Sustainable cities through integrated land use management systems

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Abstract

The use and management of land has long been the subject matter of town planners across the world. As cities and towns are growing in size, sources of developable land are decreasing rapidly. This concept of land as a scare resource has prompted planners to introduce the concept of sustainability in their science in an attempt to better accommodate the needs of current and future population. In most countries, land use planning is a function of same level of government responsible for the delivery of services such as water, sanitation, electricity etc. Local government in turn place a value on land and collect rates and taxes in attempt to fund the provision of service. In many instances, however, the activities of land use planning, infrastructure provision and municipal finance are not integrated. This leads to inefficient cities and towns that are rapidly developing in a financially unsustainable manner. Planning legislation in South Africa has changed in the last year – with far reaching consequences for South African cities and towns. This paper explores elements of the land use management system, and illustrates how integrating the different components of the land use management system (future or comprehensive planning, land development management, building management, infrastructure provision, the municipal budget etc.) can set the agenda for cities and towns to develop sustainably.

Keywords: land use planning, sustainable development, land use management systems, integrated planning.

1 Introduction

The definition of sustainability is fairly "wide". A quick google search reveals a number of definitions for example "sustainability could be defined as an ability or capacity of something to be maintained or to sustain itself. It's about taking what

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we need to live now, without jeopardising the potential for people in the future to meet their needs" [1]. The United Nations [2] links sustainability with development in its definition "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The concept of "development" can be linked to the science of urban and rural planning in within the context of this article in the sense that planning is concerned with existing and future activities happening on land.

Both "sustainability" and "planning" have a temporal dimension – sustainability refers to what we do now, and how this influences the future, planning is an activity where we actually plan for the future. Since urban planning is a function that happens within every city – we can therefore establish that planning can definitely influence the sustainability of a city or town. The next section will establish that there are two very different dimensions to planning, one that deals with everyday activity and another that looks into the future.

2 Land use planning and forward planning

The American planning association defines planning as "…a dynamic profession that works to improve the welfare of people and their communities by creating more convenient, equitable, healthful, efficient, and attractive places for present and future generations" [3]. The actual profession of planning seems to consist of two distinctly different elements:

Land use management is an exercise that seeks to manage the legality of existing land uses and buildings through tools such as zoning codes (also referred to as town planning schemes, zoning schemes and land use schemes in other parts of the world). This type of planning came about in the early part of the 1900s [4] in an attempt to separate living areas and neighbourhoods from the negative effects of residing close to job opportunities such as industries.

Forward planning tends to look much more into the future. "Forward planning is a future-oriented exercise. It is concerned with the long-term future of a large area, and identifying opportunities for growth and development so that land can be managed in the best interests of the public" [5]. The tools employed by this branch of planning includes master plans, comprehensive plans, spatial frameworks etc.

Can these two dimensions of planning actually lead to cities developing in a sustainable manner?

Critics against traditional land use management (zoning) practices seem to agree that zoning has led to urban sprawl [6], and is today one of the major stumbling blocks in establishing mixed use communities that are deemed vital to sustainable and "liveable" communities [7]. Another consequence of zoning is that it has created bloated bureaucracies that manage every fine nuance from the colour a building is painted to signage on suburban roads – yet ignores the "bigger picture" of the future of towns and cities.

It would seem as if there is a general call for planning to change its ways. Carl Shramm [8] criticises forward planning in his article "it's time for city planners to adapt a new model" stating that comprehensive plans formulated by planners

today ignore the practical realities such as population growth and economic considerations, concluding by saying "...the practice of city planning has escaped reality". The UN Habitat [9] also calls for planning reform – "…for urban planning to play a positive role in urban development, it needs to vigorously assess and reinvent itself…."

The two dimensions of planning identified above often happen in isolation. Innovative proposals from forward planning documents such as "mixed use zones", "transport orientated development" and many others that can contribute to sustainable cities must in reality be implemented using outdated zoning codes that were expressly formulated to prevent the mix of land uses. The relationship between these two elements will be further explored within the South African context later in this document.

Planning happens within some administrative context. In South Africa, forward planning is done at all three spheres of government (National, provincial and local). Land use management, however, is the sole responsibility of local government (hereafter referred to as municipalities).

