

Developing Spatial Urban Planning Guidance for Achieving Sustainable Urban Development

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Abstract

Sustainable urban planning guides are being developed to direct spatial urban planning both at the local and regional levels towards sustainability. However, due to the multifaceted nature of spatial planning, different guides do focus on different aspects of planning and tend to overlook or lay little emphasis on other aspects. The goal of achieving sustainability through spatial urban planning requires that integrated sustainable planning guidance which will incorporate all aspects should be developed. This paper discusses a general framework of sustainable spatial urban planning. It highlights the need for better urban planning guidance and proposes general guidelines in view of current international practices. These guidelines are very pertinent at this time when frequent calls are made from different international, national and local levels to ensure sustainability in urban development.



Introduction

Sustainable development has become a global issue since its introduction more than fifteen years ago by the World Commission on Environment and Development. The concept emerged to foster a balance consideration of social, economic and environmental consequences of development activities. Despite the pervasiveness of the principles of sustainability, only few communities have been able to develop strategies of fostering sustainability and these few communities and regions are mainly in the developed countries. This is due to the difficulties in operationalizing sustainability principles and the institutional contexts of implementing these principles. Different approaches and frameworks have been developed to move communities towards sustainability. Most of the approaches (ICLEI, 2002; OECD, 2000; CSD, 2002) are developed on a framework of impact assessment, monitoring, indicators and targets/benchmarking. In addition, cities and spatial planning are given special attention by these approaches. The city has attracted attention because of the environmental problems that result from rapid urbanization and continued increase in urban population. That is, sizeable number of people is affected by urban environmental problems. Spatial planning has a stake in promoting sustainability as plans, policies and programs that determines land uses and environmental impacts are products of the planning process.

The focus on spatial urban planning for the achievement of sustainable communities has been on the two major aspects of planning; the planning process and the outcome of planning (Berke and Conroy, 2000; George, 2001; Kessler, 2002; Partidario, 2002).

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It has been widely recognized that the planning system and the development plan would play crucial role in delivering sustainable development. Thus, sustainable planning guides are being developed to direct spatial planning both at the local and regional levels towards sustainability (LGMB, 1993; DETR, 1998). However, due to the multifaceted nature of spatial planning, different guides do focus on different aspects of planning and tend to overlook or lay little emphasis on other aspects. The goal of achieving sustainability through spatial urban planning requires that integrated sustainable planning guidance which will incorporate all aspects should be developed. In essence, a sustainable urban planning guide should provide guidance on integrating sustainability principles into the planning process, assessing the effectiveness of integrated sustainable planning process, incorporating sustainability principles into the development plan and evaluating the development plan for sustainability. Also, the sustainable planning guidance should be a general framework that could be applied (with little or no modification) in different local contexts.

This paper discusses a general framework of sustainable spatial urban planning. It highlights the need for better planning guidance and proposes general guidelines in view of current international practices.

Guidelines of Sustainable Urban Planning

It is imperative to develop guiding principles that will further promote sustainable planning. The guidelines are in two forms: the guidelines on integration of sustainability with planning process and guidelines for evaluating the development plan. That is, both the planning process and the plan should be guided and evaluated for sustainability. The guideline on integration of sustainability with the planning process is based on the extension of the Strategic Environmental Assessment (SEA) from environmental appraisal to sustainability appraisal.

Guidelines on Integration of Sustainability with Urban Planning Process

The integration of SEA with the planning process involves about five forms of which at least three have been widely discussed in literature (Kessler, 2002; Partidario, 2002; Elling, 2000). Practitioners have made efforts to develop principles that should guide good practice of integrating SEA into the planning process. The principles are highlighted in Table 1. The procedural aspect of the integration of SEA into planning process has attracted the highest attention due to attempts to practically link the SEA process with the planning process and the development of procedural steps as an overarching framework for integration of other aspects. SEA process has shifted from being environmental-led to objectives-led integration which is centered on its links with the planning process. George (2001) noted that sustainability appraisal in the United Kingdom developed as a shift from the traditional EIA to objectives-based approach. The objective-based appraisal requires that the objectives of development plans be appraised based on the objectives of sustainable development. The appraisal is based on three working definitions (James, 2001; DETR, 1999):

- Objective – statement of what is intended for a policy or series of related policies and of what way that intention is to be pursued.
- Target – objective that seeks a specified desired end state, usually, although not

- necessarily, within a specified time-scale.
- Indicator – piece of information which is used to measure and track the status and progress of a complex system.

