively support key economic sectors, in its 'economies of locali-

sation' strategy. These sectors were chosen because they were evaluated to be best aligned to the city's economic vision and for their high levels of competitiveness. Despite being renowned as the 'City of Gold' the financial and business services sector has long replaced primary and secondary production, including gold, as its major contributors to GDP. The next largest contributors to economic growth in Johannesburg are transportation and communications (Centre for Development and Enterprise, 2002). The preferred sectors have thus been identified as financial and business services, followed by transport and communication. CDE 2002 concurs with *Vision 2030* in the identification of the priority areas for revitalising economic growth in the city.

The vision proposes a strategy to support small, medium and micro enterprises (SMME), but not with the same detail of support as it does for firms with larger than 50 employees. This is a major oversight, considering the high unemployment levels and the prevalence of 'inappropriate' skills that have been identified. Support for SMMEs is not only essential for economic growth but would also simultaneously address social concerns of unemployment. The CDE report emphasises the need to support smaller enterprises, as most new jobs in the city have been created in the city. Whilst improving infrastructure that meets large company needs will have benefits for the smaller business, finally the city must also provide support to facilitate establishment of such enterprises.

The city wants a world-class information and data system throughout to support the service sector, rather than primary production. This requirement should be extended to support social, environmental and institutional systems. Whereas data is currently being collected, very little analysis is done to track changes and determine priorities for planning and policy making. Better co-ordination of data from the various sources in the city is required. The information must be useful and accessible to a wide range of users/stakeholders. It is proposed that a central database be set up that will be responsible for collecting core indicators for city planning and policy making, and for the public. This could be located in the Corporate Planning Unit.

Vision 2030 proposes that the city will attain higher GGP levels by exploiting economies of urbanisation. This will mean better efficiencies in labour and business infrastructure (transport, commercial space) and services (telecommunications), and increased levels of their interactions. This positive step towards a compact city is supported with a Spatial Development Plan for the city as discussed later in this chapter.

Even when improved economic growth is achieved, social and environmental impacts cannot be ignored. Although economic growth and job creation are viewed as priorities by the CDE report, improving the quality of life for the majority living in the city is maintained to be just as important. The city is just as concerned with achieving better conditions for its citizens. A primary indicator that will be measured is the Human Development Index (HDI), based on life expectancy, income and literacy. *Vision 2030* wishes to attain a quality of life (as measured by the HDI) that is comparable to world class standards.

It envisages a social sector that will be adequately resourced to manage AIDS orphans. There will also be decreased mortality rates, increased life expectancy, decreased birth rate, an increased population in older groups, and increasing numbers serviced by demanding private care, thus leaving public care to concentrate on smaller numbers. There will be an increased marketing of libraries, museums, educational events and exhibitions, and access to these facilities will reach 100%. These remain in the vision as a list of noble social goals; they do not share the same levels of detail in strategy that the economic objectives do.

Vision 2030 household survey recorded that 'only 33%' of people are dissatisfied with services. Vision 2030 declares that this means that service delivery is "far from a crisis". However, delivery of some services in the city is far from adequate. Almost 30% of the city population is inadequately housed, with 15% living in informal settlements and 14% in backyard shacks. Here, Vision 2030 is in conflict with the IDP strategic priority of "affordable, sustainable customer-focused delivery". Improving service levels will significantly contribute to increased HDI levels. It is noted that where the Vision 2030 falls short on addressing social concerns the SDF and the IDP have considered them priority areas in the short- to medium-term.

The objectives of the SDF are to create a sustainable urban environment, to promote urban efficiencies of various components in the city, and to ensure optimal accessibility to opportunities and city experience. Key components of the SDF are an urban development boundary (urban edge as a means to a more compact city), efficient public transport systems, strong viable nodes directly linked with the transport system, enhancement and protection of residential environments, provision of a functional and sustainable open spaces system that will conserve ecologically-sensitive areas and reduce pollution, and appropriate corridor development. Strategies and target deliverables have been developed to realise these objectives.

Vision 2030 addresses other social issues with its supporting SDF and IDP. It draws attention, for instance, to the possibility that increased disposable incomes will be accompanied by greater number of private cars. Congestion in the city has increased by 26% in the last 3 years. City efficiencies are aimed to enabling citizens to access commuter transport within 60 minutes of their homes. This, however, does not compare favourably with World Bank standards of reaching work from home within 60 minutes.

The SDF will facilitate the elimination of urban sprawl by increasing densification and concentration. It must, however, be noted that some parts of the city, such as the inner city, need to be de-densified because of the severe stress it is placing on service infrastructure and on social well-being. It must also be mentioned that a presidential project is currently in place to address social, environmental and economic concerns in Alexandra which is one of the most densely settled parts of Johannesburg.

Vision 2030 also aspires towards sub-urbanisation of black townships along the lines of white suburbs. The latter, it is believed, will lead to the development of a property market in traditionally black townships. It envisages that poorer communities will be concentrated in special needs areas. The apartheid city was a divided city, and these goals raise questions about the levels of integration that the city desires. Least of all, racial segregation must not be replaced by separation along economic lines.

Due to increased disposable incomes there is expected to be an increased demand for open spaces and rivers and dams will be restored for outdoor relaxation. No mention is made of the need to re-establish ecosystem health and restore biodiversity. Waste is expected to decrease due to increased recycling and litter levels will decrease because, it is assumed that, there will be an increase in civic pride. Outputs are based on assumptions that lack of civic pride is the main reason behind poor waste management. It must be recognised that it will be just as important to create the enabling conditions such as providing adequate facilities and educating people on their rights and responsibilities. To meet world class city standards the city will have to achieve world class standards of environmental management. Here again, the IDP comes to the rescue of Vision 2030, with the key performance indicator of "percent completion of environmental management indices in line with national and international standards".

Johannesburg is party to a collaborative effort with other cities to investigate the adoption of the City Development Index (CDI). This index was developed in 1997, as part of United Nations Human Settlements Programme (UN-Habitat), and is used to compare development levels of cities. The CDI is composed of a multifaceted array of parameters, namely the five sub indices of infrastructure, waste, health, education and city product, with each parameter given a specific weighting. It therefore provides a picture of how the city is performing in these five areas while at the same time allowing for comparison across cities regionally and internationally.

As mentioned earlier in the chapter, the Key Performance Areas (KPAs) and Key Performance Indicators (KPIs) of the IDP are based on the strategic priorities as defined in the IDP process, and the priorities of the executive mayor. These KPAs and KPIs serve as the scorecard to evaluate the performance of the city manager and high level management in the city. As far as institutional arrangements are concerned the *Vision 2030* process identifies the Corporate Planning Unit (CPU) for managing the process. It calls for better cooperation between spheres of government, and better networking and co-ordination between economic sectors. Annual surveys conducted by the Corporate Planning Unit will measure progress towards the high service standards it wants achieved. Any strategy that is put in place will have to address unacceptable attitudes and behaviour that contribute to poor customer service.

Within the city, strong links and co-ordination between the CPU and implementing arms of the city will have to be forged to ensure steady attainment of the 2030 goals. This must facilitate the setting up of effective partnerships. A positive link has been forged between *Vision 2030* process and the planning department in the city. The Spatial Development Framework (SDF), developed by the Strategic Planning division, supports the *Vision 2030* by directing spatial developments within the city towards incrementally addressing competitiveness through spatial efficiencies. Interim targets must also be declared, on the road to 2030.

It has been pointed out that *Vision 2030* is a living document that invites comment and discussions for improvements (Van der Walt 2002). In the interest of meeting demands for attaining and maintaining its global position the city must identify and address the gaps in its present vision. It can be argued that environmental and social dimensions of *Vision 2030* are addressed through the Spatial Development Framework. The task still remains, though, to integrate their components so that challenges are addressed holistically and opportunities are optimally exploited. An integrated vision will also gain support from a greater cross-section of stakeholders in the city. Appropriate resources will have to be dedicated to determining the needs and solutions in each dimension for the achievement of a world- class city.

OPPORTUNITIES AND CHALLENGES RELATED TO GLOBAL, REGIONAL AND NATIONAL COMMITMENTS TO SUSTAINBLE DEVELOPMENT

The Rio Summit of 1992 served an agenda-setting function, registering shifts in the global context of UN-sponsored conferences, involving debates about national models and international justice. The major international Conventions signed at the Rio Summit in 1992 include the United Framework Convention on Climate Change (UNFCC), and the Convention on Biological Diversity. The former is to stabilise greenhouse gases in the atmosphere at levels that will not upset the global climate system (Keating 1995: viii). In 1995, the Kyoto protocol to the objectives of the Framework Convention on Climate Change was effected in which the developed nations agreed to limit their greenhouse-gas emissions, to the levels emitted in 1990.

The Millennium Declaration of September 2000 contains commitments to halve by the year 2015, the proportion of the world's population living in less than one dollar per day, suffering from hunger or having no access to drinking water. In regard to tangible outcomes of the Earth Summit in Rio in 1992, in resulting in a more socially just, environmentally sound, economically vibrant and politically accountable world, the answer is said to be far from satisfactory. Many have argued that the sustainable agendas failed to fully mobilise people, governments and the business community in addressing the urgent problems affecting cities and societies today and in the future. The cited barriers include different approaches of environmentalists and development planners; political and institutional context within which local communities and cities operate, as characterised by obstacles both at national and international level.

The Johannesburg Summit 2002 therefore put much focus on questions of effective implementation and the institutional/political obstacles (Doran, 2002: 11). It constituted an opportunity to assess the impacts of *Agenda 21* outcomes, and provides renewed impetus for implementation. It reaffirmed sustainable development as a central element of the international agenda, and a wide range of concrete commitments and targets for action to achieve sustainable development objectives. It produced three types of outcomes; the Johannesburg declaration on Sustainable Development; the Johannesburg Plan of Implementation; and *Type* II Partnership-commitments by governments and other stakeholders, including business and non-governmental organisations. It put forward many targets towards sustainable development.

Sustainable development in South Africa

South Africa endorses Agenda 21 and has made its aims a reality at a local level (Beeton 2002: 64) It was anticipated that the country would have a national strategy for sustainable development (NSSD) by 2002 (DPLG 2002). The Habitat Agenda and its political statement (the Istanbul Declaration) endorsed and expanded on *Agenda 21* and highlighted the importance to be given to urbanisation and the related issues of land, housing and urban management. It recognises that in an increasingly urbanised world, cities are the locus of social, economic, and environmental problems, as well as the source of unique opportunities for a more sustainable world.

Both agendas set the stage to bridge the so-called "green" and "brown" perspectives on urbanisation, environment and development. According to Agenda 21 and Habitat Agenda, integrated planning and sustainable developments go hand in hand (CSIR 2002b: 16). Integrated development planning is a principal strategic and systematic planning instrument which guides and informs all planning, budgeting, management and decision-making in a municipality in South Africa (Beeton 2002: 64). The IDPs (outcomes of integrated development planning) need to integrate areas of legislation on issues such as water, transport, waste management, energy, housing, and local economic plans, and to include representative participation of all communities and stakeholders.

The South African constitutional requirements of co-operative governance, participatory and developmental governance, and promotion of a safe and healthy environment have sustainable development as a guiding principle. The constitution further includes the right to a healthy environment as a basic human right. The Municipal Act of 2000 recognizes that it is a duty to ensure that municipal services are provided to the community in a financially and environmentally sustainable manner. The various provincial planning and development acts encourage sustainable development by promoting community involvement in all planning and decision-making processes and ensuring that the basic needs of all communities are met.

The RDP is an integrated, coherent socio-economic policy framework. It aims to meet the basic needs of people; jobs, land, housing, water, electricity, telecommunication, transport, a clean and a healthy environment, nutrition, health care and social welfare. In meeting these needs, it reconstructs family and community life in society.

The draft land use management bill is based on five principles; sustainability; equity; efficiency; integration; and fair and good governance. The National Housing Code notes the need for low-income housing to be designed for energy efficiency and with water conservation in mind; and the 1998 White Paper on Local Government sees environmental sustainability as integral component of integrated development planning. In addition, the National Environmental management Act (NEMA) of 1998 provides an umbrella for integrating good environmental management activities across all sectors.

The Department of Environmental Affairs and Tourism (DEAT) is currently the lead agent championing the case, particularly so as required in the NEMA. It is also spearheading the formulation of a national strategy for sustainable development (NSSD) which is still in the formative stages.

Targets/Indicators for the component

Water and sanitation - water security for all. The national water and sanitation aims to provide households with clean, safe water supply of 20 – 30 litres per capita per day within 200 metres, an adequate/safe sanitation per site, a refuse removal system to all urban households.

Energy and electrification - Electricity for all – provide access to electricity for an additional 2.5 mill. households by the year 2000 therefore increasing the level of access to electricity to about 72% of all households. Both grid and non-grid power sources such as solar electricity (photovoltaics) and generators must be employed.

Telecommunication - A modern and integrated telecommunication and information technology system must be provided to all schools and clinics within 2 years.

Transport - An effectively publicly-owned passenger transport system must be developed, integrating road, rail, and air transport. All privately-controlled passenger transport must be effectively regulated and controlled.

Environment - Environmental considerations must be built into every decision, and procedures must be set in place which obliges decision-makers to demonstrate what environmental consideration they take into account when considering a project. There is a wide-range of legislation of which the responsibility for implementation is scattered over a number of departments, resulting in discrepancies, anomalies and ineffectiveness. DEAT only administers few of relevant Acts.

Nutrition - Every person in South Africa should get their basic nutritional requirement each day and that they should no longer live in fear of hunger. Short-term intervention should support nutrition education and the stable low-cost supply of staple foods with carefully targeted income transfers and food subsidies.

Health - All policies affecting health must take into consideration that SA is an integral part of the Southern Africa region and has regional responsibilities to prevent and to combat the spread of disease.

National Health System (NHS) - The aim is to draw all the different role players and services into the NHS. This must include both the public and private providers and services and must be organised at national, provincial, district and community levels. Each province must have a Provincial Health Authority. NHS must be driven by the Primary Health Care (PHC) approach

Sexual Health and AIDS - A programme to combat the spread of STD's and AIDS must include the active and early treatment of these diseases, plus mass education programmes which involve the mass media, schools, and community organisations. AIDs education for rural communities and especially for women must be a priority.

Social Security and Welfare - A comprehensive non-racial, unitary and democratic welfare system including a negotiated social security programme, must be introduced to aid the distribution of goods and services within the framework of public responsibility.

The National Welfare Act of 1978, Social Act of 1978 and Acts dealing with child and family welfare must be changed based on the princip-

les of equality, access, user involvement and empowerment, and public accountability.

Growth Employment and Redistribution (GEAR) Strategy 1996 - GEAR envisions a transformation towards a competitive fast growing outward-oriented economy which creates sufficient jobs for all work seekers; redistribution of income and opportunities in favour of the poor; a society in which sound health, education and other services are available to all; and an environment in which homes are secure and places of work are productive. It keeps with the goals set in the RDP programme, and in the context of integrated economic strategy, it aims to confront the related challenges of meeting the basic needs, developing human resources, increasing participation in the democratic institutions of civil society. It aimed for 6% economic growth rate and 400 000 jobs per annum by the year 2000.

Developmental Local Government (DLG) - DLG is regarded to represent a fusion of local and global visions about how to achieve sustainable democratic urban development. DLG has four interrelated characteristics: Maximising social development and economic growth; Integrating and co-ordinating; Democratising development and Leading and learning

Developmental targets for municipalities

These include: Provision of household infrastructure and services (water, sanitation, local roads, storm water drainage, refuse collection, and electricity); Creation of livable, integrated cities and rural areas – Spatial integration of settlements make areas more efficient since it will be easier and cheaper to provide services, reduce the costs of public transport for workers, and enable social development.

Spatial integration is central to nation building and Local Economic Development – Promoting job creation and boosting the local economy by providing good quality cost-effective services and by making the local area a pleasant place to live and work will have made a good start to sustainable LED development Integrated Development Planning, and budgeting, performance management; working together with local citizens and parties are the tools towards developmental local government

OPPORTUNITIES AND CHALLENGES RELATED TO THE GRASSROOTS FACTOR IN SUSTAINABLE DEVELOPMENT FOR JOHANNESBURG

The grassroots issues in South Africa are dominated by race-based imbalances from the apartheid era (see Wilkinson 1999) and economic, class-based imbalances of the post apartheid era (Berrisford 1999). Urban sustainability issues while linked with the national and international agenda, responds also to these imbalances via several tools, notably: the Local Integrated Development Plans (LIDPs); the city wide Integrated Development Plan (the IDP); Spatial Development Framework (SDF); Integrated Town Planning (ITP) and Land Use Management System (LUMS) among others. These are linked to citywide visions like *iGoli 2010*, *Johannesburg 2030* and *Blue IQ*.

The Local Integrated Development Planning (LIDP) process attempts to respond to these local needs via some key sectors, namely: land use management; housing and human settlements; social services; engineering and infrastructure including transport and health. These are responded to in view of the local needs through people's participation in the LIDP process and by linking these to citywide and national principles. It is important to measure the extent of people's participation in local programmes, to assess whether the 'participation principle' of the IDP is met. Each of the areas is looked at from the criteria of needs, challenges and opportunities. The IDPs sometimes incorporate Key Performance Indicators (KPIs) as required by national legislation.

Land use management

While apartheid policies encouraged eradication of 'illegal' settlements, post apartheid South Africa has been characterized by organized land invasions. On the one hand there are legal aspects to this, with such legislation as Restitution of Land Act (RLA); Extension of Security of Tenure Act (ESTA) and Prevention of Illegal Occupation of and Eviction from Land Act (PIE-Act); creating challenges for developers and on the other side there is the issue of pressure on bulk infrastructure, especially from unplanned settlements. Within Johannesburg various opportunities exist in relation to land use (see IDP, 2002). They include: upgrading and formalisation of informal settlements; development of economic opportunities in close proximity to residential areas; development of local production, support for Small and Medium Enterprises (SMMEs) and labour intensive manufacturing; creation of opportunities for tourism and improvement of public transport to create economic opportunities for the citizens. These opportunities are constrained by urban sprawl, land invasion, limited markets and poor relation between business location and residential location. The key issue that the city needs to track is the impact of these land use patterns on economy and the environment. This can be tracked by such indicators as the number of employees per sector and average travel time.

Human settlements

The government of South Africa, through the Reconstruction and Development Programme (RSA, 1994) committed itself to deliver one million low-cost houses in five years. So far 1.4 million houses have been delivered (Mahanyele, 2002). The predominant mode of delivery has been the one-off, supply side, project linked, individualized capital subsidy, whose effectiveness and sustainability has been questioned (Huchzermeyer, 2001). The paradigm shift locally is to support the People's Housing Process. Whether or not this new paradigm will meet the challenges of sustainable development is still to be seen. Several Local Integrated Development Plans (LIDPs) outline these as some of the issues of human settlements which challenge sustainable urban development, including: land invasions; uncontrolled informal settlement-growth; lack of employment opportunities in close proximity to existing and proposed housing and lack of an urban bound.

The opportunities identified by some LIDPs include upgrading of informal settlements; development of mixed income and mixed land uses next to existing residential neighbourhoods; densification and infill developments to create efficient urban systems and creation of order in housing through a detailed planning framework. The physical quality of human settlements and efficient urban systems are some of the key concerns of human settlements in Johannesburg. Such indicators as urban resi-

dential densities and floor area per capita can be used to track progress in this area.

Social services

Johannesburg exhibits stark differences in provision and distribution of social amenities. These social amenities include: hospitals; education facilities; nature reserves; parks; open spaces; recreational areas; security provisions; preservation of places of cultural and historical heritage, cemeteries, etc. Radical inequalities exist between different regions, e.g. the up-market Sandton area and the lower income Alexandra area for instance. These differences have created several challenges to sustainable urban development in Johannesburg, including high levels of crime; fragmented service delivery; limited socio-economic opportunities and high poverty level in former black townships and in informal settlements (LIDP, region 2). One of the key indicators for improved social services is the percentage reduction of crime.

The opportunities identified by some LIDPs include upgrading of informal settlements; development of mixed income and mixed land uses next to existing residential neighbourhoods; densification and infill developments to create efficient urban systems and creation of order in housing through a detailed planning framework. The physical quality of human settlements and efficient urban systems are some of the key concerns of human settlements in Johannesburg. Such indicators as urban residential densities and floor area per capita can be used to track progress in this area.

Infrastructure and services

Another local concern is engineering, infrastructure and by extension, environmental issues. Generally the LIDPs raise as issues of importance: state of the roads; storm water drainage; floods; sewerage system; waste management systems, electricity provision, etc. Waste collection in the city is done at least once a week (Pick It Up). Street cleaning is also meant to take place at the same frequency. It has been observed that several zones of the city do not have adequate landfill sites. Electricity is provided by the City of Johannesburg and ESKOM. Though the infrastructure and service levels are generally adequate in Johannesburg, it is useful to measure the status quo. Annual energy consumption and CO_2 emission per capita are useful indicators in tracking the status quo of services. The Metropolitan Open Space System (MOSS) needs to be implemented, as open space seems to be one of the major problems, especially in low-income tenements, within the city. It is observed that practices such as use of alternative energy, waste recycling; water harvesting and management, etc, seem to be lacking in the LIDPs. It may require a proactive role of the city to mainstream some of these sustainability issues.

Transport

Inadequate public transport is one of the local concerns (LIDP Region 2). This is coupled with increased use of private cars and continued growth of suburban commercial and retail outlets. The transport infrastructure and systems have several implications for the Johannesburg resident. The relationship between transport and job opportunities; pressure from uncontrolled growth of commercial centers and high-density informal settlements and poor relationship between the housing and labour markets, are some of the tensions that the transport system will have to reconcile. The urban transport system is considered as an opportunity to integrate the urban area and is a key factor in urban sustainability. On one hand the results of this inefficient public transport is reflected in the average time one spends on the road and on the other hand by the levels of CO_2 emissions, as vehicular transport is one of the major polluters of the environment in Johannesburg. The proposed express rail system (Gautrain) is intended to improve attractiveness of public transport on the Pretoria – Johannesburg corridor. The extent to which it is going to do this needs monitoring. It would be important to know the cost, travel time and pollution reductions by modal split.

Health

Health is a major local factor in sustainable urban development in Johannesburg (COJ 2002a; COJ 2002b and COJ 2000). There are several problems linked to HIV/AIDS that impact negatively on urban sustainability in Johannesburg. They include: change in household structure; HIV/AIDS orphans; increased infant mortality rates and pressure on health facilities and government resources

Table 5. - Analysis of regions according to selected criteria

Region	Popula tion figure	Unemplo yment %	% Adult population without matric [1]	% of population with no and low Income [2]	Service Delivery [3]
1	30 121	18%	65%	72%	3 service organisations
2	132 624	18%	64%	69%	8 service organisations
3	161 365	3%	32%	46%	44 service organisations [4]
4	199 717	6%	43%	48%	43 service organisations
5	175 933	5%	38%	40%	36 service organisations
6	608 927	22%	76%	85%	22 service organisations
7	188 304	18%	62%	75%	27 service organisations
8	206 402	14%	46%	66%	102 service organisations [5]
9	149 109	10%	55%	56%	21 service organisations [6]
10	575 586	21%	72%	85%	30 service organisations
11	269 164	19%	73%	83%	35 service organisations

Source: coj 2000: social welfare report: final draft

[1] Adults aged 20+ years with grade 1 to grade 11.
[2] Income between R 0 and R3 500 per month per household
[3] Indicates services for youth and children, women, people with disabilities and the aged. These services are amongst the larger more established organisations. Hence, the smaller community-based organisations that provide valuable services at local level would not be included in this table.
[4] 35 of these are retirement villages or old age homes for the aged
[5] Many of these are head office administrations of organisations which serve several of the administrative regions.
[6] 15 of these are old-age homes, sub-economic housing schemes and one service centre for the aged

(COJ 2002a: 24). Another result of this pandemic is the reduction in urban population growth, with the effect on the manpower needed to sustain urban processes. There are also other diseases that affect the urban resident in Johannesburg that need to be provided for. As such there is need for multi-sector indicators to measure improved quality of life, because of the many parameters involved. Life expectancy and mortality rates are two such indicators. Besides there is need to project the long-term impact of HIV/AIDS on the socio-economic and spatial subsystems in Johannesburg.

Indicators for sustainable urban development in Johannesburg

The main purpose of an indicator is to capture the complexity in the state of a system into simplified information. With the help of indicators, the state of a system can be described and compared with other places, or over time. Indicators can also facilitate the visualization and communication of comparative and longitudinal studies.

In sustainable development, a wider range of indicators has emerged to support the need to monitor and report inter-relationship between environment, society and economy. However, not all the available indicators are relevant or appropriate for application in every context or city. In the case of the city of Johannesburg several tools or indicator sets have been used to measure urban sustainability. These include the following:

(a) IDP targets and the city scorecard

In the IDP process, the city of Johannesburg has adopted the balanced scorecard approach, which is a strategic framework for measuring and management. The city scorecard model recognizes a number of key performance areas (KPAs), which will link the concrete initiatives to the mayoral priorities. Each KPA is then linked to one or several key performance indicators (KPIs), which make the outcome measurable and tangible. For the KPIs, the city has defined target values. In total there are 20 KPAs and 36 KPIs with special targets, covering the six mayoral priorities from four different perspectives. These include customer perspective, financial perspective, internal business process perspective, and learning and growth perspective. The scorecard is meant to function as a planning and business guide for all departments and UACs within the Council

The city scorecard approach is more of a model for measuring the city's performance management in a short-term perspective, than measuring the long term development sustainability. The indicators and targets are suited to match the existing political agenda and do not even adequately cover the visions outlined in *Vision 2030.* It will possibly indicate the successfulness of the measures and strategies in use, but missing a lot of important areas that were not among the main priorities.

(b) State of the environment.

Johannesburg was selected along with 14 other cities worldwide to participate in the project "Cities Environment Reporting on the Internet" (CEROI), supported by UNEP. A State of the Environment report has been prepared with 40 indicators having been identified to represent six priority areas, viz: pollution, poverty, environmental health, conservation, parks and open space and waste. One of the key objectives of CEROI is to make the information visible and accessible through the means of modern information technology. On the State of the Environment website its is possible to find GIS maps showing the indicators' current states in Johannesburg (COJ 2000- State of the Environment). The indicators used cover a broad range of sustainability issues besides the physical-environment concerns.

(c) National Environmental Indicator Programme, NEIP

A project was initiated by the national Department of Environmental Affairs &Tourism at the end of 2000, to develop a core set of environmental indicators for the country.

(d) Human Development Index and City Development Index

The Department of Provincial and Local Government has done a City Development Index assessment for Johannesburg and other South African cities. The Human Development Index is frequently referred to in the city's documents to compare with other cities and countries.

(e) National Environmental Indicator Programme, NEIP

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(g) Gross Geographic Product(GGP/Capita)

The indicator is commonly used to compare economic growth within and between geographic locations. Thus Johannesburg can be compared with other cities, nationally and internationally. The Gross Geographic Product for Johannesburg during 1999/2000 was R31, 000/capita/yr. This places it in the World Bank category of middle-income countries. It generates more than 35% of South Africa's Gross Domestic product and 10% of Gross Domestic Product of the Southern African Development Community (SADC) (Centre for Development and Enterprises, 2002).

Indicator sets for Johannesburg

Using the above tools to measure urban sustainability a number of indicators for the city of Johannesburg have been arrived at. In the sections below we outline these:

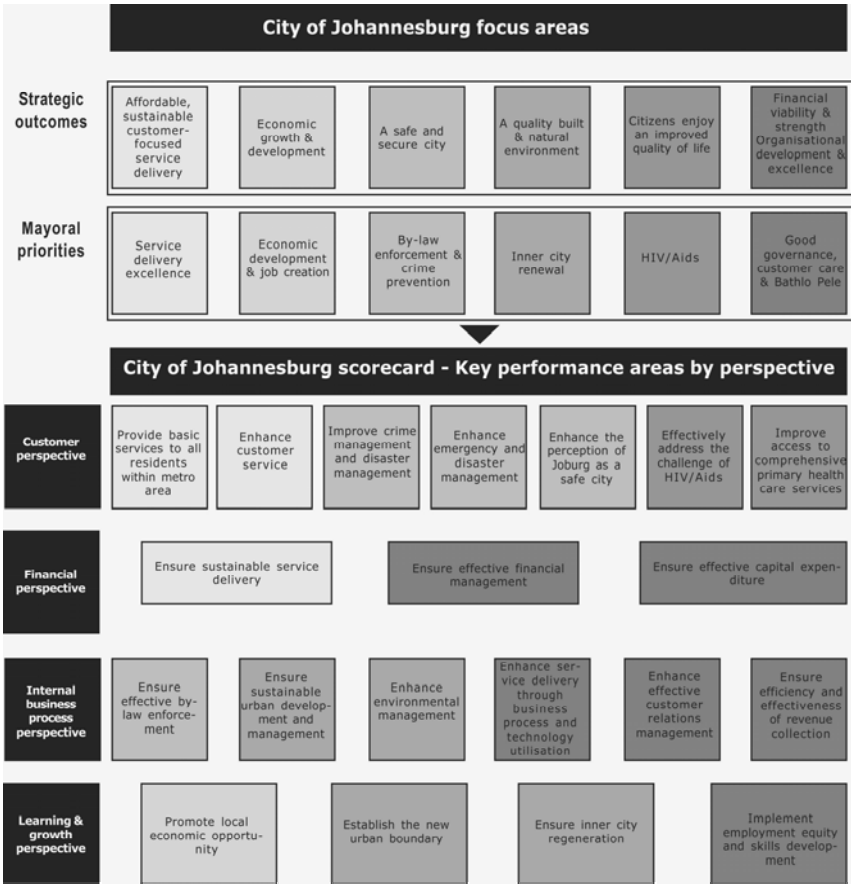
Social Economic Issues

Information on social indicators is disjointed. The key social indicators are: number of labour intensive jobs created; number of people receiving assistance from government; the ratio of government spending between economic growth and social investment; percentage of household income spent on medical expenses etc. A number of efforts both by central government and the city have been taken but indicators for the city are not readily available.

Environmental issues

The key environmental indicators include: Greenhouse gas emissions; consumption of ozone depleting substances; land cover; land

Figure 5: Model of the city's scorecard strategy (source: CoJ 2002a – Integrated Development Plan). For an overview of the priorities and KPAs, se appendix II



degradation; hazardous waste produced per sector per year; threatened and extinct species per taxonomic group; extent of waste recycling and extent of conservation areas. Currently, a set of national environmental indicators is being developed and these will have a bearing on the city of Johannesburg.

Air Quality

The energy sector is addressed elaborately in the city's (Johannesburg 2030 and Igoli 2010) with the omission of the sustainable renewable energy aspects of it. An example of this is on pollution. Data on air quality has been collected for various stations in Johannesburg for a number of years. Evidence shows that pollution is slowly creeping into the city through rising carbon monoxide emissions from cars and other pollutants from industry. Efforts must be made to reduce these high levels.

Water

The city of Johannesburg has targeted 5% as the percentage increase of the number of households with access to basic level of water provision (IDP2002). While percentage increase in access to water is important, other issues, e.g. water quality and supply to informal settlements are important. There is data from the Council and from Rand Water on water use per capita; % population with access to public taps; % of population with access to piped water to dwelling etc. Generally infrastructure and service provision in the city is considered good, with only 16% of the population receiving service below minimum standards (IDP: 20).

Indicators for meting grassroots needs

These include human settlements and land management, infrastructure and services, transport, health, and poverty and unemployment.

Human settlements and land use management

The key indicators are: urban residential densities and floor area per capita. The state of human settlements in Johannesburg remains relatively poor with 15% of the population in informal settlements and 14% in backyard shacks (IDP:20). Population densities in the townships are quite high, e.g. 1 person per 29m^2 in Alexandra. There is need for intervention in this area. Various data exists in the City Department's of GIS and is relatively reliable though infrequent. Other state oriented indicators for human settlements include land use change; ratio of reused to newly used surfaces and degree of sealed surfaces which can be sourced from the Department of GIS. Both indicators projected across time can actually be used to measure the government's response. They can also be sued in measuring the driving forces for 'unsustainability' and the pressures of human settlements on the environment.

Social services/Institutional framework

The city targets 60% increase in compliance with by-laws. This is to be accompanied with a 10% increase in the number of prosecutions (IDP). Institutional capacity is particularly lacking at grassroots level and hence needs addressing. By the city government focusing more on the use of agents to deliver services, this becomes a driving force against participatory governance. The status quo indicates that there are still civic organization structures on the ground, which mobilize the citizens more towards political courses. These could be used as the basis for participatory development organizations. A useful indicator is the level of citizen satisfaction in general and with regard to specific programmes in the city. This indicator can be derived from the LIDP.

Another indicator and concern is the level of crime. Generally crime is considered to be high in the poorer neighbourhoods in the city attributed to low incomes, unemployment and poverty. The wealthier suburbs are less crime prone. The impact of crime in Johannesburg has generally been to discourage investments in areas hitherto seen as crime zones, i.e. the inner city and the townships. This has resulted in downgrading of these areas. The government

has responded with several renewal programmes within the inner city and the townships.

Transport

The key indicators are: the average time one spends on the road, the levels of related CO2 emissions, modal split/choices and proportion of income spent on transport. The IDP for the city gives Johannesburg a clean bill of health with regard to transport, i.e. average travel times of about 72 minutes; 11% of the population spending more than 10% of their income on transport, a sizable population living farther than 500m. from a passenger bus stops and 0.8% stranded persons (against a national average of 13%) (IDP, 2002:20-21). One of the key problems noted is that of congestion of the roads; hence a need to develop indicators to measure this. There is also need to address the issue of sprawl by slowing it.

Health

Johannesburg wishes for its citizen's good quality of life and higher standards of living(IDP: Vision 2030 and iGoli 2010). The key problem of HIV/AIDS impacts have been acknowledged as one of the bottlenecks to this goal. Reduction of infant mortality rates and increase in life expectancy are also part of the goal. Health facility provision will be needed, coupled with socio-cultural amenities and increased levels of education (IDP 2002:24). Data exists to measure the standard of living. There are data on the number of clinics per population. Life expectancy and mortality rates as an indicator is derived from statistical reports of Health, Housing and Urbanisation Directorates. Other data can be derived from the annual reports of the Medical Officers of Health. Crime data can also be collected from the National Census and Crime rate Surveys.

On sanitation, there is data on indicators which show location of settlements with specific sanitation facilities like ventilated pit latrines, ablution blocks, pit latrines etc. Further, there are high levels of unemployment in and around Johannesburg(30% in 2001), great disparities in individual/household income levels and high unemployment for population with poor education. To-date, 19.2% of the people are illiterate and the number of persons with post matric qualification is still low. Attempts to deal with poverty and unemployment have been through job creation, local economic strategies and access to training to enhance opportunities.

MONITORING AND CONTROLLING SUSTAINABLE DEVELOPMENT

In view of the complexity of visioning and monitoring sustainable urban development, there needs to be a strong and integrated system of planning and implementation tools as well as mechanisms to monitor status and progress towards the set goals and objectives. With regard to planning and implementation system, Johannesburg is responding strongly to the legislated requirement for integrated development plans (IDPs) with related sector plans such as spatial, open space, transport, water etc. In this section an examination of the substantiation of the IDP planning process and its relationship to the visionary goals/objectives of Johannesburg is made. In conclusion, the section will also provide an assessment of the major gaps to be filled in order for the IDP to become a comprehensive mechanism for implementation and monitoring/reporting of sustainable urban development for Johannesburg.

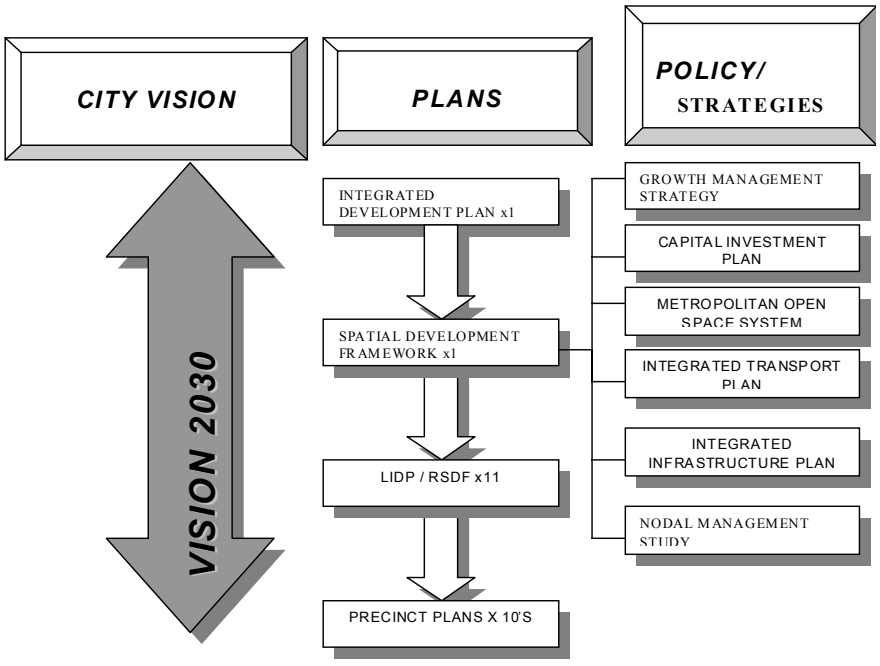
The IDP is closely linked to budgeting both in the short and medium term. In its current framework of implementation, municipal IDPs are being viewed as the Local Agenda 21 planning frameworks for South Africa (Coetzee 2000). Figure 6 represents the hierarchy and interrelationships of various plans and visioning processes/frameworks for Johannesburg.

Use of indicator-based controlling in urban planning

The legislative context of the IDP as a framework for indicator-based planning n Johannesburg

The IDP process is the principal strategic planning process used in South Africa and the city of Johannesburg. It requires participation of all stakeholders and was initiated to assist in the new development roles of local government. The Municipal Systems Act of 2000 requires municipalities to draw the IDP, as the single inclusive strategic development plan to link, integrate and include all other plans, and be aligned with municipal resources and capabilities, and especially the annual budgets. It also requires that IDP be aligned with provincial and national plans. Integrated development planning crosses different departmental divisions by linking physical, social, institutional and economic components of planning and development with management and implemen-

Figure 6. - The IDP framework for monitoring and controlling sustainable urban development



Source: COJ, 2002c

tation structures (horizontal integration). It also integrates planning in the different spheres of government(vertical integration). It is further meant to integrate municipalities with service providers and residents.

Implementation of the proposed indicator set

Contents of IDP

The minimum IDP contents as legislated in the Municipal Systems Act are:

- Vision;
- Assessment of Existing level of development
- Reflect on the council development priorities and strategies;
- Spatial Development Framework;
- Council's operational strategies;
- Disaster Management Plan;
- Financial Plans and
- Key performance indicators(KPIs).

It should reflect

- Existing institutional framework
- Investment initiatives
- Development initiatives
- All known projects, plans and programnmes.

The IDP is based on Johannesburg's long term, 30 year plan, *Johannesburg 2030,* and on its medium-term five year plan, arising from the six Mayoral Priorities. The *Vision 2030* envisions Johannesburg developing into a world class city, with economic and labour force specialized in the service sector and an outward-oriented economy operating on a global scale. The strategy focuses on economic growth as the crucial driver to building a better city.

Joburg 2030 focuses on economic growth as the means for increased prosperity and improved quality of life. This needs to be questioned as economic growth does not necessarily translate into sustainable development. Evidence in literature suggest that there is no automatic link between economic growth and overall improvement in living standards as a majority of poor persons tend to remain marginalized outside the benefits of economic growth(Pugh 1990:37; ILO, 1777; Chenery et.al. 1974).

Mayoral priorities versus sustainable urban development

The six mayoral priorities arising from *Vision 2030* are as follows: Economic development and job creation; Public safety; Service delivery excellence, customer care etc; Good governance; Inner city regeneration; and HIV/AIDs.