3 Planning reform in South Africa

Chapter 2 highlighted the need for planning systems to change to adequately address sustainable development. This section briefly introduces new planning legislation in South Africa and highlights some of the implications for sustainable development.

In 2013, the new Spatial Planning and Land Use Management Act was signed by the President of South Africa. One of the main aims of this act, it to remedy the disjoint between spatial planning (earlier referred to as forward planning) and land use management. The act introduces the principle of sustainable development and include the following objectives [10]:

- *development should happen within (among other) the fiscal means of the country;*
- consideration should be given to environmental and agricultural concerns;
- promote and stimulate effective functioning of land markets;
- *consider all costs (present and future) to all parties for the provision of infrastructure and social services in land developments; and*
- promote land development in locations that are sustainable and limit urban sprawl.

Those items highlighted in italics will be explored later in this document to illustrate how planning, through the effective functioning of the land use management system can contribute to sustainable cities.

4 Land use management systems

In trying to define a land use management system, the answer most often seems to relate to the management of land uses (through the allocation of zoning etc. as described earlier). Other definitions point to land management and processes

associated with land tenure. The land use management system however, is more complex than just the management of land use and ownership. Land use affects a municipality in many more ways than just allocating and managing land use rights. Table 1 below illustrates different components of a land use management system. Some components (discussed above) directly affects land use in the sense that planning activities either focus on existing land uses (though land use/zoning schemes and codes) or future land uses through the creation of comprehensive plans or spatial frameworks. What is *more* important to understand is how these activities influence other components of the land use management system and affects the sustainability of a city or town. Each of these components will be discussed below.

Table 1: The land use management system.

Components directly concerned with land use management	***Components affected by land use management***
Long term development strategy	The management of buildings and improvements on a property
Forward planning (comprehensive plans, spatial frameworks, etc.)	Infrastructure provision and management
Land development management (Zoning codes schemes etc.)	The municipal budget
Land development management	

(Source – compiled by author.)

4.1 Components *directly concerned* with land use management

A *long term development strategy* is a plan with a twenty year plus time horizon setting out the vision of the municipality in achieving its development objectives. In South Africa, this type of plan is not legislated. Typically, this is not even a "pure planning exercise", but rather a strategic vision or plan adopted by the executive management of the municipality. This plan influences the land use management system in that it provides a development trajectory for the municipality that includes broad statements as to where the municipality is headed, its function and vision. This in turn broadly sketches the land use aspirations of the municipality. An example of this can be seen in the vision statement of a smaller South African municipality – "our vision is to develop Tubatse as a platinum city in an integrated manner to improve the quality of life for all" [11]. This vision statement clearly articulates the importance of the platinum mining sector in this municipality and also emphasises the reliance of the municipality on this land use in the future.

Forward Planning Documents such as spatial development frameworks and comprehensive plans are documents accompanied by a sets of plans that illustrate the future spatial form of the municipality. It uses tools such as nodes and corridors and concepts such as densification, containment, protection and growth areas to

indicate how land uses in the municipality must be managed to arrive at this future spatial form. This type of plan also consider cross-cutting issues such as transportation, human settlements or housing, social facilities as well as economic development. While this type of plan provides an indication of acceptable land uses or intensity of land uses in certain geographical areas, it does not confer land use rights. Land use rights are managed though a land use scheme or zoning code.

A *land use scheme or zoning code*, together with zoning maps forms the nuts and bolts of day-to-day development administration within a municipality. The scheme is the primary tool for changing land use rights (including development controls such as density, height, coverage, building lines, etc.). Whilst forward planning provide an indication of the spatial form of the city, the land use scheme directly deals with the land use rights of a property owner.

4.2 Components of the LUMS *affected* by land use management

These components do not directly deal with land use or planning, but is definitely affected by land use and therefore play a very important role in the sustainability objective of any town or city.

The management of buildings and improvements on a property. In most countries, legislation requires a land owner or occupant to submit an application for a building plan to local government for approval before a building can be erected. This building plan requires land use rights to be in place before it can be approved.

The Municipal Budget. Cities and towns grow in wealth and size through investments in land and property. Property value is one of the key drivers of income growth. For municipalities this value is the basis of their primary source of tax income, which is used to provide basic services and perform their functions. For private investors, this value is the capital base for accessing further finance to invest in new property initiatives. Often this financial dimension to planning is not understood or recognised by planners [12].