Apart from the having a framework for integrating sustainability into the planning process, there is also the need to assess the effectiveness of the planning process in promoting sustainability. Therivel and Minas (2002) identified three tasks that should be accomplished by an effective Environmental Assessment process. One, the process should identify the sustainability or environmental ramifications of implementing the strategic action and suggest possible changes. Two, the changes recommended by the process have to make strategic actions and plans more sustainable. Three, the changes should be incorporated in strategic actions and plans. In order to make the criteria more comprehensive, the factors highlighted by George (2001) could be added to complement the criteria. The sets of criteria are based on the twin principles of inter- and intra-generational equity as shown in Table 2.

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Table 1 Guidelines of integrating SEA into the planning process.

Procedural	Sustantive	Methodological	Institutional	Policy
SEA should be a flexible and adaptable process	Focus on sustainability	Interdisciplinary and participatory approach	Incremental institutional adaptation	Adaptable to different contexts of policy development (structured, semi structured, unstructured and mixed)
SEA should be within the context of alternative scenarios	Assessment of planning objectives	Quantitative and qualitative assessment of plans, programs and policies	SEA should be within a legal framework	Broad definition of Policy to encompass the varying forms of policy decisions
The process should be participative	Linkages between environmental and socio-economic issues should be clarified	SEA methodology should be adaptable to different contextual dimensions (legislative change, sectoral plans and policies, integrated plans) of PPP formulation	Adaptable to internal and external complexities	Consideration of both direct and indirect effects of policies
SEA is a part of tiered approach	Guided by the precautionary principle of sustainability	An array of tools of analysis should be adopted	Long term institutional integration and development	
The documentation of SEA should be different from the development plan	Set of criteria of environmental quality			
SEA is independent but interlinked with the planning process	Consider the interboundary (from local to global) nature of environmental processes			
SEA should be strategic and iterative	Consider different time frames (short term, medium term and long term) of impacts			
SEA should be within the existing PPP formulation process and should start early in the process				

Table 2. Criteria for assessing the planning process.

Intra-generational equity	Inter-generational equity
<ul style="list-style-type: none"> ▪ Have all social groups within the planning area been identified and have impacts on each group been assessed? ▪ Will the planning document and Environmental Assessment be published and made available to the public? ▪ Will all members of the public have the opportunity to participate in the planning process? ▪ Have significant transboundary impacts been identified and properly assessed, are relevant international agreements complied with, and will affected parties be consulted before final decisions are made? 	<ul style="list-style-type: none"> ▪ Have any potential critical ecosystem factors that may be affected been identified? ▪ Has the risk of serious or irreversible damage arising from any such impact been satisfactorily assessed, with suitable systems for monitoring, impact avoidance and mitigation where needed? ▪ Is it demonstrated that the rate of loss of natural capital (if any) will not exceed the equilibrium regeneration rate? ▪ Is an appropriate contribution to reducing greenhouse gas emissions shown to be made, which is in accordance with the Kyoto agreement?