The Spatial Development Framework (SDF)

As a framework, the SDF addresses the following spatial planning and development issues: appropriate densities, support for public transport, clustering and focus of economic activities, growth management, the enhancement and protection of residential environments, support of viable service and infrastructure provision, guide and direct affordable housing developments, environmental management and provision of a framework for the upgrading and development of historic black townships (CoJ 2003:IDP 2003/4).

At a local level, the directorate is responsible for the development of regional spatial frameworks. It also takes a lead in ensuring that the allocation of the city's capital; budget is in line with the city needs and priorities. This is done through the development and coordination of the Capital Investment Framework.

Other mechanisms and processes utilized are policies, initiation of appropriate developments, coordination of processes and specific precinct plans.

The SDF is also informed by the Regional Spatial Development Framework which is done for all the 11 regions of the city of Johannesburg.

The city of Johannesburg GIS System

In 2001 the city of Johannesburg finally provided the opportunity to establish a fully-fledged and properly resourced GIS department with the following objectives: to provide strategic direction for the city's GIS; to analyze customer needs/requirements; to manage GIS projects; to build, validate and maintain database content; data base management; to add value to data etc.

Internal clients use the GIS mainly to support decision-making in implementing the vision of the city. Consultants and developers often use the GIS to assist in infrastructure and services planning. Rate payers, students and other people also use the system. The IDP and SDF processes of Johannesburg are strongly facilitated by GIS in various ways. For example, the CGIS produces a variety of maps on proposed and planned land use maps, spatial representation of surveys conducted in specific areas, locality maps for research etc.

In view of the strong role which GIS has come to play in the IDP and related sector plans, it is critical that a GIS-based system of monitoring and reporting sustainable urban development indicators be established as an extension to the management/operational KPAs/KPIs. This approach could be further enhanced through skills- and capacity-building in scenario-building/modeling based on GIS-linked databases.

IMPROVED MECHANISMS AND STRATEGIES FOR SUSTAINABLE URBAN DEVELOPMENT OF JOHANNESBURG

One way of improvising the current system is by introducing sustainability indicators into the city's KPA/KPI and score card. The City uses the IDP process to determine how well it is performing. The "City Scorecard" identifies priorities, establishes indicators to measure performance and acts as a reporting framework to measure delivery. It includes results aligned to its planning and development philosophy: key objectives or "performance areas", key measurements or '"performance indicators" and targets. There are objectives or "performance areas", key measurements or "performance indicators" and targets. There is a very good opportunity to incorporate sustainability indicators as integral part of performance measurements. It is also pertinent to include "Key Sustainability" Issues into Key Performance Areas. The IDP would be a good tool as it is meant to align literally every developmental issue, which goes on within the city. Performance is assessed for each region, department, utility, agency and corporate entity as well as for the city as a whole.

For example, the key performance areas in the 2003/2004 of the IDP are: Enhancing customer service; Providing basic services to all residents within the metropolitan areas with below-basic levels of service; Ensuring the sustainability of service delivery; improving crime management and prevention; enhancing emergency and disaster management; effectively addressing the challenge of HIV/AIDs; improving access to comprehensive primary health care within the city; ensuring sustainable urban

development and management; ensuring inner city regeneration; promoting community empowerment and skills development and enhancing transportation service delivery.

One cannot help noticing that urban sustainability is considered to be a small part of development priority areas. The question is should urban sustainability be a subset of the performance areas or should it guide the overall performance areas? One sees an opportunity here for both. In its mature stage, urban sustainability should be the overall philosophy which informs the setting of a city's priorities as well as the related key performance areas/indicators(KPAs/KPIs) and budgets.

The IDP and the city-budget process

The IDP contains the budgets for all council departments and for all the utilities, agencies and corporate entities. The main advantage of linking the IDP and the budget is that it provides the necessary financial backing for the planned programmes which in turn makes the IDP a critical mechanism for implementing sustainable urban development in Johannesburg. This is intended to allow residents insight about how the city intends to spend its finances over the next financial year.

Council bylaws as a tool for urban sustainability

The Council bylaws have a potential of contributing to urban sustainability, covering social, economic, physical, and institutional sustainability issues. This could only be realized if the bylaws are aligned with key sustainability issues, which is currently not the case. However, there are still sustainability issues which are indirectly addressed by the city bylaws. In June 2003, the Council adopted a revised set of bylaws for the city of Johannesburg, based on draft bylaws that were presented for public comment earlier in the year covering several areas/sectors like public roads, crematoria, street trading, waste management, water management etc.

The bylaws focus more on legalistic and economic issues and less on sustainability. The bylaws around public health lay emphasis on waterborne sewer systems, and very little on alternative sanitation, which could be more sustainable in the long run. Action on public open spaces focuses more on management of these spaces, rather than looking at their potential in terms of physical and ecological sustainability and so forth.

Public roads-related bylaws do not lay adequate emphasis on pedestrian roads, but instead cover a whole array of person' s conduct. Waste management is totally silent on waste recycling. The point here is that the opportunities of bylaws as tools and mechanisms for urban sustainability can only be realized when they are recognized as such and sustainability principles are used as a guide in their formulation, enforcement and monitoring.

CONCLUSION AND THE WAY FORWARD

The emergence of Johannesburg from a grassland of wildlife/subsistence to commercial farming and mining/manufacturing to ultimately a city of over 3 million people barely a century has contributed to a city faced with major sustainability challenges and opportunities. These challenges were further complicated by the legacy of apartheid policy and planning up to 1994. The sprawling of the city and related low densities, emerging shortage and competition over key resources like land and water as well as depletion/degradation of resources and environment are some of the key environmental challenges. Due to the apartheid legacy, the city has its share of major socio-economic and cultural challenges which require urgent attention. These include unemployment (now estimated at close to 40%) and poor skills-base(especially in view of a tertiarised economy) and backlog in housing/services such as water, energy, sanitation and waste disposal.

It is therefore ironic that the city which has grown to be the only world class African city due to its strong global network of businesses and corporations also displays such severe manifestations of African urbanization outcomes. These include high a urbanization rate, severe unemployment and poverty, homelessness and informal settlements, large informal sector, high rates of HIV/AIDs and severely degrading environment.

It is this context that inspired the city's *Vision 2030* of 2002. The document first recognizes that the unique status which the city enjoys as well as the key threats to that status. It then maps a developmental pathway highly focused on facilitating economic growth driven by private-sector investment with the Council playing a significant role of ensuring the right physical infrastructure as well as socio-economic ad cultural foundations such as controlling crime and enhancing literacy and skills-base.

The focus of *Vision 2030* and the developmental challenges at grassroots level will have to be addressed in a global context where sustainable development in the 21st century has been politically debated and accepted. The quest for development which ensures non-depletion and non-degradation of resources and environment has therefore become a major factor to be addressed by all development agencies including local authorities.

The above scenario thus translates to three major categories of challenges for sustainable urban development for Johannesburg. The first one is the desire to sustain its African world-class city status. The second one is to address the glaring grassroots needs for basic needs and alleviation of poverty (including tackling the HIV/AIDS impacts). The third one is to ensure that all this will be achieved within the framework and principles of sustainable development.

Although, the above scenario looks daunting in terms of complexity and scale, Johannesburg has an extremely high chance of achieving this objective especially through the integrated development planning (IDP) process. Due to the new constitution and governance system of the democratic South Africa, the IDP has become a legislated requirement of each local authority. The strong commitment of governments at different spheres (local, provincial and national) to ensure that IDPs are generated and implemented effectively will definitely ensure the nurturing and maturing of a systematic planning practice in South Africa and Johannesburg in particular.

However, in spite of the strong alignment between IDPs and local agenda 21 principles and process, there has not been an official recognition of the opportunity of applying sustainable urban development as the overall framework for the IDP process and outcomes. Consequently, no urban sustainability strategy (tools and mechanisms) has been explicitly applied in the conceptualization of the IDPs.

For example, even though environmental plans

are a required component of the IDP, there is no requirement that this be broadened out to encompass sustainable urban development as the key framework of the IDPs. Instead, the need to ensure an institutionally- and financially-viable local authority as well as the socio-economic demands for job creation, increasing competitiveness for economic growth and addressing backlogs in housing/ services constitutes the key focus issues for Johannesburg's IDP process and outcomes.

This arises from the strong bias of *Vision 2030* towards global economic competitiveness, followed by socio-economic concerns, with environmental concerns falling way below in the priority list. The key performance areas and indicators clearly reflect this bias. Even though key operational performance areas and indicators have been formulated as a response to the legislated IDP requirements, they do not address urban sustainability in the broader context.

The state of the environment report (one of the major inputs to the environment-sector plan) comes closest to identifying the broader sustainable urban development challenge and opportunities. The document actually sets a strong base for status quo and future monitoring of key sustainability indicators (environmental, socio-economic, cultural and institutional). The document applies the DPSIR model (driving force, pressure, state, impacts and responses) of data capture and reporting. It is definite that with regular capture and reporting of such data as used in the report, one can easily track sustainability trends of the city.

However, there is no systematic mechanisms/strategy of linking the monitoring/reporting outcomes/indicators of the report to the other sector plans to ensure action aimed at improving on the indicators in an integrated and synergetic approach. In other words, there has not been an explicit effort towards closing the loop of sustainable urban development (planning, implementation, monitoring/evaluation and back to planning stage).

One can therefore conclude that from a legislative and institutional point of view, Johannesburg has a very strong base for explicitly embarking on sustainable urban development. Recasting of *Vision 2030* and future cycles of IDPs (including related SDFs and other sector plans) with the broader framework of urban sustainability would be a primary step in the right direction. This could be followed by expanding the key performance areas and indicators of the IDP (KPAs and KPIs) of the City's Score Card to include both operational/management areas/indicators as well as the broader urban-sustainability indicators to facilitate and support monitoring/evaluation for both categories of issues rather than the management ones only. It is this need/requirement which Johannesburg must refocus its attention to in order to sustain its global and regional competitiveness and also ensure that the grassroots needs will be met in a sustainable manner over time.

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NEW INSTITUTIONALISM AS A NEW THEORETICAL FRAMEWORK FOR URBAN POLITICAL ANALYSIS

Ljiljana Grubović

Using new institutionalism as a theoretical framework means focusing on two themes: rules in organizations, and informal links. These two themes might form the theoretical ground for the explanation of the many problems in Belgrade in the 1990s, for example, of illegal building. Instead of an analysis of the rigid structures of communist institutions and inherited weaknesses, the attention will be on the new institutions or more precisely, rules and routines created in the new political system, as well as corruption being the most dominant one.
Key Words: Institutions, Informal Links, Rules, Routines, Corruption

INTRODUCTION

Due to the complex political causes of the development of Belgrade in the last decade, it is difficult to apply a single theory to understand urban politics. The aim of this work is to give a new framework that is applicable for analysis of a Belgrade's political context and governance from the 1990s onwards.

Classic political theories like the elitism and pluralism approaches in urban politics, although useful, are not completely explanatory because they are mostly shaped and used in the Anglo-American context. This context is characterised by liberal capitalism and a pluralist democracy. Contrary to this, Yugoslavia was characterised by a command economy and a one-party system until the late 1980s. The 1990s were characterised by a very different economic and political environment that failed to develop either democratic political institutions or free market institutions. Indeed that period was a specific form of post-modern dictatorship (Prodanovic, 2000), which was different from any other in the world. The main characteristic of this system was the collapse of existing institutions, the transferring of power from institutions to private hands and massive corruption. Since corruption is a sum of fundamental economic, political and institutional causes, addressing corruption effectively means tackling these underlying causes.

Consequently, given that classical political studies do not take corruption into consideration, there is a need to apply a new approach, and new institutionalism may provide a good theoretical framework for explanation for existing problems. As stated above, since corruption is a symptom of fundamental economic, political and institutional weaknesses, it needs to be viewed within a broader governance framework. The newly created institutional framework of the post-communist era did not take an organisational form, but it was based on new rules created and old rules constrained by corrupt politicians. As a consequence of its loss of power the 'cripple state' was unable to control its bureaucracy, to protect property and contractual rights, or to provide institutions that support the rule of law (Prodanovic, 2000). Political behaviour became a function of financial motivations and expectations.

OLD INSTITUTIONALISM

In order to understand new institutionalism it is necessary to explain the old institutionalism upon which the newer version is built which reflects some features and characteristics of the older approach in understanding politics. However, there are significant variations from the older institutionalism.

Old institutionalists developed an important body of literature that was the foundation for development of new institutionalism as well as for the other schools of thought that emerged in parallel. Although it has been much criticised for its descriptive richness and methodology that was mainly based on observations and descriptions (Peters, 1999), old institutionalism gave a good impetus for the further research of political institutions and political life.

The main concern of old institutionalists was to analyse the nature of governing institutions that were capable of structure the behaviour of individuals towards better ends and collective purposes (Peters, 1999). The most famous school of old institutionalists was the school of the Progressive Movement in the United States, which consider political science as the study of the State and an exercise in formal-legal analysis, and that constituted the basis of political science research for much of the late nineteenth and first half of twentieth centuries (Peters, 1999).

Peters characterises old institutionalism as "normative, structuralist, historicist, legalist, and holistic" (Peters, 1998:11). *Legalism* emerges from its concern with law and the central role of the law in governing. According to old institutionalists law constitutes both the framework of the public sector itself and a major way in which government can affect the behaviour of its citizens. Therefore, to be concerned with political institutions was and is to be concerned with law. *Structuralism* is the second dominant assumption of old institutionalism. The assumption that structures determine behaviour was the main point of the critique by behaviourists later because they consider that structuralism does not leave room for the impact of individuals. *Holism* represents the comparative nature of old institutionalists. They had a strategy of comparing the whole systems, rather than to examine individual institutions such as legislatures. The main critique of this approach is that it tended towards generalisation and consequently, made theory construction more difficult. *Historicism* is another feature of old institutionalism. Old institutionalists were concerned with how contemporary political systems were embedded in their historical development as well as in their socio-economic and cultural present. For them, individual behaviour, especially of political elite, was a function of their collective history and of their understanding of the meaning of their politics as influenced by history (Peters, 1999). However, for the contemporary, more individualistic approaches, the deep-rooted conception of history is not that relevant (Bates, 1998). Finally, the older institutionalists tended to have a strong normative component in their analysis. They often affiliated their descriptive statements about politics with a concern for 'good government' (Peters, 1999), which was consequently criticized as "not scientific" (Storing, 1962).

Old institutionalism was focused upon formal rules and organizations rather than informal conventions, and upon official structures of government rather than broader institutional constraints on governance (in public, private and civil spheres). It has been criticised for its descriptive method and disdain for theory. New institutionalism has emerged from old and from vulgar institutionalisms that were a 'sad and misleading caricature of institutionalism today' (Lowndes, 2001). However, the development of new institutionalism was preceded by Behaviourist and Rational Choice theories.

BEHAVIOURISTS AND RATIONAL CHOICE THEORISTS

These preceding approaches were the most influential at the development of new institutionalism. Although different from one another in some respects, they share some common features including a concern with theory and methodology, anti-normative bias, assumptions of individualism and imputism (Peters, 1999). The focus of inquiry of individual behaviourism is often individual, whether as a voter, as a holder of opinions, or as a member of the political elite. For rational choice analysis the assumptions of individual utility maximization tends to drive the whole approach. According to behaviourists, social collectivities such as political parties, interest groups and legislatures do not make decisions but people within those collectivities do. "What matters is not what people are supposed to do, but what they actually do" (Goodin, 1996: 13). The institutionalists' answer on those theories is that the "same people would make different choices depending upon the nature of the institution within which they are operating at the time" (Peters, 1999: 14).

Old institutionalism concentrates on the formal institutions of government and the Constitutions which produce those structures. The behavioural revolution in political science concentrates completely on the reverse process and analyses the inputs from society into the political system (Easton, 1953). Although institutionalism excluded many interesting and important features of political mass behaviour, the behavioural revolution went to the other extreme and denied the importance of formal institutions in determining the outputs of government. "It was the behaviour, not the performance of government that was the principal concern" (Peters, 1999: 14). Furthermore, only the economy and society was considered to influence politics and political institutions. Institutionalism, both old and new, argues that causation goes in both directions and that institutions shape social and economic life.

Rational choice theory does admit the that institutions do possess some influence over participants because institutional rules establish the parameters for individual behaviour (Buchanan and Tullock, in Peters, 1999:15) but still deny their significance in shaping the preferences of the participants (Peters, 1999). The perfect generality of their applicability has been greatly exaggerated (Goodin, 1996). "The behaviourists' focus usefully serves to fix attention upon agency, upon individuals and groupings of individuals whose behaviour it is. But those individuals are shaped by, and in their collective enterprises act, thorough structures and organisations and institutions. What people want to do, and what they can do, depends importantly upon what organizational technology is available or can be made readily available to them for giving effect to their individual and collective volitions" (Goodin, 1996:13). Another critique from Goodin is related to organizational technology and governance explanation. "Governance is nothing less than the steering of society by officials in control of what are organisationally the 'commanding heights' of society" (Goodin, 1996: 13). However there are limits to the sorts of commands that might effectively issued from those commanding heights, and managers of the states face various constraints, both in what others will let them do and in what others will help them to do. Therefore they are constrained both in their 'relative autonomy' and in 'their power to command'. Behaviourists were insufficiently sensitive to those constraints, and consequently the state has returned as a key focus in order to complement their theories (Goodin, 1996).

The initial advocates of the new institutionalism, James March and Johan Olsen, who named the movement in 1984, reasserted some of the features of the old institutionalism, and they also argued that behavioural and rational choice analyses were characterized by: Contextualism, Reductionism, Utilitarianism, Functionalism, and Instrumentalism (March and Olsen, 1984).

Contextualism means that instead of the central role that was given to the State, political science depends upon society (March and Olsen, 1984). *Reductionism* refers to the tendency of both behavioural and rational choice analysis to reduce collective behaviour

to individual behaviour. *Utilitarianism* represents the tendency to value decisions for what they produce for the individual, rather than as representing some intrinsic value of their own and it is more linked to rational choice than to behavioural theory (March and Olsen, 1984). *Functionalism* represents a critique of the way in which the behavioural and rational choice approaches had dealt with history. Institutionalists tend to assume much less functionality in history than behaviourists and rational choice theorists. And finally, March and Olsen argued that contemporary political science was characterized by *instrumentalism*, or the domination of outcomes over process, identity, and other important socio-political values (1984). In other words, they criticized contemporary theorists in that they analyzed political life as simply something done it through the public sector rather than as a complex interaction of symbols, values, and even the emotive aspects of the political process (March and Olsen, 1984).

On the basis of these criticism of political science of the time March and Olsen (1984) argued for the creation of new institutionalism, and they offered a replacement for the five prevailing characteristics of political science with a focus on collective action for the understanding of political life. Furthermore, the relationship between political collectivities and their socio-economic environment should be more reciprocal in order to explain complex political life.

NEW INSTITUTIONALIST APPROACH

The new institutionalism which emerged in the 1980s was a reaction to the dominance of under socialised accounts of social, economic and political behaviour. Both behaviourists and rational choice theorists had regarded institutions as "epiphenomenal or as the aggregation of individual actions" (Lowndes, 2001:1950). In the first case, institutions were regarded as a result of individual roles, and in the second as an accumulation of individual choices based upon utility maximising preferences (Shepsle, 1989). In political science, March and Olsen, argued 'the organisation of political life makes a difference' and asserted a more autonomous role for institutions in shaping political behaviour (March and Olsen, 1984). Contrary to the descriptive and theoretical style of the earlier institutional theories, new institutionalism developed a more sophisticated definition of their subject matter, operating through explicit theoretical frameworks.

> "The new institutionalists concern themselves with informal conventions as well as formal rules and structures, they pay attention to the way in which institutions embody values and power relationships, and they study not just the impact of institutions upon behaviour, but interaction between individuals and institutions" (Lowndes, 2001:1953).

Where there is a creation of new type of institutions, new institutionalism can provide powerful tools for understanding change inside local government bureaucracies and for conceptualising 'the strength of weak ties' (Granovetter in Lowndes, 2001). Lowndes (2001) also distinguishes organizations from institutions and outlines regards 'weak ties' to be as important as formal constitutions.

Lowndes presented differences between new and vulgar or 'old' institutionalism in terms of movement along six analytical points:

- From a focus on organizations to a focus on rules;
- From formal to an informal conception of institutions;
- From a static to a dynamic conception of institutions;
- From sub emerged values to a value critical stance;
- From a holistic to a disaggregated conception of institutions; and
- From independence to embeddedness (Lowndes, 2001).

Political institutions should not be equated with political organizations, rather they are the sets of rules that guide and constrain actors' behaviour. Institutions provide the rule of the game, while organizations and individuals are players within that game. As Goodin states, institutions are differentiated in the sense that they embody, preserve, and impart differential power resources with respect to different individuals and groups (Goodin 1996). That means that institutions embody power relations by privileging certain courses of actions over others and by including certain actors and excluding others. "Institutional rules may produce variation and deviation as well as conformity and standardisation. They evolve in unpredictable ways as actors seek to make sense of new or ambiguous situations, ignore or even contravene existing rules, or try to adapt them to favour their own interests" (Lowndes, 2001:1960).

Due to its complexity and the wealth of literature on the subject, there is a problem with defining of new institutionalism. Therefore it is crucial to see what criteria should be used for defining whether an approach is really institutional or not. Peters attempted to define a common core that binds all approaches together. The most important element of institutionalism, according to Peters, is that institutions are a *structural feature* of a society and/or polity. That structure may be formal like a legislature, an agency in the public bureaucracy, or a legal framework, or may be informal like the set of shared norms or a network of interacting organisations. Another feature is the existence of stability over time. A third feature is that it must affect individual behaviour or in some way constrain the behaviour of its members. There should be some sense of shared values and meaning among the members of institutions. Those constraints may be formal or informal but they must be constraints if there is to be an institution in place (Peters, 1998).

According to Peters, the first of six different approaches in new institutionalism is *Normative institutionalism* advanced by March and Olsen in their works 1984 and 1989. The strong accent is on the norms of institutions as means of understanding how they function and how they determine individual behaviour. They put an accent on the 'logic of appropriateness' as a tool for shaping the behaviour of the members of institutions. The most different to normative institutionalism is *Rational Choice Institutionalism*. Instead of values and norms, those scholars argue that behaviours are functions of rules and incentives. According to them, institutions are systems of rules and inducements to behaviour in which individuals attempt to maximise their own utilities (Weingast, 1996). The third approach is *Historical Institutionalism* which, represents the view that choices which are made early in the history of any policy or any governmental systems. As those scholars argued policies are path

dependant and 'once launched on that path they continue along until some sufficiently strong political force deflects them from it' (Peters, 1998: 19). *Empirical institutionalism* is the closest to old institutionalist and argues that that the structure of government makes a difference in the way in which policies are processed and which choices which will be made by governments. Peters also differentiates those scholars into two groups. First, scholars who use conventional categories such as the difference between presidential and parliamentary government like Weaver and Rockman (1993) and second, those who use more analytic categories such as decision points, like Immergut (1992).

Other varieties of institutionalism, but with more connections, are International Institutionalism, of which the most clear example is international regime theory as represented by Krasner (1983) and Societal Institutionalism that describes the structuring of the relationship between state and society (Peters, 1998).

DEFINITION OF 'INSTITUTION'

The most fundamental issue is to define what an institution is. As Peters states, the word institution is loosely used in political science to mean everything from a formal structure like a parliament to very amorphous entities like social class, with other components of the socio-political universe, such as law and markets, also being defined as being institutions. In sociology it is often used interchanging with the term 'organization' (Peters, 1999).

March and Olsen have a different definition of institutions. According to them institutions should rather be understood as a collection of norms, rules and understandings, and perhaps most importantly routines (March and Olsen, 1989). They define institutions as:

> "Collections of interrelated rules and routines that define appropriate actions in terms of relations between roles and situations. The process involves determining of what the situation is, what role is being fulfilled, and what obligation of that role in that situation is" (March and Olsen, 1989: 21).

Furthermore, they define institutions also in terms of the characteristics that they represent and that their members demonstrate. They also define institutions by their durability and their capability to influence the behaviour of individuals for generations (March and Olsen, 1994: 99). They argue that institutions possess an inherent legitimacy that obligates their members to behave in ways that may even violate their own self interest (March and Olsen, 1994: 23).

The most important feature of the March and Olsen conceptualisation is that 'institutions tend to have a *'logic of appropriateness'* that influences behaviour more than a *'logic of consequentiality'* that also might shape individual action. That is, if an institution is an effective in influencing the behaviour of its members, those members will think more about whether an action conforms to the norms of the organisation than about what the consequences will be for member themselves (Peters, 1999). The extreme example he gives is of firemen who willingly enter blazing buildings because that is the role they have accepted as a function of their job. In less extreme situation, logic of appropriateness may be manifested through activities in public institutions, like serving clients as well as possible and not engaging in corruption on the job (Heidenheimer, 1989).

In this normative conception of institutions it is the routine that appears most important. However, March and Olsen assume that institutions are not so well developed that there are chances for the development of anomalous situations and consequently there is a need for the creation of enforcement mechanisms to deal with deviant cases. But still for the most of decisions routines will be sufficient to generate appropriate performance (March and Olsen, 1994).

The major critique of March and Olsen's work is related to making a distinction between rules and routines. March and Olsen defined routines as a stable pattern of behaviour, without the sense of it being unchangeable or dysfunctional. Routines are assumed to make the behaviour of organisation more predictable and more rational, although it is difficult to determine when predictability ends and inertia begins (Peters, 1999). Although not considering rules to be central to their research as most of the new institutionalists, March and Olsen do address rules as a part of the control of behaviour within institutions and organisations. They consider rules as constitutive and to some extent as the formalisation of the logic of appropriateness (March and Olsen, 1994). Rules serve as guides for newcomers to an organisation for example. Institutions derive a good deal of their structure of meaning, and their logic of appropriateness from the society in which they are formed (March and Olsen, 1984). Routines appear to arise naturally once people begin to interact in institutional setting (Peters, 1999).

Finally, the third question that March and Olsen have not answered according to Peters, is the difference between an institution and an organisation. He adds that it is easier to make the distinction if the adjective 'formal' is added in front of 'organisation' thus applying a very strict definition of organisations, and a loose, more culturally based, definition of institutions (Peters, 1999).

One of the strongest and most persuasive components of March and Olsen argument is the change of institutions based on their 'garbage can' approach to decision-making (Cohen, March and Olsen, 1972). The 'garbage can' approach means that institutions have a repertoire of solutions as responses to problems when there is a need to adjust policies. Routinized responses are used before searching for alternatives that are further away from core values. Therefore, institutional changes that are implemented conform to the logic of appropriateness, and those institutional values have the function of limiting the range of extending policy alternatives for the institution. Institutional change is thus rarely a planned event, but rather a product of the confluence of several different activities, and opportunities for action, within the institution (Cohen, March and Olsen, 1972).

According to Peters, there are several different stimuli for change, but the new institutionalists mostly concentrate on the process of learning (1999). According to Goodin there are three basic ways in which institutions arise and change over time: as the result of accident, evolution or intentional intervention (Goodin in Lowndes, 2001). Another interesting issue is a mechanism through which the institutions shape the behaviour of individuals, and the other mechanism through which individuals are able to influence and reform institutions. Gid-

dens has argued that these relationships are 'dual, which means there is a reciprocal causation of agent and structure' (Giddens, 1984), implying the dynamism of this relationship.

NEW INSTITUTIONALISM IN URBAN POLITICS

In his article on urban governance, Pierre argues that nation states play an important role in shaping urban governance. In order to understand urban governance it is necessary to bring the value dimensions into analysis. Institutional theory, which highlights overarching values that give meaning and understanding to the political process, is the one theory according to Pierre, that offers analytical assistance (Pierre, 1999).

The institutional dimension of urban politics is conceptualised in a similar way as the new institutionalism developed by March and Olsen (1984, 1989), and 'institutions' refers to systems of values, traditions, norms, and practices that shape or constrain political behaviour (Pierre, 1999). In a similar manner to neo-institutionalists, Pierre makes a distinction between organisations and institutions, although he recognises the organisational logic of institutions and categorises their relationship as being very dynamic.

However there are some doubts about the institutional dimension in urban politics. "Although institutional theory has become a leitmotiv in much of mainstream political science, the institutional dimension of urban politics remains unclear and ambiguous" (Pierre, 1999:373). The main reason for that is the much greater constraint of institutions in urban governance by organisational factors such as constitutional arrangements and other types of legal definitions of the responsibilities of public organisations, than at the national level. However, at state level organisational arrangements shape urban politics and therefore it is necessary to examine the extent and the relationship between institutions and organisations in urban politics.

This argument can be summarised in four points. First, governance refers to the process through which local authorities, in concert with private interests, seek to enhance collective goals. It is a process shaped by those systems of political, economic and social values from which the urban regime derives its legitimacy (Pierre, 1999). Second, an understanding of local government organisations is fundamental for an understanding of urban governance. The key question should be centred on the role of local government in urban governance. To address this it is necessary to bring these aspects of urban politics to mainstream political science and institutional analysis. Third, different institutional models of urban governance represent different system of values, norms, beliefs, and practices. Theses systems produce different urban policy choices and outcomes. Just as new institutionalists (March and Olsen, 1984; 1989) see institutional systems as a result of values and norms, the formal organisation of urban governance reflects values and interests typical to local community. Therefore, urban governance is embedded in a myriad of economic, social, political and historical factors pertaining to the exchanges between local state and local community. And finally, Pierre acknowledges the significance of the national context within which urban governance is embedded. "National politics and state traditions remain the most powerful factors in explaining various aspects of urban politics, including urban political economy, urban political conflict, and strategies of local resource mobilisation" (Gurr and King, 1987; Keating, 1993; Pickvance and Preteceille, 1991 in Pierre, 1999: 375). Therefore, nation states do effectively constrain local political choice[1]. Subsequently, and understanding of local governance and institutional change in Belgrade needs to be seen in the context of regime change in Yugoslavia in the 1990.

INSTITUTIONAL CHANGE IN THE SERBIAN TRANSITIONAL PERIOD

The creation of institutions or the building of new and better social, political and economic institutions is generally considered to be the central problem that transitional societies face as they emerge from their discredited post authoritarian and post communist pasts. Institutions establish standards, both normative and cognitive, as to what is held normal, what must be expected, which rights and duties are attached to which positions, and what makes sense in the community or social domain to which the institution is answerable.

Offe (1996) argues that institutions play two major roles, perceptive and functional role. The perceptive role means that "good citizens make good institutions, and good institutions are 'good' to the extent they generate and cultivate good citizens or the 'better selves' of citizens, who at least get 'used to' and 'feel at home' in those institutions, develop a sense of loyalty, and come to adopt the cognitive expectations and moral intuitions from which the institutions themselves derive" (Offe, 1996: 200). The functional role of institutions is called 'congruent socialisation' which assumes that institutions will function properly. In other words it means that institutions need to accomplish the task that is set for them, or to be compatible with the supply of resources they depend upon and must hence extract from their environment (Offe, 1996). If institutions are established properly and widely supported, they 'fly by themselves due to the invisible operation of an autopilot' (Offe, 1996:200). Furthermore, Offe argues that both those function are necessary as criteria for the existence and viability of institutions, internal socialisation and external effectiveness, or the consolidation of beliefs, on the one hand, and purposive rational or strategic action on the other (Offe, 1996).

March and Olsen relate to the same dualism (1989: 23), but they define institutionalised actions as backward looking which is obligatory, and forward looking or anticipatory motivational forces. The perceptive role of institutions is a 'logic of appropriateness' and second role is 'logic of consequentially' in March and Olsen's work (1984, 1989, 1994). However if institution fails, does the failure lead to an attitude of doctrinaire over identification on the part of actors with the rules, values, and routines embodied in the institution that fails?

[1] Pierre suggests four different models of urban governance determined by the national institutions: managerial, corporate, pro growth and welfare governance models. Although very extensive in their approach and field of investigation, those models are not applicable to the Belgrade case due to the different political and economic institutional context of the cities where they have been developed and applied.

The stability of institutions comes at the cost of rigidity (Offe, 1996). Democracy as a preference aggregating machinery can only work under a framework of rights that is protected by independent courts and at least relatively immune from democratic contingencies. One key problem to the Central and Eastern European transition from communism is the lack of necessary rigidity for stability of institutions. Any regime that could enforce such rigidity has broken down, and there exists too little scope for reasoned choice, as every actor has a strong reason to believe that it cannot rely upon institutional parameters since they are the subjects of sudden change. According to Offe (1996) there are two major factors that create institutional stability. The first is the degree of freedom that institutions leave to individual behaviour and choice, and the more liberal the regime that institutions impose upon agents, the less vulnerable they will become to disloyal or attempted innovation. The other stability factor is the mechanism that institutions have in the form of rules for changing institutions (Offe, 1996). In Yugoslavia, both of the conditions necessary for institution stability had not been fulfilled. There was neither freedom of choice or mechanisms for institutional protection. In Hungary and Poland, institutional building was based on the logic of appropriateness and in Romania and Bulgaria on the logic of consequentially (Offe, 1996). However, the success of newly built institutions is likely to depend more on people's trust, compliance, and patience in enduring the transition costs involved than in the quality of those institutions themselves.

Furthermore beside the fact that state communist institutions have failed to generate socialist preferences, they have "as a rule, generated a state of mind, a set of assumptions and expectations that now often turn out to be inimical to the growth of democratic capitalist and democratic institutions. This state of mind regardless of whether it has been cultivated by the last fifty years of experience of state socialist institutions or the cultural or political inheritance of the last five hundred years of precarious and often failed modernization process, is described by many authors (Moravski, Schöpflin, Sztompka, in Offe, 1996), as a combination of apathy, depletion of communal bonds, passivity, unwillingness to accept responsibility, atomization, lack of respect for formal rules, 'short terminism' and pervasive 'grab and run attitude' towards economic gain. Additionally, economic attitudes are shaped by zero-sum-assumptions as well as the expectation that success must be, as a rule, due to patronage, corruption, and cooperation, not effort" (Offe, 1996:217-218). However, people need to 'get used to' and make sense of the new institutions, thus to adopt the set of standards, obligations and expectations, or as referred to by Weber terminology 'the spirit of institutions'. The success of newly built institutions is likely to depend more on people's trust, compliance, and patience in enduring the transition costs involved than in the quality of those institutions themselves.

Another characteristic of post communist societies is that instead of having a 'downward looking' notion of equality, they have 'upward looking' variant of distribution which is a product of old regime. This means that individuals that are trying to become richer have to be prevented from it because big private ownership is still considered as being negative. But there is also a reasoning that unless the state does something, people on the top are still privileged and are entitled to use every means available including illegal ones to get ahead. The tolerance for distributional inequalities and resulting privilege is extremely limited (Offe, 1996).

CONCLUSION

In the 1990s individuals and parties controlled institutions and imposed the rules of game in Yugoslavia. The political elite actively transferred power from institutions to its hands, leaving institutions as complex and massive as they were during the communist era, but lacking their former executive power. The 'collapse' of institutions was not only associated with planning and development but at all other levels of society. Institutions had shrunk at all levels, and the basis for democracy was not established, and weak ties were solidified. Since institutions are no long considered to be static but dynamic concepts, institutional rules have to be sustained over time. "An ongoing process of institutionalisation creates stability" (Lowndes, 2001: 1958), and this materially failed to occur in Yugoslavia. Additionally corruption became the dominant 'logic of appropriateness'.

Due to the general manifestation of corruption new institutionalism is the approach that is most promising in relation to theorise the post socialist Serbia. Using new institutionalism as a theoretical framework means focusing on two themes: rules in organizations, and informal links. The second focus is a shift from a formal to informal conception of institutions, which means a focus on informal pressures that shaped decision making, rather than the formal structures. In particular, the elite that had an important role in defining the environment should be studied. Institutional factors are those that affect the degree of power that actors have over decision making and its outcomes and the institutional position of actors influences the definition oh his/her interests, responsibilities and relationships. Additionally, it is very important to focus on disaggregated conception of institutions and how they produced deviation in society, and how individuals contravened old rules and consequently changed them and adopted them to their own interests. Moreover, corruption as an accepted rule or routine in society can be regarded as an institution. The negative logic of appropriateness can be especially applied to the case of building in Belgrade, where bribery and corruption became a shared value and norm, or 'logic of appropriateness'.

Considering all accounting features of the newly emerged institutional framework in Belgrade in the 1990s, new institutionalism offers the most comprehensive theoretical approach for explanation of the development of abnormal political practices and institutional deviations.

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SUSTAINABILITY OF THE CITY AND ITS ECOLOGICAL FOOTPRINT

Jasna Petrić

There are some agreed sustainability indicators, even some agreed target values regarding a sustainable city, but they still have to be underpinned by empirical evidence. The common starting point of definitions is generally the destructive impact of the city on its regional and global environment, which can be observed in form of the depletion of natural resources and the pollution of soil, water and air. A sustainable city is therefore generally regarded to be the one that is compact and preserves land, has mixed use to increase access and reduce need to travel, is socially and economically balanced, uses clean and renewable energy and recycles all its waste. However, the sustainable city cannot exist as a self-sufficient unit, in ignorance of relationship with its hinterland. The ecological footprint, which is the amount of land required to produce resources to sustain our quality of life is a yardstick for measuring the ecological bottom line of sustainability. With a sustainable city target to relieve pressure on the countryside, there is an increasing awareness of the importance of calculating city's ecological footprint and see how it relates to the target global average. Although problem of reducing ecological footprints primarily concerns the wealthiest countries, it has to be fully acknowledged in the less economically developed part of the world, while recognising that cities themselves provide many potential solutions.

Key words: sustainable city, hinterland, resources, ecological footprint.

INTRODUCTION

Sustainability stands for finding satisfying ways of life for all, within the capacity of the planet. With urban areas becoming our primary habitat, it becomes a major task to investigate whether a sustainable relationship can be established between cities and the planet. Most cities have managed to prosper while simultaneously destroying the environment on which their survival depends. This was made possible only by the historical expansion of their ecological footprint – i.e. the hinterland from which cities extract their resources and into which they dump their pollution and waste.

Being confronted with the limits of our planet's resources, it is time to extend the domain of urban planning from discourses on sustainability of urban form to account for all the land upon which urban populations actually depend. With global change now upon us the message of ecological footprinting acquires a keener urgency.

Achieving sustainability is possible if its elements are defined in a way that is accountable and consistent with ecological realities. Refering to this, ecological footprint accounts can help policy planners assess a population's ecological impact and compare this impact to nature's capacity to regenerate. These analyses give us a benchmark for today's ecological performance, identify the challenges for lightening people's ecological load, and allow us to document gains as a city, region, or country moves toward sustainability. In this way, the ecological footprint becomes a tool for weighing the merits of potential policies and developing effective strategies and scenarios for a sustainable future.

THE NOTION OF SUSTAINABILITY

Before about thirty years ago, the term 'environment' was little used and had for most people the general meaning of our surroundings, without particular concern that it might be seen as a significant problem area. Today this has changed radically because our age is seemingly beset by environmental problems and consequences of the interaction of population, resources and environment in the context of continued economic development.

Sustainable development is identified as a much broader concept than environmental protection. It has economic, social and cultural as well as environmental dimensions, and embraces notions of equity between people in present and between generations. By linking environmental protection to economic development, sustainability entrenches environmental considerations in economic policy-making.

Generally, people find it difficult to live in a sustainable way since present values, knowledge systems, technologies and institutions make it easier to live unsustainably (1). Another great obstacle for implementation of sustainable development is that many people feel threatened by change, especially when viable alternatives are not clear. While simple to spell out, sustainability is hard to

implement. Some initiatives have successfully reduced human pressure on distinct ecosystems, but on the whole, humanity has not lived up to the challenge to reduce, or even stabilize human pressure. There are numerous reasons, among the most prominent being that the challenge seems too daunting and in the short term it is always easier to procrastinate than to change established patterns.

Not knowing what is sustainable, not knowing where we are, or where we are going makes our future even more risky. Only clear and measurable objectives help us manage for sustainability. Simple benchmark yardsticks that compare human consumption with nature's limited supply help refocus public attention on the sustainability challenge. They clarify ecological boundary conditions and make way for meaningful debates on development.