Property rates are the most important source of general revenue for municipalities, especially in developed areas. Revenue from property rates is used to fund services that benefit the community as a whole, as opposed to individual households. These include installing and maintaining streets, roads, sidewalks, lighting, and storm drainage facilities; and building and operating clinics, parks, recreational facilities and cemeteries. Even though most planners never consider the financial dimensions of planning, forward planning documents such as the Spatial Development Framework (SDF) effectively guide development of entire municipalities and sets general guidelines for the types of activities or land uses that should occur in the future and the general location of such development. The make-up and mix of future land uses have a direct impact on the future municipal budget. Plans requiring for more residential development and less industrial or commercial development will produce a different property value configuration than a plan with an opposite configuration. Differences in property values translate almost directly into different tax revenues or revenue potential associated with anticipated land uses. The graph below summarises the annual revenue generated

in Ekurhuleni Municipality for every square meter of land use. It points out that the highest yield (ignoring the cost of services) the municipality can generate is from business and commercial type land uses (R32/m^2) whilst agricultural land uses in the municipality only contributes 8 cents per m^2 per annum.

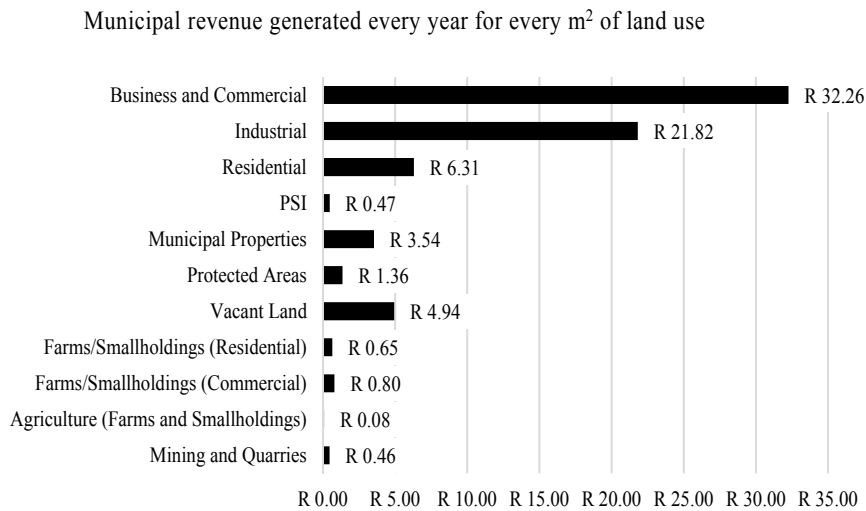

Figure 1: Municipal revenue from land uses (source: compiled by author using municipal valuation roll and property tariffs of Ekurhuleni Metropolitan Municipality, South Africa).

Planners decide on the future land use mix of the municipality through the vision of the municipality as well as forward planning documents such as the spatial development framework, they also approve applications for land use on a daily basis though land use management processes associated with zoning – therefore planners indirectly help decide on the future income of the municipality! *Infrastructure provision and management.* Where the previous section illustrated that planning has a direct influence on the income of the city, this section will make it clear that planners also have quite a lot of say in costs affecting the municipality. Municipal infrastructure is defined in broad terms as "the capital works required to provide municipal services" [13]. Whilst national and provincial government are responsible for creating an enabling policy, municipalities are responsible for planning and implementing municipal infrastructure. While it is clear that land use planning influence development sustainability, its impact on the financial sustainability of a city is often neglected [14]. Planners decide on the built form of cities both in terms of the location of land uses and the intensity thereof. The financial implication of delivering services to different spatial forms can be quite staggering. For example, research suggests that the current costs of low-density urban development in South Africa can be R6.4 billion more than those of a compact urban form [14].

Environmental Management. Planners take land use decisions that can ultimately either benefit or harm the environment. These decisions can be on a relatively small scale for example approving development on an environmentally sensitive site; or it can be on large scale for example decision on the future urban form that effects reduce or increase urban energy consumption.

5 Planning for sustainable cities

This section will use two of the objectives of the new South African planning legislation and elements of the municipal land use management system described above to illustrate how planning can contribute to sustainable cities.