Source: (Adapted from George, 2001)

Guidelines for Evaluating the Development Plan

Evaluation of master plan is necessary to know the status of our progress towards sustainability. As Walsh and Brand (1998) noted, that “no more than ever environmental appraisal must take place as an essential part of plan-making process for it is an effective means of ensuring that land use plans are environmentally sustainable”. The task of monitoring and evaluating the plans for sustainable development has not been fully investigated. Baer (1997) noted that the planning profession has developed relatively few criteria for evaluating the quality of general plans. To date, there has only been sporadic empirically based investigation exploring the linkages between sustainable development and land use planning (Hales, 2000). The intricacies of evaluating master plan for sustainable development are in the quantification of qualitative concepts of sustainable development. Although some indicators of sustainability have been developed, the gap of objectivity and quantitative measurement still exist. The ability to determine the best sets of indicators and to quantify the relationship between the indicators and master plan elements is very crucial to sustainability appraisal of master plans.

Different attempts have been made to develop a quantitative and systematic approach for evaluating sustainable development principles in master plans. Counsell (1999) investigated the attempts to operationalize some themes and principles of sustainable development in UK structure plans. The study investigated resource protection (environmental capacity, environmental capital and the precautionary principle) and socio-economic (social equity, policy integration and participation) themes. Relative ranking approach was used to rank the plans based on the relative operationalization of the different themes of sustainability. Bruff and Wood (2000) used content analysis approach to assess the strengths and weaknesses of development plans in terms of sustainable development. The approach is mainly qualitative as plans are graded on the extent to which a set of identified policies are covered and fulfilled. In an attempt to make the evaluation more quantitative, Berke and Conroy (2000) highlighted about seven plan elements which are assessed on the principles of sustainable development. The plan elements are housing, transportation, environment, energy, land use, economic development and public

facilities. An effective and comparable assessment of the master plan can be achieved if the approach is objective and quantitative. The selected sustainability indicators should be measurable on all the master plans that are considered and a measurable relationship between the indicators and the plan elements should be established.

Guidance for Sustainable Development Plans

Having highlighted the guiding principles for evaluating the development plan and integration of sustainability in the planning process, it is very important to elaborate on the components of a sustainable development plan and how these components could be explored to promote sustainability. As it has been recognized that there is a linkage between the planning process and the actual plan, the planning process must be guided by the principles of integration of sustainability for the development plan to be sustainable. These guidelines, as highlighted above, include early integration, systematic and multidisciplinary approach, separate documentation of assessment and interlinking environmental assessment with the planning process. It is also relevant that the process should be supported by adequate institutional and legal frameworks that are embedded with community participation and institutional capacity building.

The institutional framework should effectively link planning and administration at the national, regional and local level thereby promoting coherence in policy and decision-making. The framework needs to enhance institutional arrangement for full implementation of Agenda 21 by encouraging sustainable planning at the local level. The framework should be capable of promoting good governance, transparency and inclusive community participation. The legal framework should provide legislative directive to support the integration of environmental assessment into the planning process. The directive should specify the roles and responsibilities of different government and private sectors and enjoin public participation. The capacity of different government and private agencies to effectively discharge their responsibilities should be enhanced through adequate training and sharing of information and knowledge on good practice. Also, the level of environmental awareness of the populace should be improved to promote effective public participation and consultation.

The guidelines of sustainability integrated planning process could be complemented by the guidance for the development plan. The procedural guideline for preparing a sustainable development plan has been highlighted in literature (Counsell, 1998; English Nature, 1994; Quaid, 2002; ICLEI, 2002). The steps are similar to the stages of planning process highlighted by DETR (1998) but they are more detailed. The two approaches could be synthesized for practical application. The modified steps included in the procedure are (Fig. 1): inventory of resources and establishment of information base; formulation of goals, targets and indicators; development of a strategic sustainability action plan; strategic environmental assessment of the plan; and implementation and monitoring.