Although many sustainability issues are global or national in scope, we relate most directly to what is happening in places where we live. While the whole range of environmental issues is important and all are interrelated, it is the issue of urbanism that seems to provide the problems that are among most intractable and difficult to solve.

A SUSTAINABLE CITY

For most urban centres as they are presently structured, it is clear that they do not perform as sustainable entities. Unless they become so, the international effort to achieve a sustainable civilisation will undoubtedly fail, as the ecological impact of the world's rapidly growing urban population inflicts increasing devastation on the Earth's biosphere. The world's major environmental problems can only be solved as part of the way we run our cities.

Original concerns over modern urbanism arose in the context of 19th century urbanisation and industrialisation in Europe and North America when it was 'only Britain, North-West of Europe and the USA that had more than 25 percent of urban residents' (2), and only 2 percent of the world population was urbanised. Since then, a world in which most people lived in rural areas has been transformed into a predominantly urban world, with almost half of population living in urban areas in the year 2000. In addition, if we observe current level of urbanisation of 80 percent in the EU for example, it is noticeable that urban population of mostly developed parts of the world is having and will continue to have a growing impact on the earth's environment through its increasing number and its rising per capita resource demands.

The observation that cities are not ecologically sustainable is no value judgement, simply a fact. Cities occupy only 2 percent of the world's land surface, but use some 75 percent of the world resources, and release a similar percentage of wastes. Their concentration of intense economic processes and high levels of consumption both increase and stimulate their demands on resources.

The metabolism of most 'modern' cities is essentially linear, with resources flowing through the urban system without much concern either about their origin, or about the destination of their wastes: inputs and outputs are considered to be largely unrelated. This linear system is profoundly different from nature's own circular metabolism where every output is also an input which renews, and thus sustains, life (3). To become sustainable, cities have to develop a similar circular metabolism, using and re-using resources as efficiently as possible and minimising material use and waste discharges into the natural environment.

The Compact City

The compact city is a term, which is widely promoted as the sustainable urban form representing a normative solution for a problem of urban sprawl. Sprawl is perceived to be and has been proven to be, a less sustainable form of living and the compact city has been seen as an antidote to it. The benefits that compact city is quoted to achieve regard greater energy efficiency and less pollution, because its higher residential densities preserve land, enable residents to live closer to shops and work, and to use sustainable means of transportation. Apart from environmental gains, the compact cities are argued to encourage social mix and people's interaction. Yet, there is evidence which suggests that such arguments are 'at the very least romantic and dangerous, and do not reflect the hard reality of economic demands, environmental sustainability and social expectations' (4). Compact city is associated to an assumed capacity to relieve cities' surroundings from demand for more settlements but what is often missing is that the compact city promoters focus their attention to the city and largely fail to discuss the relationship of the city with its hinterland.

Are Cities Where They Are Shown on the Map?

Some conventional notions on urban sustainability view the city as a self-contained, bounded territorial unit and the sustainable city as the one that is self-sufficient and self-reliant. However, a city cannot exist without its hinterland, and that hinterland can encompass territories much larger than the city proper reaching enormous amounts of land, which is already happening with cities of the wealthiest countries.

Many cities tend to be large consumers of goods and services, while draining resources out of external regions they depend on. All of the resources which people use for their daily needs and activities come from somewhere, even if not from their immediate surroundings. As a result of increased level of urbanisation, increasing consumption of resources, and growing dependencies on trade, the ecological impact ('ecological footprint') of cities extends beyond their administrative boundaries.

WHAT IS AN ECOLOGICAL FOOTPRINT?

The ecological footprint challenges common assumptions about economy, society and nature. It also reveals the sustainability gap confronting society – the difference between ecological production and human over-consumption.

The ecological footprint (EF) of a given population, be it that of a city, region, country or the whole world, is the total area of ecologically productive land and water occupied to produce all the resources (food, fuel, fibre) consumed and to assimilate all the wastes generated by that population using prevailing technology.

Developed as a planning tool to guide individuals and communities toward sustainability, the footprint is a yardstick for measuring the ecological bottom line of sustainability – a tool that helps answering the common questions of what sustainability might really mean and how we will know if we are being "sustainable".

Figure 1. - An illustration of the "ecological footprint". Source: http://www.olywa.net/ roundtable /footprint/index.html

Initially, EF was conceived in 1992 by William Rees and Mathis Wackernagel as a tool to teach young urban planners in training a rudimentary fact of human ecology: although more and more people are living in cities, the land that actually supports them lies far beyond the urban boundary. Since that time, the concept of EF has been firmly established in the discourse on sustainable development, ecological economics and urban studies.

EF analysis differs from the classical concept of Carrying Capacity of the environment. Rather than asking the question of Carrying Capacity 'How many people can the earth support (individuals/area)?' EF asks 'How much land do people require to support themselves (area/individual)?' In other words, the ecological footprint is the measure of how much ecologically productive land and water a defined population unit needs to support its current consumption and to take care of its wastes. Under prevailing technology, it measures the amount of arable land and aquatic resources that must be used to continuously sustain a population, based on its consumption levels at a given point in time (5).

How to Calculate EF

There is a finite area of biologically productive land and water on our planet, which equates to 11.4 billion hectares after all unproductive areas of icecaps, desert and open ocean are discounted. Divided between the global population of six billion people, this total equates to just 1.9 hectares per person (6). Accepting the World Commission's recommendation of 12 percent of biologically productive land needed for biodiversity preservation, one can calculate that from approximately 2 hectares per capita of biologically productive area, only 1.7 hectares per person are available for human use and this represents a 'fair earthshare'. These 1.7 hectares become the ecological benchmark figure for comparing people's ecological footprints.

EF calculations are based on two simple facts: 1) we can measure most of the resources we consume and many of the wastes we generate; 2) these measurements can be converted to corresponding areas of productive land and sea.

Consumption is divided into the following 5 categories: food, housing, transportation, consumer goods, and services. Land is divided into 8 categories: energy land, degraded or built land, gardens, crop land, pastures and managed forests, and 'land of limited availability', considered to be untouched forests and 'non-productive areas'. Data are collected from disparate sources such as production and trade accounts, state of the environment reports, and agricultural, fuel use and emissions statistics. The ecological footprint is calculated by compiling a matrix in which a land area is allocated to each consumption category (7).

Ecological Footprint Figure Warnings

According to the 1999 figures, with the world average EF of 2.3 hectares per person humanity has already exceeded the planet's capacity to sustain its consumption by 35 percent. While the EF of the average African or Asian consumer was less than 1.4 hectares per person in 1999, the average Western European's footprint was about 5.0 hectares, and the average North American's was about 9.6 hectares per person. In comparison to this, the footprint of Serbia and Montenegro's consumer is closer to Asian than the Western European average with 2.14 ha/person[1] (6).

[1] This figure was given in the WWF's *Living Planet Report 2002* for the estimated population of 21.1 million in Federal Republic of Yugoslavia and therefore should be recalculated.

Table 1. - Ecological footprint of countries by their level of income (6).

COUNTRY	ECOLOGICAL FOOTPRINT
High income countries	6.48 ha/person
Middle income countries	1.99 ha/person
Low income countries	0.83 ha/person

Countries with ecological footprints lower than 1.7 hectares per person have a global impact that could be replicated by everybody without putting the planet's ecological long-term capacity at risk. However, if every nation had the same rate of consumption and waste production as the three countries with the biggest EFs (the United States, the United Arab Emirates, and Singapore) at least another two Earth-sized planets would be needed. In the context of growing populations with rising material expectations, the question of providing everybody with essential resources becomes a major challenge. The right thing would be that those with biggest ecological footprint adopt an ethic of 'voluntary simplicity' and radically reduce their consumption and waste production. Although we simply cannot grow our way to sustainability in a world that sees people first as potential consumers and only second as responsible citizens, only a small minority of the world's population is in any position to adopt a post-materialistic perspective, and only a minority of these choose to do so.

Based on the UN and FAO reference scenarios, the world's EF will continue to grow between 2000 and 2050 to a level between 80 and 120 percent above the Earth's biological capacity. Of course, it is very unlikely that the Earth would be able to run an ecological overdraft for another 50 years without some severe ecological backlashes undermining future population and economic growth.

City's Ecological Footprint

Eco-footprinting shows that wealthy cities and communities prosper by appropriating the carrying capacity of an area vastly larger than the spaces they physically occupy. Some cities are situated and sited better than others to take advantage of natural resources, but all depend on hinterlands, i.e. areas from which city resources are drawn.

Throughout history, areas with rich agricultural hinterlands have enabled the growth of cities. Nowadays, due to the new economy and increasing size of cities, instead of using the local hinterlands for their support, cities may draw on resources great distances from where they are located. This has been facilitated by technological revolutions, especially in cheap transportation, which allowed the import of materials (and export of waste) further away from cities.

Table 2. - Some examples of city's ecological footprints and the amounts of required territory in comparison to city's geographical area

CITY	ECOLOGICAL FOOTPRINT	HOW MANY TIMES BIGGER TERRITORY IS REQUIRED THAN THE CITY GEOGRAPHICAL AREA
London	6.6 ha/person	293
Paris	6 ha/ person	300
Toronto	5.3 ha/ person	201
Oslo	7.8 ha/ person	90
Berlin	4.7 ha/ person	32

The table given above illustrates that affluent cities have ecological footprints much larger than the ecological benchmark figure of fair earthshare. For example, London ('the mother of megacities') has the ecological footprint which is 6.6 ha/person. This translates to a territory around 300 times larger than London itself (8), which equates twice the territory of the UK. Now, is that a problem? If there are 300 London areas available to support London, obviously not. But we are in the world that is ecologically constrained and can't support such consumption patterns of cities in wealthiest countries that are severely stressing the global ecosystem while settlements in the developing world need more raw material, energy, and economic development simply to overcome basic economic problems (9).

So, cities are really where the action happens, where we have to find out how to live in a more sustainable way. In doing so, one should keep in mind that most of environmental demands and impacts that can be traced to cities have nothing to do with the structure, form, or other inherent properties of cities per se. Rather, they are a reflection of societal and individual values and consumer behaviour. In such situation, the wealthy clearly have a moral obligation to make their cities more ecologically benign and as part of this they will have to reassess their private consumption patterns.

FUTURE SCENARIOS

To deal with the uncertainty of future possibilities, we need 'scenarios' – asking the question 'what if' certain trends are followed with certain actions in certain conditions (10).

Following the previous discussion on ecological deficit (the amount by which the ecological footprint of a population exceeds the biological capacity of the space available to that population) and the role that cities take in forming such a deficit, it is possible to recognise three development scenarios in relation to the sustainability of a city.

Scenario 1: Return to a lifeless state

Once humanity is in ecological overshoot (the situation when human demand exceeds nature's supply at the local, national or global scale), development based on the same level or expansion of resource consumption becomes a negative sum-game. In this projection of a bleak future, an old economic maxim that goes "grow or die" could very well become "grow and die".

Present EF figures for both nations and cities of the developed world indicate that we are already exceeding the planet's capacities and that further expansion of human activities will liquidate the very natural assets on which present and future generations depend. This scenario of 'business as usual', which presumes no change in our current behaviour, suggests a self-destruction of cities, similar in outcome to the historical destruction of Machu Picchu that was swept away by invaders or Pompei that was stricken by the natural disaster.

For such an extreme case, as the Greens argue, the objective policy should be "zero growth", which presumes rapid shift towards bio-centric values and lifestyles. However, zero growth doesn't take in account uneven distributional effects of economic activity in the world and therefore is not a helpful objective. After all, successful programs for a sustainable society cannot be built on martyrdom and suffering.

Scenario 2: Living within the limits of a naturally renewing eco-system

To make sustainability a reality, we must find ways for people to thrive in all senses without needlessly overtaxing the ecosystems that support us. Perhaps it is not possible to design cities with zero ecological footprint – that use no more energy or water than native flows – that emit nothing that can't be biologically rendered on site, but the challenge is to get close to it. The imperative of this scenario is to achieve balanced relationship between city and its hinterland.

As previously argued, the ecological impact of cities usually spreads well beyond their administrative boundaries. On the other hand, sustainability requires us to reintroduce the concept of proximity in order to help increase the efficiency of urban consumption patterns. For instance, could at least some of the food consumed in the wealthiest cities come from local hinterland? Until recently the planned agriculture of China required that cities were surrounded by belts of agricultural land where food was produced for them. Such connection to the land is beginning to return in a very modest fashion through the rise in popularity of community farms and markets to serve urban districts (11).

Cities, particularly those in the most developed countries, have yet to prove they can be compatible with a healthy biosphere and that they can help liberation of ecological space. Eco-friendly urban development could well become the greatest challenge of this century, not only for human self-interest, but also for the sake of a sustainable relationship between cities and the biosphere, on which humanity ultimately depends.

Scenario 3: Engineering artificial renewing eco-systems

Knowing that the ecological footprint of the present world population/ economy already exceeds the total productive area available on Earth and that in future, instead of present requirement of 2 phantom planets, we will need 5 or 10 additional planets, this third scenario projects on the possibility to produce viable artificial biospheres.

As we stand now, despite our increasing technological sophistication, humankind remains in a state of "obligate dependence" on the produ-

ctivity and life support services of the ecological space. Therefore, this scenario speculates on possibility to extend our planet's limits by either increasing bioproductive area on this planet (making use of non-productive areas, e.g. deserts and oceans) or we start colonies on other planets. At the moment, this looks more like a science-fiction scenario but like Scenario 2, it represents a possible alternative to returning to the lifeless state.

CONCLUSIONS

Ecological Footprint analysis provides us with a number of critical insights regarding sustainability of the city. Firstly, it rises a cautionary signal for sustainable future by indicating the level of ecological deficit reduction that is required from a city to become sustainable. A city's EF can be used to measure its current consumption against projected requirements and point out likely shortfalls. In this way society as a whole can compare the choices we need to make in the near future about our demands on nature – or else nature will make our choices for us.

The use of bioproductive area as an aggregate unit makes EF a powerful and resonant means of measuring and communicating environmental impact and sustainability. By quantifying the material flow requirements for sustaining the present lifestyles, EF addresses the issue of uneven distributional effects between cities/ nations of wealthy and developing countries.

In questioning who gets what in resource distribution, EF brings out the awareness that there are natural biological and physical limits to what we take from nature and pinpoints that in order to reduce our impact equitably those that take the most will be required to scale back the most.

Moving sustainability of the city forward becomes far more likely if strategies are chosen that both improve people's quality of life and reduce the size of city's ecological footprint. These strategies concern both city's supply side (protection, conservation, and restoration of natural ecosystems), and city's demand side (improved resource-efficiency with which goods and services are produced, reduced per capita consumption, and controlled population size).

It is true that EF analysis shows certain limitations, especially in explaining the total dynamics that lead to the outcome, but it serves well enough in documenting the outcome (the city performance) on its sustainable development path.

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PLANNERS' ROLES AND TECHNIQUES IN DEVELOPING SUSTAINABLE "ECO-CITY"

The Case of Gaborone, Botswana

Branko I. Cavrić

Efforts to incorporate sustainability principles into city planning demands new relationships between traditional and contemporary culture of key players involved in urban development arena. Many stakeholders involved in urban projects, management and governance are tailoring the destiny of urban world. Unfortunately, their contribution to sustainable practices show the lack of awareness and negative attitude towards protection of basic environmental, economic and social elements for the benefits of future generations of urban dwellers.

By changing the way in which they think it is important to spell out clearly the role of planning professionals which should be more active and persistent in educating and advising decision-makers and other stakeholders helping them not to think and act only sectorally supporting individual and forgetting common interests. With carrying capacities and sustainability in mind these "key players" should be trained and guided by planners and diverse community entrepreneurs to have a look well beyond current planning horizons of socio-economic and physical plans, because sound sustainable solutions need wider and more ecologically friendly temporal frameworks.

This paper explores contemporary physical planning concepts for sustainable development of Gaborone city, the capital of Botswana. sensitive development solutions, lamenting more on behavioural, organisational and technological improvements in city planner's "toolkit" and planner's roles of technocrats and advocates of sustainable change. The purpose of this exploration will also be to suggest how to create enough manoeuvring space beyond the exclusive political power and how to apply different planning concepts which can help to create a sustainable eco-city.

INTRODUCTION

The sustainability movement, like the smart growth and ecological movement, evolved as a response to declining quality of regional and urban environments worldwide. The concept of sustainability has been accepted in Botswana as a part of National Vision 2016 based on local Agenda 21 (Botswana Agenda 21, 2002). The Rio 1992 Earth Summit was quickly translated into Local Agenda 21 initiatives around the world. The HABITAT II conference (Istanbul 1996) proclaimed the right of appropriate living space to everybody and the world conference URBAN21 (Berlin 2000) showed 'best practice' examples of sustainable development of cities. Sustainable urban development was also treated as a crosscutting theme on the JOHANNESBURG SUMMIT 2002 (Keiner and Cavric 2002).

The concept and ideas of sustainable development offer an inspiration and address numerous aspects of urban life in Gaborone and other major urban settlements of Botswana. However, the implementation and translation of sustainable urban practices is still pending. Concerns with sustainable city development are not yet prominent in local planning concerns (Molebatsi, 1996), although sustainable and smart growth might be affordable solutions in a country with limited natural, population and economic resources. Definitely, if further urban sprawl in Gaborone if continues at such a high rate, it cannot be sustainable, because it is not economically and socially viable.

There is a clear evidence from DIMSUD[1] research (2003) and through series of maps and aerial photographs that Gaborone urban

[1] In May 2002, the Alliance for Global Sustainability (AGS) sponsored the international, multi-disciplinary and cross-cultural project 'Designing, implementing and measuring sustainable urban development' (DIMSUD). The DIMSUD is carried out jointly by the Swiss Federal Institute of Technology (ETH), Massachusetts Institute of Technology (MIT), Chalmers University of Technology (Sweden), University of Botswana, University of the Witwatersrand (South Africa) and the Catholic University of Santiago de Chile. Another partner was the United Nations University (UNU) at Tokyo.

image has changed enormously in the last 30 years characterised by indefinite urban sprawling outside declared city boundaries (see Figure 1). The change was signified by an important shift in the country's economy, rural-urban migration and acceptance of road transport as the only suitable way for commuting between functional city zones. Initially the city was planned and assembled around the "garden city model" followed by the "super block" development and other experimental forms originating from "western planning" laboratories. From the physical planning perspective these models were artificially incorporated into the traditional "Kgotla social and settlement setting", changing the lives and behaviours of newly born "urbanites" with still have strong rural identities (Hall & Pfeiffer, 2000:16) say that to bridge this gap between economical and social development, it would require generations of inculcated habits.

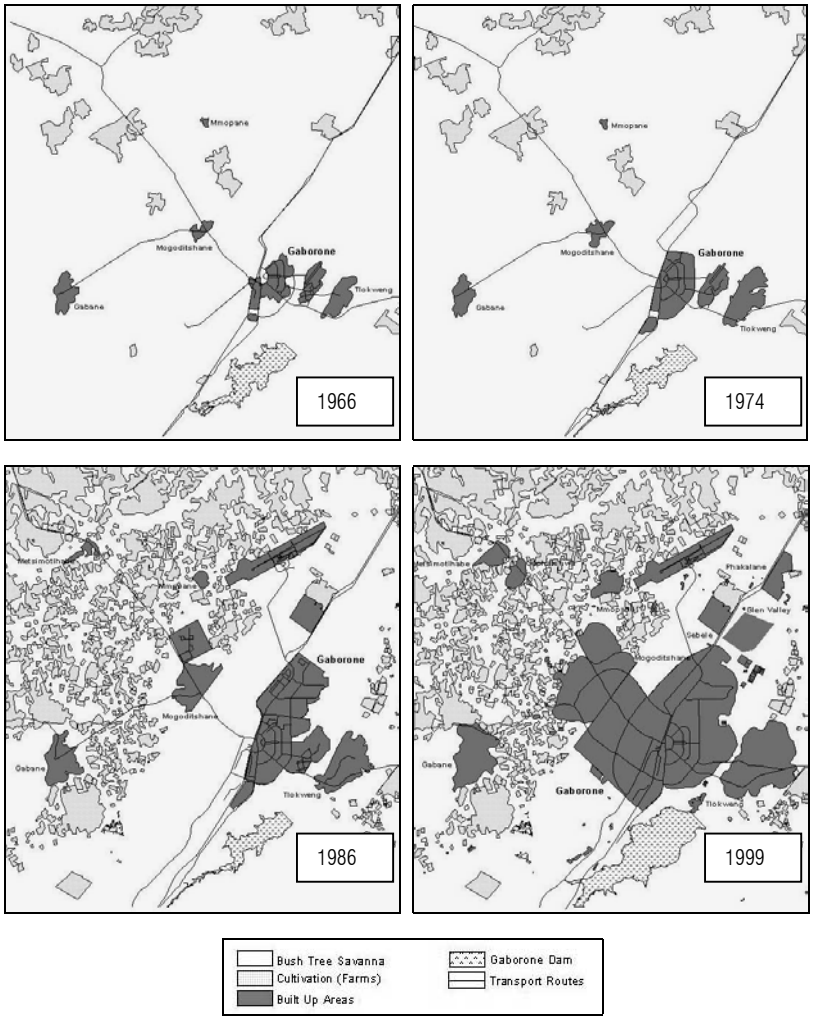
Furthermore, the majority of today's senior local planning staff have been engaged in applying above foreign planning models which is not surprising because they have been trained abroad, mostly in UK and USA. The faster the development of Gaborone, the more difficult becomes the mastering of the urban challenges based on non-indigenous planning concepts. Obviously, authorities are neither in terms of human resources nor in terms of problem perception ready to be confronted with the urbanisation wave. In Botswana, there is a lack of qualified and skilled engineers and planners. Indeed, only recently (in the last 10 years) over 100 physical planners have acquired their degrees at the University of Botswana Department of Architecture and Planning, (formerly Planning Unit of the Department of Environmental Science).

There is no doubt that the economic shift from an agricultural towards diamond-based economy fuelled the city's and country's progress. However, this progress didn't take care of the capacity of urban environs to absorb an increased number of job seekers from rural areas, coming to Gaborone and wishing to start new life. An imbalance between Gaborone as a hub and the rest of the predominantly waste deserted territory become more visible with an appearance of dramatic problems such as biosphere resource depletion, urban poverty, congestion, inadequate facilities, lack of affordable housing, HIV/AIDS, uncontrolled waste disposal and many others.

Certain aspects of unsustainable change discovered in Gaborone and its vicinity are underpinning its progressive urban development. The city is now urbanising very rapidly and changing the environment on a scale comparable to some southern African cities. But the difficulty lies in the fact that the city's economy is not able to produces the financial surpluses sufficient to support prudent environmental management. Despite the level of concern now being expressed by numerous stakeholders (professionals, politicians, businessman, communities) it is necessary to develop new awareness and implement a sustainability agenda for all particular types and levels of urban land developments which take place in the city centre, inner ring and its periphery. Hall & Pfeiffer (2000, p.14) state that 'the overwhelming problem is not the urban growth in itself, but the fact that city administrations lack the will, the competence or the resources to manage that growth'

Notwithstanding, the role of urban planners in such a situation should not end with the approval of the urban plan which is a common practice in Botswana. However, it should be realized that the planning profession worldwide is turning into a profession of urban technocrats, facilitators, negotiators, mediators, political advisers, urban designers, environmental mana-

Figure 1. - Agricultural and Urban Sprawl in and around Gaborone 1966-1999



Source: DSM Topographic Map and aerial Photographs, GIS and thematic map compilation by R. Chalashika and B. Cavric 2004

gers, urban governors and advocates of urban change. The DIMSUD project indicates the need for human and organisational re-structuring in which the current position of physical planners in implementing sustainable paradigm would change the focus from passive administration to active advisory and multidisciplinary services. The burgeoning literature on the role of the contemporary planner involved in application of sustainability principles, highlights his ability to play a variety of tasks in integrating multi-disciplinary perspectives into plan-making and plan implementation (Randolph 2003, Kelly & Becker 2000). Their changing role and daily practice also demand a sound understanding of theoretical paradigms underpinning "environmental agenda", as well as hand-on knowledge of different methods and techniques based on advanced technologies.

SUMMARY OF DEVELOPMENT AND ENVIRONMENTAL ISSUES IN GABORONE CITY

For the past 40 years, Gaborone city has undergone a rate of change unprecedented in Botswana settlement history. The "diamond boom" of the seventies and eighties has tailored the capital city as an engine of growth but at the same time it was a source of increased environmental concern. The rapid expansion of diamond mining and the country's economic renaissance created many positive effects in terms of improved human life for people who incidentally become "urban dwellers". As revenues from the mining sectors are directed towards the promotion of the country's development, Botswana was able to make a big step in its economy. The "diamond boom" enabled the country to invest in urban housing programmes for rural migrants and other sectors of the country's economy.

In recent years, however we have began to recognize many of the problems caused by overwhelming growth which exceed city's environmental and spatial limits. The forces which have recently been driving higher productivity of Gaborone urban communities are not able to swallow easily today's environmental and development pressures such as endangered natural resources, increased poverty, high unemployment rate, lack of serviced land, declining agriculture that should feed the city, frequent droughts, water famine, limited market, a non-diversified economic base, HIV/AIDS plaque, increased crime rate, cultural and behavioural decay, etc.

Urban Dynamics

The knowledge of contemporary urban developments in Botswana can be better acquired if we distinguish some important factors. According to Silitshena and McLeod (1998) there are three reasons behind the formation of Botswana's modern towns: the need to exploit mineral deposits, the development of commerce, and the need to create a new administrative capital. Gaborone was created as the capital of the new state of Botswana as the time of independence approached. Gaborone was built to satisfy two essential needs: the effective administration of Botswana and the promotion of a modern economy (Silitshena and McLeod, 1998). Comparing to other emerging African capitals Gaborone is a relatively young city (only 39 years old), but is one of the fastest growing cities on the African continent.

Diamond based socio-economic development brought about changes in the system of Botswana settlements. New towns sprang up, traditional villages were restructured and transformed into urban villages and agro-towns and there has been considerable migration from villages to towns and cities (Cavric 2001). The National Settlement Policy (NSP) was introduced to counteract the prevailing bias of investments in urban areas, particularly in capital city and several new mining towns For example the capital of Gaborone has had the greatest urban growth rate in Africa. From the planned 17000 inhabitants in 1967, it has grown to a city with a population of 186,007 (CSO, 2001) people. Today, almost a half (46,3%) of the country's population live in urban settlements (see Table 1).

Urbanisation in Botswana has resulted in Gaborone (in less than 40 years) becoming two times larger than the next largest town Francistown. In addition, Francistown is several times larger than the other inter-immediate towns. In 1981, about half of the country's population lived within a radius of 200 km of Gaborone, and in 1991 the corresponding figure was 100 km, which shows an increased concentration.

Similarly to other southern African countries, rural-urban migration in Botswana was one of the major contributors to the fast transition from rural to urban society with an urbanisation rate reaching almost 50%. For the first time in history, half of the Botswana's people live in urban areas – characterised by the dominance of built-up areas and urban type of economic activities. The country's major urban villages have grown steadily as well, despite the fact that many people moved out towards the capital. The pull factors of the big city in the form of job diversification, and better living and working conditions coupled with stimulative (but not always prudent) government policies, influenced the concentration of people in Gaborone City proper and its fringe (Greater Gaborone Region) where the physical environment deteriorate most. In Gaborone, in the peri-urban villages of Tlokweng, Mogoditsane, Gabane and Metshomotlaba essential services are of the lower quality and congestion caused by cheaper land and speculations contributed to increased environmental degradation.

Table 1. - The structure of Urbanisation growth in Botswana

	1981		1991		2001	
	Total	%	Total	%	Total	%
Botswana	941 027	100.0	1 326 796	100.0	1 680 863	100.0
Urban Population	344 201	36.5	606 329	45.6	778 143	46.3
Towns	150 019	15.9	284 551	21.4	343 209	20.4
Townships	5 598	0.6	12 114	0.9	20 451	1.2
Urban Villages	188 584	20.0	309 664	23.3	414 483	24.7
Rural Population	596 826	63.5	720 467	54.4	902 720	53.7
Villages	596 826	63.5	720 467	54.4	902 720	53.7

Source: CSO, NSP, 1981-2001

Urban sprawl and Low-density Developments

Other major factors of unsustainable land use planning and development practices in and around the capital city are urban and agricultural sprawl and the enormous extent of low-density areas where 90% of buildings are detached structures (usually one storey buildings) located on individual plots. As a consequence of such urban milieu, city perimeter has been stretched into the tribal land (see Figure 1 above). Furthermore, an overdeveloped road network, individual cars and private public transport based on kombis and taxies have accelerated urban sprawl beyond city limits.

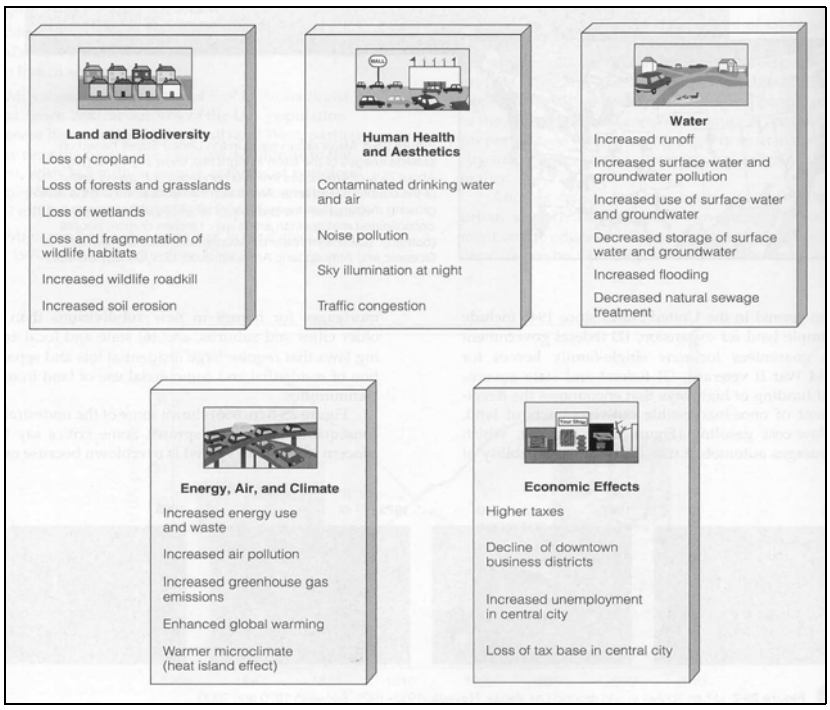
Numerous underlying factors which promote today's sprawling pattern of Gaborone are mostly related to:

- mechanistic application of conventional western planning concepts based on private transport requirements and super-block system
- lack of ecological, traditional and smart growth planning initiatives
- flat terrain with a few natural barriers and constraints
- lack of consolidated agricultural land parcels in the city vicinity and vast open spaces inside the city
- development of roads/streets and other infrastructures in a vicious circle followed by out-laying tract of land developments in leap-frog and peace mall fashion
- application of urban development standards (UDS 1994) based on big plot sizes
- functional zoning which separates different land uses (e.g. mixed land use is a rare category in Gaborone land use classification matrix)
- subsidised petrol prices, favourable rates for car loans and hidden costs of transportation system operation
- government sponsored residential schemes (e.g. ALSP, SHHA) for low income groups
- extended payment schemes (period of 4 years) for urban state land that support land acquisition on a first-come-first served basis
- exaggerated demand for urban land (e.g. people applied for plots even though they had neither the immediate intention nor resources to develop them)
- lack of development and land use control in the city proper and Gaborone region which falls under the tribal authority and district council jurisdiction
- limited professional and human resources in the planning sector
- speculation with land prices, allocation of non-serviced plots, illegal conversions and subdivision of agricultural land, and informal land transaction
- issuing of fictitious "certificates of customary land grants"
- allocation of plots by influential people to their children, relatives and friend for free
- lack of cost recovery system for urban development programmes (e.g. land cost being separated from land servicing costs)
- lack of communal tax, capital investment and operating cost systems and other urban-economic instruments associated with varying density and spatial patterns
- deficiency of a land information system
- the rural mentality of new urban dwellers brought from their home villages (e.g. different sense of space and place, difficulties to adapt to urban life)
- extension of the city (Gaborone City) and metropolitan area (Greater Gaborone) boundary into surrounding freehold farms rather than incorporating or buffering nearby villages of Tlokweng, Mogoditsane, Mmponae, Metsemotlhabe and Gabane.

The consequence of human development and intervention in Gaborone are similar to the introduction of a stress into any natural system. Of course the effects of stress are most dramatically observed after critical thresholds of tolerance (which is weakening in Gaborone area) are exceeded and a strain of anomalous response in the system is produced. Figure 2 illustrates a number of characteristic problems caused by ecological stress. Most of them are related to environmental, social and economic aspects of urban sprawl in low density and car-dependant land development patterns like Gaborone.

Australian researcher Peter Newman (1990) notes that "the most unsustainable form of settlement yet developed-the low density suburb-has been a relatively recent phenomenon, motivated by a strong anti-urban Anglo-Saxon sentiment and facilitated by the automobile. Similarly, in their former African colonies there was little opportunity to tailor different paths in which urban authorities can develop much autonomy, either legal or financial (Stren, 1989:21). Colonial and indigenous

Figure 2. - Some of the undesirable impacts of urban sprawl



Source: Miller, 2004:666

anti-urban inheritance are also dominating creation of Gaborone spatial assembly. Social organization for ecological sustainability will need to reverse this trend and Newman's analysis of settlement patterns and sustainability suggests that sustainable settlements require making cities more urban and making the countryside more rural.

According to Roseland (2000:103) making cities more urban can be accomplished by "reurbanizing" Gaborone's city centre and sub-centres; re-orienting transport infrastructure away from the automobile; removing subsidies on the automobile; and providing a more public-oriented urban culture, assisted by attractive urban design (townscapes, streetscapes, malls and squares) and by "traffic calming" measures to facilitate bicycle and pedestrian use of residential areas and major roads. Making the Gaborone countryside more rural can be accomplished by means such as protecting and encouraging sustainable agriculture and forestry in neighbouring village areas and moving towards bioregionalism as the basis of local government boundaries and responsibilities.

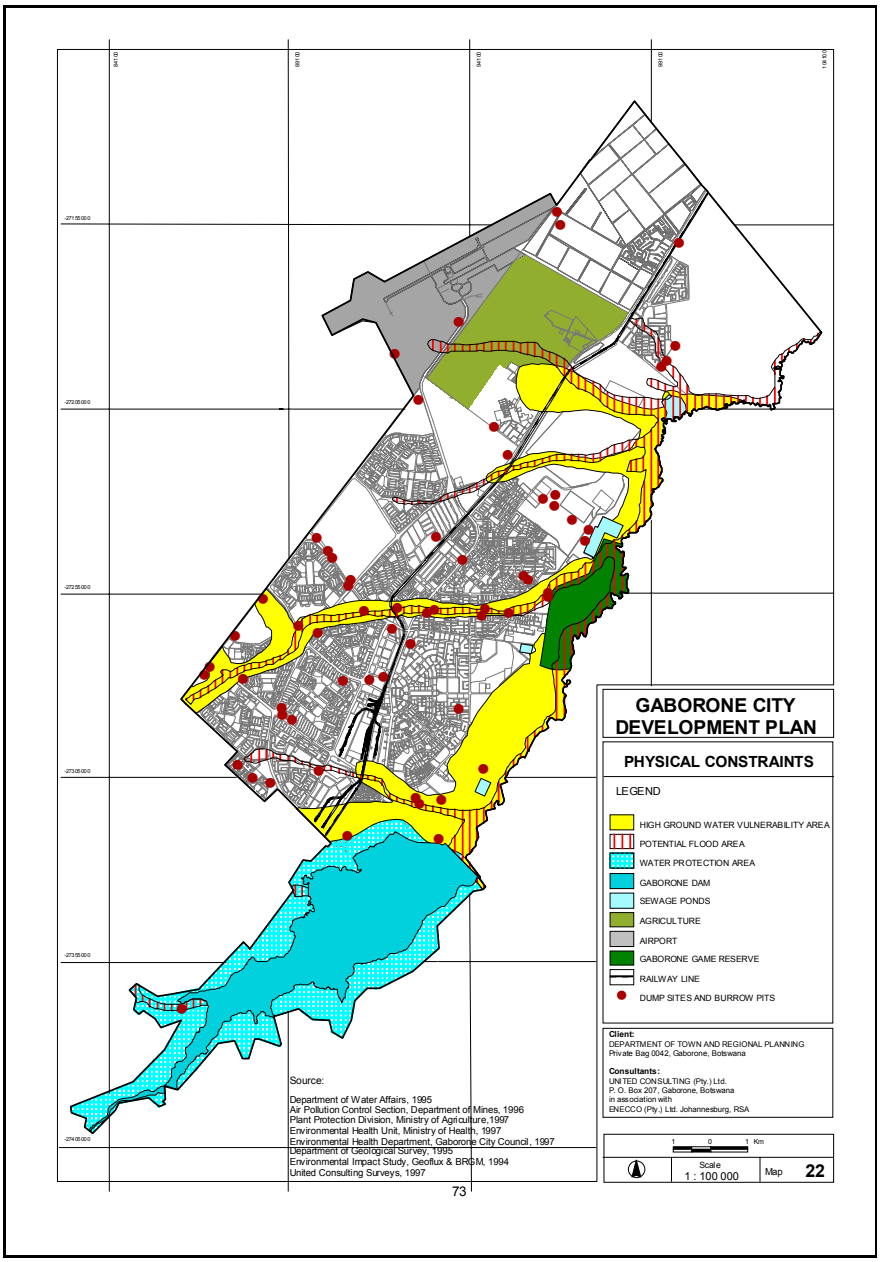
Environmental Issues

In less than a century, a large scale intervention sometimes very sensitive and fragile to the natural environmental setting brought to light a new image of small Gaborone's urban enclave and its surroundings. The natural and built-up environments are now revealed melting as spatial structures located in the heart of a tremulous "green garden". Gaborone and its present inhabitants have rediscovered an unknown pages of natural and human history by piecing together fragments of memories from pre-colonial, colonial and modern times. The existence of urban agglomeration in expansion is evitable. Though Gaborone is built on a relatively small scale compared to other African capitals, over the several decades it has been faced with a litany of environmental problems. Each one can be distinguished as one move through city's districts, neighbourhoods and its sub-urban periphery (Figure 3).

The following paragraphs provide a summary of environmental problems facing Gaborone City. The method used, particularly the presentation of the problems on sectoral basis, can help physical planners to depict the current situation and the extent of different environmental impacts. It is important to note that the environmental problems identified are area specific. Similarly, the solutions should be local and relevant.

Open spaces - Gaborone was once planned as a Garden City. A city with such an image may be attractive, however, it might not be the right concept in a country regularly afflicted by drought. Unfortunately, many of city's open spaces are frequently abused as dumping sites, driving schools, parking lots, driveways, refuge for criminals, open space toilets, informal vending, urban agriculture and other uses. Their main functions as recreational and leisure resorts, places for children to play freely and neighbour's to socialize, as well as pedestrian and bicycling corridors, are hampered by negative intrusions. These open spaces are essential for improvement of bio-diversity and protection of limited urban habitats. They change micro-climate through shading, cooling, and absorption of air pollutants. In

Figure 3. - Environmental and physical constraints for future Gaborone growth



Source: GoB, 1997:73

addition they influence aesthetic pleasure and secure human comfort and enjoyment. As the city grows open spaces are becoming more rare and valuable, and their protection, maintenance and upgrading become a matter of urgency.