5.1 Establish related planning instruments

Chapter 2 concluded that the two dimension of planning, land use management and forward planning are often divorced from each other. One dimension plans the future shape of our cities, the other is a mechanism through which land uses are managed and regulated.

The long term development strategy of any municipality should clearly articulate the desired vision of the city in land use terms. This should involve a detail economic analysis to ascertain the specific economic sector in which the city has a comparative advantage. Further analysis should indicate if this economic sector is growing or declining. This should be supported by the specific skills set of residents of the city specific skills. Too often do we find grand future economic develop visions completely misaligned with the labour force of the specific city – Shramm [8] refers to this as a fallacy of contemporary urban planning "build it and an economy will come".

The Long Term Development Strategy should be supported in more detail by the spatial plan of the city (be it a comprehensive plan or spatial development framework etc.). These plans should take the vision and translate it into broad land use proposals in specific geographic areas.

The spatial framework and its broad land use proposals should be in turn supported by the land use scheme (or zoning code) of the municipality. Conventional zoning do not give effect to new sustainable planning concepts such as mixed use – and should be reviewed to react to modern day planning requirements. Planners has for such a long time been considering which uses to separate that we have forgotten how to plan for mixing uses together. Our land use schemes are more restricting development more than we are enabling it. Very few schemes include incentives or any instrument that would actually convince a developer to rather exercise his land use in a specific area. Once such an example can include demarcating a geographic area where the process of acquiring land use rights (specifically those preferred for that specific spatial structuring element) can be fast tracked. Other examples include financial instruments such as tax increment financing. These instruments are typically not understood by planners – reinforcing the idea that planning should also include the financial departments of a municipality.

5.2 Plan within the financial means of the city

Section 4.2. Mentioned that planners often plan without a necessary comprehension of the financial implications of planning proposals. Fortunately, however, there is a growing sentiment that planners can improve the chances of seeing their plans and programs implemented if they better understand how municipal budgets and related financial mechanisms work [12]. The following simple suggestions could make a world of difference:

Land use planning can increase or optimise the revenue of the city. Planners have the ability to influence the future income base of the municipality through a choice of the future land use mix of the municipality (as set out in a comprehensive plan or a spatial development framework). Figure 1 illustrated that business related land uses yield a return on investment (per m^2) 400 times more than agriculture related land uses. Obviously property rates should not be the ONLY criteria to consider in deciding the future land use mix of a municipality, but it does at least deserve some consideration.

Planners manage those processed that change the use of a property. Financial departments of municipalities are in charge of property rates levied on a property (and these rates are based *on the use of the land*). Though it seems simplistic, the lines of communication between these two municipal departments are not always as clear as one would imagine. Consider the following example of Ekurhuleni Municipality in South Africa. The municipality consist of 566,045 cadastral entities. All processes such as subdivisions, consolidations, rezoning etc. that affect the number of properties are managed via the town planning division of the municipality. The municipal valuation roll (which forms the basis of revenue calculations) exclude 8% of these properties. This translates into a potential additional income of *8 Billion Rand* in property revenue that the municipality is currently not realising. To contextualise this amount – the municipality has an annual capital budget of around R 15 billion mark, larger than the national budgets of several smaller African countries.

Land use planning can reduce the cost of providing infrastructure. Land use decisions affecting the shape of the city can also have a serious impact on the cost of providing infrastructure. Case studies [15] indicate that planning a compact city can lead to savings of between 33% and 38% on the capital cost of roads, transit, water and other infrastructure, as well as savings on operational costs of between 14% and 60%.

6 Conclusion

Planning has been labelled as ineffective by many. More often than not, planners lack the authority or fiscal means to turn ideals into reality. Even though planning departments can be found in most public services around the globe, they are often removed from the decision makers such as Municipal Managers and Chief Financial Officers. This article demonstrated that planning decisions in fact influence many more aspects than planners typically would have thought. It is time for planners to comprehend the truly integrated nature of the profession, and to

understand the impact (such as the financial impact) of planning decisions on the total built environment. It is furthermore required that city leaders understand the importance of planning in achieving the illusive objective of sustainability of cities and towns. The new planning legislation enacted in South Africa is proving, like the country's Constitution, to be innovative and world leading. Given this framework, planners can act to plan for sustainable cities.

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