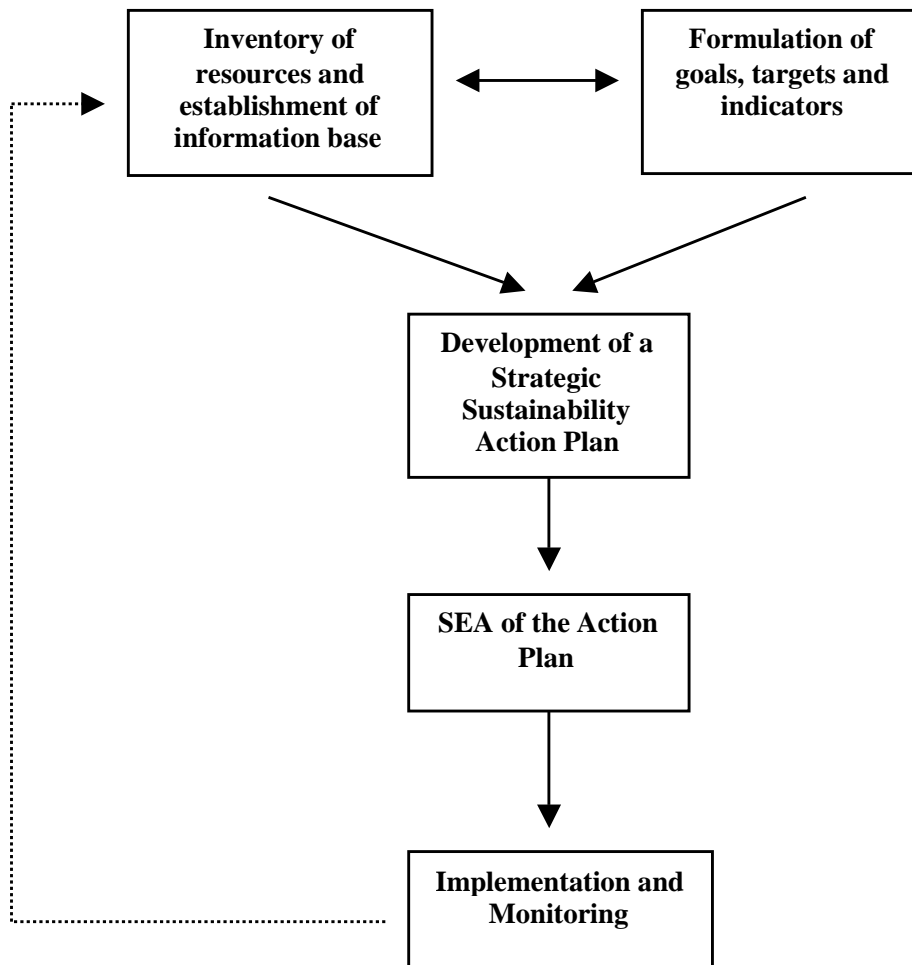
- Inventory of resources and establishment of information base – This step involves the collection of data on the quality of the environment. The baseline profile of natural, social and economic resources is established and information base on the current state of the environment is developed.
- Formulation of goals, targets and indicators – Sustainability goals is formulated after

effective consultation with the public and stakeholders. The goals statements express the commitment of the development plan to pursue sustainable development. Targets are set from the overarching goals and appropriate indicators are developed to measure the progress of the plan towards the stated goals.

- Development of a strategic sustainability action plan – Based on the formulated goals and targets, a strategic sustainability action plan is developed. The strategic sustainability plan outlines actions to achieve sustainability. The strategic plan states the priorities in achieving sustainability base on adequate analysis of inventory data and information.
- Strategic environmental assessment of the plan – The strategic sustainability plan is subjected to strategic environmental assessment to ensure that significant environmental effects of the plan (including its attendant policies and programs) are taken into account. Alternative scenarios are assessed and the best course of action is selected with recommendations on mitigating the likely environmental effects.
- Implementation and monitoring – The strategic sustainability action plan is implemented with adequate monitoring and evaluation. The progress made towards the achievement of the goals and targets of the strategic sustainability action plan are measured. The evaluation is carried out by analyzing the data and information collected on the identified sustainability indicators. Obstacles to the implementation are identified and resolved. Changes in the components (transportation, housing, economic development, safety, energy etc) of the action plan are identified and documented to form the basis for the inventory of resources for future strategic sustainability plan.