Solid waste, recycling and hazardous waste - There is a huge number of illegal dump sites and burrow pits within the city's perimeter, especially in the urban-rural fringes. This is both a serious environmental threat and a visual intrusion to the city's image. Littering devaluates areas of natural beauty with potential for passive recreation. Separation of different types of solid waste is not common. Although about 1/3 of Botswana's cans are recycled, there is still a major lack of education, awareness and governmental initiative concerning this subject. What is happening at the moment is that all sorts of waste are collected and brought to the landfill. By recycling paper, glass, iron etc., Gaborone could create new jobs and, of course, protect the environment. Poorly managed hazardous wastes present another growing threat, particularly when industrial discharges are poorly regulated and when municipal waste management is inadequate. Because of these shortcomings, it is difficult to monitor discharges as well as to ensure that hazardous waste does not end up in city sewers, landfills, or drinking water. This problem is accompanied by the large quantities of waste generated by small-scale industries and by hospitals and clinics located in and around cities. Human exposure to these waste materials whether inhaled, ingested, or absorbed through the skin-may result in short-term acute effects, long-term irreversible chronic diseases, or genetic mutations affecting future generations (Bartone at al. 1994: 30).

Water supply, sanitation, sewage and storm water drainage - The use of pit latrines and the overcrowding in some areas (e.g. Old Naledi, SHHA) can cause health problems, and pollute the ground water. Over spilling sewage ponds endanger both the ground and superficial water, like the Gaborone dam or Notwane river. There is an urgent need to connect all plots to adequate water and sewage services, and to regulate industrial discharge into municipal sewer system. Waste water, if recycled in a correct way, can be reused for ground water recharge, as potable water or for irrigation. Since the water situation in Botswana is not the best, water recycling must have a high priority. Leaks and poor management of water distribution systems need also to be addressed. The storm water drainage of Gaborone is inadequate to handle high quantity of seasonal storm-water. The open channels are often filled and blocked with mud, sand or rubbish, which leads to recurrent street floods. Poorly drained wastewater and runoff are ideal nest for outbreaks of mosquitoes and other water–borne environmental and health diseases.

Urban Transport - Every day more and more vehicles are added to the Gaborone transport park. In average almost every fourth household is motorized and some of them are having more than one vehicle. It is not surprisingly to see the latest model of fancy car parked inside the low or middle income plot. Private cars, similarly to mobile phones and HI-FI equipment are status symbols in Botswana. As Tyler states (2004: 673) to many people, cars are also symbols of power, sex, excitement, social status, and success and islands of privacy in an increasingly hectic world. Someone of wealth and social appearance is usually followed by their shiny metal puppets. The inefficiency or lack of urban transport services and infrastructure will be one of the major impediments to economic growth and urban productivity in Gaborone. Increasing motorization, poorly operating public transport services, inadequate road maintenance, insufficient bikeways and walkways, poor traffic management, lack of enforcement, transport education and culture are contributing factors to congestion, road accidents, and air pollution. Already in Botswana's capital the morning and afternoon traffic congestions lead to lost work and leisure time, increased fuel consumption and emissions, and high accident rates. Indeed, road safety is a major concern. The costs of road accidents in Gaborone, are increasing due to high fatality and injury rates and material damages on vehicles

Air and noise pollution - Gaborone is not yet seriously affected by polluted air. There is no heavy mining close to the city (except Kgale quarry). Although some urban corridors are congested during rush hours, the overall traffic volume is still moderate. However, vehicle ownership is increasing, traffic-intensive decentralised shopping malls are mushrooming and the surrounding villages are becoming huge dormitories for numerous daily commuters. Another source of air pollution are distributed construction activities, back yard burrow pits and landfill where rubbish is dumped and burned purposely or incidentally. Furthermore, many disadvantaged citizens use wood for cooking and heating. This has a double environmental impact. First on the range ecology around the city and secondly on the air, which is polluted by the combustion products and is visible especially during winter months. In addition to the problems of increased air pollution, noise levels are on the increase, caused by higher traffic volumes, construction and quarry operations, and large sport and cultural events. Any unwanted, disturbing or harmful sound become a threat to citizens working and living in semi-arid conditions, where peaceful sleeping and relaxing are very important. Since they will undoubtedly increase further, air and noise pollution are going to be a topic of concern in the foreseeable future.

Energy - Very soon energy resourcing and consumption will become one of the key factors for future urban development of Gaborone. However, the supply and demand of virtually every type of fuel generates varying degree of environmental impacts. Because Gaborone, is a major consumer of petrol fuel, wood, coal, and electricity - energy-related environmental problems spill over to neighbouring rural areas. On the supply side, the extraction and conversion of energy resources for urban use can harm the environment in many ways, some of which may occur outside the city (for example, deforestation from fuel wood harvesting or disruption of watersheds and evictions of communities to make way for coal projects. On the demand side, human health is affected largely because of fuel combustion and its resulting emissions. Secondary impacts include the generation of heat that can raise temperatures. The nature of these impacts is dynamic: as economic development occurs, the structure of the energy balance changes and the environmental effects shift accordingly (Leitmann 1991). For example, poor people who cannot afford electricity depend on wood

for fuel. This leads to deforestation of the areas surrounding the city. Also, the severity of impacts is affected by land use patterns. Urban form and density influence energy consumption for travel. Density and land use affect energy consumption for heating and cooling, and landscaping affects microclimatic conditions (Organization for Economic Cooperation and Development 1993). Gaborone has very good prospects to promote alternative energy sources and technologies like photovoltaic plants, since there is a lot of sparsely used desert land where this equipment could be installed. Solar energy can also be used for water heating because there are more than 300 sunny days annually with an average temperature of 25°C. If the city change its energy resource policy from non-renewable to renewable ones (gas, solar), it would be a big step towards sustainable development..

Human Health - When compared with the rest of country and smaller settlements, it is evident that Gaborone residents enjoy a better health status than people elsewhere in the country. However, the number of people who wants to remain healthy trough walking, cycling or playing in the open and recreational areas, is decreasing, due to lack of safe pedestrian and cycling routes, and the absence of well organised recreational and open spaces. This is a critical element in a healthy Gaborone urban planning which should offer more opportunities to its dwellers in order for them to develop a healthy life style. Regular exercise and exposure to recreational activities protects against increasing heart diseases, obesity, and diabetes. It promotes a sense of wellbeing and protects older people from depression (Wilkinson R., & Marmot M., 1998). Human health in Gaborone is also triggered by social, economic and environmental conditions, as well as by the spread of HIV/AIDS. The current deficiency in social communication networks caused by numerous prejudices, lack of social services and facilities, increased unemployment, traffic congestion, sexual behaviours, work pressures and other stressful episodes can help aggravate the wellbeing status of Gaborone citizens. Barton and Tsorou (2000) explain that this does not mean that urban planning can "create" communities. It is people who choose to form communities. But planning affects the opportunities they have to choose. In the case of growing Gaborone these warning notes are of crucial importance in developing more sustainable approaches to human health issues.

FACTORS AGGRAVATING DEVELOPMENT AND ENVIRONMENTAL PROBLEMS

To reverse unsustainable development and environmental degradation in most developing and transitional countries, it is essential to understand and specify the factors that perpetuate the lack of appropriate preventive and curative environmental actions (Bartone et. al. 1994). There are numerous actors in the city arena that could initiate and implement these actions. Sometime their roles are very specific and politically restricted. While at other times they can operate in a more freely and innovative fashion. In most of the cases urban environmental problems can be anticipated before they become burning issues. To rectify them it is necessary to back-up activities such as improvement of public and political awareness, development of sound governance, and securing of smooth access to knowledge and information.

Public and Political Awareness

These two important elements that influence recognition and acceptance of current environmental deterioration in Botswana capital are hidden factors for pursuing more efficient and productive urban environment approach. Even when they have acute environmental risk at their doorsteps people are closing their eyes expecting government and city official to intervene. Cases of public awareness and pressures to change unsustainable development practices or wrong decision making are very rare. Only occasional environmental disasters can influence the public to play more active role in mitigation campaigns.

For example a recent disastrous flood in Notwane's river corridor between Tlokweng and Gaborone that took place four years ago, did not affect the final decision to locate and develop the new River Walk Shopping Centre in 50-years flood zone. Even the proximity to old dumping site (only 300 m) has not changed the decision where to locate another new shopping mall. The lack of public participation in this case demonstrates that final decisions supported by political leaders and "hidden business forces" have not been influenced by potential environmental threat. Permissions are given, before anyone (publicly or professionally) could intervene highlighting the link between environmental cause and effects. Potential disaster was recognised as remote danger for people's wellbeing and properties.

According to Bartone at. al. (1994: 33) political leaders often focussed on immediate and highly visible problems, leading to short-term "band-aid" solutions and are inclined to skimp on meeting the recurrent costs of maintaining local infrastructure or the investments needed to control environmental spill-over effects that extend beyond political boundaries. Regrettably, it often takes an environmental disaster to stimulate profound change. The flooding accident in the area of River Walk shopping centre is a moderate example of an environmental disaster in which political expediency in alliance with an influential businessman was a contributing factor leading to failure.

In the absence of public pressure to improve environmental controls over industry and other polluting sectors, the easiest government response is inaction or disregard for environmental considerations. In making investment decisions, government policymakers typically consider direct economic benefits above all other considerations. In assessing a proposed industrial facility, for example, the prospect of new jobs usually overrides concern about potential environmental degradation. Another impediment to industrial pollution control is that many of the large-scale pollution-intensive industries (for example, mining, paper and pulp, chemicals, iron and steel, and nonferrous metals) are owned and managed by the state or by the politically powerful upper-income elite. Under these conditions, government officials have a difficult time summoning the political will needed to impose strict regulations, particularly when the targeted industries are viewed as vital to economic development (Bartone at. al., 1994: 33).

To change the current situation and enforce environmental safety in anticipation, people are obliged to pressurise local "decision makers" and curb frequent misleads with regard to environmental friendly propositions. Indeed, in

a cacophony of different interests, public awareness needs to be articulated through continuous education and neutral professional expertise. On the another side of the coin, politicians with their own agenda should stop to undermine the public solicitude on environmental aspects of urban life. Awareness reforms and educational boosting are the musts in all public and political scrutinising. An atmosphere of free and open dialog, environmental debate and precise action plans must bring communities and their respective political leaders into harmonic force to enable to work and act together.

The latest political rallies in anticipation of this year's parliamentary elections show that the majority of political front runners have included an environmental agenda in their public speeches and marketing pamphlets. The public and concerned citizens believe that this time politicians are not wearing "environmental dresses" only until they reach their electoral offices. Public expectations are much broader due to a long period of neglect where emphasis was not on seeing Gaborone urban area in "functional ecological terms, reflecting the daily patterns of human activities rather than defining it by physical edges or administrative boundaries which includes environmental and social benefits" (Barton & Tsorou 2000: 84).

Readiness for Sound Governance

Governance machinery in a "sustainable city" can be aimed at a two crucial aspects: technical and political. The ultimate and most important task is to balance two. Unfortunately, Gaborone City Council (GCC) machinery as the only responsible authority doesn't have enough finances, man power or expertise to handle the emerging number of environmental issues, whether independently or in co-operation with community and professional associations. The influence of politics in creating objectives and rigidity of a central government framework are overwhelming technical "know-how" and the daily routine of GCC. Copying the central government counterpart, GCC authorities are losing operational power and their links with grassroots stakeholders. Numerous impacts and pressures by players involved in the urban land use game, leaves the city officials in limbo, where their and central government responsibilities are mixed and overlapping. Too many expectations, pressures, requests and responsibilities are served on the plate of the city governor and its team. But not enough flexibility and trust is given to them to execute their decision making and technocratic power. As a result of such powerlessness, the implementation of city environmental management projects encompasses only declarative and decorative actions, and implementation of a "top-down" approach.

In addition to the above there is also the problem of jurisdictional complexity (sometimes confusion) where there are overlapping activities of GCC, Central Government departments, South-East and Kweneng District Councils and Tribal Land Boards. Poor co-ordination and duplication of efforts among these parties complicate recognition of responsibilities and executive power in the greater Gaborone metropolitan region. In contrary this also affects Gaborone city as a part of the region. These overlapping settings, together with the competing priorities of satellite villages, local neighbourhoods, district government, municipal officials, regional and national policy-makers, contribute to jurisdictional mosaic. Resolving issues of interfering jurisdictions and spatial scale (that is where the environmental problems spill over local boundaries), requires finding a balance between decentralised and centralised. (Bartone at. al., 1994: 34). However, in the case of Gaborone and Botswana, the process of decentralisation is only a declared goal and a "curtain" for continued presence of the central government in the matters of local (district, city, town, village) importance. This interference is clearly visible in the physical planning process where involvement of central government and its agencies is a prerequisite (see Table 2).

Sound governance and management activities are an inherent part of securing commitment to the projects; obtaining resources; involving and educating stakeholders and creating a tandem or team structures which can effectively utilise multidisciplinary capacities, envisioning of political flagships and growing public needs. Targeting these prerequisites the GCC could channel its efforts toward sustainable development. With shared responsibilities and co-ordinating contextual factors of sound managerial routine, the GCC executives could influence a new approach in running the city and providing equitable services to all community groups. In such a scenario a citizenry would have an opportunity to voice concern about all aspects of urban life and the state of the environment.

The emerging environmental policies should be based on adopting an intersectoral approach that will facilitate the formation of partnerships between city government and civil society. Such an approach is commonly referred to as governance. Although the need for government institutional reform is recognized, GCC government may be slow to respond. Moreover, while the technical and institutional capacity of the local government side of partnerships has been considered, the technical ability and cultural willingness of civil society still need to be considered. (Harpham & Allison 2000). Numerous case studies of cities like Davis, Chattanooga, Tapiola, Curitaba and Portland might show how improved consensus between local governance and community can lead to a marriage of convenience, which can be an essential guide to reconsidering current GCC practices.

Improved knowledge and environmental information

Knowledge and smooth access to information are essential conditions for all urban dwellers who wish to tailor the destiny of their cities. Paul (1986) argues that nowhere is the need to manage both resources and information more acute than in developing countries, where poverty and underdevelopment have created a vicious cycle whereby those living directly from this resource base are, at the same time, wreaking such devastation on this same resource base.

The development and implementation of an education system and training facilities by different government, parastatal and private organisation, shows enormous progress in last decade of Gaborone's expansion. However, most of these positive trends have not advanced urban education and research that emphasizes environmental focus. For example, a current syllabus in the school of planning

Table 2. - Planning process and levels of planning in Botswana

Planning level	Spatial Extent	Responsible Authority	Final Outcome	Adoption	Approval
National	Whole country	Central Government (DTRP)	Laws, standards, Codes, policies	Central Government Ministries	Parliament
Regional	Planning region	Central Government (DTRP)	Regional Master Plan	District & urban Councils	Ministry of Lands & Housing (MLH) Cabinet Parliament
	District	Central Government (DTRP) District & Urban Councils	- District Settlement Strategy - District Integrated Land Use Plan	District & urban Councils	District & urban Councils MLH
Settlement	City, town, village	District &Urban Councils Central Government (DTRP)	- Urban Settlement Development Plan - Village Development Plan	District & urban Councils	District & urban Councils MLH
Local	Part of settlement	District & Urban Councils Central Government (DTRP)	Detailed layout plans, urban & site designs of - - New Development Areas - Upgrading Areas - Specific Areas	District & urban Councils	District & urban Councils MLH

Source: GoB (1997:83) and GoB (2004:20)

and architecture at the University of Botswana only takes into consideration a few environmental planning, management and sustainability related subjects. Other departments are lightly covering the topic, with only exception being the Department of Environmental Science which mostly produces secondary school teachers and an insufficient number of specialised professionals who can take a role as environmental planners and managers in central and local government offices.

The another problem is a lack of education efforts directed into the improvement of public knowledge. The capacity to acquire and disseminate knowledge on urban environmental problems to citizenry in concerned Gaborone communities and ability to educationally empower lay persons is still not common practice. Few managers within GCC departments see the benefits of such an approach. However, many of them remain quiet even when the knowledge is at the door step of the GCC. Little effort has been spent on transforming current practice into weaponry for institutional and public "know how" necessary for objective scrutinizing and supportive decision making. In some cases GCC units (e.g. planning, engineering, environmental health) that have a potential for in-house and training for public are headed by people who are not up to date with the latest educational opportunities, and the benefits institutional-public ventures. For that reason their own training and knowledge refreshment should be taken care of in the form of "education for educators".

With regard to urban environmental informatics there is also a "status quo" where adequate environmental data series for Gaborone urban areas are lacking and they are not developed on a systematic basis. Legislatively requested Environmental Impact Assessment reporting (on case by case basis) is a novelty in Gaborone's land planning development practice. But still there is no any regular service which can for example provide monthly reporting on air, water, noise and soil pollution, or the health situation in the form of written referrals, tabular series, graphical charts and/or environmental zone mapping. A permanent network of spatially distributed "environmental hot spots" for instrumental data sampling and collection doesn't exist. Only Department of Mines (DoM) Air Pollution Unit, Department of Water Affairs (DWA) and GCC Environmental Health unit occasionally collect environmental data. Integrated urban environmental laboratories are not a part of GCC, and the most of the data is available in manually designed form. Existing laboratories for analysis of individual environmental media (e.g. water, soil, air) can not comprehensively contribute to the city environmental informatics.

Although, the GIS and other spatially and environmentally oriented IT tools exist in Botswana in last 10 years, their utilisation and implementation for urban environment related application are not priority. A common situation is grouping of hardware and software which is not used in practice. Dependency between the successful use of GIS technology and a number of personal, organisational, and institutional factors has been widely recognized, but unfortunately these findings were not applied in changing GIS status within Gaborone GCC and other institutions oriented towards urban planning, environmental management and governance. The problem of employing all personal, organisational, and institutional factors in GIS implementation is still pending (Cavric 2002a). Until it is resolved, the current GIS outcomes will be only recognised through mapping production, pore networking, duplication of data and efforts, organisational disharmony, unnecessary expenditures and unreliable decision making about allocation of natural, human and financial resources.

In summary it can be said that most authorities are not aware of the magnitude of ongoing environmental damage or how various land development intrusions may be threatening human health and environmental resources. Similarly, local authorities do not have adequate data on the locations of environmentally fragile or hazard-prone lands. They have not pinpointed where vulnerable populations are, nor do they maintain adequate record on the locations and capacities of existing utilities and services. Gaborone city also lack the necessary information to facilitate land transactions,

effective land use planning, property taxation, and hazard mitigation. To make matters worse, education programs covering the scientific, technical, and managerial aspects of urban environmental management and pollution are either weak or non-existent. Consequently, there is a shortage of professionals who can adequately understand and analyze the relationship between environmental problems, impacts, causes, and preventive and curative actions (Bartone at. al., 1994: 36).

THE NEED FOR THE CHANGING ROLE OF PLANNING PROFESSIONALS IN CURBING CURRENT UNSUSTAINABLE PRACTICES

Aforesaid, discussion on sustainability and environmental issues have significance and present a challenge for a new generation of planning professionals who work in an environmentally fragile Gaborone setting. Despite the numerous problems, it appears that there is still room and good prospect to curb unsustainable practices, and find alternative and environmentally friendly solutions. A small but growing contingent of environmentalists, planners, scientists, and community activists is trying to get the word out that our current way of doing business and shaping Gaborone city environmental image need a serious rethinking (Krizek and Power, 1996) for the benefit of today and future generations.

Unfortunately, the planning offices in Gaborone are short of staff with specialised environmental and sustainable development knowledge. This problem affects daily operations and efficiency of physical planning units that need to deal with more sophisticated problems such as: urban renewal, squatter settlements, environmental impacts, Agenda 21 and sustainability, urban agriculture, gender issues, urban indicators, globalisation, the HIV/AIDS pandemic, land evaluation, planning techniques (e.g. GIS), etc. There is also a serious gap between senior and junior planning staff, as well as a lack of leadership and coordinating skills. This has resulted in out-sourcing and commissioning environmental and planning projects to external consultant. How will Gaborone planning develop further, and what are its existing experiences to date? Does planning practice have to be firmly rooted in environmental science, or is this the time to go "back to basics" grounded in design (Hague, 1994)? Could there possibly be some other way it could follow, perhaps a combination of these, or does it need a marriage of convenience based on an interdisciplinary set-up?

Planning paradigms have changed over the past decade and they are continually evolving as we work to address the many new problems of environmental impacts, urban renewal, sustainable development and urban revitalisation of human settlements. In this respect, planning today is not what it used to be in the past, and what it will be tomorrow. Change will be continuous and evolution prolonged. Current planning practice is deeply involved in the social, economic, environmental and political aspects of urban development. For example "planners" who have recently started their careers, will spend at least a third of their time specialising in particular aspects of planning. More likely than not, they will have focused on environmental planning and management, urban design, housing or economic development." (Batey, 1994).

Hague (1994) argues that if you ask practising planners what today's planning professionals lack, they will answer an understanding of development funding, and graphical and written communication skills. Furthermore they will require skills in identifying policy, evaluating service options, letting and monitoring contracts, and management and an understanding of the principles of quality assurance. All these novelties in the same time means to the more fundamental end of changing the context and ethos of a central and local government authorities.

Involvement of physical planners and other professionals working in public, parastatal, private or non-governmental agencies is only a part of a comprehensive community campaign to trace the road to sustainable development. Today there are so many concerned parties which raise their voices in democratic societies. Physical planners are now beginning to be a force that expands the horizon of activity advancing the concept of sustainability. They are becoming more and more aware of their safe guarding function in protecting urban health, productivity, and quality of life of city dwellers. In the course of these permanent interactions with the people physical planners should be tasked to educate average citizens on the importance of the physical (built) and natural environments that surround them, as well as on changes in those environments induced by human activities. Their daily practice should be attuned with societal needs offering strong professional background and spirit of interdisciplinary thinking.

The role of physical planners varies. However, in many countries it has been affected by growing democratization; increasing public value for environmental resources; an information revolution; and a movement toward more ecological, equitable, and sustainable forms of development (Randolph 2004: 29). Today's planning practice should focus more on a science-based approach, where a fundamental understanding of social, economic and environmental phenomena is emphasised. Planners are expected to perform a wide range of roles as generalists and all-rounded planners, as well as specialist in any given socio-economic and environmental context of Gaborone (e.g. government agencies, community based organisations, NGOs, private consulting firms, development and parastatal corporations, research and education). In addition, the intention is also to ensure that planners are equipped to perform well and learn from any position in which a newly qualified planner might be employed. Such work should involve planning at any city scale from metropolitan (e.g. Greater Gaborone Region) to the site level (see Appendix A.).

The new approach towards the changing role of planners in Gaborone aims at a shift, where the passive administrator' should became a "manager of environmental change". This requires an ability to enrich analytical and interpretative views on urban environs from single towards multidisciplinary perspective which includes architecture, engineering, planning, humanities, social, natural and health sciences. In addition, an understanding of legal, political, and organisational context within which Gaborone planning occurs will ensure that future planners are able to function effectively and creatively in different office environments and situations, working towards the well - being of all people in Gaborone.

Following a proper sequential and interdiscip-

linary process, planning should always come before other development expertise such as surveying, engineering, architecture, urban design, landscape architecture, quantity surveying and building. Also, during the implementation of plans, planners should be heavily engaged in integrated development together with representatives of other professional fraternities, mostly architects and engineers. In the case of Gaborone all other disciplines and stakeholders should follow and work closely together with planners.

BETWEEN THEORY AND PRACTICE

The complexity and distinctiveness of Gaborone's urban environmental issues demand diversification in the physical planner's opus. What local planners may not have realized is that the sustainability of the planning profession is at as a risk as the sustainability of Gaborone communities. As communities gradually become more autonomous, the days of "planner as technician, town and country planning board administrator, or building and planning permittee" are ending. The planning profession needs to recognize that the same strategies that work for sustainable communities foresight, partnerships, communication- are also necessary to make their work relevant in the context of sustainable communities (Krizek and Power, 1996).

For a long time our fellow colleagues have used to imagine planning is knowing, now they have to realize planning is learning. A quiet revolution is underway in environmental planning and management. In response to the increasing complexity of the remaining problems, protracted disputes, constrained government budgets, and recent movements toward deregulation and property rights protection, new approaches have emerged. They aim to provide more effective, more efficient, and more publicly accepted decisions in environmental management. These approaches are given different labels: "civic environmentalism," "integrated resource management," "community-based environmental protection," "ecosystem management," "watershed management," and "negotiated agreements" to name a few (Randolph 2004: 29).

From the current planning scheme of services (DPSM 1993, DTRP 2000) and workshop results (DIMSUD Workshop, 2002) it is evident that there is a growing need for local planners to rejuvenate theoretical and practical skills, and become more productive and self-sustained. They have urgently to pick up on the sustainability agenda, and necessary theories, tools, and case studies which may highlight different approaches and open wider horizons of sustainable development.

For a successful professional shift local planners must realise, first, the need for sound theoretical background relevant to sustainable development. Contemporary planning thinkers offer different modalities for such a venture into the world of "theoretical principles" and "pragmatic implementations" relevant to the development and maintenance of sustainable urban environs. Roseland (2000) argues that traditional theories like "social reform", "policy analysis", "social learning" and "social mobilisation" elaborated by Friedman (1987) are relatively impoverished in relation to sustainable development. They need to be coupled and refreshed with paradigms associated to "healthy communities" (WHO, 1986), "appropriate technology" (Shumacher 1973, Foster 1987), "social ecology" (Bookchin 1987), "green movement" (Capra and Spretnak 1984, Swift 1987), "bio-regionalism" (Sale 1985, Dodge 1981, Berg at al., 1989, Aberley 1994, Wackernagel and Rees 1996), and "native world view" (Callicot 1982, Smith 1989)

Healthy communities and healthy people

A healthy planning agenda is hidden in the grassroots of the planning profession and it was traditionally their responsibility for years until some other professions have been advancing and taking over. Although the name "healthy communities" makes an impression on communal medicine and public health issues, the Ottawa Charter for Health Promotion (WHO, 1986) gives a lot of room for planners to influence programmes for smart use of natural conditions and resources, provision of shelter and services, stabilisation of ecosystems, sustainable resources, social justice, and equity. Proliferation of HIV/AIDS in Gaborone and Botswana is a warning sign and strong motive for local planners to take a role in "better physical facilitating" of people affected by this plague.

Appropriate technology (AT), innovation and diversification

AT is an excellent umbrella for application of all technological novelties which bring positive effects to our societies. Technologies which make our lives more productive, healthier and sustainable are always welcomed, compared to technologies which are only profit oriented and not environmentally friendly. Beside common public effects these technologies can improve the lives of the lay-man and secure their self-subsistence even in harsh semi-arid and arid conditions. Roseland (2000) gives numerous examples which can be suitable for Gaborone and Botswana environmental settings. These include passive solar design; active solar collectors for heating and cooling; small windmills to provide electricity; roof-top gardens and hydroponic greenhouses; permaculture; and worker-managed craft industries. In addition to their environmentally positive effects, the ATs can also support a process of economic diversification which is one of the "most burning" issues for the future country prospect.

Social ecology vs. social stratification

This theoretical framework has already been applied in Botswana and especially in Gaborone through avoidance of social segregation based on income. Unfortunately, this approach has not careful in regards to the physical dimension where there is still no mixture of land uses that could help curb urban sprawl. Furthermore, some other premises of social ecology have not been implemented in Gaborone local planning practice. Deficiency in equal gender treatment, more liberal position of industrial class, and disadvantaged social groups like HIV/AIDS orphans, tribal minorities, urban poor, "makwerekweres or makulas"[1], guys and lesbians, juvenile and (always) foreign criminals[2], teenage mothers, etc., are some of few examples of

1 In Setswana's unofficial but widely used lexicon such as Makula and Makwerekwere – in reference to Indians and nationals of other African countries respectively (Mmegi, 2004:6).

2 It is common understanding that every criminal act in this country is the work of foreign nationals from Botswana's northern neighbour (Mmegi, Ibid).

Gaborone polluted social environment, and they are ultimately all part of the struggle against domination, hierarchy and unfavourable working and living conditions.

"Social ecology advances a holistic worldview, appropriate technology, reconstruction of damaged ecosystems, and creative human enterprise. It combines considerations of equity and social justice with energy efficiency and appropriate technology. Social ecology goes beyond environmentalism, insisting that the issue at hand for humanity is not simply protecting nature but rather creating an ecological society in harmony with nature. The primary social unit of a proposed ecological society is the eco-community, a human-scale, sustainable settlement based on ecological balance, community self-reliance, and participatory democracy." (Roseland, 2000: 92).

The Green Movement and greening the urban change

The Greens believe in the "four pillars" of ecology, social responsibility, grassroots democracy, and non violence (Capra and Spretnak, 1984). These pillars translate into principles of community self-reliance, improving the quality of life, harmony with nature, decentralization, and diversity, as well as freedom, equality and democracy (Tokar, 1987), or supporting civil liberties, working for solidarity with Third World peoples, and standing for an end to the arms race (Swift, 1987). From these principles, the Greens question many cherished assumptions about the rights of land ownership, the permanence of institutions, the meaning of progress, and the traditional patterns of authority within society.

Although some of the above principles (e.g. decentralisation, diversity, democracy, freedom) are proclaimed in numerous Botswana policy documents, there is still a long way to go before their real implementation. The postulates of a green movement can have different forms in different countries. In some countries they became equal political partners (Germany), while in other countries they only back-up environmental campaigns and struggles against environmental pollution and degradation. Many ecologically oriented international and local NGOs operate by following the green movement agenda. Worth of mentioning is "Somarelang Tikologo" or Environment Watch Botswana, a Gaborone based NGO involved in many local environmental campaign. The basic principles of this NGO are very similar to those of the green movement.

Inheritance of the green agenda practices can help local planners to come out with challenging alternatives vs. rigid government and privately sponsored developments. Recently, approved EIA legislation form a good framework for the "greening" of Gaborone urban development proposals. This greening is expected to be urgently incorporated first in the "city open space" programmes, and secondly in protection of "Gaborone north area", where a big chunk of prime agricultural land has been taken away from its primary use. This battle should show a strong "green force" in saving one of the biggest city's food resorts and biodiversity settings for small animals and different natural and man-made flora.

Bio-regionalism and eco-zoning

The meaning of bio-regionalism encompasses territorial planning and governing based on the rules of nature, its carrying capacity and suitability ratings (e.g. eco-zoning). Unfortunately, these rules have not been applied in Gaborone Region and City planning and governing practices. Both physical plans, the Greater Gaborone Region Structure Plan (1994) and Gaborone City Development Plan (1997) were prepared, without necessary soil, engineering geology, climatic, hydrology, climatic and studies of other natural complexes. Even today, detailed soil map in scale 1:5000 is only available for limited part of the city, and it has been prepared after plan was approved.

Also, the constitution and the forming of Gaborone Greater Region were forced without the knowledge of linkages with its hinterlands. Bio-regional practice applied in this case was not oriented toward resistance against the continuing destruction of savannah natural systems (through urban and agricultural sprawl), and toward the renewal of this natural system based on a thorough knowledge of how natural systems work and the development of techniques appropriate to specific sites (Dodge, 1981). However, prospect are good that a new generation of physical planners trained locally will expose their fellow colleagues (from older generation) to professional critiques for mistakes that have been made. Acceptance, of theoretical paradigm which support both, human dictate, as well as the dictate of "natural conditions and resources" might be a logical way forward.

The implications of bio-regional social organization are clearly for local political control by communities on their own behalf combined with broader allegiance to an institutional structure that governs according to an ecological ethic. Bioregionalism considers people as part of a life-place, as dependent on natural systems as are native plants or animals. By virtue of the emphasis it places on natural systems, perhaps, bioregionalism may perhaps appear weak in terms of human systems; however, some "Green City" ideas (e.g. Berg et al., 1989) are rooted in bioregionalism. Recent volumes edited by bio-regionalist Doug Aberley explain how to do bioregional mapping for local empowerment (1993) and cover the history and theory of ecologically sound planning (1994). The "ecological footprint' analysis developed by Wackernagel and Rees (1996) is a bioregional tool which can consider the impact of cities on natural resources and ecosystems.

Native world view and indigenous knowledge

This theoretical concept is becoming very intriguing in academic and professional debates. Some authors observe that sustainable patterns of resource use and management have for centuries been reflected in the belief and behaviour systems of indigenous cultures. These systems traditionally have been based in a world view that does not separate humans from their environment (Callicott, 1982). A good illustration for these observations can be found in indigenous practices of Botswana traditional leaders (chiefs) who have been involved in practical settlement planning scrutiny.

The structure and shape of the traditional Botswana settlement symbolised the nature of the social structure of the Tswana political life (Rankhuna, 1997) and its natural setting. The highest rank in social hierarchy and organisa-

tion of everyday life and work in a settlement and its hinterland was the chief. Comparing to other tribesman, he had an absolute administrative and judicial power, topping the hierarchical scale. For example, all decisions in connection with selection of place for settlement development, grazing the livestock or ploughing were relegated exclusively to him. Technically speaking, he played a role of a manager, planner and developer, with all the attributes that accompany such a position. His personal intuition and wisdom, combined with heritage, experience of past generations and cognition of principles of nature and environment were of extreme importance.

The World Commission on Environment and Development recognized how much industrialized cultures have to learn about sustainability from traditional peoples, and at the same time, how vulnerable the latter are to encroachment by the former (WCED, 1987). As a native chief speaking at a symposium on sustainable development suggested, mainstream society would be wise to look at native "history, culture, and traditions and practices, and find out how they managed to survive for thousands of years before European contact" (Smith, 1989).

Analysis of these alternative-planning paradigms has significant pedagogical implications for the education and training of professional planners and other municipal officials who increasingly must address sustainable development issues and concerns in their work. It indicates that much of what is currently taught in the name of planning theory is of limited value in addressing sustainable development, and that planners concerned with these aspects of sustainable development must look elsewhere for relevant theoretical guidance (Roseland, 2000: 94).

THE PLANNING SPECIALIST OR JACK OF ALL TRADES

Planners must always have their own way of thinking and judging. Their proactive approach towards development and environmental issues is the basic premise of their existence in the world of limited natural and social resources. The game of planning is a mother of resource distribution, in which planners and their multidisciplinary skills are more useful than the skills of other individual key players.

Planners should recognize that this changing role won't be a major stretch because many of the fundamental philosophies behind sustainability are also an integral part of what for years has been considered good planning. Integrating many of the concepts of some of planning's best ideas (mixed-use development, compact urban form, non motorized transportation) is necessary to effectively address the land-use aspects of local governance. In fact, the day-to-day work and education of most people in the planning profession make planners ideal candidates to exert a leadership role (or assume an active role) in such programs.

Physical planning as an attractive profession which includes numerous interdisciplinary skills, the knowledge of social and natural sciences; the vision of politics, vocation of negotiations; and the creation and futurism of urban design. Seven different elementary roles of today's physical planning arena are essential ingredients for every planner involved in sustainable development programmes. These are the following: 1) technocracy and information provision; 2) regulation and land development co-ordination; 3) negotiation and mediation; 4) facilitation and initiation; 5) political advising; 6) designing; and 7) advocacy. An efficient planning professional could adopt all of them and become skilful as a "jack of all trades", or a specialist in some of them. Depending on where they work physical planners can undertake all these roles and manage the change that comes with it.

Planner as Technocrat and Information Provider

Technocracy based on data and information provision is one of the most traditional and common roles of physical planners world wide. "A Planner's source of influence includes specialised knowledge or technical expertise, a monopoly on organisationally and politically relevant information, and the role of gatekeeper of information and access" (Forester, 1989). This role has been improved recently by advancements in information technology (IT) in general, and Geographic Information Systems (GIS) in particular. Processing and provision of spatial and environmental data for decision makers is fruitful when it leads to sustainable development practices, but it is disastrous when it leads to land speculation and environmental decay. Planning technocratism in developing and transitional countries like Botswana, and most of the third world and eastern European countries is "sourcing power" and critical part in planning process and plan implementation.

Prudent use of advanced information technologies is a must for contemporary planning professional. Good information not only provides a direct basis for decisions, it also informs citizens of problems and possibilities and thus can directly advance decision politically by building community support (Randolph, 2004: 30). Botswana society is very much political. It is rooted in the traditional tribal democracy that influences all aspects of daily life. The questions of politics, instability and the balance of power are consumed on daily basis in this country. First of all, local politics can favour technocrats and information providers if there is recognition that for example GIS can help political rallies. The 1999 parliament and presidential elections showed that GIS can be viewed as very useful tool for political marketing. A carrousel of colourful maps and flows of images combined with tendering charts have been very impressive elements of the candidates' presentations of their political programmes. The advantages of Botswana's long term political stability and balanced power between ruling party and their opposition counterparts will be fertile environments for future GIS diffusion, and political debates on burning land and environmental issues

Planner as Regulator and Development Control Coordinator

Land allocation and development practices have been an extremely "hot potato" in the hands of Gaborone and Botswana officials over the last five years. Numerous public and official enquiries are shaking chairs of cabinet ministers and local businessman involved in unlawful practices. This is a good sign that democracy has a means to curb unsustainable development. However, the role of planners in this activity was not of the "highest professional" level and their ethical conduct was overshadowed by the power of political influences. Planning and building permits have been issued without serious professional ana-

lysis. Unfortunately, they were not up to development control code standard and appropriate building and planning permit approval procedure. The failure of this recent "planning acting" is an open question, are our planning colleagues are really ready to accept the challenges of a regulator's role and development control gate keepers in foreseeable future, or do they need more rectification in their information and knowledge displays?

Many Gaborone planners will continue to spend more time enforcing regulations that is, permitting and approving, negotiating, or denying development proposals, than they do "planning." In this position as ministerial gatekeeper for development projects, they have been accused of accommodating development rather than managing it. It is true that planners must react to the proposals submitted, often performing little more than ministerial review and approval. And when development plans do not conform to existing regulations, variances and rezoning are commonplace (Randolph, 2004:31).

This was exactly happened in Gaborone Central Area after approval of the detailed plan, that influence a huge shift of businesses from residential plots (privately owned and rented) where have been operated for years. Unfortunately this shift caused more damages than benefits. At that time (1995) there were no enough provisions for offices and small business outlets. Development of the Central Business District has been delayed for years, and new office park at the foot of Kgale Hill was already in the pipeline. In such a situation GCC and DTRP planers rigidly stopped a transitional process and pushed plot occupants to move quickly. With hindsight, that decision has been retracted, and some relaxation is being allowed for certain land uses (e.g. clinics, kindergartens, attorney offices) and planners decided to stop "radical practice" of killing down-town life based on small businesses. At the end of the day, it was just a game in which "local planning" authorities supported further urban sprawl and avoidance of mixed-land uses.

Planner as Negotiator and Mediator

As a negotiator, the planner is expected to be involved in conflicts resolutions between disputed or parties with different goals and interests, usually land developers on one side, and community representatives and government officials on the other. If they work for central or local government, planners must take different position in negotiation with developers, than when they are sitting on the other side of the table working for private developers and investors. If a planner represents government and community his or her obligation is to serve the public interest. This includes concern for the long term consequences of present actions and for the ways that various decisions relate to each other. It also includes provision of full, clear and accurate information on planning issues and their social effects to both the public and to the decision-makers. This also includes protection and conservation of the environment in line with principles of sustainable development. Such situations are still common in transitional and developing countries where majority planners work in government agencies.

In the case of representing private entrepreneurs, a planner follows the instructions from management boards and their executives who usually aim at most profitable land project solutions. A physical planner working in such setting is obliged to support the request for maximal land utilisation, but also he should be diligent, creative, competent and independent in spelling out environmental and socio-economical consequences of intensified land development. A planner's ability to mediate between the "boss's orders" and private interests on one side, and legal, spatial and people's induced needs on the other, puts him in an extremely sensitive and responsible position where the highest level of negotiation skills and prudent balancing among interested parties are a real challenge for the planning professional. Planning can then be looked at as a competitive marketplace of ideas and alternatives (Susskind and Ozawa, 1984). In such a context, an alternative reflecting a negotiated agreement between conflicting and/or parties involved, stands the best chance of winning the competition for acceptance and being publicly, politically and business wise adopted and successfully implemented (Randolph, Ibid)

Planner as Facilitator and Initiator

As a facilitator, the planner should initiate land development projects by making public and relevant departments/organisations aware of the purpose of the planning activity and practice. The question of cultural context, human and organisational behaviour is crucial for further diffusion of planning awareness amongst different stakeholders in Gaborone. It directly relates to the prevalence of people who will understand the message and importance of planning in creating sustainable communities. There is no reason for planners not to facilitate different societal and economic groups that form the core of Gaborone's cosmopolitan urban village. Planning facilitation and initiatives could always help build awareness about various local and national sustainability agendas among all interested groups and individuals, their needs wishes and interests. The philosophy of domination and prevalence is goes against Botswana's democratic principles; hence the planning facilitation and their development initiatives should be accessible to everybody.

The best way to facilitate urban change is to regularly chair public debate on actual planning and development problems, monitor urban change dynamics and orchestrate discussion and democratic scrutiny from the top level to the neighbourhood grassroots. For example, in discussion about alternatives of the general urban plan, a good planning facilitator is a master of ceremonies. He manages and leads the neighbourhood or professional meetings, ensuring that the planning process and its consecutive parts accomplishes commoners and individual stakeholders goals. Like the conductor in the orchestra or an air traffic controller, a physical planner leads the assembled group of stakeholders towards creating more inviting and pleasing urban settings. While everyone's contribution is most welcomed and noted in planning debate, true excellence can be only achieved under the skilfully orchestrated scrutiny in which a planner as facilitator inspires all contributors to give their best.

"Community action runs counter to this so-called facilitated growth machine, trying to compensate for the social imbalance of the market. Action by civil society has emerged as a third system of power, joining governments ("the state") and economic powers. Environmental planning needs to enlist citizen action and encourage a process of citizen empower-

ment. Collaborative environmental planning has emerged as an approach for the engagement of citizens and other stakeholders. This begins with participatory planning and joint decision making but also includes environmental education, encouragement of "counter planning" by citizen groups, and citizen involvement in program implementation." (Randolph, Ibid: 30) In all these collaborative actions it is expected that planning facilitation will take a pivotal role, which would in contrary influence that the character and appeal of community stems from its cultural milieu.

Planner as Political Advisor

Politics in planning is becoming more and more important due to the increased sensitivity of democratic processes and its outcomes. In most of the countries prominent ministers of planning, housing and environment do not necessarily posses a planning or similar background. In a such situation their ability to handle peculiar land development and environmental issues can trigger animosity amongst the public, land owners and their opposition competitors. Self confident and wise politicians tasked with "land development" and planning cases should always listen to the voices of planners, and other professionals involved in interdisciplinary advisory teams. Of course, every political leader has right to make their own decision, but if such a decision is not coupled with professional opinion it can lead to political and other disasters. The cases recently presented before the Land Commission show how professionally blind decision making can haunt prominent political figures. Nobody can be immune to knowledge deficiencies including government officials in high positions and their most junior and senior advisers. Consultation (or confrontation) with physical planning bodies is a necessary part of decision making process and should be most welcomed by ministers, permanent secretaries, directors and other highly ranking members of government machinery.

The question of the political side of planning involvement in political advising and decision making has not been directly tackled yet in Gaborone's professional and political circles. The scope of this factor ranges from professional motivation and commitment to the details of political career opportunities and multisided political and professional satisfaction. Planning experts in Botswana are an enthusiastic fraternity, but not always welcomed and well understood by politicians. Sometime politicians limited awareness about the value and usefulness of physical planners as political adviser leads to discriminatory practices, but to be most effective planners must recognize the political context in which they operate and adapt their strategies accordingly." (Randolph, Ibid: 31). As consequence of political non-adaptiveness of some fellow colleagues they may be treated as a "dead wood" or being "re-located" to rural district administration where their voicing or advising would not harm those in power. "If planners ignore them, they insure their own powerlessness. Alternatively, if planners understand how relations of power shape the planning process, they can improve the quality of their analyses and empower citizen and community action." (Forester, 1989).

Planner as Designing Visionary

Urban planning has its roots in design tradition and city beatification. These roots are extremely important for better understanding of the forces they have been shaping and assembling cities all over the world. Urban design as a bridge between architecture and urban planning can always help to improve and polish city image. In the contrary we can always appreciate or refuse consequences of urban design expressing our satisfaction or dissatisfaction with different urban places. Meaningful city design at different urban scales from the entire city to an individual site guides our cognition and recognition. City image carrousel is a natural part of an urbanite whose life depends on the urban sense of place. A planner as designer of such imagery should always contribute to city visioning and development of its long term character. Cities without such character are like music without emotion and the planner's designing role is to fill the city with space, scale, colour, texture and furnishings. Only these "contributory features" can help that our cities carry a sense of place, history and spirit of its developers.

Having said that, there is an urgent need to skilfully attend to city designing following the principles of sustainability, traditional design practices, smart growth and new urbanism which should recognised as a "resurgence of innovation in the planning profession" (Calthorpe and Fulton, 2001; Corbett and Corbett, 2000; Duany et al., 2000; Myers and Kitsuse, 2000; Neuman, 1998). Many critics of today's urban development patterns lament the loss of a design perspective in planning and suggest that emphasis on rational science and political participation cannot always project future scenarios necessary to create sustainable environments (Randolph, Ibid:32). The Gaborone city is an excellent framework and opportunity to design and build an "urban village" where we have place that feels like a village and a big city at the same time. The design of such a place should be solely provocative and poetic hosting concurrently an intimacy and quietness on one side, and bustling and diversification on another. Its design should conjure two different form of settlement (and their associated emotions) and rhetoric that calls for the creation of city of contrary sensations (Sucher, 1995)

"Although greater emphasis on design and visual images is needed in planning today, it cannot, perhaps should not, replicate the utopian planning of the past. Rather than designing their own creative vision for the community, planners help the community discover its vision of the future and explore means to achieve it." (Randolph, Ibid:32). In this context, as Forester (1989) writes, "designing is making sense together." It is a collective process, and the vision represented by a comprehensive plan should represent the community's values. Urban design planners should combine physical design with urban policymaking. Their work focuses on creation unified physical plans for subdivisions, downtown revitalisation, and plans fro shopping malls and corridors. While urban design planners are involved in issues of land use, they differ from other planners who typically work on a larger scale creating policies and programmes. Urban design planning has changed over the years, with the increasing importance placed on the psychological and sociological effects of the physical environment on the quality of life of citizens. In response to this recognition of the importance of the physical setting on human activities and

behaviour, urban design planners have to find ways to involve the public in their proposals and designs (Kelly and Becker, 2000). Plan development is a participatory exercise, but this does not mean that planners are just facilitators. By providing good information, by offering creative and visual alternatives, and by clarifying opportunities, planners play a principal role in "organizing attention to possibilities" (Forester, 1989). This is no less creative a task than that other planner tasked described above.

Planner as Advocate of Change

By the nature of his profession the planner should be an agent of positive change. Working with numerous stakeholders his role is to fertilise democratic debate and participatory involvement. Promotion of local community empowerment and development of sustainable natural and built-up settings for today's and future generations are basic ingredients of planners advocacy. As advocate, the planner represents the interests of the people affected by a proposed development, in their dialogue with government or private developers. In this role the planner ensures that the views and anticipation expressed by people are incorporated in the plan proposals (GoB, 1997).

All planners can use their authority as regulators, as gatekeepers of information, as negotiators and political advisers, and as designers to promote certain programs, plans, and patterns of development or non development. However, the degree to which a planner can overtly advocate positions depends on the type of planner he or she is and the position he or she holds. For example, county (district) and city planners, as part of local government administration, are somewhat constrained in their ability to openly promote new initiatives. Their actions need to be more discreet, working with community organizations and sympathetic elected officials. On the other hand, "citizen planners" or counter planning community groups are the strongest advocates. However, they have less authority and their influence depends on building a constituency and using community support to affect decisions (Randolph, 2004: 32-33).

In exercising the advocacy role planners must be fluent in legislative issues and legal practice. Sometimes they will need advice from professional lawyers who are specialists in land, environmental and property law. The complexity of spatial and environmental issues influenced an increase in number of physical planners who are now adding law and other specialised degrees to their planning background. Equipped with such weaponry the implementation techniques for plans such as ordinances, control codes and other forms of local laws become easy tasks for the multidisciplinary professional. There is also an excellent opportunity for planners to enrol some combined planning/law degrees that open more room for their engagements as real advocates of change. This trend has started in USA and continues in Australia, Britain and some European countries. On another side traditional planning and law schools are introducing more subjects originating from other school. For example at the University of Botswana planning and architectural school it has been proposed to introduce 3 law subject on undergraduate level and several electives on post-graduate level.

APPLICATION OF SUSTAINABLE ECO-PLANNING CONCEPTS

Many researchers have recognised the importance of the changing role of the contemporary planning professional (Batey 1994, Hague 1994, Kelly and Becker 2000, Krizek and Power 1996, Randolph 2004, Roseland 2000). However, this also needs to move towards application of sustainable planning concepts and techniques by which physical planners should actively be exposed as a leading professional force in solving the developmental problems of existing and new cities. Currently, many national policies are driving prosperity through the economic prism only, where ecological sustainability that includes trends in natural and social capital is not considered seriously. Economic modelling and prediction of urban growth without sound ecological instruments are dominating today's scene. The battle between parties of reds, greens, browns and whites on one side, and profit oriented on another side is still on. The more practical tools you have in this battle, the better possibility of wining or at least establishing a clear line of defence of basic "environmental and social values" (see Table 3).

Planning of cities as an ongoing attempt to guide their future development and redevelopments should rest on ecosystem premises, and apply an approach where cities and towns should be treated together with their hinterlands and seen as an entire ecosystems. The strength of this approach is its capacity to treat urban settlements holistically through an effective application of planning models and techniques that have been developed to support "ecologically sustainable change". While this is an essential step in moving toward creating different and more sustainable urban environs in Gaborone, there is also concern about the ability of decision makers to accept and understand disadvantages of current "urban patterns" and need for its rectification based on ecological principles and collaborative learning.

The purpose of this part of article is to initiate the planning auditorium, decision makers and public with the "eco-system approach" which is deeply rooted in numerous "sustainable planning concepts and techniques" such as: 1) new town development; 2) urban growth boundaries, buffering and purchasing of development rights; 3) green belts, greenways and urban blue; 4) clustering, densification, compacting and vertical expanding; 5) mixed land use development (MXD); 6) traditional and modern neighbourhood planning; 7) the new urbanism and smart eco-growth. Selection and implementation of planning modalities outlined here in the planning daily practice is a question of concrete local needs and characteristics of current development trends. These concepts and instruments illustrate diverse pathways in curbing unsustainable urban development and securing more environment user friendly strategies. As an ending consequence it is expected that they can lead to the planning and development of the "eco-city".

All these selected concepts are highlighted in terms of their guiding concerns which can improve "urban environs" based on the following: 1) creation of an urban environment that improves a social, economic and psychological sense, the quality of life of those communities that experience that environment; 2) facilitation through a variety of transport modes, the circulation of people, goods and services within a local neighbourhood, and

Table 3. - Smart growth tools used to prevent and control urban growth and sprawl

Limits and Regulations	**Protection**
Limit building permits	Preserve existing open space
Urban growth boundaries	Buy new open space
Green belts around cities	Buy development rights that prohibit certain types of development on land parcels
Public review of new development	**Taxes**
Zoning	Tax land, not buildings
Encourage mixed use	Tax land on value of actual use (such as forest and agriculture) instead of highest value as developed land
Concentrate development along mass transportation routes	**Tax Breaks**
Promote high-density cluster housing developments	For owners agreeing legally to not allow certain types of development (conservation easements)
Planning	For cleaning up and developing abandoned urban sites (brownfields)
Ecological land-use planning	**Revitalization and New Growth**
Environmental impact analysis	Revitalize existing towns and cities
Integrated regional planning	Build well-planned new towns
State and national planning	

Source: Miller, 2004

between the neighbourhood, districts, zones and larger city environment; 3) facilitation of the provision of mixed land uses by identifying appropriate locations for, and quantities of facilities and amenities; and 4) facilitation of the provision of the full range of utility services, by ensuring that the spatial and environmental requirements of the various services are met within the city plan (Behrens and Watson, 1997).

New Town Development

Application of the new town development is a very popular way to escape from problems of population pressures and environmental decays. Planning literature and practical cases show that there are three potential types of the new town development. These are 1) satellite town development; 2) freestanding new towns development; and 3) development new towns in-town. The first type can be applied in Gaborone setting by establishing clear "green belts" between city proper, surrounding fields and sprawling areas of neighbouring villages. The second type is characterised by the development of mining towns in the areas where the diamonds have been discovered. The third type is visible in the northern part of Gaborone city, where the development of Phakalane Estate takes a place.

A combination of second and third sub-type in this planning model can be a sound solution for the future of Gaborone in terms of fragile environment protection and benefits for those who can afford to live in such places. Some critics are concerned that most of these communities do not provide affordable housing for the poor and for many middle-class families. In the Botswana context these disadvantages can be curbing with government programmes that support mixing low-income and middle-income developments in the same neighbourhoods. The quest here is not to secure only that poor, middle class and reach live in the same vicinity, the more important question is how they are going to utilise the public facilities and utilities in such new development assemblies? Arte they going to have an equal access and opportunities or will the new town setting will restrict accesses based on income abilities? Some of these dilemmas need to be addressed before actual planning starts.

Urban Growth Boundaries, Buffering and Purchasing of Development Rights

Current boundaries of the Gaborone metropolitan region and the city proper are an administrator's fictions (both City Council and South-East District) which support sprawling of built-up areas and sub-division of natural savannah into small pieces of agricultural land. It was very difficult to keep stable boundaries in the dynamic evolution of Botswana capital, due to unpredictable development of the new city which has been planned for only 20,000 people at it beginnings in 1966. An urban growth unprecedented in the history of this country has triggered almost uncontrolled movements towards virgin lands in the city vicinity.

Urban growth boundary as a line surrounding a city beyond which new development is not allowed is one possible option in societies with strict legal regulations and opportunity to protect the state interest. Also, people's behaviour and cultural preferences can support or discourage how boundaries are set-up. In most of the cases, is quite difficult to assure that communities worldwide would follow this concept in preserving their open spaces, agricultural land, forests, wildlife habitats, and water features.

An extended version of this concept so-called "buffering" gives more freedom outside the strict boundary line, including the space on both sides of the line, in the form of narrow protection zones and corridors. This transitive solution can be more acceptable in situations where land users don't want rigidly imposed restrictions. As ever cities expand these small pockets and corridors can save fragile locations to be encroached with negative impacts from surrounding areas. Creation of small or medium-size parks or open spaces in "buffers" by (1) removing buildings and streets, (2) planting trees and grass, and (3) establishing ponds, wetlands, and lakes in areas where buildings have been abandoned (Miller, 2003:681) shows some options in applying this planning technique.

Many interest groups may support government policies intended to intensify the process of (1) buying land for use as parks and other forms of community open space and to protect environmentally sensitive land or surrounding farmland from being developed or (2) purchasing development rights that prohibit certain types of development on environmentally sensitive land (Miller, 2003:681). Different stakeholders and interested groups may be involved in a such venture (e.g. government agencies, NGOs, parastatals, private enterprises, non-profitable, charitable and religious organisations, city communities)

Unfortunately, the case of Gaborone shows that farmland acquired through government intervention has been mostly planned and developed as a built-up area for future expansion of the city. Farmers located near the city have

been left with small chunks of unsustainable and unconsolidated land which cannot secure community self-sufficiency in food production. For example, the prime land in Gaborone north, that buffers the College of Agriculture (north of Sebele and Glen Valley) is zoned for low and medium density residential land uses in the latest Gaborone City Development Plan. This case demonstrates the significant obstacles in traditional zoning where economic factors were not sufficiently strong to keep this prime farmland as a base for the entire city food supply. Ideally preservation, smart subdivision, consolidation and conservation should follow application of purchasing development rights. This will limit leapfrog development in open country and allocates the concentration of development in urbanising part of the growing Botswana capital.

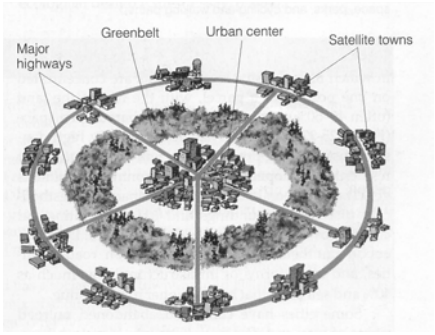
Green Belts, Greenways and Urban Blue

Greening and refreshing of thirsty cities are truly important components of healthy and aesthetic urban growth. Greenery and water features change the micro-climate, secure tranquillity, helps recreational opportunities, boost city breathing capacity and beautify its communities settings. Developers as well as interested citizens recognise the value of green belts, green ways and urban blue (e.g. water features) in diverse neighbourhood settings. However, the quantity and quality of these natural and semi-natural landmarks is shrinking and in the most of the cases they are converted into residential, commercial and transportation land cover.

Actions in providing green belts to save open spaces and control urban growth are aimed to curb speeding land conversions and ensure that some areas are left for a more sustainable utilisation than the thousands of hectares covered by street concrete and building footprints. Many cities all over the world have started to implement the "green belt concept" where a large belt of greenery is encircling the city proper (see Figure 4). The main city is usually surrounded by a network of satellite towns connected to the major urban centre of green belt region by an extensive public transport system network.

Some cities have converted abandoned railroad rights-of-way and dry creek beds into bicycle, hiking, and jogging paths, often called

Figure 4. - Green belt development



Source: Miller, 2004:68

"greenways". More than 500 new greenway projects, developed largely by citizens' groups, are under way in the United States. Many German, Dutch, and Danish cities are connected by extensive networks of footpaths and bike paths (Miller, 2003: 682). Everywhere across urban world once-barren streets are now a-greening and a-blooming. Flower bedecked planters, window boxes, and hanging baskets enframe store windows. Recessed bays and setbacks are converted to mini parks with raised planting beds and seating. Concrete boulevard medians are converted to seasonal showpieces. Vacant lots in the inner city are cleared of trash by citizen groups and, with the help of civic groups or clubs, made neighbourhood gardens and gathering places. Waterish arrangements flows through the dry landscapes and many formerly polluted river streams and riverbanks have been cleared of debris and restored to verdant waterways. Lake-shores and waterfronts have become a focus of public improvements and the focal points and pride of many cities (Simonds, 1997:344-5).

Gaborone and its surroundings were once areas of more green and blues then today. However, not only because climate changes, but mainly due to human interference, greenery and water resources have become scarce. One of the solutions to improve the situation and provide urban habitat for an increasing number of people was to construct the dam as main source of potable water. The seasonal character of rainfall has put restrictions on dam operation, especially during the periods of prolonged drought which sometimes had the character of a natural disaster. In such a situation the development of Gaborone urban greenery and urban blue system have become heavily dependant on the water situation. Water scarcity is inevitable during the dry season, but unfortunately during the short and mostly reach rainfall episodes water is not collected and saved. The majority of rain water drains into the ground instead of being seized and utilised during the time of low rainfall. Besides, the dam as a main water circuit, city planners, engineers and developers should consider some other water accumulation and conservation techniques. Greening the city, but not only within the perimeters of individual plots and establishment of more local water collection points can be a prudent way in applying "greenway and urban blue" strategies in Gaborone context. Small semi-treated sewage water ponds in Phakalane Golf estate are good example of how water can be preserved and utilised for watering grass, urban agriculture in neighbouring Glen Valley and Sebele areas and for keeping small animal habitats alive.

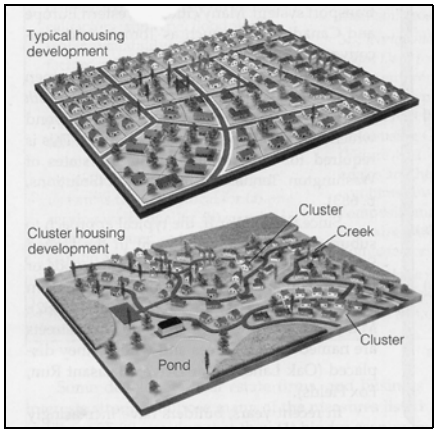
Clustering, Densification (infilling), Compacting and Vertical Expansion

Urban sprawl, leapfrog development and a lowered sky-line silhouette are the dominant characteristics of Gaborone's horizontal and vertical urban morphology. Consequences of such an urban pattern have been discussed earlier and the conclusion is to try to find the ways how to make Gaborone's image more compact and robust. The first available option in a planner's toolkit can be introduction of "cluster subdivisions", which can help to protect environmentally sensitive areas and compensate individual owners with more communal space (see Figure 5).

To be effective, this requirement should rate building sites according to some functional criterion such as soil suitability for on-site sewage disposal, degree of slope, or degree of soil erosion. The clustering provision in a development control code or zoning ordinance should indicate the maximum number of building units per hectare. Bylaws that could be adopted by the Gaborone City Council jurisdiction could set aside one-half or more of a parcel for agricultural use or open space while still allowing the same number of plots that conventional subdivision permits. For example, cluster zoning could require a

minimum of ten hectares for a development. The prospective developer may be restricted to building on only 25 percent of it and nly on a portion of the land with permeable soil or some other specific criterion. Approval may depend on development rights on the remaining land being dedicated to the town or estate jurisdiction (Sargent at. al., 1991:96)

Figure 5. - Cluster vs. conventional development



Source: Miller, 2004:682

This technique would help to subdivide exterior yards of currently large plots (e.g. with varying sizes staring from 800 m² to sometime more than 4,000 m²) in many Gaborone areas. Application of this technique is currently visible in Phakalane Golf Estate area. These formerly big plots have now been reduced to 700 m² and 1,400 m² with the excess converted to golf greens. Reliance on smaller plots in a typical sub-urban setting and maintenance of privacy brought by green buffering between residencies have been maximally achieved in this case. It is advisable to continue to implement this technique in Gaborone North, as well. In combination with urban greening, the clustering can help to keep more land for urban agriculture, recreation, and habitat protection. Furthermore, the subdivision of newly formed super-blocks in Gaborone West can also be executed by cluster subdivision devoting more land to common open spaces and allowing for the concentration of building activity on the more suitable areas of a site which will ideally result in a reduction in development costs associated with earth works, grading and supporting infrastructure.

When done properly, high-density cluster developments are a win-win solution for residents, developers, and the environment. Residents get (1) more open and recreational space, (2) aesthetically pleasing surroundings, and (3) lower heating and cooling costs because some walls are shared. Developers can cut their costs for site preparation, roads, utilities, and other forms of infrastructure by as much as 40% and sell units that have a higher market value (Miller, 2003:680). Cluster developments are often very attractive, from visual point of view, and therefore may be quite marketable (Anderson, 2000). In addition, the argument for clustering development and higher densities development includes optimum use of infrastructure, recreational and cultural facilities, as well as employment opportunities and financial viability (Righini, 2000).

The 1963's master plan for Gaborone followed the principle of a 'Garden City', allowing low densities. Even with the expansion of Gaborone City, the demands for plots continued to outstrip supply. Planning could neither satisfy the high demands for plots nor could it turn the page from cost-intensive low-density, low-floor housing to low-cost high-density and multiple floor housing. One reason for these failures is that Batswana (the people of Botswana) are not used to live in multi-storey buildings. As the migrants come from rural areas, where land and space seems unlimited, there is no need to build technically complicated and costly two- or more storey houses. This flatlander culture has been shaping the development of the new quarters of Gaborone. Mostly, vast single storey houses cover only between 100-150 m² of the plot, which gives very low ratios of the sum of all floor spaces to plot area (0.4 to 0.6). On those plots, building coverage is approximately around 10-20% (Keiner & Cavric, 2004).

Changes in flatlander "sense of place" and culture are very slow, but an appearance of the first multi storey buildings in Government Enclave, and multi-family (2 to 3 storey) flats and town houses in Gaborone West (e.g. Block 2, Village area, Ext. 9) are good signs that developers, urban designers and officials in planning and engineering agencies are trying to contribute to densification and vertical expansion of city sky-line. It has been assumed that this process can mark a new milestone in anticipated urban development trends. More rational, less expensive, and socially and environmentally pleasing set-ups in these types of building constructions could bring a sustainable and more compact form of city in the future. Off course, avoidance of sky-scrapers as monuments of "some other worlds" and reasonable height between 8-12 storeys for office blocks, and 2-4 storeys for residential and 3-5 for commercial buildings, could be a good guideline in re-shaping Gaborone's sky-line and "compacting" its built-up foot print based on the following premises:

- shortening trip lengths (than a dispersed pattern) and giving more opportunities for exercise through walking and cycling;
- lowering car dependence and reducing levels of air/noise pollution;
- offering a wide choice of facilities within easy walking distance, promoting greater access to and choice of food;
- securing land values that can be sufficient to encourage urban renewal and regeneration, which can help foster pride and a sense of community;
- bolstering the vitality and viability of the city centre, improving the economy and providing more employment opportunities;
- recycling and reusing buildings materials, reducing energy and resource consumption; and
- improving access to rural open space, providing opportunities for increased recreational activity (Barton & Tsorou, 2000).

Mixed Land Use Development (MXD)

Horizontal and vertical mixtures of different land use activities is another opportunity for redevelopment and rejuvenation of Gaborone City. A simple look at the latest Gaborone City Development Plan (GoB, 1997a) land use proposal map shows that there is practically no mixed land uses. A limited area of 51,17 hectares has been recognised as a MXDs, which represents only 0,27 % of the total land mass (e.g. 19,096 ha). The system of 14 large super blocks with internal rigid zoning is dominant planning tool applied in the plan. Unfortunately, this proposal will shape the destiny of the Botswana capital in the next 17

years if responsible officials don't react and request an urgent plan review. The mixed land use development (MXD) concept is flourishing all over the world, and even in USA which was leading force in strict zoning regulations and planning based on private car ownership. Today there is clearly a significant difference in the philosophy of "strict zoning separation" and "MXD" which brings mosaic city experience at the doorstep of its urban dwellers.

Emerging trends on the content and context of "MXD" development patterns and principles include:

- A greater focus on the integration of uses, as might be exhibited in a reduction in distances between development types, or vertical integration, as with the first retail and upper level office or residential uses.
- A more subtle way of mixing uses, from the standpoint of an increased variety of residential types given the market diversity of residents, and greater integration with nearby retail and employment activities.
- A renewed focus on the connectivity within and between developments in ensuring adequate and alternative means of vehicular movement as well as greater attention to pedestrian opportunities.
- A reassessment of the location of open space with recognition of its role in place making and elevating it beyond the unusable or leftover ground within a development (Dewbery, 2002: 220-221).
- A means of achieving higher densities and rapid development of the site's potential.
- A means of sharing infrastructure, thereby making possible economies of scale in development and operation.
- A means of achieving greater long-term appreciation in land and property values.
- A means for balanced development, representing a compromise between broad control over development for fiscal, environmental, or other reasons and narrowly sufficient regulation of the real estate industry, and
- A means to provide an attractive transition between different land uses and districts.

By virtue of their scale and design complexity, as well as by functional diversity, mixed-use developments can have a far greater impact on community development than single purpose projects (Schwanke at. al., 1987: 45-46), which are the current in urban development in Gaborone. The contribution of MXDs in creating spaces with more sense and individual character is enormous, especially in the parts of city which can be called "sleepy" or "dead" districts. A mixture brings new life to these urban areas and makes them vibrant and liveable 24 hours a day. It is an amazing experience for the occasional visitor or tourist that in Gaborone's down-town (e.g. Central Mall, Government Enclave, and African Mall) there is a complete absence of entertainment, cultural or recreational attractions. Instead one finds that after working hours these areas attract people with vices. This makes visiting this part of the city unpleasant, uninteresting, and sometimes even dangerous. With a little bit more of vision, imagination and diversification ideas, MXDs can add a new dimension to the Gaborone urban experience. It could help to revitalise and revive the downtown, inner city and the suburbs which are mostly echoing a boring weekend rhetoric of "braai (grill)" and "chibuku (traditional brew)" culture.

Traditional vs. Modern Neighbourhood Planning

The generations of physical planners who were trained abroad are forgetting their roots and the culture of "Kgotla" neighbourhood planning concept and the way of life in traditional Botswana. The influence of modernists coupled with traditional concepts in future planning and design of Gaborone might be a good "marriage of convenience" and answer for transition which is anticipated in this country and its capital.

Many years before Howard (1898), Perry (1929), Solow and Copperman (1948) produced topical works on "neighbourhood planning concept", settlements in Botswana had a distinctive form of physical and social organisation based on "Kgotla public democracy" and a "traditional wards system" (e.g. neighbourhoods). The dominant position in internal physical structure of traditional Tswana settlement was designated for the chief's Kgotla. In every small village, and in each town ward there is a Kgotla (Rankhuna, 1997). The Kgotla is a nucleus of public and political life and a meeting place. Beside main chief's Kgotla, which is usually located in the geographical focus of the village, there are several word's Kgotlas (or headmen's digkotla). They usually assemble extended families from 3-6 wards. The role and location of the Kgotla as a principal meeting and decision-making place and centre of socio-political and public life is preserved to the present time in almost all major urban villages.

The typical layout plan of a traditional Tswana settlement is characterised by a range of circular and semi-circular geometric features, which are not based on strict planning principles and infrastructure matrix. As Wareus (2000) notes, the traveller can see "horse-shoe" clusters of houses with the private *lowlapas* (small yard with 2-3 individual buildings). These are followed by communal areas of *patlelos* (designated as children play grounds, close neighbours meeting places and small live stock keeping places) and finally with the public *Kgotlas* with buffers, reserves and communication spaces between. This plan was created without the aid of modern planners and it was an indigenous adaptation of a communal solution to the surrounding environmental settings.

In a physical sense, the Kgotla and areas that are formed around it from the centre of the settlement reflect social and physical organisation and segregation. The chief was in the centre with members of his family, his brothers, uncles, cousins, while other radiated outwards in order of seniority and importance, including other Batswana families and number of people who acted as servants (Rankhuna 1997, Tlou and Campbell 1984). The analysis of an overall "Kgotla" organisation of traditional Tswana settlement, evidently shows the distinctive elements of the neighbourhood planning concept. In connection with it Wareus argues that "modern thinking about neighbourhood planning suggests about the full range of private, semi-private and public areas should be included in planning layouts and that the ideal size of neighbourhood clusters is the same as the typical of villages in Botswana" (1997).

The Kgotla is a traditional instrument for articulating public and individual interests in Botswana. Its functions are similar to those of a local parliament. The Kgotla is a meeting place in a ward. Wards are subsets of Council political areas. The Kgotla is regarded as a legitimate institution for public decision-

making. Once a decision has been made at the Kgotla, it is considered binding for the entire community. The Kgotla should hold public meetings for development activities concerning the city, in addition to its customary court functions the Kgotla forms an important forum that should brings urban development issues to the attention of the government. It is the starting point for bottom up development and forms an imporatnt basis for involving the people in decision-making processes. (Keiner, Salmeron, Schmid and Poduje, 2004:208).

However, the opportunities given by this traditional framework for social and physical organisation has not been implemented in today's modern planning of Gaborone city. Supper block arrangements have killed opportunities for closer contacts among people and their opportunity to express and advocate their interests and requirements for improving their physical and socio-economic environment. According to Anderson (2000) some sociologists and urban planners have suggested that the residential pattern of the neighbourhood would foster an increase in social contacts ("neighbouring"). This, they said, would reduce the impersonal atmosphere that is found in many of our cities. The degree to which this has come about in newly developed neighbourhoods can be argued. It appears that increased localized "neighbouring" does occur to some degree in sections of planned neighbourhoods, but that this does not spread over wide areas, in such super-blocks which are the basic spatial-units in Gaborone city.

The New Urbanism and Smart Eco-Growth

When rural migrants reach Gaborone city and decide to stay, work, study and live in a new ambient, they are exposed to numerous challenges and dilemmas in the daily battle for adaptation and smooth settlement. Whatever the changes they feel, between their previous rural and current urban type of setting, a city makes a radical impact on their behavioural and cultural senses. At first glance they look lost, in limbo between, urban and village metaphors, and between freedoms and restrictions posed by both urban and rural environments. They start to memorise dualistically all aspects of their lives then and now. The words urban and village are bringing to them the following opposing emotions (Sucher, 1995:8):

Urban	**Village**
hustle-bustle	tranquility
liberty	structure
lonely	together
hostile	friendly
far away	closeness
strangers	kindred
possibilities	limits
growth	stasis
artificial	natural
complex	simple
large	small
skyscraper	cottage
liberal	conservative
anonymous	familiar

In countries like Botswana the planning concept which should recognise both scale of settlement cognition has a good prospect for success because it tries to balance and translate both settlement perceptions into the real world of physical patterns. In 1972, a young builder named Michael Corbet began implementing a development concept for "Village Homes" and other developments suitable for new comers and indigenous urban dwellers. The ideas around this concept have sprung quickly covering issues such as:

- Energy efficiency and natural heating and cooling
- Water resources and riparian habitat management through natural drainage systems
- Agricultural production for local consumption
- Provision of consumer services, jobs, recreation, education, and cultural opportunities within walking and cycling distance to reduce dependency on the automobile
- Orientation of development away from streets and toward pedestrian and open areas to reduce people's confrontation with vehicles
- Useful, satisfying employment within the community, including small businesses and entrepreneurial activities
- Opportunities for low-income people and new comers to get job training, to buy housing, to become part of the community (Randolph, 2004:114)

Latter on, this original idea was improved on by Calthorpe (1993), Duany, Plater-Zyberk and Speck (1993), Kunstler (2001) and others, culminating in the Charter for the New Urbanism (2002) in which the preamble highlights:

> "Existing patterns of urban and suburban development seriously impair our quality of life. The symptoms are: more congestion and air pollution resulting from our increased dependence on automobiles, the loss of precious open spaces, the need for costly improvements to roads and public services, the inequitable distribution of economic resources, and the loss of a sense of community. By drawing upon the best from the past and present, we can plan communities that will more successfully serve the needs of those who live and work within them. Such planning should adhere to certain fundamental principles".

Admirers of this new way of urban thinking believe that cities and their integral parts should be designed and built in a far better manner. Applied in a regional constellation this concept is also known as "smart growth". Randolph (2004) lists the key elements of its application at regional level. These are regional integration, conservation design, rural and greenfield development, sub-urban revitalisation, village and small town development, and urban fill and brown field development.

Analysing Gaborone Greater Region and Gaborone City as its integral part, all the above listed elements are already issues which need serious consideration. Regional integration call for more integrative role of Greater Gaborone Structure plan and cooperation of Gaborone City Council, Kweneng and South-East District authorities. Conservation design have not been applied as an instrument in preserving indigenous African character of Gaborone city and its rural hinterlands.

In situation where the food resources and local healthy agricultural products are becoming priorities, conservation and green-field development should appear at the planning stage. The development and more sustainable design of surrounding peri-urban villages of Mogoditshane, Tlokweng, Mmopane. Metsimotlhabe, Gaphatshwa, Gabane and Mopane, is also an element of serious concerns. Curbing their sprawl, buffering, and establishment of green belts should help them not to be consumed by the growing Gaborone agglomeration. Already

there is no hope for Tlokweng and Mogoditshane which are integral parts of the city's expansion. Urban in-filling, densification and clustering, as well as sanitation, clean-up and closure of brown field development (e.g. dumping sites, borrow pits) are burning issues and priorities which need urgent attention when applying smart growth instruments.

CONCLUSIONS

Sustainable future of Botswana capital will not come easily and overnight. It will require a transition in our cultural, behavioural and socio-economic values which are becoming more and more attitudes of western societies that should not be always a model for our anticipated destiny. More active and changing role of physical planners in designing and developing Gaborone city recognises that the key to a sustainable shift lie in different perception of today reality which is full of problems. Physical planners as frontrunners for sustainable change should professionally and intuitively understand and guide public how to sense what are the alternative solutions for improvement of societal well being. "What really matters is not always one's material possessions but one's psychological economy, one's richness of human relations and freedom from the conflicts and constrictions that prevent us from enjoying what we have" (Wachtel, 1989). Examples of "psychological economy enjoyments" are becoming parts of Gaborone daily scenery which is full of clashes between poverty and extreme richness.

Not long ago Botswana was one of the poorest countries in the world, then become pretty reach. The change of its economy from agriculture to diamond-based and limited market economy has brought many challenges in less than 30 years. However, today there are lot of signs of economic, social and environmental decline. The race for fast economic growth based on western principles, have melted traditional frameworks of Botswana sustainable life. This retrograde trend is immanently recognised in urban part of this society, where negative impacts are reaching almost every individual. This trend still continues and it will bring more problems, if we don't wake up from fallen dreams and false notions about our greatness amongst other African brothers. Only with wealthy, educated and knowledgeable people we can curb negative consequences of non-diversified economic matrix and thresholds of our urban settlements in general, and Gaborone city in particular.

Sustainable Gaborone eco-city require unprecedented and simultaneous emphasis on the efficient use of its urban space, on minimizing the consumption of essential natural capital, on multiplying social capital, and on mobilizing citizens, their associations and city government toward these ends. This synergistic approach will enable our capital to be cleaner, healthier, and less expensive; to have greater accessibility and cohesion; and to be more self-reliant in energy, food and economic security than it is now. Sustainable Gaborone will not, therefore, merely "sustain" the quality of our lives-it will dramatically improve it (Roseland, 2000). The case examples of cities like Curitaba (Brazil), Waitakere (New Zeeland), Tapiola (Finland), Portland, Davis and Chattanoga (USA), confirm that "eco-city" which should be the target in future planning of Gaborone is not a futuristic dream. The development of such an eco-city capital of Botswana can be based on:

- preventing pollution and reducing waste,
- using energy and matter resources efficiently
- recycling and reusing at least 60% of all municipal solid waste
- using solar and other locally available (e.g. natural gas) renewable energy resources
- encouraging biodiversity
- using composting to help create soil
- using solar-powered living machines
- walk or bike to most places, including work
- use low-polluting mass transit
- requiring that all buildings, vehicles, and appliances meet high energy efficiency standards
- planting the trees and other greenery that is adapted to the local climate and soils only
- introducing small organic gardens and a variety of plants adapted to
- reducing pollution, noise, and soil erosion, and
- securing supply for limited urban wildlife habitats
- cleaning and restoring polluted and abandoned lots, industrial sites, landfills and other brownfields
- preserving urban forests (eucalyptus, bush trees), grasslands (savannah), wetlands (sewage ponds), and farms from urban sprawl.
- producing food from organic farms, solar greenhouses, community gardens, and small gardens on rooftops, in yards, and in window boxes (Miller, 2004).

This article urges planners to assume a changing and stronger role in planning the future of Gaborone city. In many people's minds, the role of the planner has always been about securing a more sustainable future (i.e., allocating resources wisely, reducing waste, making transport cheaper, easier, and better). In this respect, sustainability may require new generations of planners to emphasize what people thought they should have been doing all along helping people arrive at the future they desire. What may be new (or rediscovered) is the commitment to extend the time horizon beyond a reasonably predictable future and clarifying possible outcomes and opportunities that are available. As members of a profession dedicated to making communities, states, nations (and for that matter, the world) more liveable and humane, it is the planning profession's responsibility to ensure that our vision includes not just the current generation but future generations as well (Krizek and Power, 1996).

People designing and living in eco-cities should take seriously the visionary statement of Lewis Mumford in which he advised more than three decades ago that we have to "forget the damned motor car and build cities for lovers and friends." In reaching such a lofty ideal, our planners have a whole fan of applicable tools. Gaborone planning and development are still passing through pioneering stage. The list of planning techniques discussed in previous section of this article is only a part of potential planners' arsenal and it is not exhausted. Most of them can be varied in Gaborone local context. They can have indigenous approach and the scope, and the way in which they can help supporting sustainable urban development practices. Their selection is given for an illustrative purpose, but if they are practically implemented, they can have the catalytic effect on other interdisciplinary stakeholders involved in creating Gaborone' responsive environment. This requires powerful reform in planners and decision makers' knowledge, as well as in public perception of their mother city.