Apart from making the planning process sustainable, different elements/components of the Master/Development plan should be based on the principles of sustainability. Land use, transportation and natural resources are crucial sustainability issues or components of development/master plans. Particular attention should be paid to the interrelationship between the three components. Land use decisions have a direct impact on a community's quality of life, the form and location of economic development, public sector investment decisions (e.g. infrastructure), and the viability of natural environments (Seasons, 2002). Also, land use generates travel demand and thereby dictates the need for transportation facilities. Thus, land use decisions and planning should be guided by the principles of sustainability. Land use and transportation should be integrated and compact settlements, mixed land use and re-use of already developed/derelict land should be promoted. Transportation has a large impact on resource consumption (energy and land area) and considerable source of pollution. Transportation is one of the sources of carbon dioxide, nitrogen dioxide and nitrogen monoxide emissions and a major cause of high noise level (Abolina and Zilans, 2002). Socially, transportation influences the degree to which the residents access the city and the mobility of the residents. Most perspectives to sustainable urban development are of the view that the method of addressing urban transport problems requires mixed-use development, pedestrianization, development of public transportation, promotion of non-motorized transport and reduction of travel demand. The conservation of natural resources is very vital to the achievement of the intergenerational and intragenerational principles of sustainability. The main goal is to maintain the resource stock and biodiversity of the community. That is, the use of non-renewable resources should be minimized and the efficient use of renewable resources should be encouraged.

Figure 1 Procedure for making Strategic Sustainability Plan.



Source: (based on Counsell, 1998; English Nature, 1994; Quaid, 2002; ICLEI, 2002).

These principles should reflect in the action plans that aim at promoting sustainable communities. It is noteworthy that studies have shown that these principles are only partially covered in most of development plans (Counsell, 1998; Bruff and Wood, 2000). It is important to improve on the breadth and strength of coverage of the principles to foster sustainable communities. Sustainability indicators have to be developed (bearing in mind the local context) and applied in development plans in order to monitor and improve upon the breadth and strength of coverage of sustainability principles. Indicators are measures of variables over time, often used to measure achievement of objectives or targets. It is important to develop viable, sustainable indicators in order to assess the master/development plans' sustainability . Different international organizations and non-governmental organizations (United Nations Council on Sustainable Development, OECD and ICLEI) have developed sustainability indicators that could be applied in fostering sustainable urban development. The indicators are could be very complex to apply if all the elements are to be considered therefore different communities should choose and develop indicators that could be applied in

their specific situations. Table 3 highlights some of the important sustainability indicators (social, environmental and economic) that could be applied in development/master plans.

Table 3. Development/master plan elements and sustainability indicators.

Plan Element	Theme	Indicator
Land-Use	Urban area footprint	Total community land area in acres per resident.
	Infill	Percent of building permits issued annually on property platted more than five years prior to building permitting.
	Use mix	Dissimilarity among one-acre grid cells containing predominant land use.
	Land redeveloped	Percent of designated land area redeveloped per year.
	Jobs/housing balance	Ratio of jobs to dwelling units
Transportation	Travel density	Distance travel per Capita by mode of transportation
	Transit service density	Index of miles of transit routes multiplied by the number of transit vehicles traveling those routes each day, divided by total land area.
	Auto use	Auto vehicle miles traveled per capita per day
	Pedestrianization	Percent of all person trips made by walk/bike modes.
Environment	Natural areas protection	Percent of total land area protected as natural area or equivalent.
	Species biodiversity	Abundance of selected key species
Environment	Agricultural land conversion	Acres of agricultural land urbanized per year.
	Imperviousness	Percent of total land area covered by impervious surfaces.
	Water Quantity	Annual withdrawal of Ground and Surface water as a percent of Total Available Water.
	Water Quality	BOD in water bodies
	Air Quality	Ambient Concentration of Air Pollutants in Urban areas.
	Climate Change	Emissions of Greenhouse gases
	Ozone depletion	Consumption of Ozone depleting substances.
Infrastructure	Water consumption	Residential water use in gallons per capita per day.
	Park space availability	Acres of park and school yards per 1,000 residents.
	Waste generation and management	Waste recycling and reuse
Urban design	Preservation of historic and archaeological sites and buildings	Percentage of historic and archaeological sites and building designated for preservation.
	Open space protection	Percent of total land dedicated to open space.
Housing	Density	Dwelling units per net acre of land designated

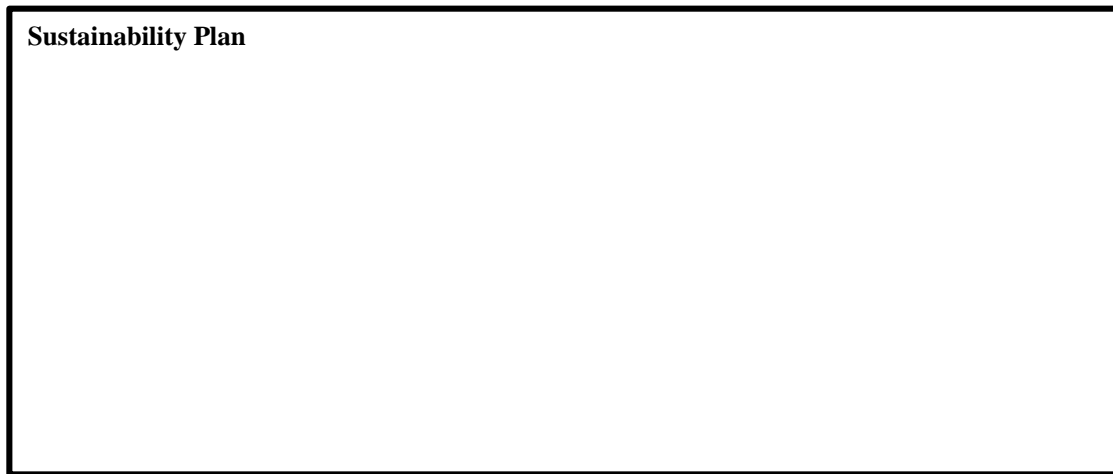
		for residential use.
	Affordability	Ratio of average house sale price versus an “affordable price”.
	Transit proximity	Average travel distance from dwellings to closest transit stop in feet.
Energy	Energy use	Intensity of energy use and share of consumption of renewable energy resources.
Economic development	Economic performance	GDP per Capita
	Level of investment	Inward investment (as per level of output)
	Employment	Number of employees per net acre of land designated for employment uses and unemployment rate.
Population	Human health	Years of healthy life expectancy
	Poverty	Percent of population living below poverty line
Population	Education	Literacy rate
	Security	Recorded crime per 1000 population
	Social inclusiveness	Percent of the poor, children, women and disabled people that have access to community facilities and services. Percent of deprived people that participate in decision making.

Source: (Adapted from ODPM, 2002; the UN Council on Sustainable Development; FSCN, 1999)

It is important that the development plan reflects the sustainability indicators that are used in preparing the plans or that are attendant to the objectives of the plan so that the plan could be evaluated through the indicators. As noted by Seasons (2002), most municipalities used quantitative indicators in preparing plans but these indicators were rarely presented in the municipal plans or were difficult to find in the documents. Indicators have become integral component of sustainability planning as indicator-based approach is more adaptable and useful than other approaches.

Operationalization of the Development/Master Plan Elements and the Indicators

The operationalization of the plan elements and the sustainability indicators can be achieved by linking indicators and targets with the goals and objectives of the development/master plan. The goals and objectives of the plan which should be derived from the sustainability inventory of the community and the contributions of stakeholders should be used to develop indicators and set targets for sustainability. Actually, the three components should be sequential; sustainability goals and objectives should be incorporated into the plan and indicators (which will measure the progress towards the goals) should be developed followed by targets (fig. 2).