Paraphrasing the words of John Ormsbee Simonds (1998: 346-350) we can say that the people of Gaborone' who would live and work in its urban spaces; enjoy its sunsets, blue skies and desert green; rise their children and tell the stories of grand-grand fathers to the new generations of urban dwellers must have city rich in a variety of urban spaces. Each should be planned with sensitivity-to best express and accommodate its function; patterns through which everyone may move with safety and with pleasure and in which they may congregate. Citizenry of this "*petite and cosmopolitan African urban village*" must have health, convenience, and mobility on scales as yet undreamed. There must be also an order. Not an antiseptic, stylish, or grandiose order of contrived geometric dullness or sweeping emptiness but a functional order that will hold the city together and make it work-an order as organic as that of the living cell, the leaf, and the tree. A sensed cohesive and satisfying order that permits of the happy accident, is flexible, and combines the best of the old with the best of the new. An order that is sympathetic to those structures, things, and activities that afford interest, variety, surprise, and contrast and that have the power to charm the heart. Today' and future habitants of Gaborone need their city as a source of inspiration, stimulation, refreshment, beauty, and delight. They also must have, in short, a salubrious, pollution-free urban environment conducive to the living of the whole, full life.

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ELEMENTS OF SPATIAL DATA QUALITY AS INFORMATION TECHNOLOGY SUPPORT FOR SUSTAINABLE DEVELOPMENT PLANNING

Dušan Joksić, Branislav Bajat

We are witnessing nowadays that the last decade of the past century, as well as the first years of the present one, have brought technology expansion with respect to spatial data gathering and processing which makes a physical basis for management of spatial development. This has resulted in enlargement of the spatial data market. New technologies, presented in computer applications, have greatly expanded the number of users of these products.

The philosophy of spatial data collecting has changed; analogue maps and plans printed on paper have been replaced by digital data bases, which enable their presentation in a way that is the best for a particular user. Further, digital spatial data bases provide the possibility of their further upgrading by users.

The two aspects, with respect to circumstances mentioned above, are very important in the process of data bases production and distribution. Firstly, the users of these data bases should be the ones who decide which of the available bases could satisfy their requirements, or in other words, what is the data quality level necessary for a certain application. On the other hand, the visualization of digital data bases could often mislead, since review of data bases could present data with better accuracy then the actual one. Thus, certain methods that would point to a quality of the selected data in the process of their analysis should be available to users.

Specific, already adopted international standards, or specially developed procedures and methodologies, so called de facto standards, could be used in this data processing, enabling the estimation of these data quality.

The development of Open GIS concept requires the adoption of widely accepted standards for spatial data quality. It is recommended that ISO standards should be accepted, firstly TC211 standards, which are related to geographic information and geomatics. The realization of projects on ISO standards should be finished by 2006, so, all participants of these data bases should be both familiar with this project and ready to adapt to the given solutions.

The basic components defining quality of data bases are explained by this work, and the results of the standardization regarding the procedures and methodology of their quality assessment, obtained so far, are also presented.

INTRODUCTION

The fundaments for decision making in projecting and spatial planning are made of spatial data, first of all cartographic data, such as cadastre, topographic and thematic maps, then statistical data and all available associated documentations. In the last decade of the twentieth century, these documentations have been changed by geospatial data (in digital format) organized in GIS encirclement, suitable for data processing and visualization for all data users. Progress of information technology, as well as revolution in data collecting technologies (GPS, digital photogrammetry, laser scanning, InSAR etc.), play a leading role in spatial data base management. The final result was the change in technology of accessing, maintaining and processing of spatial data. Term spatial data refers to data about positions, attributes, and relationships of features in space (9).

Since then the traditional cartography products have no longer an irreplaceable role in spatial and sustainable development planning. Software which use spatial data in digital form (GIS, COGO and CAD utilities) are unavoidable tools for spatial planners, architects and other experts.

The geographic information systems (GIS) have largely been used as technology for complex management which, as a mean for coping with enormous volume of data associated with geographic information and the extensive calculations, need to rectify and analyze these data in decision-making context (2).

Different sources of spatial data lead to different level of data quality. Great amount of data are obtained by encoding analog maps of different scales or satellite images of different resolutions. Those parameters have great influence on some data quality elements.

Spatial databases of completely unknown qualities of accuracy are greatly enhanced by inter-mixture of digital maps and associated attribute data with different errors and uncertain characteristics with specific error reducing or error amplifying properties of particular sequence of GIS operations (12).

SPATIAL DATA AND SUSTAINABLE DEVELOPMENT MANAGEMENT

The use of spatial information produces a direct or indirect possibility of increased efficiency in all sectors of public administration, in political decision-making process as well as in the private sector (13). There are innumerable applications where spatial information are used, like: cadastre projects, land management, transportation infrastructure, health monitoring programmes, monitoring of environmental issues, environmental impact assessment, statistical analyses, conservation projects, natural resource management, etc. All those activities could be classified as a part of the broader work called sustainable development planning.

Spatial Data is data with a direct or an indirect geographic reference to the surface of the earth. Combining data from one or more different sources creates information. More than 80% of all information in society has a spatial reference. Spatial Data and information are strategically important for decision-makers at all levels of Sustainable Development Management (13).

The sustainable exploitation of environmental resources requires:

- Data to be available, to be up-to-date, reliable and usable indicating the quality, quantity and spatial location of the various resources and the size and spatial distribution of the population which depend on these resources;
- The availability of tools to support the transformation of data into understandable information for decision-makers, from the national and international levels to the grassroots levels;
- Rethinking of both inter-organizational and intra-organizational relations in order to improve the use of common data and the reuse of data.

In view of the fact that spatial data plays very important role in decision making, it is necessary to bear in mind the quality of the above data as well as its applications.

Since a dataset is produced for different applications rather than for a specific application, the quality of dataset can be assessed only by knowing the data quality elements, as well as by the data quality overview element (6).

QUALITY ASSESSMENT OF SPATIAL DATABASES

New technologies of the computer systems applications have changed traditional role of cartographic products. They have enabled inclusion of more participants in making spatial data products, and what is more important, they have significantly expanded the number of users of such products. The introduction of GIS in the mapping process has also produced a completely new kind of users different from the traditional map users.

The philosophy of map production has changed, maps sheets printed on paper have been finally replaced by databases, with data structures which enable visualization of different manners, that depend on the purpose and necessity. The dominant opinion among such data users is that digital data are of a higher quality than conventional map data.

The fact is that in distribution, digital data bases offer opportunity to be updated by users. It is very common case that spatial data bases are compiled by different firms which are engaged in collection and processing of a data.

Two aspects are very important in the cycle of production and distribution of spatial data bases. Firstly, users have to decide which of responsible spatial data bases may satisfy their needs, in other words, which level of data quality is sufficient for particular application; on the other side computer visualization of digital data often mislead users because the views obtained may present more accurate data than they really are. That is the main reason why users must have certain methods which would point out the quality in the stage of data analysis and visualization.

The interest for data quality assessment is emphasized for the following reasons (17):

- Increased data production by private sector. Historically, mass production of geospatial data was the domain of governmental agencies. Unlike these agencies, private companies are not required to conform to already known quality standards.
- Increased use of GIS as a decision-support tool. This trend has led to realization of the potential deleterious effects of using poor quality data, including the possibility of litigation if the minimal quality standards are not attained.
- Increased reliance on secondary data sources. This has been fuelled by a reduction in accessibility and constraints resulting from network accessibility and the development of standards for data exchange.

Data quality is itself a difficult term to categorize. The term data quality is broader than the accuracy of the data. Accuracy plays a large part in evaluating quality, but there are related issues which must also be considered. There are many varying classification schemes developed by research organizations in order to describe data quality. The objective of the different categorizations is to separate data suitability into distinct components.

Nowadays, the term 'data quality' has been replaced with the concept of uncertainty. According to dictionary, word 'uncertain' means not known, unreliable, changeable, or erratic. A variety of terms have been used, almost interchangeably, to communicate spatial uncertainty, including: error, accuracy, precision, vagueness, ambiguity, and reliability. Uncertainty can be defined in terms of either an affirmative or negative character. Uncertain data possess attributes of either accuracy (an affirmative attribute, means closeness of agreement between a test result and the accepted reference value) or error (a negative attribute, measured in terms of discrepancy). Accuracy is more readily quantified, in comparison with a model (geodetic, statistical, cartometric,

thematic, etc.) constructed for a specific purpose. Uncertainty is not simply a flow to be avoided or ignored; it is rather an inherent attribute of data manipulation processes (2).

COMPONENTS OF THE DATA BASES QUALITY

Work on evaluation of data bases quality started in the early eighties of the last century. At that time the only well-known standards which could be used as starting point were already existing cartographic standards. International Cartographic Association (ICA) was the first organization involved in research with the aim of standardizing various aspects of digital data bases.

At the ICA meeting held in September 1991 in Bournemouth U.K. the Commission on Spatial Data Quality was established, and its main goals were to:
- develop and document a comprehensive set of data quality criteria,
- develop and document a standardized rating scheme against those criteria,
- develop a methodology for data quality testing,
- publish an ICA manual for assessing digital spatial data quality.

In 1982 USA established National Committee on Digital Cartographic Data Standards (NCDCDS) under the auspices of the American Congress of Surveying Mapping (ACSM). "A Draft Proposed Standard for Digital Cartographic Data" deliberated by this Committee was the first comprehensive report related to digital cartographic data quality. This report clearly points out that "The purpose of the Quality Report is to provide detailed information for a user to evaluate the fitness of data for a particular use. This style of standard can be characterized as 'truth in labeling', rather than fixing arbitrary numerical thresholds of quality." (8).

A modified version of this document has been accepted by the National Institute of Standards and Technology (NIST) as the Federal Information Processing Standard-FIPS 173.

For the first time this report clearly designates five quality components of spatial data bases:
- lineage,
- positional accuracy,
- attribute accuracy,
- completeness,
- logical consistency.

ICA commission on Spatial Data Quality has accepted these five components as initial elements of spatial data quality. Two additional components are added on latter:
- semantic accuracy,
- temporal information.

Lineage or genealogy of data includes description of data sources, methods which are used for data bases creation, including all data transformations and transactions used in this process. This component must contain all data important for both, data sources and for the data upgrading process.

Lineage is usually the first component given in data quality reports, because all other quality components are subordinate on data genealogy and vice versa. The final purpose of lineage report is to keep precious information of data history for future users.

Positional Accuracy – Spatial and geometric accuracy of data. For point features, spatial accuracy is represented by discrepancy between encoded location and the location defined in the specification. It might be expressed in measures accuracy along coordinate axis or as a sum of them (Figure 1).

Metrics of spatial accuracy depends on dimensional entity which is considered. In the case of the point features it is represented with usual statistical means, like root mean square error (RMSE), standard deviation or confidence interval etc. For line and area features situation is more complex, because positional accuracy is a result of positional accuracy of points which define lines or segments used as generalized shape of reality. The accuracy of the liner features like roads, contours etc. are very often presented by ε-bands (Figure 2.)

In the case of the positional accuracy three distinct levels are presented:
- absolute or external accuracy – closeness of reported coordinate values to values accepted as/or being true,
- relative or internal accuracy – closeness of the relative positions of features in a dataset to their respective relative positions accepted as/or being true,
- gridded data position accuracy – closeness of gridded data position values to values accepted as/or being true.

Two methods for assessing positional accuracy are available:
- direct comparison with referent values with higher hierarchy level,
- assessing of accuracy with indirect methods.

Attribute accuracy is defined as the closeness of attribute values to their true value. In some documents it is mentioned as thematic accuracy. In contrast to positional accuracy, which considers spatial components of the features, attribute accuracy, its measures and methods of assessment, depend on domain of attributes. It can be defined as an accuracy of

Figure 1. Measuring components of spatial error

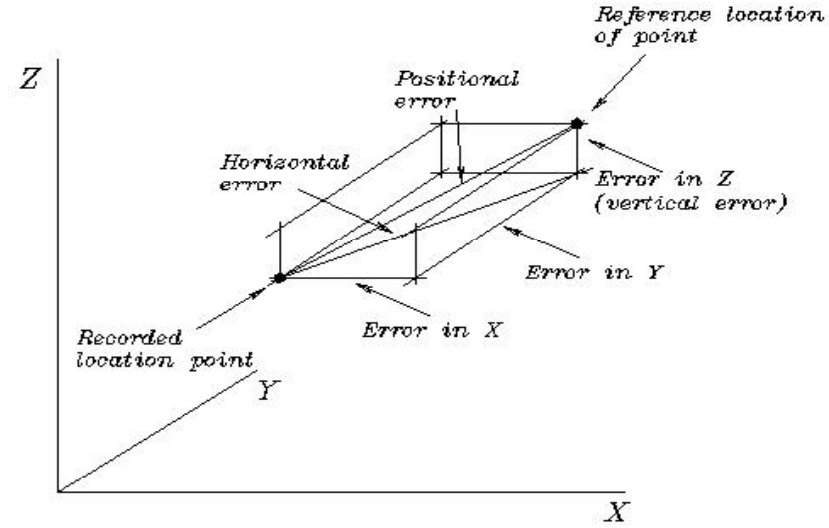
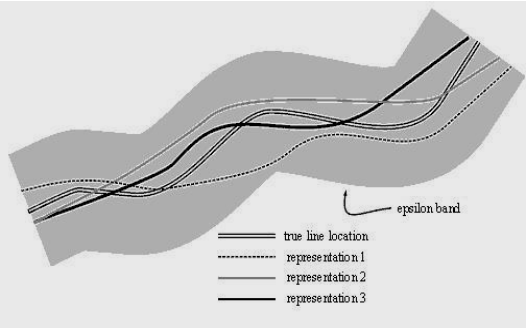


Figure 2.- Epsilon band defines a zone of uncertainty around the measured line, within which the "actual" line exists with some probability



quantitative attributes and the correctness of non-quantitative attributes and of the classifications of features and their relationships.

The term attribute accuracy is often replaced with attribute uncertainty. Attribute accuracy can be nominal, ordinal or interval. In case of the nominal or ordinal domain of attributes, frequently used accuracy indicators are percent correctly classified (PPC) or Kappa index κ (16).

For interval domain instance, applied methods for attribute accuracy assessment are the same as for positional accuracy. Digital elevation models are an evident example of 2.5D GIS applications where terrain heights represent attributes of point features. Terrain heights take continual values in the range between minimum and maximum values for examined area.

Report of *completeness* describes the exhaustiveness of set of features and their attributes in spatial data bases. It reports on how much detailed features and entities are presented in data base meaning to their spatial attribute characteristics. Completeness is divided on:
- completeness of a data,
- completeness of a model.

The report on completeness describes the relationship between objects represented and the abstract universe of all such objects (10). The completeness of a data illustrates the commission of an entities in spatial data base related to their number in the real world. It encompasses the completeness of entities and completeness of their attributes. The completeness of a model indicates the level of credibility of how accurate is a data base. Model completeness is in a correlation with semantic accuracy. It is application-dependent and therefore it is an aspect of fitness-for-a use (17). The term '*fitness for a use*' is referred to decision making for accessing whether a database meets the needs of a particular application (5).

Logical consistency represents degree of achieved reliability of logical rules and connections in data structures. It deals with structural integrity of a given data set based on a formal framework for the modeling of spatial data and the relationships among objects.

Subelements of a logical consistency are:
- conceptual consistency – adherence to rules of the conceptual scheme,
- domain consistency – adherence of values to the value domains,
- format consistency – degree to which data is stored in accordance with the physical structure of the dataset,
- topological consistency– is usually assumed to refer to the lack of topological errors (e.g., unclosed polygons, dangling nodes, etc).

Semantic accuracy describes the number of features, relationships and attributes that have been correctly encoded in accordance with a set of feature representation rules, or in other words it means the quality that geographics are described in accordance with selected model (14).

Temporal information gives date of data observation, type of update (creation, modification, deletion, unchanges), and validity periods for spatial data records (9). Aspects of temporal elements are already presented in the first primary elements of data quality. The quality of temporal information can be appraised by the degree to which the information describes adequately (in terms of temporal precision, frequency and process history) spatial phenomena (3).

Traditionally temporal characteristics of spatial objects are handled as special or thematic attributes of the appropriate object types (classes). For example, cadastral data of a certain property includes date of property transaction that is crucial data (15).

Quality report related to temporal information must contain the following quality subelements:
- temporal accuracy;
- accuracy of a time measurement – correctness of the temporal references of an item (reporting of error in time measurement),
- temporal consistency – correctness of ordered events or sequences, if reported,
- temporal validity – validity of data with respect to time.

ISO STANDARDS FOR GEOGRAPHIC INFORMATION

Many international associations interested in using such data bases were working on their own standards for assessing data quality. A study conducted by technical committee TC211 for geographical information and geomatics of International Organization for Standardization (ISO) became very important at the beginning of the nineties of the last century. The main goal of TC211 was to harmonize all responsible standards related to spatial data bases. Study of TC211 was very closely connected with the work of other international associations engaged in GIS and geomatics, like Fédération Internationale des Geometres (FIG), International Association of Geodesy (IAG), International Society of Photogrammetry and Remote Sensing (ISPRS), Open GIS Consortium (OGC), United Nations Geographic Information Working Group (UNGIWG), International Civil Aviation Organization(ICAO), Global Spatial Data Infrastructure (GSDI), Digital Geographic Information Working Group (DGIWG), World Meteorological Organization (WMO), Committee on Earth Observation Satellites (CEOS), Global Spatial Data Infrastructure (GSDI) etc. All these enumerated user communities are the external liaison organizations of ISO/TC 211 Geographic information / Geomatics.

Implementation details are left to other organizations such as the Open GIS Consortium. The OGC is an international membership organization composed of many private companies, government agencies, and academic institutions, committed to development of geospatial data and geoprocessing standards. The OGC is working to develop the 'interoperable geoprocessing', which refers to ability of digital systems to:
- freely exchange all kinds of spatial informa-

tion about Earth and about objects and phenomena on, above, and below the Earth's surfaces.
- cooperatively, over networks, run software capable of manipulating such information

Since its establishment in 1994, ISO/TC211 (Secretariat NTS, Norway) Committee has been steadily increasing. There are now 28 P (participating) members and 30 O (observer) members.

Coordination with regional organization, like technical committee TC287 for geographical information of a Comité Européen de Normalisation (CEN), was very important for this study. The aim of TC287 committee was to develop "...a structured set of standards which specifies a methodology to define, describe, structure, interrogate, update, codify, transform and transfer data and metadata that represent geographic information".

At the moment ISO TC211 works on 40 standards related to acquiring, processing, analyzing, and accessing of Geographical Information. Work on those standards is subdivided into 9 working groups

Working group (WG3) of TC211 responsible for Data Administration was concerned with standards important for the field of spatial data quality, and the most significant among them are:
- ISO 19113 Quality principles
- ISO 19114 Quality evaluation procedures
- ISO 19115 Metadata

Interesting project concerning the spatial data quality has been led under working group 9 (WG 9) which is in charge of Information management, with the following interesting standards:
- ISO 19138 Data quality measures
- ISO 19139 Metadata – Implementation specification

The ISO standards define principles for reporting quality of spatial data bases and designate components for submitting the report of their quality. These standards also take care of the access, organization and information of quality report. They are intended for both the companies which are involved in data bases production, and for spatial data users. The first ones use them in assessment and reporting of how much those data describe reality, formally or implicit, and others use them while making decision if some particular base consist of quality and useful data for some application. Realization of ISO standard projects must be completed until the end of 2006.

It is worth mentioning that standards and associations engaged in this field of research at the national level, like Spatial Data Transfer Standard (SDTS) developed by the United States Geological Survey (USGS) are based on the principles that users should be able to characterize fitness-for-use for a given application based on data quality documentation; likewise Canadian Spatial Archiving and Interchange Format (SAIF), or Digital Geographic Information Exchange Standards (DIGEST) which represents a NATO effort to develop standard geospatial data exchange formats for military applications.

METHODS FOR EVALUATION AND REPORT OF DATA QUALITY

The quality of a dataset might be described by using two components:
- data quality elements;
- data quality overview elements.

Data quality elements, together with data quality subelements and the descriptors of data quality subelements, describe how well a dataset meets the criteria, set forth in its product specification and how well it provides quantitative quality information. Quantitative quality information shall be reported as metadata in conformity with the requirements of ISO 19115, or by using a quality evaluation report in compliance with the requirements of ISO 19114 (6). According ISO 19113 recognized data quality elements are:
- completeness,
- logical consistency,
- positional accuracy,
- temporal accuracy,
- thematic accuracy,
- quantitative attribute accuracy.

ISO 19113 establishes the principles for describing the quality of geographic data and specifies components for reporting quality information. It also provides an approach for organizing information about data quality.

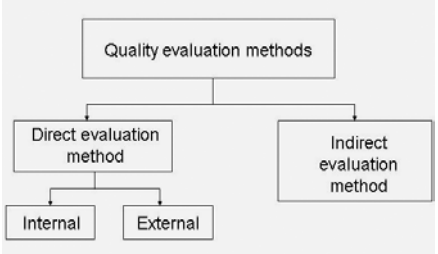
Data quality overview elements provide general, non-quantitative information, and they shall be reported as metadata in conformity with requirements of ISO 19115. Data quality overview elements are:
- purpose - which gives information on the reasons for creating the dataset and on the intended use of the dataset.
- usage - provision of information on the kind of application for which the dataset has been used.
- lineage - describes the history of the dataset.

ISO 19114 standard provides a framework of procedures for the evaluation of quality that is applicable to digital geographic datasets and it is consistent with principles defined in ISO 19113. The data quality evaluation procedures are used for determining and reporting data quality information, either as a part of data quality metadata only, or as a quality evaluation report as well. This standard is intended for persons and firms which are involved in spatial data bases production, as framework for data quality reports, as well as, for users who, on the basis of these reports, evaluate how much these data are useful for particular application.

The objective of ISO 19115 Standard is to provide a structure for describing digital geographic data. This International Standard is intended to be used by information system analysts, program planners, and developers of geographic information systems, as well as others, in order to understand the basic principles and the overall requirements for standardization of geographic information. This International Standard defines metadata elements, and establishes a common set of metadata terminology, definitions, and extension procedures which provide comfortably and effective use of such data. All these standards are applicable to all types of digital geographic data. Their principles can be extended to many other forms of geographic data, such as maps, charts and textual documents.

Data quality evaluation methods are divided into two main classes, direct and indirect. Direct methods determine data quality through comparison of the data with internal and/or external reference information. Indirect methods infer or estimate data quality by using information on the data, such as lineage. The direct evaluation methods are further subclassified by the source of the information needed to perform the evaluation. Figure 3. depicts this classification structure.

Figure 3.- Classification of quality evaluation methods



The direct evaluation method is further subdivided into internal and external, depending on whether the reference data are parts of the existing data base, or they belong to external data.

Meta-information or metadata are vitally important for informing and warning the data users of the data limitations. The purpose of a metadata standard (ISO 19115) is to provide a common set of terminology and definitions for documentations related to metadata. Metadata (an attached / associated description of the data; data about data) statements should provide users with an indication of these data quality issues and fitness for use (in common applications). They are vitally important to informing and warning data users about limitation of the data. The main reason to document data is to maintain an organization's investment in its geospatial data. Organizations that do not document their data often find that, over time or because of personal changes, they no longer know the content or quality of their data (4).

The metadata content elements included in the standard were determined on the basis that metadata serve the following roles (1):

- availability: Information to determine if information exist for a geographic location,
- fitness for use: Information to determine if data meet a specific need,
- access: Information needed to acquire a set of data,
- transfer: Information needed to process and use a set of data.

THE SERBIAN EXPERIENCE

Our country belongs to the group of participating countries and is involved in the work of ISO standards right from the beginning through the Institution for Standardization of Serbia&Montenegro (ISSM). At the national level there is Commission for Standards for Geographic Information/Geomatics (KS Z 211), established in 1995 under condescension of ISSM. The goal of this Commission is work on national standards concerning geomatics and also participation in related bodies of ISO TC211. Unfortunately, during the last few years the work of this Commission has become extinct, and thus our participation in ISO TC211 research could be considered as formal only. The existing statements and technical regulations in our country, related to spatial data, may be classified as *de facto* standards. As an example one can mention regulations for which Republic Geodetic Authority of Serbia (RGA) is responsible. In such regulations like act standard for Digital Geodetic Map recognizes some of the mentioned elements of spatial data quality like topological, geometric and attribute consistency, positional accuracy etc. As the subsequent step that is supposed to be undertaken one can mention an immediate implementation and harmonizatation existing technical regulations with ISO standards, particularly with respect to those already mentioned above. At the institutions such as Republic Geodetic Authority of Serbia there is a widespread opinion that the work on these standards is indispensable and that during the next period something must be done along these lines.

CONCLUSION

The availability of spatial datasets at the local, regional and global level is indispensable for sustainable development planning. Exchange of information through different levels of Spatial Data Infrastructures (SDI) could be made attainable through vertical line of information, from the local, through the national, regional and up to the global level.

Great and rapid development of technologies and methods of surveying and mapping by using contemporary means, such as integrated geographic systems, satellite positioning, remote sensing digital networks, for sharing and disseminating of data, is of great importance with respect to sustainable development.

The rapid development of technologies and methods in surveying and mapping, such as integrated geographic information systems, remote sensing, satellite positioning systems and digital networks for sharing and disseminating of data, provides a strong and important tool for decision making for Sustainable Development. Accessible and relevant geographic information will play an important role in planning, executing and monitoring development.

The ability to access the information and to interpret this information by decision makers at all levels requires global planning and implementation of sustainable development. This is really the best way to evaluate risks and consequences of all relevant information. Recognizing quality elements, such data bases and their level determination play important role in decision making and planning.

The International Organization for Standardization (ISO) Technical Committee 211 for Geographic Information / Geomatics is developing an integrated suite of standards to promote global interoperability.

In the near future one can expect that data quality assessment is going to be increased. Recent efforts of national agencies which are trying to develop workable data quality standards for spatial data is the best indication for such statement. Increased standardization could enhance the opportunity of communicating data quality characteristic of transferred data.

One aspect of data quality assessment that is likely to increase in importance over the near-term is standardization of data quality information. This is recognized in recent efforts of the national agencies to develop workable data quality standards for geographical databases. Increased standardization would serve to enhance the ability to communicate the data quality characteristic of transferred data. Flexible standards are required allowing different levels of quality available to the intended use of the database.

The International Federation of Surveyors (FIG) decided at Congress in Brighton in 1998 to form a Task Force in order to prepare an FIG statement on how the Federation will implement the concept of sustainable development in the twenty-first century, exposed at The United Nations Rio Conference in 1992 in document known as ***Agenda 21***. Conclusions of ***FIG Agenda 21*** could be underlined as working guideline for all organizations participating in life cycles of spatial data bases, especially in collecting those data.

"Considerable data exist, but access to data is

often hampered by lack of standardization, coherence and adequate services for data retrieval, including information about what data exist and where data are kept." ***FIG Agenda 21*** emphasizes: "Work with international bodies such as the International Standards Organization (ISO) to develop and implement suitable standards for the exchange of geographic information."(11).

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PRIORITY ENVIRONMENTAL INVESTMENT PROGRAMME
Development and Implementation

Zoran Njegovan

This paper is created to serve as a methodological base and possible work plan for Assistance in Priority Environmental Investment Programme Development and Implementation in the Republic of Serbia. It will contribute to improved mechanisms for selection of priority environmental investments. Also, the paper should outline a scope of work for technical assistance for Republic of Serbia in developing mechanisms for identifying and selecting priority environmental investments.

The main feature of the long-term environmental policy in the Republic of Serbia is absence of integrated approach, which goes hand by hand with the international environmental standards, and lack of efficient economic instruments and regulations. It causes an inadequate technology policy and location of the polluters. Besides that there has been a lack of appropriate environmental monitoring system good enough to provide efficient ex-ante and ex-post protection. It has caused a lot of environmental damages so that a completely new approach in the field of environment is expected to be created out of which the Priority Environmental Investment Programme (PEIP) should be a main tool for experience of good environmental governance in the Republic of Serbia as well as in the region of SEE.

Key words: Environment, Priority Investments, Programme, Development, and Implementation

BACKGROUND

The paper is linked to the Priority Environmental Investment Programme of Serbia (PEIP) and Montenegro done under the Regional Environmental Reconstruction Programme for South Eastern Europe (REReP). This programme served as a basis for environmental policy in South Eastern Europe (SEE) and the main environmental component of the Stability Pact. During the development and endorsement of REReP[1], The SEE countries have continuously stressed the high priority of environmental investments in the reconstruction process. In order to implement the investment programs in parallel to the process of institutional strengthening and policy reform, the SEE countries should develop a regional investment strategy and establish national environmental funds and/or other mechanisms enabling the management of earmarked public money for environmental investment projects.

The list of beneficiary countries for REReP projects includes Croatia, Serbia and Montenegro, the Former Yugoslav Republic of Macedonia, Bosnia and Herzegovina and Albania. Bulgaria and Romania should also benefit from the networking activities.

The SEE countries have already indicated priority sectors to be addressed by the Priority Environmental Investment Programme: air protection, bio-diversity, water protection and waste management but many of them did not have national and local investment strategies which address key environmental investments. Many of the existing programming and strategic documents, however, were drafted before and their validity is not verified in the current situation. In the recent past, some international environmental and development agencies (EU DG Environment, UNEP, World Bank, UNDP, etc.) sent expert teams to the SEE region to evaluate the state of environment and to recommend technical and investment assistance to be provided by the international donor community.

The paper is focused on the methodology and mechanisms for the prioritisation of the environmental investments such as:

- Environmental infrastructure projects in the air, water and waste sector,
- Environmental priorities of SEE countries,
- Environmental priorities of the SEE as a region,
- Requirements of the donor community.

THE MAIN OBJECTIVES

The overall aim of the paper is to stress the need for development and implementation of

[1] The author was a member of the team and leading economist in the Project governed by the Regional environmental centre for Central and Eastern Europe, Budapest (project REReP 1.2 and 1.5.1. for which the beneficiary was Serbian Ministry of environment).

Priority Environmental Investment Programme (PEIP) and assist Republic of Serbia in its further development and implementation i.e. in identifying environmental infrastructure investment projects that would reflect the environmental priorities of the region. Furthermore, the paper is designed to assist in the development of strong and viable institutions or mechanisms capable of effective implementation of priority environmental infrastructure investments foreseen under implementation.

The Specific objectives of the paper are as follows:

- To develop national and SEE priority environmental investment programme (comprising the strategic document and the priority project list).
- To provide the guidance for assistance in implementation of the aforementioned SEE regional priority environmental investment programme through co-operation with the donor community
- To support capacity-building in environmental investment planning
- To support the regional networking and mutual co-operation of environmental and financial institutions and experts in SEE

ANALYTICAL FRAMEWORK AND DEFINITIONS OF PEIP

There are different types of environmental projects. They can depend on differences in (i) the environmental problems they intend to address; (ii) type of organisation/agent initiating, deciding and implementing the projects; (iii) applied financing mechanisms.

For the purposes of the PEIP the following categories could be defined:

- Environmental infrastructure development projects
  1. Water distribution and wastewater collection and treatment systems;
  2. Solid waste management facilities;
  3. Hazardous waste management facilities.
- Pollution abatement projects (in production mostly)
  1. End of pipe abatement
  2. Cleaner technologies
- Clean up of past pollution
- Environmental monitoring projects
- Nature conservation projects

Magnitude and structure of environmental investment expenditure is the indicator for the implementation of environmental investment projects. Therefore, the objective of the project can be formulated in the process of recommendation of institutional and policy changes, which should result in an increased and more efficient environmental investment expenditure. Framework for analysing implementation of the environmental investments relates to the determinants of the size and efficiency of environmental investment spending.

The analytical framework is derived from economic theory. Accordingly, the interaction of demand for and supply of environmental investment resources determine the size and structure of the environmental investment spending. Consequently, it is needed to analyse the institutional and policy factors that are important either on demand or for the supply side or to facilitate demand and supply interactions. Suggested changes, however need to be evaluated against the joint work of demand and supply side. Focusing on supply of finance side only might result in suggesting changes on that side while the bottleneck in increasing investment expenditure is on the demand side (for e.g. lack of proper enforcement).

Demand side: The Demand for environmental investment resources represents the intention for implementing environmental investment projects.

The need for financing environmental protection is driven by national environmental objectives. In the best case, economic developments and pubic awareness play an important role in determining priority environmental problems and related objectives. Both environmental objectives and different policy instruments applied to meet them determine private and public environmental investments and shape the demand for domestic and foreign financial resources. Policy instruments as they are translated into legal requirements together with the strength of their enforcement determine the financial rate of return for the planned projects.

Organisations/agents that can initiate environmental projects (offer environmental projects for financing):

- Enterprises;
- Municipalities;
- Budgetary organisations;
- Central and regional governments;
- Households

Supply side: The availability or supply of capital is determined by the pace of economic development and, to a certain degree, influenced by the availability of international financial instruments. The supply of financial means, and the associated conditions, is governed by economic development; the strategies and policies of the financial organisations.

Organisations/agents on the supply side are the following:

- Commercial banking sector;
- Central and regional governments;
- Public organisations, such as environmental funds;
- International financing institutes;
- Foreign governments and international organisations.

Financing mechanisms operated by the above organisations are the following:

- Commercial loans;
- Equity investments, concessions;
- IFI loans;
- International subsidies, such as soft loans, grants, etc.
- Direct government budgetary financing;
- Government budgetary subsidies;
- Extra-budgetary subsidies, such as soft loans, grants, loan guarantee etc.

Interaction of the demand and supply: The following figure describes this analytical framework.

THE POSSIBLE PEIP WORK PLAN

The Scope of Work in developing the Priority Environmental Investment Programme (PEIP) must include the following tasks:

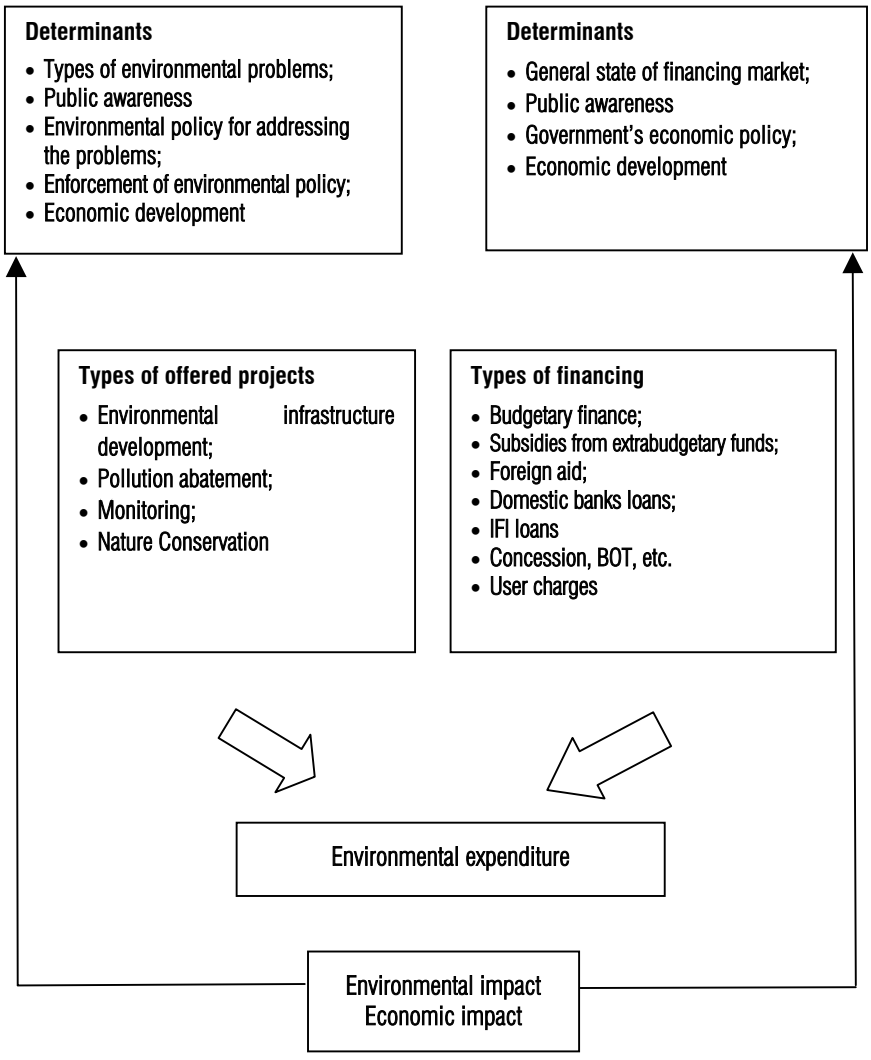
1. To develop Country Report on the State of the Environment.
2. To develop a Regional Set of Priorities.
3. To identify projects at the national level based upon regional priorities.
4. To identify programmes using sector and geographical key.
5. To assess investment needs identified by SEE countries; conduct gap analysis.
6. To compile regional strategy, priority programmes and project list.

The country budget, donor community and international development and financial agencies are the intended audience for the selected projects, with particular focus on the European Commission. Therefore, it is assumed that

project development and implementation shall be consistent to standards and approaches relevant for EU project cycle management including the following aspects:

the projects into groups as the focus of investors has been moved from single investment projects into packages of projects serving one objective and proving they represent the cost effective way to do it.

Figure 1. - Determinants of environmental expenditure



The Priority Environmental Investment Programme (The PEIP) will consist of several sector and/or geographically defined investment sub-programmes.

In other words the projects identified would be organized, either by the sector they address (such as waste management…), or by the geographic region (hot spot) they influence, into the investment sub-programmes. The main reason for such approach is to make the PEIP readable and attractive for potential investors and to enable them to easily package

When identifying the investment sub-programmes, one must stick to the following principles:

- Each PEIP objective will constitute one sub-programme
- Each sub-programme will list the types of priority actions required to fulfil its objective (Furthermore, the investment projects within the sub-programmes will be organized by priority actions they belong to. For example, if proposed sub programme is defined by the objective to reduce air pollution from the fossil fuel based on energy production, one may cluster the projects by the following types of priority actions (if defined) – installing scrubbers, changing fuel, clean technology such as fluidised bed combustion. For each type of actions one will list the relevant projects).
- For each type of action, priority projects will be listed (Estimation to what extent the identified investment projects contribute to the fulfilment of the given objective is needed and subsequently only the most effective projects should be included).

a) The PEIP and its sub-programmes would be presented in the logical framework matrix format (Log Frame) and the process of its creation will be based too.

- Goals structured in a tree.
- Goals/measures described using indicators of quality, quantity and time.
- All-important assumptions/risks are explicitly stated.
- Significant stakeholders involvement if possible.
- Balance between expert analysis and stakeholders analysis.

b) The PEIP programmes, types of actions and projects will be consistent with key EU requirements[1] as far as possible, but above all:

- Air:
  - Air quality framework directive 96/62 EC
  - Daughter directive 1999/30 EC on PM, SO2, NO_X and Lead
  - Daughter directive 2000/69 EC on CO and Benzene
  - Proposal for the Daughter directive on Ozone COMM 1999/125-2 final
  - National emission ceilings directive 2001/81 EC
  - Large combustion plants directive 2001/80 EC
- Water:
  - Water framework directive 2000/60 EC
  - Drinking water directive 98/83 EC
  - Urban waste water directive 91/271 EEC
- Waste
  - Waste framework directive 75/442 EEC
  - Landfill directive 1999/31 EC
  - Waste incineration directive 2000/76 EC

[1] For more information on the directives, see REC training materials on heavy investment directives at http://www.rec.org/REC/Programs/ocallnitiatives/Training/TrainingMaterials.html

c) The PEIP general priorities will be based upon the Environmental Action Programme for Central and Eastern Europe, namely:

- Priority given to hot spots (geographically defined areas with one or several environmental problems).
- Priority given to the protection of the human health, followed by protection of nature/biodiversity.
- Involving all relevant local experience.

d) Combination of a top-down and bottom-up approach:

- The top-down approach, driven by logic, goes from general goals through generic types of actions down to the identification of projects to meet those goals.
- The bottom-up approach, driven by real-life experience, in contrast starts from projects supported by stakeholders.