Figure 2: Linkage between goals/objectives, indicators and targets.

Targets serve as benchmarks that indicate specific accomplishment to be achieved by a given date (Dalal-Clayton and Bass, 2002). Targets will not only indicate the direction of change but also the desirable levels or thresholds to be achieved. Apart from guiding the planners on action to take to achieve sustainability goals, targets make it easier to carry out the tasks of evaluation, monitoring and follow-up. Comparisons can be made between the stated targets and what is actually achieved and future goals, indicators and targets could be set from the outcome. Communities will achieve some levels of sustainability by improving in the level of their present targets. The continuous monitoring of the sustainability indicators and targets will ensure the future community sustainability. The change from unsustainable to sustainable development status will only be guaranteed by the improvements in the established local sustainability targets.

The development of sets of sustainability indicators and targets is very complex because there are a lot of components (social, economic and environmental) to measure and there is no single index that sufficiently measures these factors. Differences in local experiences and situations have also made it difficult to establish international standards. However, there are guidelines for developing applicable local sets of indicators and targets and even some sets of indicators have been recognized as 'core indicators' of sustainability. CSD (2002) highlighted some sets of indicators as core indicators having tested them in different countries of the world. The indicators include:

- Unemployment Rate
- GDP per capita
- Domestic per capita consumption
- Land use change
- Ambient concentration of urban air pollutants
- Emissions of greenhouse gases
- Emissions of nitrogen dioxides
- Annual energy consumption
- Population growth rate
- Use of fertilizers
- Ratio of threatened species to total native species
- Emissions of sulphur dioxide

It is recommended that this set of indicators or measurements that are similar to them should be included in national or local sets of indicators. In order to develop viable local indicators and targets, the following issues that should be considered are outlined below:

- Availability and reliability of data
- Linkages to other indicators
- How well does the indicators directly reflect the objectives
- Usefulness of indicators to decision makers
- Level of aggregation
- Resource input

Despite the complexity of issues involved in developing sets of indicators and targets, different organizations and governmental agencies have been able to develop both local and international frameworks of indicators and targets. The CSD (Commission on Sustainable development), ICLEI, OECD and IISD compiled sets of indicators that could be applied in fostering sustainable communities. These frameworks of indicators do not obviate the need to develop applicable local indicators because some of the indicators might not be applicable to all local settings. Also, international standards are unavailable for most of the targets that are developed. Table 4 highlights a framework of targets which have been developed for planning elements and indicators. The targets have been developed from the framework of CSD (2002), OECD (2002) and other sources. Probable targets are suggested for indicators that have no international or documented targets.

Table 4: A framework of plan elements, themes and sustainability targets.

Plan Element	Theme	Targets
Land-Use	Urban area footprint	Reduce the total community land area in acres per resident by 10% by 2015
	Infill	Increase in the percent of building permits issued annually on property platted more than five years prior to building permitting by 10% by 2015
	Use mix	Increase the dissimilarity among one-acre grid cells containing predominant land use.
	Land redeveloped	Increase the Percent of designated land area redeveloped per year by 5%
	Jobs/housing balance	Increase the ratio of jobs to dwelling units
Transportation	Travel density	Reduce the distance travel per Capita by mode of transportation
	Transit service density	Increase the (index of miles of transit routes multiplied by the number of transit vehicles traveling those routes each day, divided by total land area) by 10%.
	Auto use	Reduce auto vehicle miles traveled per capita per day
	Pedestrianization	Increase the percent of all person trips made by walk/bike modes by 20%
Environment	Natural areas protection	Increase the percent of total land area protected as natural area or equivalent.
	Species biodiversity	Reduce abundance of selected key species
Environment	Agricultural land conversion	Reduce acres of agricultural land urbanized per year.
	Imperviousness	Stabilize the percent of total land area covered by impervious surfaces.