Finally, the first task of developing a Priority Environmental Investment Programme (The PEIP) is to identify and describe the environmental problems through a review of existing strategic and operational documents including priority investment lists using the schematic description of OECD "Pressure-State-Response" Model of indicators[1] (see the graph bellow).

It is expected that, in order to maintain consistency with other efforts and to enlist full support of Member Countries, the Priority Environmental Investment Programme will interact with an official from each Member Country's Ministry of Environment (or equivalent) and some of the decision makers are members of the Network of Environmental and Finance Specialists.

The PEIP will provide country reports, which must be in a form to be used as an input into the strategic portion of a regional PEIP. Based on findings from the Countries PEIP assistance will be expected in developing the strategic part of the regional report for the SEE region, the main purpose of which will be to identify and justify selection of regional priority areas.

The first step of this task has to be to compare and analyse national priorities and to formulate a set of regional priorities by provision of comments and suggestions.

[1] see http://www.oecd.org/EN/about/0,,EN-about-567-nodirectorate-no-no-no-8,00.html – OECD work on environmental indicators

Project identification at the country level based on regional priorities

Primarily, the assistance is needed in identifying generic types of projects as well as project screening criteria. Based on existing inputs the investment project questionnaires will be adjusted to the PEIP needs. For that purpose detailed questionnaires and project identification guidelines must be developed. The PEIP methodology will respect the project logic utilizing the Logical Framework Approach. The final approval of the PEIP will be obtained by the central government. Based on identified data on project financing needs and available project funding, it will be conducted a preliminary estimation of financial gap and its distribution over time and sectors on a country level and comments and suggestions that shall be taken into consideration during identification of priority environmental infrastructure investment programmes.

Programmes identification using sector and geographical key

Based on identified country priorities and investment projects, programmes (goals) and priority actions within the programmes will be identified. Furthermore, the prioritisation of projects according to their physical impact on the environment with special attention to hot spots will be undertaken. The programme will be justified and compiled into a log frame format.

Development of a Regional PEIP

Based on the identified programmes consisting of strategic considerations, planning mechanism, project screening criteria and preliminary gap analysis, Central Government has to make a proposal for developing/revising of a regional PEIP. It is expected that the SCG will assist international community and provide comments and suggestions on particular issues related to development of regional PEIP.

PEIP results

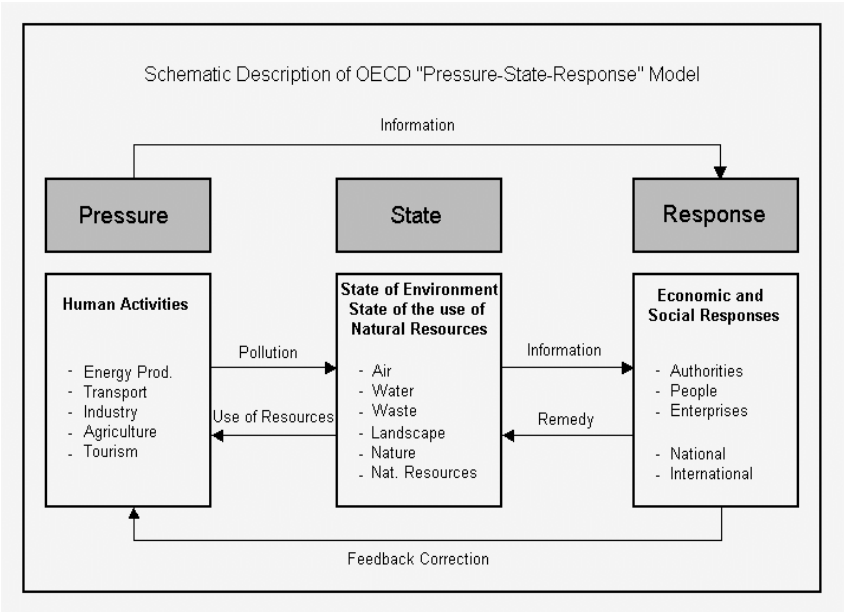
In the process of completing the PEIP on the Country level a written Documents described below will be prepared. The Documents shall be consistent with the methodological guidelines. The following Documents are expected under PEIP completion:

Reports

- Country Report on the Environment – Final
- Regional PEIP on Priorities and Criteria
- Instructions for PEIP Identification (methodology guideline)
- PEIP Database
- Final PEIP

ADMINISTRATIVE LEGAL PROTECTION AND FINANCING MECHANISMS

Environmental protection requires well-organized decision-making process. It requires that all environmental aspects are integrated in policy, planning and in the levels of environmental management, by the implementation of the



legal system which includes a clear, transparent and efficient structure. That includes an efficient administrative, legal and financial system strongly supported by the informatics in the management decision-making process.

The main characteristic of the state of previous organization of administrative-legal environmental protection is the extensive and overlapping spheres of activity and competence, both between Federal authorities, and between Federal and Republic bodies, absence of a central body for the coordination of all activities in this field.

Aiming at more efficient and more rational implementation of the commitments in this field pursuant to the conditions which are becoming the general principles (integration of environmental protection and sustainable development), the first step in this direction is the transformation of the wide range of the State institutions at all levels and their networking with a clear division of competences and spheres of activity, control of mechanisms for getting the funds for the implementation of environmental protection.

Despite the visible results in some sectors the problem of double management and overlapping of competence in the field of protection of water, soil, forest, leads to non-uniform, incomplete and inadequate approach to their protection. The practice indicates the growth of activities and competencies in the field of environmental protection. This requires an independent decision-making i.e. equal consideration of individual measures and regulations in the context of the development. For the environmental institutions to be effective, it is necessary to have sufficient staff and sufficient financial resources. Capacity building and training is also significant, i.e. the study of the latest methods of environmental management - particularly inter-sectoral analysis of ecology issues, acquisition and analysis of data (technical, economic, etc.) and the use of these data in the development of management and investment policies.

To improve the integration of environmental protection and development, the competent administrative bodies - institutions must be responsible that the proposed policy, programs and investment decisions are not contrary to sustainable development. The parameters of planning and implementation of the development must include the parameters for the assessment of the environmental effects resulting from that development.

The essentially changed role of the State in the economy, as the main actor in the environment, introduces new elements in the process of decision-making on economic development, harmonized with environmental conditions and values. The reform of the economic system also means the reform of administrative-legal system in general, and also in the field of environment. Further enhancement of the Legislation is in progress. The legislative system in the field of environmental protection must include:

- Harmonization of the Legislation with international norms and standards;
- Training of the administrative staff at all levels for efficient environmental management;
- Resolving of the issues of competence to avoid overlapping and conflicts of interests;
- Enhancement of scientific infrastructure parallel with administrative infrastructure to ensure environmental management based on scientific knowledge.

It also brings up the need of raising the public enforcement in the field of identifying environmental problems and enforcement of needed protection.

Public participation

The right to get information on the state of the environment is a Constitutional right for all citizens of Republic of Serbia.

By introducing the directives of Aarhus Convention in the domestic legal system on Access to Information and public participation in decision-making and availability of legal protection in the issues of environmental protection, created the conditions for stronger public participation in the process of environmental protection. The State bodies and institutions dealing with environmental protection are forced to provide to the stakeholders to acquire the information. Citizens can participate in decision-making on the issues of environmental protection, in the administrative procedures for decision-making, or in the judicial procedure to protect their rights.

Non-governmental organizations

Till the late 1990s, several tenths of non-governmental environmental organizations were registered. Although this is a relatively high number of organizations, if the structure of their activities is compared with the standards and activities in west countries, it can be concluded that only a small share of these organizations is active and that they are still in the initial phase of development. There are many local non-governmental organizations, which are directed to environmental protection in the local region. Although their actions have primarily a local character, their role in environmental protection should not be underestimated. Taking into account that environmental protection issues in Republic of Serbia considerably increased over the past decade and that many of them exceeded the national frame it is a priority to establish environmental NGO-s on new foundations.

Education

It has been generally assessed that education has not been appropriately organized, and there is a notable lack of planned activities on rising awareness on the need of environmental protection. Education of the professional staff for integral environmental protection is unsatisfactory. However, on the other hand, it must be emphasized that environmental protection was included in preschool, primary and secondary education, and in four-year university study. The courses of environment protection are included in the curricula of many universities, although the approaches at some faculties differ. These differences were conditioned not only by the structure and nature of the faculty, but also by the subjective attitudes of the responsible.

Information for decision makers

The coordination of the decision-making processes regarding the environment and sustainable development is subject to general rules of administrative bodies and other involved subjects. Information management in this field, at all levels, is coordinated by the environmental protection bodies, data acquisition and information is performed by the bodies responsible for statistics, hydro-meteorology, health,

water resources management, agriculture, forestry, industry, etc. Still, a clear system of coordination and responsibility for information in the field of environment and decision-making process does not exist. The processes of capacity building in this field are in progress.

This topic is not regulated. There are only general regulations, covering the availability of information on the environment. The reform of legislation is pending.

The state of the environment was monitored over the past decade, but it was not systematic. However it is necessary to study the multiannual trends in this field. The harmonized methods of data collection are still lacking and on these basis the precise analysis of individual segments leading to adequate decisions could be made. Some of the major problems are: inadequate national information system for environmental protection, inadequate professional and laboratory capacities for monitoring, and lack of horizontal and vertical dissemination of data and information.

It is difficult to overcome the above problems. Some information systems starts to develop: system of statistical research is quite anachronous; hydro-meteorological monitoring of the quality of surface watercourses, coastal sea and drinking water, as well as air quality; monitoring of radioactivity in the environment is much better, etc.

The present activities at the national level are poorly continued on the design and establishment of information systems for environment. Activities are also directed towards the project of the Establishment of National Indicators of Sustainable Development, and introduction of Geographic Information System for environmental management. It should be stressed that Government intends to ratify UN ECE Aarhus Convention in 2002.

Environmental financing mechanisms

Economic instruments and environmental financing mechanisms in Serbia are still underdeveloped. The entire system is based on the principles, which are not pursuant to the principles of market economy. The economic mechanisms of environmental protection include: compensations for the tenure of natural resources, taxes, insurance, incentive earnings, voluntary contributions, credits and other economic forms of incentives for environmental protection or for restricting environment degradation. Instead of the direct allotment of funds on the special account for the purposes of environmental protection, the funds are transferred to the budget of the Republic of Serbia and then further distributed to other purposes. This method is contrary to the one in the developed countries, where the resources intended for environmental protection are transferred directly to the special, independent Funds.

Significant funds for resolving environmental problems were provided by the Donors Conference held in Brussels on June 30th, 2001, when about $95 million was planned for realization till 2004, of which $11.2 million is intended for the remediation of the four "hot spots".

By the law of corporate taxes on profit in Serbia there are some stimulative incentives for depreciation of real estates which are in function of protection of air, water and soil pollution, decreasing of noise and implemented energy saving equipment. Almost identical solution is specified by the law on taxes on citizen's earnings as well as on cadastral earnings of agricultural producers for investing in the equipment for environmental protection.

By the law on public earnings and expenditures of Republic of Serbia the special payments are introduced for water use, for usage of forests, soil, natural medical resources and mine exploitation.

Having that in mind, it is necessary to intensify the role and the significance of economic instruments in the system of environmental protection. The policy of environmental protection should be focused primarily on preventive actions, applying the "polluter pays principle".

ENVIRONMENTAL POLICY RESPONSES

Building capacities to implement preventive and long-term environmental protection approach, polluters–pay-principle and fully implemented international conventions and other standards in relevant sectors, is the process included in Reform Agenda of Serbia. In regard to that, main challenges for a near future include the rehabilitation of the identified environmental "hot spots" and reverse natural resources destruction, improvement of environmental information production and dissemination, as well as air and water quality improvement, municipal water supply and sewerage improvement, and development of the efficient waste management strategy for industrial and municipal solid waste and waste water. All of the listed elements ensure environmentally sound development in industry, energy and agriculture sectors.

The main challenges for the future

Identification and adoption of the national environmental priorities (PEIP) at the same time defined development challenges within the environmental sector:

a) Capacity building in environmental monitoring and development, including trainings, technical assistance, institutional strengthening, institutional building including building up environmental multimedia coverage by new ministry, approximation and adoption of new legal and economic instruments, etc.

b) Monitoring and accidental response environmental system management & technical assistance, including Environmental mobile units.

c) Environmental hot spots remediation and technology development as the condition of agriculture, economic & in general sustainable development in Danube basin-, Carpathian-, Balkan-, SEE-, CEE - region, including selected case studies, ecological zoning of Serbia and management system.

d) Waste, hazardous waste & wastewater management and technical assistance, including selected case studies selected municipal landfills, selected medical waste treatment facilities, selected PCBs and other hazardous wastes treatment facilities, selected waste water treatment plants and sludge disposal, and management system.

e) Protected areas, biodiversity, nature and environmental protection, including selected case studies and management system.

f) Environmental Education

In consideration of main development challenges, main challenges would be:

- Building up and reinforcing of institutions (existing or new ones) having strong competencies and power in all fields of the environmental system.

- The implementation of National Environmental Action Plan (as well as other strategic documents for natural resources and protected areas). The needs for updating environmental policies and strategies, as well as preparation of realistic plans are equally recognized by the government, experts- and NGO- stakeholders.
- Improvement of regional co-operation and environmental legal reform, taking into account the EU accession and the related economic reform, is recognized as priority, particularly concerning integration of environment in the economic transition.
- Further involving Serbia to international bodies/institutions, cooperation with GEF as operational focal point for FRY, for project such as assessment on influence on climate changes, biodiversity and etc, further cooperation with REC and REC Country Office Belgrade, in REReP and other projects, further cooperation with UNEP, UNDP and other UN organizations, further cooperation with OSCE in environmental security issues, participation on UN, UNEP, UN ECE, OECD and other relevant meetings.
- Government of Serbia has stressed the importance of the integral environmental information system together with public awareness, civil society building, awareness of decision-makers and environmental education.
- Preparation of Local Environmental Action Plans has come up strongly as one of the major priorities. Gradual implementation with clear steps and guidelines are desired.

Relation with other sectors

It is essential to be noted that other sectors, such as:

- COAL MINNING RECONSTRUCTION (such as ash disposal problems, natural sand and stone exploitation, etc)
- OIL AND GAS (used oils, efficiency, pollution limits)
- ENERGY (possibilities to use alternative fuels like waste; environmental friendly technologies and production)
- TRAFFIC (the concrete example will be given – clean up bridges in Novi Sad, conducting by traffic goals, are performing without EIA procedure by national legislation)
- WATER SUPPLY AND SANITATION (water is natural resource)
- PRIVATISATION (without EIA the cost could be very different than the real one – the costs of facility have to include the costs of approximation to environmental standards)

should be conducted by national law according to EIA (Environmental Impact Assessment Procedure), and as the condition for the EU accession procedure.

In addition, sustainable use of natural resources, renewable and alternative environmental friendly energies, environmental friendly technologies and production are conditions for sustainable development of Serbia, and commitment to that process is very crucial to a variety of financial assistances. High level of environmental awareness amongst decision-makers and high priority in government, with developed realistic step-by-step procedure towards sustainable development, should be a part of each sector policy.

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THE CONCEPT AND PRINCIPLES OF SUSTAINABLE ARCHITECTURAL DESIGN FOR NATIONAL PARKS IN SERBIA

Predrag Milošević

The paper elaborates the concept of sustainable architectural design that has come to the forefront in the last 20 years, and in the light of the National Park. This concept recognizes that human civilization is an integral part of the natural world and that nature must be preserved and perpetuated if the human community itself is to survive. Sustainable design articulates this idea through developments that exemplify the principles of conservation and encourage the application of those principles in our daily lives.

A corollary concept, and one that supports sustainable design, is that of bio-regionalism - the idea that all life is established and maintained on a functional community basis and that all of these distinctive communities (bio-regions) have mutually supporting life systems that are generally self-sustaining. The concept of sustainable design holds that future technologies must function primarily within bioregional patterns and scales. They must maintain biological diversity and environmental integrity contribute to the health of air, water, and soils, incorporate design and construction that reflect bio-regional conditions, and reduce the impacts of human use.

Sustainable design, sustainable development, design with nature, environmentally sensitive design, holistic resource management - regardless of what it's called, "sustainability," the capability of natural and cultural systems being continued over time, is the key. Sustainable design must use an alternative approach to traditional design and the new design approach must recognize the impacts of every design choice on the natural and cultural resources of the local, regional, and global environments.

Sustainable park and recreation development will succeed to the degree that it anticipates and manages human experiences. Interpretation provides the best single tool for shaping experiences and sharing values. By providing an awareness of the environment, values are taught that are necessary for the protection of the environment. Sustainable design will seek to affect not only immediate behaviors but also the long-term beliefs and attitudes of the visitors.

Key words: concept, principles, sustainable, architectural design, national park, development, and environment.

INTRODUCTION

How do we define sustainable architecture? And what the National Park has to do with it?

Prior to the use of the term "sustainable architecture," the term "solar architecture" expressed the architectural concept of the reduction of the consumption of natural resources and fuels. The intent was that we could conserve our fuel resources through the immediate capture of the available solar energy through appropriate building design. The evolution of the development of this design approach has brought us to the current and broader concept of "sustainable architecture." This term describes those who take up the banner for an energy and ecologically conscious approach to the design of the built environment. In doing so, it has broadened the scope of issues involved. Unfortunately, because of the confusion of the literal meaning of the term, it has also hampered the communication about this approach to architecture.

The literal interpretation of the words "sustainable environment" is the creation of an environment for human occupation, performance and the support of life to which sustenance or nourishment is continuously given. That is the definition used in this paper. The term "sustainable" does not express the minimization of the expenditure of those resources necessary for the prolongation of the life of the National Park. The term defines the fact that no humanly created environment can survive without the contributions of the larger natural

environment or ecological systems what National Parks normally are.

We cannot create environmental order as architecture without ultimately extracting energy and resources from other systems. The end product is a closed system of increased order but only at the expense of other systems within the universe. The net result is a decrease in order or an increase in entropy. A sustainable environment is an entity that owes its existence to the consumption of the natural resources and order that surround it. If an environment physically exists, it is being sustained. It is impossible to have a non-sustainable environment (1). That of course applies to National Parks too, probably even much more than to any other environment.

The term “sustainable architecture”, used to describe the movement associated with environmentally conscious architectural design, still creates ambivalence and confusion, even more than twenty years ago when it was introduced (2). A brief examination of the meaning of “sustainable” identifies why this occurs. The popular interpretation describes an approach to design that minimizes sustenance of resource consumption so as to prolong the availability of natural resources. And that directly applies to the National Park. However, the definition of “sustainable” does not imply a minimization of sustenance. “Sustainable” simply expresses the fact that resources do maintain our environment. Depletion of resources is inevitable in maintaining any environment. Sustainable architecture describes the fact that we receive what we need from the universe. This realization compels us to respond with care or stewardship in the use of those resources around us. Sustainable architecture, then, is a response to awareness and not a prescriptive formula for survival, let alone fashion.

Sustainability might be understood as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (3). We will most probably run out of resources at some point in time but we seek to delay that point for as long as possible. Implicit in this definition is the hope that if we delay long enough, we may be able to see how new technologies will reverse what now appears to be a continual process to an inevitable end. A similar interpretation is that we treat the natural resources available to us as capital and seek to leave off only the interest or produced resources of nature. It would mean that we would consume less through the products of our creative efforts than nature produces through the natural cycles. The reality is that we are beholding to the universe that surrounds us for our survival, the existence of life and the opportunity to express ourselves creatively. We do create order and an increase in resources for human fulfillment through our architecture (4).

Sustainable architecture describes the fact that we can only exist and create with the availability of natural resources. Those resources are the foundation of our world. Sustainable architecture proclaims this fact to the world. It is a celebration that we are that we create and that resources are available to do this. And that is probably the most appropriate understanding of the term (5).

“Sustainability” is a term that represents the social and cultural shift in the world order, patterns and styles of living (6). It is another step in the process wherein society has moved from a nomadic hunting order, to an agricultural order, to an industrial order and is currently moving fast to an information-based order. “Sustainability” has become a buzzword or symbol describing this inevitable, ongoing transition. As such, the term “sustainability” is actually not the first one that has little to do with the dictionary, literal definition of the word, but is the name for a new attitude and way of looking at the world.

The artists, including architects, state that our priority as human beings is to express ourselves and continually say things in new and different ways. Resources are for consumption. Sustainability refers to the adjustments that we must make as we exhaust one form and use another in its place. On the other hand the priority of life for materialists is economic productivity and physical comfort and welfare. This is the argument of Capitalism and Communism alike. Consumption is what motivates us. The earth's resources exist for our consumption, including National Parks. Based upon the laws of supply and demand adaptation occurs.

Both of these approaches offer opportunities to contribute to the goals of the popular understanding of sustainable architecture. The artistic, should we say architectural approach contribution is based on the concept of continually seeking new forms and means of expression. In a time of social and cultural change, the artist, namely architect is in the forefront. After all, the new architecture, if it tends to be really new, is about sustainability (7).

Related to the nebulous quality of the term "sustainable" in this context is that some proponents of sustainability feel that we really can create environments that consume less than they produce, and I am definitely one of those. Some even say the term is intellectually dishonest, and we, as a society, do not know how to build sustainable architecture.

So the term "sustainable," as popularly understood, is inadequate and, consequently, it is a negative influence toward the real goals of the sustainable architecture movement. First and foremost, it is a negative concept. The aim of architecture is to improve our quality of life and environment. The intention of architecture is not to save resources preventing their use but to reorder them to better serve the people. In the context of that priority, the issue is how do we achieve it.

The reality of the finites of energy and resources and the resulting deterioration and destruction of our natural environment, including National Parks, clearly has significant impact upon our cultures and lifestyles. The logical conclusion is that we must address the issues of sustainability in our architecture everywhere, and of course especially to National Parks. We need a long-term view, not the fulfillment of immediate physical satisfaction. Both artistic and economic points of view have significant roles to play in the development of sustainable architecture.

SUSTAINABLE NATIONAL PARK

In order to propose meaningful developments that are sustainable and environmentally sound in the National Park, then a number of environmental aspects that promote sustainable design need to be looked at. Therefore, next is the study that looks at the environmental guidelines of the National Park.

All the proposed interventions and develop-

ments at the National Park need to be sustainable so as to maintain the existing ecosystem (8). The concept of sustainable design has come to the forefront in the last twenty years. It is a concept that recognizes that human civilization is an integral part of the natural world and that nature must be preserved and perpetuated if the human community itself is to survive. Sustainable design articulates this idea through developments that exemplify the principles of conservation and encourage the application of those principles in our daily lives.

A corollary concept, and one that supports sustainable design, is that of bio-regionalism - the idea that all life is established and maintained on a functional community basis and that all of these distinctive communities (bio-regions) have mutually supporting life systems that are generally self-sustaining. The concept of sustainable design holds that future technologies must function primarily within bioregional patterns and scales. They must maintain biological diversity and environmental integrity contributing to the health of air, water, and soils, incorporating design and construction that reflect bio-regional conditions, and reducing the impacts of human use (9).

Design principles

Sustainable design, sustainable development, design with nature, environmentally sensitive design, holistic resource management - regardless of what it's called, "sustainability," the capability of natural and cultural systems being continued over time, is the key (10).

In order to have sustainable design in the National Park, an alternative approach to traditional design and the new design approach must recognize the impacts of every design choice on the natural and cultural resources of the local, regional, and global environments.

A model of the new design principles necessary for sustainability is exemplified by the "Hanover Principles" or "Bill of Rights for the Planet," developed by William McDonough Architects for EXPO 2000 held in Hanover, Germany.

1. Insist on the right of humanity and nature to co-exist in a healthy, supportive, diverse, and sustainable condition.

2. Recognize interdependence. The elements of human design interact with and depend on the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.

3. Respect relationships between spirit and matter. Consider all aspects of human settlement including community, dwelling, industry, and trade in terms of existing and evolving connections between spiritual and material consciousness.

4. Accept responsibility for the consequences of design decisions upon human well being, the viability of natural systems, and their right to co-exist.

5. Create safe objects to long-term value. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creations of products, processes, or standards.

6. Eliminate the concept of waste. Evaluate and optimize the full life cycle of products and processes, to approach the state of natural systems in which there is no waste.

7. Rely on natural energy flows. Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.

8. Understand the limitations of design. No human creation lasts forever and design does solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not an inconvenience to be evaded or controlled.

9. Seek constant improvements by sharing knowledge. Encourage direct and open communication between colleagues, patrons, manufacturers, and users to link long-term sustainable considerations with ethical responsibility, and reestablish the integral relationship between natural processes and human activity.

Role of interpretation

For any National Park to be sustainable, it will only succeed to the degree that it anticipates and manages human experiences (11). Interpretation provides the best single tool for shaping experiences and sharing values. By providing an awareness of the environment, values are taught that are necessary for the protection of the environment. Sustainable design will seek to affect not only immediate behaviors but also the long-term beliefs and attitudes of the visitors.

To achieve a sustainable park:

- Visitor experiences should be based on intimate and sensory involvement with actual natural and cultural resources. The local culture should be included. The experiences should be environmentally and culturally compatible and should encourage the protection of those resources
- Educational opportunities should include interpretation of the systems that sustain the development as well as programs about natural and cultural resource values of the setting.
- Site and facility design should contribute to the understanding and interpretation of the local natural and cultural environments.

Interpretation should make the values of sustainability apparent to visitors in all daily aspects of operation, including services, retail operations, maintenance, utilities, and waste handling. A good example should be set in all facets of operation

Opportunities for Interpretation

A value-based visitor experience requires interpretation as an essential part of the planning and design process (12). The primary interpretive resources of the park can usually be identified in the planning stages of the development by answering the following questions:

- What is special or unusual about a particular National Park?
- What is particularly interesting, scenic, or photogenic about the park?
- What do visitors come to see?
- What is fun to do?
- What can be done to the park that is both environmentally sustainable and challenging?
- What resources provide particularly strong opportunities to demonstrate the underlying value system of sustainable development?
- What significant environmental controversies might be illustrated using local resources?
- What experiences are currently fashionable?
- What knowledge do visitors already have about the area?

- What knowledge and attitudes do neighboring residents have about the park and its resources?
- What messages can be offered about sustainability that visitors can use in their everyday lives?

In addition, interpretation must be reinforced in all visitor experiences and inherent in management's thinking and in the relationship of the proposed development to the larger cultural context. The value system that interpretation communicates must pervade the entire cycle of planning, design, construction, operations, and maintenance.

Integration of Interpretation into Sustainable Development

Visitor experiences must be based on actual knowledge of resources that are environmentally sustainable and influence human values, thus protecting the overall environment. The table below provides a list of general goals and specific examples to facilitate the integration of interpretation into sustainable development of the park.

Design considerations

The National Park depends on close and intimate associations with the ecosystems around it. Park visitors and ecotourists seek to participate, to join in, to experience, and to gain a better awareness, appreciation, and understanding of the ecological system.

The following are essential considerations for the integration of the park's development with natural resources (13).

1. Natural Behavior within an Ecosystem - A basic understanding of the natural behavior of an ecosystem is required before designing facilities for sustainable functioning within it. It is crucial to identify key resources on which ecotourism will be focused and to understand how these resources are linked. Geographic information system inventories of soils, hydrology, and plant and animal communities can aid to this understanding.

2. Links between Ecosystems - There are links between ecosystems that may be geographically separate, and changes in one ecosystem may have consequences in another, therefore long-term resource protection involves plan-

Visitor Experiences

Interpretive Goals	Examples
Visitors must	Visitors would benefit by
- have the opportunity to see that the local natural and cultural worlds are interrelated.	- participating in organized cultural activities and demonstrations that allow local residents to share their values and skills with visitors. - being served meals that feature local foods and products and by seeing heal food plants being cultivated within the park.
- learn that the resources that surround them are important, interesting, and worthy of respect.	- attending evening programs featuring site specific interpretive themes. - having plants and other features of the site identified by labels or in guidebooks. - ensuring that the beauty of the natural and cultural environments are preserved and revealed in the park.
- have the opportunity to interact with the environment at every possible moment.	- participating in guided activities that focus on significant natural and cultural features found onsite or nearby. - participating in environmental education programs that include members of the community and local schools. - ensuring that the physical development is designed to grasp every opportunity to bring the visitor in close sensory contact with the environment. - ensuring that preservation of the environment takes precedence in all aspects of the park and that this goal is made visible.
- have opportunities for learning through exhibits and literature as well as through guided activities.	- participating in organized volunteer activities that allow visitors to work on the enhancement of the environment after appropriate training. - using the National Park's resource library - providing sensory experiences using interpretive messages whenever possible as part of the design.
- share in the responsibilities of caring for the natural and cultural environments.	- taking part in active programs that are planned for preserving and restoring the environment. - participating in routine operations of the park, such as recycling, energy conservation and so on.

Facility Planning/Design/Construction

Interpretive Goals	Examples
Sustainable design must	Sustainable design would
- include a professional understanding of the natural and cultural resources involved and clearly state that people must be subordinate to (or in harmony with) nature.	- ensure that the site plan, design, and construction preserve and emphasize key elements of the natural and cultural environments.
- give the park a special sense of place based on the resources of the site.	- feature architectural materials that are native to the site or region and that are renewable and environmentally sensitive. - encourage opportunities for sensing, experiencing, and/or understanding resources in the architecture and site design.
- provide education about the natural and cultural environments and the support systems that sustain the park while bringing visitors and resources together whenever possible.	- place interpretive exhibits within the development, allowing visitors to be aware of immediate resource protection concerns associated with the environment. - provide information in visitor facilities about the resource, using printed or electronic media as appropriate. - provide access to the support systems of the park through cutaway walls or other methods.
- allow visitors to experience nature in an intimate sensory fashion, providing opportunities for private moments in natural settings.	- limit outdoor night lighting to low wattage, directional lighting, with consideration of photovoltaic power and control. - provide passive, quiet areas where visitors can reflect on the natural scene. - assist interpretive programming to set the stage for private moments in natural settings.
- incorporate the living culture as a significant part of the visitor experience and encourage opportunities for visitors and local residents to interact and share their values and experiences.	- incorporate architectural traditions, names, and images into facility design.

ning and government controls on a wide geographical basis.

3. Fragmentation of Habitats - Whether due to a specific facility or throughout an ecosystem, habitat fragmentation causes loss of biological diversity and must be minimized.

4. Energy Subsidies for Ecosystems - Sustainable planning and design can keep energy subsidies in the park at a minimum by taking advantage of renewable energy resources within the local ecosystem. Questioning how the park can function if the energy subsidy were unavailable will keep development more in harmony with existing resources and minimize the environmental impact of importing energy.

5. Human Demands on Ecosystems - The demands of human use on an ecosystem are cumulative. New proposals must account for the previous use of resources so that the effects of the activity, proposed development, and increased use do not exceed the ecosystem's capability. Change in the system is inevitable, but limits of acceptable environmental change should be established before development begins. Unpredictable events such as floods and droughts, which could cause the whole system to collapse, should be considered.

6. Ecosystem Monitoring - The effects on surrounding resources of developing and operating facilities should be routinely monitored and evaluated, and actions to correct problems should be taken immediately. This will ensure that the limits of acceptable change are not exceeded and will provide information about the behavior of the system. This information can be used for improved designs.

7. Management of Cultural Resources - Cultural resources are reflections of past cultural, historical, and environmental influences. Any development in areas containing cultural resources like the National Park should pursue appropriate methods during planning, design, construction, and throughout subsequent operation to ensure that these nonrenewable, environmentally sensitive resources are protected, conserved, interpreted, and left unimpaired for future generations.

The following general recommendations should be included in the park's sustainable

Operations and Maintenance

Interpretive Goals	Examples
The values of a sustainable park development must be	The values of a sustainable park development are shown by
- communicated by the manager who serves as the chief interpreter of a sustainable park.	- providing all staff with regular training regarding local natural and cultural features and resources. - organizing work / study programs that emphasize resources and sustainable design techniques. - organising volunteer activities that allow visitors to work on restoration or enhancement of the environment after appropriate training. - developing volunteer programs that allow visitors to operate site support systems.
- understood and appreciated by the entire staff, who should demonstrate understanding and respect for the local environment and share their knowledge with visitors.	- providing tours that present the sustainability goals of the park as shown in the operation and maintenance functions such as utility and support systems. - providing visitors the opportunity to understand the relationships of local water, wastewater, solid waste, and electrical systems to local, regional and global environments.
- shared with those who live in the surrounding areas; the local culture should have a significant role to play in the operation of the park.	- including representatives of the local culture in significant staff positions. - organising cultural activities and demonstrations that allow local residents to share their values and skills with visitors. - organising environmental education programs that include members of the local community and schools.
- visible in all daily aspects of operation, including energy use, food handling, waste handling, maintenance activities, retail operations, and visitor services.	- providing a central staffed location for resource and activity information. - serving meals that feature local foods and products and by cultivating local foods within the park. - recycling all possible waste. - selling appropriate informational materials and quality items crafted by local people.

design that affects cultural resources:

- All the proposed development sites within the park should be surveyed for cultural resources, and the significance, integrity, and tangible and intangible qualities of those resources determined.
- All site and facility designs should incorporate methods for protecting and preserving significant cultural resources over the long term.
- The architectural style, landscape design, and construction materials of new developments within the park should reflect the cultural heritage of the locality or region.
- Cultural resource treatment and maintenance methods should be both environmentally and culturally sensitive and sustainable over the long term.
- When opportunities arise, cultural resources should be interpreted to include lessons about the environmental exploitations or sustainable, environmental successes of the past.
- Any proposed development plan associated with the park must take into account the total impacts of development in the widest possible context, and it must seek and implement effective mitigation for those impacts.

The conservation and management of cultural resources in an environmentally sensitive manner requires detailed planning; knowledge of materials and their interactions; knowledge of construction, craft techniques, skilled technicians, and available resources; and an ongoing commitment to resource conservation. Successful preservation must also address construction and operations associated with the park's proposed development.

Site design

Site design is a process of intervention involving the location of circulation, structures, and utilities, and making natural and cultural values available to visitors. The process encompasses many steps from planning to

construction, including initial inventory, assessment, detailed design, and construction procedures and services (14).

Sustainable Site Design Philosophy

Sustainable site design of the park requires holistic, ecologically based strategies to create projects that do not alter or impair but instead help repair and restore existing site systems. Site systems such as plant and animal communities, soils, and hydrology must be respected as patterns and processes of the living world (15).

Useful in understanding sustainable ecologically based site design is the "Valdez Principles for Site Design" developed by Andropogon Associates, Ltd. These strategies are precedent setting regarding their application and especially important to rightfully integrate the built environment into the park.

1. Recognition of Context - This site can not be understood and evaluated without looking outward to the site context. Before planning and designing for the park, fundamental questions must be asked in light of its impact on the larger community.

2. Treatment of Landscapes as Interdependent and Interconnected - Conventional development often increases fragmentation of the landscape. A fabric of development that diminishes their ability to support a variety of plant communities and habitats typically surrounds the small remaining islands of natural landscape. This situation must be reversed. Larger whole systems must be created by reconnecting fragmented landscapes and establishing contiguous networks with other natural systems both within the park and beyond its boundaries.

3. Integration of the Native Landscape with Development - Even the most developed landscapes, where every trace of nature seems to have been obliterated, is not self-contained. These areas should be redesigned to support some component of the natural landscape to provide critical connections to adjacent habitats.

4. Promotion of Biodiversity - The environment is experiencing extinction of both plant and animal species. Sustaining even a fraction of the diversity known today will be very difficult. Development itself affords a tremendous opportunity to emphasize the establishment of biodiversity on the site. Site design must be directed to protect local plant and animal communities, and new landscape plantings must deliberately reestablish diverse natural habitats in organic patterns that reflect the processes of the site.

5. Reuse of Already Disturbed Areas - Despite the declining availability of relatively unspoiled land and the wasteful way sites are conventionally developed, existing built areas are being abandoned and new development located on remaining rural and natural areas, which is something that must not occur in the development of this park.

6. Making a Habit of Restoration - Where the landscape fabric is damaged, it must be repaired and/or restored. As most of the ecosystems are increasingly disturbed, every development project should have a restoration component.

When site disturbance is uncontrolled, ecological deterioration accelerates, and natural systems diminish in diversity and complexity. Effective restoration requires recognition of the interdependence of all site factors and must include repair of all site systems - soil, water, vegetation, and wildlife.

General Site Design Considerations

The following considerations apply to the sustainable site design of the park:

- Promote spiritual harmony with, and embody an ethical responsibility to, the native landscape and its resources.
- Plan landscape development according to the surrounding context rather than by overlaying familiar patterns and solutions.
- Do not sacrifice ecological integrity or economic viability in a sustainable development; both are equally important factors in the development process.
- Understand the site as an integrated ecosystem with changes occurring over time in dynamic balance; the impacts of development must be confined within these natural changes.
- Allow simplicity of functions to prevail, while respecting basic human needs of comfort and safety.
- Recognize there is no such thing as waste, only resources out of place.
- Assess feasibility of development in long-term social and environmental costs, not just short-term construction costs.
- Minimize areas of vegetation disturbance, earth grading, and water channel alternation.
- Locate structures to take maximum advantage of passive energy technologies to provide for human comfort.
- Provide space for processing all wastes created onsite (collection/recycling facilities) so that no hazardous or destructive wastes will be released into the environment.
- Determine environmentally safe means of onsite energy production and storage in the early stages of the park's sites planning.
- Phase development to allow for the monitoring of cumulative environmental impacts of development.
- Allow the natural ecosystem to be self-maintaining to the greatest extent possible.
- Develop facilities to integrate selected maintenance functions such as energy conservation, waste reduction, recycling, and resource conservation into the visitor experience.
- Incorporate indigenous materials and crafts into structures, native plants into landscaping, and local customs into programs and operations.

Specific Site Design Considerations

Site Selection

The requirements and environmental characteristics of a sustainable National Park will vary greatly, but the following factors should be considered in site selection:

- *Capacity* - As difficult as it can be to determine, every site has a carrying capacity for structures and human activity. A detailed site analysis should determine this capacity based on the sensitivity of site resources and the ability of the land to regenerate.

- *Density* - Siting of facilities should carefully weigh the relative merits of concentration versus dispersal. Natural landscape values may be easier to maintain if facilities are carefully dispersed. Conversely, concentration of structure leaves more undisturbed natural areas.

- *Climate* - The characteristics of the park's climate should be considered when locating facilities so that human comfort can be maximized while protecting the facility from climatic forces such as violent storms and other extremes.

- *Slopes* - In certain parts of the park where the steep slopes predominate, special sitting of structures and costly construction practices are required. Building on slopes considered too steep can lead to soil erosion, loss of hillside vegetation. Appropriate site selection should generally locate more intensive development on gentle slopes, dispersed development on moderate slopes, and no development on steep slopes.

- *Vegetation* - It is important to retain as much existing native vegetation as possible to secure the integrity of the park. Natural vegetation is often an essential aspect of the visitor experience and should be preserved. Site selection should maintain large habitat areas and avoid habitat fragmentation and canopy loss. In some areas, most nutrients are held in the forest canopy, not in the soil - loss of canopy therefore causes nutrient loss as well. Plants occur in natural associations (plant communities) and should remain as established naturally.

- *Views* - Are critical and reinforce visitor's experience. Site location should maximize views of natural features and minimize views of visitor and support facilities.

- *Natural Hazards* - Sustainable development should be located with consideration of natural hazards such as dangerous animals and plants, if any. Site layout should allow controlled access to these features.

- *Access to Natural and Cultural Features* - Good siting practices can maximize pedestrian access to the wide variety of onsite and offsite resources and recreational activities. Low impact development is the key to protecting vital resource areas.

- *Traditional Activities* - Siting should be compatible with traditional agricultural and hunting activities. Some forms of recreational development that supplant traditional land uses may not be responsive to the local economy.

- *Energy and Utilities* - Conventional energy and utility systems are often minimal or nonexistent in potential ecotourism areas. Siting should consider possible connections to offsite utilities, or more likely, spatial needs for onsite utilities. The potential exists for alternative energy use in many places, particularly solar and wind based energy systems. Good sustainable siting considers these opportunities.