	Water Quantity	Reduce annual withdrawal of Ground and Surface water as a percent of Total Available Water.
	Water Quality	Reduce the level of BOD in water bodies
	Air Quality	Reduce by 55% of 1990 levels the emissions of fine particulates by 2030 and reduce NOx emissions by 10% of 1990 levels (OECD, 2002)
	Climate Change	Reduce emissions of Carbon dioxide by 5% of 1990 levels by 2012 (CSD, 2002)
	Ozone depletion	Eliminate ozone depleting substances by 2030 (CSD, 2002)
Infrastructure	Water consumption	Universal access to safe drinking water supply by 2025 (CSD, 2002)
	Park space availability	Reduce the acres of park and school yards per 1,000 residents.
	Waste generation and management	Increase percent of waste that is recycled.
Urban design	Preservation of historic and archaeological sites and buildings	Increase the percentage of historic and archaeological sites and building designated for preservation.
	Open space protection	Increase the percent of total land dedicated to open space.
Housing	Density	Increase the dwelling units per net acre of land designated for residential use by 50%.
	Affordability	Increase the ratio of average house sale price versus an “affordable price”.
	Transit proximity	Reduce the average travel distance from dwellings to closest transit stop in feet.
Energy	Energy use	Reduce the intensity of energy use and share of consumption of renewable energy resources.
Economic development	Economic performance	Increase the GDP per Capita
	Level of investment	Increase Inward investment (as per level of output)
	Employment	Increase the number of employees per net acre of land designated for employment uses and reduces the unemployment rate.
Population	Human health	Increase the years of healthy life expectancy
	Poverty	Reduce the proportion of people living in extreme poverty by at least one-half by 2015 compared to 1990 (CSD, 2002).
Population	Education	Universal access, and completion of primary education by 2015 (CSD, 2002)
	Security	Significantly reduce violence and crime (CSD, 2002)
	Social inclusiveness	Increase percent of the poor, children, women and disabled people that have access to community facilities and services. Increase percent of deprived people that participate in decision making.

Apart from the three dimensions of sustainability mentioned above, there is another dimension which is often regarded as the fourth dimension in some literature; institutional dimension. We view the institutional dimension as a very basic and crucial aspect of sustainability that must be enabling for sustainability to be achieved. As noted by Lake and Hanson (2000), that sustainability is fundamentally a political problem in the sense that the greatest barrier to sustainability lies in the absence of enabling institutional framework for fostering sustainable practices. There is emerging worldwide consensus that decentralized control of spatial planning; enhanced local participation and municipal autonomy do promote sustainable communities. Thus, an enabling institutional context must be established along with the sustainable planning guidelines highlighted above to achieve urban sustainability.

Conclusion

This paper has shown that efforts were made by some cities worldwide toward considering sustainable principles which are incorporated in the development plans. However, limited attempt were made to develop a comprehensive framework of sustainable indicators and targets that incorporate such sustainable indicators into the development plans and plan evaluation. In addition, there is the need to review the approaches adopted in the planning process to a more participatory approach which will encourage and ensure adequate input into development planning by the affected communities. The participatory approach can be enhanced by improving the level of environmental awareness of the citizens and establishing effective training program for the staff of different agencies that are involved in the spatial planning process. Essentially, an efficient and effective information system should be developed to support and integrate the sustainable planning system. The information system must be robust and versatile enough to incorporate a system of sustainable indicators and targets especially spatial indicators which requires geographical analysis. The efforts of some local authorities in developing geographic information systems for cities and villages are noteworthy and should be improved upon to incorporate environmental/sustainability information system. Overall, an effective system of institutional capacity building should be established to ensure the implantation of these spatial guidelines.

Although the guidance and framework illustrated in this paper are general and were developed from current international practices in sustainability planning, it should be pointed that such sustainable planning guidance be adapted to local conditions. It is hoped that the adopting of such guidelines and practices and implementation would improve the integration of sustainability principles in urban development.

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