- *Separation of Support Facilities from Public Use Areas* - Safety, visual quality, noise, and odor are all factors that need to be considered when siting support services and facilities. These areas need to be separated from public use and circulation areas. In certain circumstances, utilities, energy systems, and waste recycling areas can be a positive part of the visitor experience.

- *Proximity of Goods, Services, and Housing* - This development often requires the input of a variety of goods and services and the large operational staff. Sitting should consider the availability of these elements and the costs involved in providing them.

Site Access

Site access refers not only to the means of physically entering the park but also to the en route experience. For example, the en route experience could include transitions between origin and destination with sequential gateways, or it could provide an interpretive and/or educational experience. Other considerations for enhancing the experience of accessing the developed area include:

- Select corridors to limit environmental impacts and control development along the corridor leading to the facility.
- Provide anticipation and drama by framing views or directing attention to landscape features along the access route.
- Provide a sense of arrival at the destination.

Site access can be achieved by various means of travel including pedestrian, transit systems, private vehicles and aircraft. These transportation means impose limitations on users based on the capabilities of the traveler or the capacity of the particular transportation mode. Transportation means that are the least polluting, quiet, and least intrusive in the natural environment may be the most appropriate for this recreational development. Where environmental or other constraints make physical access impossible (just like accessing some particular areas during the snow or rainy season), remote video presentation may be the only way for people to access the site. The need to construct a road into a site is the first critical decision to be made. Building a road into a pristine site should be considered a serious intervention that will change the site forever. Roads tend to create irreversible impacts.

Road Design and Construction - Crossing unstable slopes should be avoided and retaining walls should be included on cut slopes to ensure long-term slope stability. The road should have low design speeds (with more and tighter curves) and a narrower width to minimize cut-and-fill disturbance. Over engineering of park roads should be avoided.

Access corridors should be provided for multiple purposes - e.g., visitors, maintenance, security, emergency vehicles, underground utilities. Secondary access (road, dock, or helicopter landing site) should always be provided to permit emergency entry and evacuation in the event of a natural disaster. Multi use corridors can be effective and using the same road during construction can limit site degradation and re-landscaping.

Many soils are highly susceptible to erosion. Vegetation clearing on the road shoulders should be minimized to limit erosion impacts and retain the benefits of greenery. Exposed soils should be immediately replanted and mulched. Paved ditches are frequently used to stem erosion along steep road gradients. In the design of park roads, landscape solutions are preferred to render a softer appearance.

Unpaved surfaces are appropriate in areas of stable soils, lower slopes, and low traffic loads, but they require more maintenance. Permeable paved surfaces allow limited percolation of precipitation while providing better wear than unpaved surfaces. Impermeable paved surfaces are needed for roads with the highest load and traffic requirements. Whenever possible, recycled materials should be used in the construction of the surfacing, e.g., recycled aggregate. The surfacing material should blend with predominant landscape tones. Contractual arrangements should be developed with local businesses for the reuse/recycling of any construction waste.

Other Access Improvements - Airstrips should not disturb the other recreation facilities because of visual and noise impacts of airplanes. Permeable pavements should be used to increase water recharge and reduce runoff.

Core Site Access - While all visitor facilities should be accessible to visitors with disabilities, some natural features and site opportunities may by their very nature limit total accessibility. Rather than forcing unacceptable physical disturbance to make these areas accessible to all visitors with disabilities, the concept of challenge levels should be used. The degree of difficulty is determined and made known to visitors in advance, much in the same way as ski slopes are classified for beginners, intermediates, or experts. Challenge levels assume that while key facilities will be readily accessible to all visitors, some other sections of the park will be more difficult to access, and will involve some sense of adventure and accomplishment.

Utilities and Waste Systems

Utility Systems - Substantial impacts usually occur in order to provide electricity, gas, heating, cooling, ventilation, and storm drainage, on the landscape and the functioning of the natural ecosystem. Sustainable site planning and design principles must be applied early in the planning process to assist in selecting systems that will not adversely affect the environment and will work within established natural systems. After the appropriate systems are selected, careful planning and design is required to address secondary impacts such as soil disturbance and intrusion on the visual setting.

Utility Corridors - Due to environmental impacts of utility transmission lines, onsite generation and wireless microwave receivers are preferred. When utility lines are necessary they should be buried near other corridor areas that are already disturbed, such as roads and pedestrian paths. Overhead lines should not be located in desirable view sheds or over landform crests. Low impact alternatives for utility lines such as shielded conduit placed on the ground should be considered.

Utility System Facility Siting - Sustainable development of the infrastructure embodies the principles of reducing scale, dispersal of facilities, and the use of terrain or vegetative features to visually screen intrusive structures. Odor and noise are strong nuisance factors that are addressed by location and buffering. Also, the insulation of mechanical equipment that can have acoustical impacts has been considered. The exception to this rule may be to feature alternative utility systems for the purposes of interpretation for the environmentally conscious visitor.

Night Lighting - Care is required to limit night lighting to the minimum necessary for safety. Low voltage lighting with photovoltaic collectors has been considered as an efficient alternative energy.

Storm Drainage - The main principles in storm drainage control are to regulate runoff, to provide protection from soil erosion and avoid directing water into unmanageable volumes. Removal of natural vegetation, topsoil, and natural channels that provide natural drainage control should always be avoided. One alternative that has been considered is to try and stabilize soils, capture runoff in depressions (to help recharge groundwater supply), and re-vegetate areas to replicate natural drainage systems.

Irrigation Systems - Low volume irrigation systems are appropriate as a temporary method in most areas, to help restore previously disturbed areas or as a means to support local agriculture and native traditions. Irrigation piping can be reused on other restoration areas or incorporated into future domestic hydraulic systems. Captured rainwater recycled gray water, or treated effluent should be used as irrigation water.

Waste Treatment - It is important to use treatment technologies that are biological, non-mechanical, and do not involve soil leaching or land disposal that causes soil disturbance. While a septic system can be considered, treatment methods that result in useful products such as fertilizer and fuels are preferred. Constructed biological systems are increasingly in use to purify wastewater. They offer the benefits of being environmentally responsive, nonpolluting, and cost-effective.

Site-Adaptive Design Considerations

The concept of sustainability suggests an approach in terms of site components that is somewhat different from conventional site design. With a sustainable approach, site components refer to the character of the landscape they occupy, in this case the park, so that the experience of the landscape will be paramount. Instead of human functional needs driving the site design, site components respond to the indigenous spatial character, climate, topography, soils, and vegetation as well as compatibility with the existing cultural context. For example, all facilities would conform to constraints of existing landforms and tree locations, and the character of existing landscape will be largely maintained.

Natural buffers and openings for privacy are used more than artificially produced through planting and clearing. Hilly topography and dense vegetation are natural ways of separating site components.

Natural Characteristics - When nature is incorporated into designs, spaces can be more comfortable, interesting, and efficient. It is important to understand natural systems and the way they interrelate in order to work within these constraints with the least amount of environmental impact.

- Wind - The major advantage of wind in the park is its warming/cooling aspect. For example, as the southerly winds prevail, orientation of structures, and outdoor gathering places need to take advantage of this warming wind movement, or "natural" air conditioning.
- Sun - Where the sun is abundant, shading for human comfort and safety in activity areas is to be provided. The most economical and practical way is to use natural vegetation, slope aspects, or introduced shade structures.
- Rainfall - Is to be captured for a variety of uses (e.g., drinking and bathing) and this water reused for secondary purposes (e.g., flushing toilets, washing clothes). Wastewater or excess runoff from developed areas is to be channeled and discharged in ways that allow for groundwater recharge instead of soil erosion. Minimizing disturbance to soils and vegetation and keeping development away from natural drainage ways protect the environment as well as the structure.
- Topography - Potentially can provide vertical separation and more privacy for individual

structures. Changes in topography can also enhance and vary the way a visitor experiences the site by changing intimacy or familiarity. Again, protection of native soil and vegetation are critical concerns in high slope areas.

- Geology and Soils - Designing with geologic features such as rock outcrops can enhance the sense of place. Soil disturbances should be kept to a minimum to avoid erosion of fragile soils and discourage growth of plants. If limited soil disturbance must take place, a continuous over cover of disturbed soils with erosion control netting will need to be maintained.

- Vegetation - Sensitive native plant species need to be identified and protected. Existing vegetation is to be maintained to encourage biodiversity and to protect the nutrients held in the biomass of native vegetation. Native planting is to be incorporated into all new developments in such a way that every removed plant is replaced by two new ones. Vegetation can enhance privacy, be used to create "natural rooms," and be a primary source of shade. Plants also contribute to the visual integrity or natural fit of a new development in a natural setting.

- Wildlife - Sensitive habitat areas will always be avoided. Encouraging wildlife to remain close to human activity centers enhances the visitor experience. This can be achieved by maintaining as much original habitat as possible.

- Visual Character - Creating onsite visual intrusions (road cuts, utilities, etc.) will be avoided, and views of offsite intrusions carefully controlled. Using native building material, hiding structures within the vegetation, and working with the topography can maintain a natural look. It is easier to minimize the building footprint initially than to heal a visual scar at the end of construction.

- Cultural Context - Local archeology, history, and people are the existing components into which visitation must fit. Sustainable principles seek balance between existing cultural patterns with new developments like this one. Developing an understanding of local culture and seeking their input in the development processes can make the difference between acceptance and failure.

- Archeology - A complete archeological survey prior to development is imperative to preserving resources as some archeological discoveries have been made before in this area. Once resources are located, they can be incorporated into the final designs as an educational or interpretive tool. If discovered during construction activities, work should be stopped and the site reevaluated. Sacred sites will be respected and protected.

- History - Cultural history bas been reinforced through design by investigating and then interpreting vernacular design vocabulary. Local design elements and architectural character have been analyzed and employed to establish an architectural theme for the new developments at the park.

- Indigenous Living Cultures - Cultural traditions need to be encouraged and nurtured. Hence a forum should be provided for local foods, music, art and crafts, lifestyles, dress, and architecture, as well as means to supplement local incomes. Traditional harvesting of resource products will be permitted to reinforce the value of maintaining the resource.

Construction Methods and Materials

If a project is to be successful, there should be no residual signs of construction, and environmental damage should not be permitted. Certain site design strategies should be discouraged based on the probable environmental impacts of the construction methods necessary to build them.

Construction Process Program. A careful organization and sequencing of construction is emphasized. Examples include building of walkways first, and then their use as access to the site. Also it is important to plan material staging for areas in conjunction with future facilities.

Construction Limits and Landscape Features. All undisturbed soil and vegetation located outside specifically designated construction limits will be protected. Where disturbance occurs, the site needs to be restored as soon as possible and all the topsoil from a construction area will be collected for use in site restoration. Flexibility in revising construction plans should be allowed to change materials and construction methods based on actual site impacts. Throughout construction, resource indicators will be monitored to ensure that resources are not being adversely affected.

Native Landscape Preservation / Restoration

Preservation of the natural landscape is of great importance during construction because it is much less expensive and more ecologically sound than subsequent restoration. Restoration of native planting patterns should be used when site disturbances are unavoidable (16). The site should be replanted with native materials in a mix consistent with that found in a natural ecosystem. In some instances, native materials will be used compositionally to achieve drama and visual interest for human benefit.

Interpretation of the restoration areas will inform and educate the public on the value of native landscape restoration. Protection of existing resources in the ecosystem is the fundamental purpose of sustainable design (17).

Visitor Safety and Security

Written and personal briefings by staff could help foster awareness of safety risks and allow visitors to take responsibility for their own safety and security.

Some important design considerations are as follows:

- Visitors must have a sense of personal safety and security to be attracted to recreation areas. The facility will have reasonable provisions to protect visitors from natural and manmade hazards. Location of walks and lodging are designed to discourage visitor of contacts with dangerous plants or animals.

- The design considers safety from climate extremes; visitors may be unaware of natural hazards, including intense sun, high wind, heavy rainfall or snow, and extreme humidity.

- Ecological integrity will be balanced with safety concerns in this development where adventure and challenge are important for the experience. Various challenge levels in site facilities will be provided to accommodate all visitors, including visitors with disabilities.

- The use of artificial lighting are to be limited to retain natural ambient light levels - using ground-mounted light fixtures to limit light impacts while providing a basic sense of security.

- Remote location and controlled access can enhance appropriate atmosphere and security to the facilities - incorporating natural barriers into facility design to minimize the need for security fencing or barriers has to be done.
- An alternate means of access will be available to provide essential emergency provisions of water, food, and medicine and a reliable communication system.

SENSE OF PLACE

In meeting the needs of the human community, development needs to be designed and built with an awareness of the interrelationships between natural, cultural, social, and economic resources both locally and globally (18). In order to make this development sustainable is aimed at an absolute minimal impact on the local, regional, and global environments. In providing facilities and activities for visitors a special care should be taken in preventing them to destroy the very resources or qualities they have come to experience (19) .

Sustainable Building Design Philosophy

Sustainable design balances human needs (rather than human wants) with the carrying capacity of the natural and cultural environments. It minimizes environmental impacts; it minimizes importation of goods and energy as well as the generation of waste. The ideal situation is that since this development is necessary, it will be constructed from natural sustainable materials collected onsite, generate its own energy from renewable sources such as solar or wind, and manage its own waste.

The use of immediate and locally available materials for construction will be made and hence done with economy and efficiency. The same strategies when used in development can minimize global and local impacts on resources. This ecologically sensitive design adjusts demands, lifestyles, and technologies to evolve a compatible balance with the natural and cultural systems within its environment (20).

Understanding Resource Sensitive Design

One method of describing sustainable building design is to compare it to other forms of resource based developments. Metaphorical interpretation of traditional forms of tourist resorts provides insight into the relationship that the facilities and visitors have with the resources upon which they are based.

Plantation

The plantation represents a significant piece of history of many not only tropical and subtropical, but also temperate areas. Characteristics of the traditional plantation include:

- a strong hierarchical organization of building forms (i.e., large main buildings for owners and visitors, small outbuildings for laborers, animals, agricultural processes, and storage)
- exploitation / importation of energy
- environmental degradation through the removal of native plant material and the introduction of cash crops with an emphasis on profit rather than the environment
- import and export as a primary operational mode, including export of capital to some extent, and import of building forms and technologies

The plantation model carries many negative connotations as a result of these very characteristics. Although representational of a harsh disregard for local natural and cultural resources, the plantation model can be seen in design and operation of numerous tourist resorts around the world. All too often, tourist-related development is conceived as a resource in and of itself. This type of plantation approach to tourism development satisfies its own needs through exploitation and importation, rather than through harmonic integration with its host environment.

Community

The community metaphor depicts resorts focused on activity more than the built environment (21). Characteristics of the activity-related resort include:

dispersion of building units in a functional but nonhierarchical pattern, often the resorts are conceptualized as "villages"

strong interaction of staff and visitors in a more democratic manner than the plantation model

integration of maintenance and operational staff into the life of the resort as a necessary element to sustain its operation

Resource based activities override concern for the local ecology or interest in interaction with native culture while the community model recognizes a dependency on the resources for its activities; it makes marginal investment in sustaining the health of those resources and typically operates in isolation from the local community. (22)

Aesculapia

A more appropriate metaphor for resource related design might be aesculapia, the Greek “place of healing”. In this model, nature is respected for its restorative qualities.

The human experience is set in harmony with the environment and an opportunity is created to allow a reconnection of human needs to the natural systems upon which all life is based. Applying these objectives to the national park would embrace the following characteristics:

- the primary senses - sight, hearing, smell, taste, and touch - are incorporated into the visitor experience to enhance understanding of the environment's uniqueness
- to be healing, visitors must experience an obvious organic connection with the natural and cultural context of the surroundings so as to appreciate their value and to seek ways to minimize biological disturbances

Sustainable Park Development

Today's increasing demand for ecologically oriented tourism provides a prime opportunity for applying the attributes of aesculapia to the National Park. (23). Following are criteria or standards that park intends to meet:

- Provide education for visitors on wildlife, native cultural resources, historic features, or natural features.
- Involve indigenous populations in operations and interpretation to foster local pride and visitor exposure to traditional values and techniques.
- Accomplish environmental restoration.
- Provide research and development for and/or demonstration projects of ways to minimize human impacts on the environment.
- Provide spiritual or emotional recuperation.
- Provide relaxation and recreation.
- Educate visitors that knowledge of our local and global environment is valuable and will

empower their ability to make informed decisions.

Sustainable Building Design Objectives

The long-term objective of sustainable design is to minimize resource degradation and consumption on a global scale (24). Therefore sustainable building design within the park seeks to:

- use the building as an educational tool to demonstrate the importance of the environment in sustaining human life
- reconnect humans with their environment for the spiritual, emotional, and therapeutic benefits that nature provides
- promote new human values and lifestyles to achieve a more harmonious relationship with local, regional and global resources and environments
- increase public awareness about appropriate technologies and the cradle-to-grave energy and waste implications of various building and consumer materials
- nurture living cultures to perpetuate indigenous responsiveness to and harmony with, local environmental factors
- relay cultural and historical understandings of the site with local, regional, and global relationships

Checklist for Sustainable Building Design of the Park's Infrastructure

General

The design (25) is meant to:

- be subordinate to the ecosystem and cultural context
- respect the natural and cultural resources of the site and absolutely minimize the impacts of any development
- reinforce/exemplify appropriate environmental responsiveness
- educate visitors/users about the resource and appropriate built responses to that environment.
- interpret how development works within natural systems to effect resource protection and human comfort and foster less consumptive lifestyles
- use the resource as the primary experience of the site and as the primary design determinant
- enhance appreciation of the natural environment and encourage/establish rules of conduct
- use the simplest technology appropriate to the functional need and incorporate passive energy conserving strategies responsive to the local climate
- use renewable indigenous building materials to the greatest extent possible
- avoid use of energy intensive, environmentally damaging, waste producing, and/or hazardous materials
- strive for "smaller is better", optimizing use and flexibility of spaces so overall building size and the resources necessary for construction and operation are minimized
- strive for minimal environmental disruption, resource consumption, and material waste, and identify opportunities for reuse/recycling of construction debris
- provide equal access to the full spectrum of people with physical and sensory impairments while minimizing impacts on natural and cultural resources

Also, the design's aim is to

- consider phasing the development to allow monitoring of resource impacts and adjustments in subsequent phases
- allow for future expansion and/or adaptive uses with a minimum of demolition and waste
- materials and components should be chosen that can be easily reused or recycled
- make it easy for the occupants/operators to recycle waste

Natural Factors

By definition, sustainable design seeks harmony with its environment just like facilities relate to their context. It should be obvious as to provide environmental education for its users. The following information serves as a checklist of basic considerations that have been adopted for the sustainable development of any National Park.

Climate

The development proposes to:

- apply natural conditioning techniques to effect appropriate comfort levels for human activities - do not isolate human needs from the environment
- avoid over dependence on mechanical systems to alter the climate (such dependency signifies inappropriate design, disassociation from the environment, and non sustainable use of resources)
- analyze whether the climate is comfortable for the anticipated activities, and then which of the primary climatic components of temperature, sun, wind and moisture can improve the comfort levels.

Temperature

- temperature is a liability in climates where it is occasionally too hot or too cold
- areas that are very dry or at high elevation typically have the asset of large temperature swings from daytime heating to nighttime cooling, which can be flattened through heavy/massive construction to yield relatively constant indoor temperatures
- when climate is predominantly too hot for comfort:
- minimize solid enclosure and thermal mass
- maximize roof ventilation
- use elongated or fractured floor plans to minimize internal heat gain and maximize exposure for ventilation
- separate rooms and functions with covered breezeways to maximize wall shading and induce ventilation
- isolate heat generating functions such as kitchens and laundries from living areas
- provide shaded outdoor living areas such as porches and decks
- capitalize on cool nighttime temperatures, breezes or ground temperatures
- when climate is predominantly too cool for comfort
- consolidate functions into most compact configuration
- insulate thoroughly to minimize heat loss
- minimize air infiltration with barrier sheeting, weather stripping, sealant and airlock entries
- minimize openings not oriented toward sun exposure

Sun

- sun can be a significant liability in hot climates, but is rarely a liability in cold climates
- sun can be an asset in cool and cold climates to provide passive heating
- design must reflect seasonal variations in solar intensity, incidence angle, cloud cover, and storm influences
- when solar gain causes conditions too hot for comfort
- use overhangs to shade walls and openings
- use site features and vegetation to provide shading to walls with eastern and western exposure
- use shading devices such as louvers, cove-

red porches and trellises with natural vines to block sun without blocking out breezes and natural light
- orient broad building surfaces away from the hot late-day western sun (only northern and southern exposures are easily shaded)
- use lighter-colored wall and roofing material to reflect solar radiation (be sensitive to resulting glare and impact on natural/cultural setting)
- when solar gain is to be used to offset conditions that are too cool for comfort
- maximize building exposure and openings facing south
- increase thermal mass and envelope insulation
- use darker colored building exteriors to absorb solar radiation and promote heat gain

Wind
- wind is a liability in cold climates because it strips heat away quicker than normal; wind can also be a liability to comfort in hot dry climates when it causes the human body to dehydrate and then overheat
- wind can be an asset in hot, humid climates to provide natural ventilation
- use natural ventilation wherever feasible; limit air-conditioning to areas requiring special humidity or temperature control such as artifact storage and computer rooms
- maximize/minimize exposure to wind through plan orientation and configuration, number and position of wall and roof openings and relation to grade and vegetation
- use wind scoops, thermal chimneys or wind turbines to induce ventilation on sites with limited wind.

Moisture
- moisture can be a liability if it comes in the form of humidity, causing such stickiness that one cannot cool by perspiring in summer
- strategies to reduce the discomfort of high humidity include maximizing ventilation, inducing air flow around facilities and venting or moving moisture producing functions such as kitchens and shower rooms in outside areas
- nature can be an asset by evaporating in hot, dry climates to cool and humidify the air
- techniques for evaporative cooling include placing facilities where breezes will pass over water features before reaching the facility, and providing fountains, pools, and plants

Other Climatic Considerations
- rainfall can be a liability if any concentrated runoff from developed surfaces is not managed to avoid erosion
- rainfall can be an asset if it is collected off roofs for use as drinking water
- storms / cyclones
- provide or make arrangements for emergency storm shelters
- avoid development in floodplain and storm surge areas
- consider wind effects on walls and roofs
- provide storm shutters for openings
- use appropriate wind bracing and tie downs
- design facilities to be light enough and of readily available and renewable materials to be safely sacrificial to large storms or of sufficient mass and detail to prevent loss of life and material

Vegetation

The development shall propose to:
- locate and size facilities to avoid cutting mature vegetation and to minimize disruption to or disassociation with, other natural features
- use natural vegetation and adjustments in building plan to diminish the visual impact of facilities and to minimize imposition on environmental context
- in warmer climates, strengthen interplay of facilities with their site environment through minimizing solid walls, creating outdoor activity spaces, etc.

Topography

The development shall propose to:
- consider building to minimize disturbance to site character, skyline, vegetation, hydrology and soils
- consolidate functions or segment facilities to reduce footprint of individual structures to allow sensitive placement within existing landforms
- use landforms and the sensitive arrangement of buildings to
- help diminish the visual impact of facilities
- enhance visual quality by creating a rhythm of open spaces and framed views
- orient visitors to building entrances
- accentuate key landmarks, vistas and facilities

Hydrology

The development shall propose to:
- locate and design facilities to minimize erosion and impacts on natural hydrological systems
- safeguard hydrological system from contamination by development / activities
- allow precipitation to natural recharge groundwater, wherever possible

Geology / Soils

The development shall propose to:
- minimize excavation and disturbance to groundcover
- minimize erosion by avoiding large impervious surface areas and building footprints that collect rain and create concentrate runoff onto site

Pests

The development shall propose to:
- design facilities to minimize intrusion by noxious insects, reptiles and rodents
- ensure that facility operators use natural means for pest control

Wildlife

The development shall propose to:
- respect importance of biodiversity and the humble role of humans in design
- avoid disruption of wildlife travel or nesting patterns by sensitive sitting of development and by limits set on construction activity and facility operation.
- allow opportunities for users to be aware of indigenous wildlife by observing and not disturbing

Human Factors and Cultural Resources

Archeological resources – it is proposed to:
- use preservation and interpretation of archeological features to provide insight to previous cultural responses to the environment, their successes as well as failures

Vernacular architecture – it is proposed to
- analyze local historic building styles, systems and materials usually for time tested approaches in harmony with natural systems
- use local building material, craftsmen and techniques to practically greatest extent in the development of new facilities

Sociology – it is proposed to:
- understand the local culture and peoples needs to avoid introduction of socially unacceptable or morally offensive practices
- consult with local indigenous population about design input and foster their sense of ownership and acceptance

- include local construction techniques, materials and cultural considerations (that are environmentally sound) in the development of new facilities

Arts and crafts – it is proposed to:
- incorporate local expressions of art, handiwork, detailing and, when appropriate, technology into new facility design and interior design
- provide opportunities and space for demonstration of local crafts and performing arts

Sensory Experience

Visual – it is proposed to:
- provide visitors with ready access to educational materials to enhance their understanding and appreciation of the local environment and threats to it
- incorporate views of natural and cultural resources into even routine activities to provide opportunities for contemplation, relaxation and appreciation
- use design principles of scale, rhythm, proportion, balance and composition to enhance the complementary integration of facilities into environmental context
- provide visual surprises within design of facilities to stimulate the educational experience
- use colors to blend facilities with natural context, unless contradictory to other environmental considerations or cultural values

Sounds - it is proposed to:
- Locate service and maintenance functions away from public areas
- space lodging units and interpretive stops so that natural, not human, sounds dominate
- use vegetation to create sound baffle between public and private activities
- orient openings toward natural sounds such the lapping of waves, babbling of streams and rustling of leaves by the wind
- restrict the use or audio level of unnatural sounds such as radios and televisions

Touch - it is proposed to:
- allow visitors to touch and be in touch with the natural and cultural resources of the site
- vary walking surfaces to identify or give different quality to different spaces
- use contrasting textures to direct attention to interpretive opportunities

Smell - it is proposed to:
- allow natural fragrances of vegetation to be enjoyed
- direct air exhausted from utility areas away from public areas

Taste - it is proposed to
- provide opportunities to sample local products and cuisine

Environmentally Sensitive Building Materials Selection Priorities

(Used to Determine Appropriate Building Materials for the Park's Infrastructure) (26)

When their source is sustainable:
- Natural materials are less energy intensive and polluting to produce and contribute less to indoor air pollution.
- Local materials have a reduced level of energy cost and air pollution associated with their transportation and can help sustain the local economy.
- Durable materials can save on energy costs for maintenance as well as for the production and installation of replacement products.

In selecting building materials, prioritizing them by origin and avoiding materials from nonrenewable sources was done. The following guidelines should be used.

Primary - materials found in nature such as stone, soil, reed, wool, cotton, and wood
- ensure new lumber is from certified sustainable managed forests or certified naturally felled trees
- use caution that any associated treatments, additives or adhesives do not contain toxins or off-gas volatile organic compounds that contribute to indoor air/atmospheric pollution

Secondary Materials - materials made from recycled products such as wood, aluminum, cellulose and plastics
- verify that production of material does not involve high levels of energy, pollution, or waste
- verify functional efficiency and environmental safeness of recycled materials and products from old buildings
- look closely at the composition of recycled products; toxins may still be present
- consider cellulose insulation; it is fireproof
- specify aluminum from recycled material; it uses 80% less energy to produce over initial

Tertiary - man made materials (artificial, synthetic, non renewable) materials having varying degrees of environmental impact such as plywood, plastics, and aluminum
- avoid use of materials and products containing or produced with chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs) that deteriorate the ozone layer
- avoid materials that give off gas volatile organic compounds, contributing to indoor air/atmospheric pollution
- minimize use of products made from new aluminum or other materials that are resource disruptive during extraction and a high energy consumer during refinement

CONCLUSION

Sustainability refers to a process and an attitude or viewpoint. It is a process wherein responsible consumption is practiced, so as to minimize waste and interact in balanced ways with natural environments and cycles. (27) In terms of process, the task is to formulate a program and a process where comprehensive nature would balance the desires and activities of human kind within the integrity and carry the capacity of nature, instead of a defined wish list of idealized conditions, principles and processes. That is what we should adopt to achieve a stable, long-term relationship within the limits of our local and global environment. It represents a process document. It presents a complete and coherent theory for the realization of the sustainable environment. It also describes a politically workable, economically feasible process through which the balance-seeking process of sustainability may be actualized. (28) The accomplishments are not so much in achievement of perfect environments as they are in raising consciousness and defining appropriate, effective steps and actions. The same if not much more applies to the National Parks..

Sustainable architecture is also a response and an expression of gratitude for our existence and respect for the world around us. The human environment is what the resources of the natural universe are sustaining. We recognize that we cannot create, we cannot live or survive without the use of the resources of the universe and we are filled with awe and respect. (29) A sense of sacredness attaches itself to those

resources. In response the concept is best expressed in the term "stewardship." When we do these things, and say these things with understanding, we cross into another realm - leaving behind the simple innocence of ignorance. We can see our allies, ourselves and the world more clearly now. We have formulated a rudimentary value system and we are further on the path to the formulation of a workman's code, the view of the good steward of our National Parks too (30).

Although the term "Sustainable Architecture" transmits slightly different meanings to different audiences, nevertheless it serves as a rallying point for creating greater concern about the built environment and its long-term viability. Rather than signaling a return to subsistence living, sustainability means an increase in quality and standard of living, using and enjoying our National Parks too.

The key to sustainable architecture is in recognizing our position as temporary stewards of our environment everywhere. The better we as architects understand and implement our stewardship of the built environment, the greater the quality life of future generations which we will enjoy (31). Within the borders of our National Parks too.

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IRRIGATION WATER QUALITY AS INDICATOR OF SUSTAINABLE RURAL DEVELOPMENT

Slaviša Trajković

The sustainable rural development more and more depends on the efficient usage of water resources. Most often, at least in one part of the year, the rain is not sufficient for plant growth and rain plant production significantly depends on the yearly precipitation variation. The increase and stability of the agricultural production is possible in the irrigation conditions. The most part (around 70%) of the global water resources is used for food production.

Irrigation water quality indicator is used to show if the available water resources have the required quality for application in agriculture. Irrigation is characterised by the complex water-plant-soil relationship, and in that eco-system the man as the end user of the irrigated fields occupies a very important place. That explains the difficulties in producing one universal classification of irrigation water quality. The paper analyses numerous water quality classifications from the aspect of the applicability on the quantifying of this indicator. The adopted classification should possess understandable, qualified and internationally comparable indicator. Thus, local classifications (Neigebauer, Miljkovic) cannot be used for this indicator.

United Nation Food and Agricultural Organization (FAO) and US Salinity Laboratory (USSL) classifications are used for the evaluation of the irrigation water quality throughout the world. FAO classification gives the complex picture of the usability of the irrigation water from the point of its influence on the soil and the plants. However, the scope of the analyses is not often suited to the needs of that classification, which makes it difficult to apply. The conclusion is that the USSL (US Salinity Laboratory) classification is best suited to this range of chemical water analyses.

The evaluation of the irrigation water quality indicator in the Juzna Morava river basin, upstream from the Toplica river estuary is given in this paper. Based on the obtained results, it can be concluded that the irrigation isn't limitation for sustainable rural development.

INTRODUCTION

The world faced great challenge during past decades that showed that the development based only on the economic indicators is not possible. Those challenges are: the climatic changes, environment endangering, large gap between the developed and developing states, social problems.

As a response, the world community, in the late eighties, offered a sustainable development concept that has, later on, been developed by a series of conventions (Agenda 21 from United Nations Conference on Environment and Development, United Nations Framework Convention on Climatic Change, Convention on Biological Diversity, United Nations Convention to Combat Desertification).

There are many definitions of the sustainable development, but most frequently the Brundtland definition is used. The sustainable development is one that satisfies the needs of the current generation without endangering the future generation's ability to satisfy its needs (14). The sustainable development concept comprises that the current generation uses the resource in such a manner that the quality and quantity of these resources is minimally altered so that the future generations could use it. In the recent years, the scientific public pays a lot of attention to the sustainable development of the water resources (5), (7). A special attention is paid to the water usage in agriculture (9), (12). The new ethics of the sustainable development requires the new approach to water resources management.

SUSTAINABLE RURAL DEVELOPMENT

The sustainable rural development more and more depends on the efficient usage of water resources (11). Most often, at least in one part of the year, the rain is not sufficient for plant growth and rain plant production significantly depends on the yearly precipitation variation. The increase and stability of the agricultural production is possible in the irrigation conditions. The most part (around 70%) of the global water resources is used for food production. Although there is enough water on the global level, many areas face the water shortage phenomenon.

The water shortage can be defined as a lack of adequate quantity of water of the appropriate

quality, at the right place, at the right time. The situation is rendered additionally difficult by the reduction of the water and soil resources quality that, in the great part, has been caused by the human activities. As the water resources shortage increases, so also does the usage of the water of inappropriate quality. The intensive usage and bad management of such irrigation water causes: damage to the soil quality and salinization. The special attention in sustainable rural development should be paid to the irrigation water quality.

The great challenge for the agriculture will be the obligation to increase food production, especially in the areas with limited soil and water resources. The possibility of farming land expansion is limited so that the increase of production must be affected by the increase of the crop yield. Both rain and irrigated agriculture have the ability to produce more food per unit of soil and per unit of water. In order to satisfy the future needs for food and growing competition for water between the various users, the more efficient usage of water in the irrigated agriculture becomes very important. The basic measure for the increase of the water usage efficiency is the reduction of the irrigation water losses. The global data show that the plants use only 45% of the water used in irrigation. The calculation of plant needs for water from the climatic data is the key element for providing higher water usage efficiency.

Agriculture is the important sector of the Serbian economy. Plant production has been significantly reduced during the recent years because of the draught. Construction of the large number of irrigation systems is planned and it is the right moment for the sustainable irrigation analysis.

INDICATORS OF SUSTAINABLE RURAL DEVELOPMENT

The Agenda 21 invites the development of the sustainable indicators. A large number of indicator sets has been established for various applications. No particular indicator set can satisfy the needs of all potential users. It is necessary to develop a special indicator set for the needs of the sustainable rural development observation, and it can be developed through the following activities:

- Adoption of the analytic framework
- Adoption of the indicator selection criteria and,
- Indicator selection.

There are several methods for organising the sustainable development indicators (Category list, Goal-Indicator matrix, Driving force-State-Response (DSR) framework, Pressure-State-Response framework, Endowment framework). The most used is the DSR framework. It is described in the UN Commission on Sustainable Development (UNCSD) reports.

The indicator has to fulfil the following criteria:

- to point at the problem important for the sustainable irrigation
- to be understandable
- to be quantified
- to be founded on the available data
- to be theoretically well-founded
- to provide basis for the international comparison

In the UNCSD indicator set, there are a large number of potential indicators of sustainable rural development. The indicators can be adopted from other sources (Organization for Economical and Cooperational Development (OECD) (6), EnviromentaL Indicators for Sustainable Agriculture (ELISA). The following indicator can be considered as possible candidates: Urban population growth rate, Gross Domestic Product (GDP) per capita, Environment protection costs in GDP percents, Water Usage Degree, Underground Water Reserves, Changes in Land Usage, Monthly rain index, Pesticide usage, Fertilizer usage, Farmed soil irrigation percentage, Salinization. The mentioned indicators belong to the group of social, economical and ecological indicators.

The development of the additional ecological indicators is necessary in order to fully comprehend the sustainable rural development. In chapter 2, the problems important for the sustainable agricultural production are briefly signified. On the basis of the criteria for the indicator selection, this paper would point out the irrigation water quality.

IRRIGATION WATER QUALITY

Irrigation water quality indicator is used to show if the available water resources have the required quality for application in agriculture. Irrigation is characterised by the complex water-plant-soil relationship, and in that ecosystem the man as the end user of the irrigated fields occupies a very important place. That explains the difficulties in producing one universal classification of irrigation water quality.

The adopted classification should possess understandable, qualified and internationally comparable indicator. Thus, local classifications (Neigebauer, Miljkovic) cannot be used for this indicator. United Nation Food and Agricultural Organization (FAO) and US Salinity Laboratory (USSL) classifications are used for the evaluation of the irrigation water quality throughout the world (5). FAO classification (2) gives the complex picture of the usability of the irrigation water from the point of its influence on the soil and the plants. However, the scope of the analyses is not often suited to the needs of that classification, which makes it difficult to apply.

USSL classification (12) the evaluation of the water quality forms on the value of its electric conductivity (EC) as the indicator of its salt concentration, and on its value of SAR (Sodium Adsorption Ratio) as the indicator of its relative sodium activity. On the basis of the reached values of EC and SAR the water quality is formed by a chart, which enables the classification of water in 16 categories. However, in order to make it easier to formulate the indicator it is necessary to reformulate and simplify the output categories. J. M. Servant classified the irrigation water into seven quality groups: good (C1S1), medium to good (C1S2, C2S1), medium (C1S3, C2S2, C3S1), medium to bad (C1S4, C2S3, C3S2, C4S1), bad (C2S4, C3S3, C4S2), very bad (C3S4, C4S3) and useless water (C4S4) (1). Anyway, this classification has a large number of groups, as well, which makes it hard to use. In (10) there is a less complicated and easier to use division into four quality groups: very good (C1S1), good (C1S2, C2S1, C2S2), not satisfactory (all with C3 or S3) and bad (all with C4 or S4). This division is more suitable for the quantifying of the indicator. Nevertheless, the more reliable classification should be still sought for.

EXAMPLE

The evaluation of the irrigation water quality indicator in the Juzna Morava river basin, upstream from the Toplica river estuary is given in this chapter. The research has been conducted

in the 1990-1992 period. The mineralization indicators (electrical conductivity, calcium, magnesium, sodium, potassium, sulfate) are displayed as the extreme values in the Table 1. In the same table, the evaluation of the water quality according to the USSL classification and according to the division from (3) is given.

Table 1. - Extreme values of mineralization with water quality evaluation.

Water course/ Station	Value	Na mg/l	K mg/l	Ca Mg/l	Mg mg/l	SO4 mg/l	EC μS/cm	Indicator USSL	Indicator Mark
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
J. Morava	Max	8.5	5.1	82.2	22.7	60	460	C1S1	V. good
Grdelica	Min	3.2	1.8	30.5	0	22	200	C2S1	Good
Vlasina	Max	8.4	1.5	59.7	18.4	60	700	C1S1	V. good
Stajkovac	Min	4.3	0.9	30.1	0	17	190	C2S1	Good
Veternica	Max	7.6	6.7	52.1	49.7	40	500	C1S1	V. good
Leskovac	Min	3.3	3.0	28.8	7.1	11	180	C2S1	Good
Jablanica	Max	59.0	14.2	69.7	22.7	70	740	C1S1	V. good
Pečenjevce	Min	9.2	4.0	25.2	4.1	24	230	C2S1	Good
Pusta reka	Max	21.0	6.3	59.0	18.9	45	650	C2S1	Good
Brestovac	Min	9.0	4.3	50.1	9.9	30	390	C2S1	Good

Based on the obtained results, it can be concluded that the irrigation is not limitation for sustainable rural development in the Juzna Morava basin. The similar irrigation water quality is observed in other Serbian regions (14).

CONCLUSION

The paper analyses the sustainable rural development concept. It provides the definition of the sustainable development. The procedure of indicators development, organizing and training is given. Observation of the sustainable development is impossible without the development of additional ecological indicators.

A special attention in the paper has been paid to the irrigation water quality indicator. The reason for this is the lack of the universal classification that makes the application of this indispensable indicator difficult. For the time being the USSL classification with the division in four quality groups is proposed. In Serbia, the irrigation is not limitation for sustainable rural development.

In the further studies, the attention will be redirected to FAO classification and Water Quality Index (WQI) (9). Testing of the UNCSD indicator set which has been conducted in many countries shows that there is a need for adoption of one water quality indicator. WQI can serve as such indicator. That is why it is very important to explore the possibility of WQI application in evaluation of the quality of water used in agriculture, and which has its particularities.

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