Productive Urban Landscape: Appropriating Forces and Criteria

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Abstract

One of the major concerns nowadays is sustainability, with all of its aspects, dimensions, realms and reflections upon the built environments. Achieving sustainability is no more a choice but it is a must especially, in an environment suffers from a lot of threats and stresses which affect all aspects of life such as socially, economically, environmentally and also affects the beauty and aesthetics of urban fabrics, so sustainability impacts upon different urban scales should be recognised to reshape the way of thinking and the way of urban interpretations.

One of the most relevant domains related to sustainability is landscape, for the reason that it links nature with the built environments. Landscaping enhances people understanding towards environmental issues. It is no doubt that good landscaping leads to a healthy environments. Nevertheless landscape can cause - as all kind of development- bad impacts if neglecting the criteria of efficiency, so, both landscape and sustainability are two terms of strong relations which represents the catalyst for several approaches and trends to be emerged as a better practice concerning life and environments.

This paper aims at recognising productive landscape as one of the emergent approaches concerned with urban sustainability, through appropriating its variation of guidelines. This can be achieved through discussing Landscape and sustainability interpretations, the discourse of productive landscape and its related hierarchy and appropriating ruling criteria to elaborate an adapted model that concludes the criteria of efficiency that rule the applicability of this approach.

***Keywords**: landscape, sustainability, productive landscape, urban farming.*

1 Introduction

At the end of the 20th century, humanity is involved in an unprecedented experiment that turning ours into an urban species. Large cities, not villages and towns, are becoming our main habitat. Urban growth is changing the face of the earth and the condition of humanity. In one century, global urban populations have expanded from 15 to 50% of the total, which itself has gone up from 1.5 to nearly 6 billion. The size of modern cities in terms of numbers as well as physical scale is unprecedented. By 1990, the world's 100 largest cities accommodated 540 million people and 220 million people lived in the 20 largest cities, mega cities of over 10 million people, some extending to hundreds of thousands of hectares .Urban agglomerations and their resource uses are becoming the dominant feature of the human presence on earth, profoundly changing humanity's relationship to its host planet and its ecosystems. (Deelstra & Girarde , 2009)

This stress -of course- has a lot of interpretation in all aspects of life .The fact that nowadays, there are several approaches which aim to find an optimum, relation with the comprehensive context and surroundings. This paper discusses the discourse of productivity through urban landscape developments and how this can affect and lead to a better coherent dependent urban landscape environments.

1.1 Objective

This paper aims at investigating the role of continuous productive urban landscape in formulating new sustainable urban fabrics with special reference to the criteria and guidelines of efficiency.

1.2 Hypotheses

The main hypothesis can be stated that the concept of productive landscape can be applied to urban settings achieving the same qualities and regulations of non productive (decorative) landscape.

2 Landscape and Sustainability: New Interpretations

Introducing the terms of sustainability in the domain of landscaping and landscape architecture has been elaborated since the literature of Ian Mac Harg – design with nature (Stephen, Wheeler & Beatly, 2004), also the concepts of Tilleman lyle and Thyer in their discussion about design for human ecosystem, these concepts that figure out the relation between the development impacts upon their context whether locally or globally.(Thyer,1994)

Sustainability has emerged as a planning concept from its beginnings in economics and ecological thinking and has widely been applied to urban development. Urban sustainability is seen as a desirable state of urban conditions

that persists overtime. It is often characterized by issues such as inter-generational equity, intra-generational equity, protection of the natural environment, minimal use of non-renewable resources, economic vitality and diversity, community self-reliance, individual wellbeing, and satisfaction of basic human needs. (Adinyira, 2007)

In a world increasingly dominated by cities, the international community is addressing the issue of urban sustainability. The process began in Rio with Agenda21 and continued at the 1996 UN City Summit in Istanbul. The Habitat Agenda signed in Istanbul by 180 nations, states: "Human settlements shall be planned, developed and improved in a manner that takes full account of sustainable development principles and all their components, as set out in Agenda 21. ... We need to respect the carrying capacity of ecosystems and preservation of opportunities for future generations. ... Science and technology have a crucial role in shaping sustainable human settlements and sustaining the ecosystems they depend upon."(Newman & Jennings, 2008)

Relevant to these discussions is the concept of ecological footprint analysis which assumes that every category of energy and material consumption and waste discharge requires the productive or absorptive capacity of a finite area of land or water (Wackernagel & Rees, 1996). The sum of all land and water required meeting material consumption and waste discharge of a defined population is that populations' ecological footprint on the earth.

Sustainable landscape commonly describes landscapes that support environmental quality and conservation of natural resources. For many people, a sustainable landscape is hard to understand or visualize. Other terms such as xeriscape, native landscape and environmentally friendly landscape have been used interchangeably to describe sustainable landscapes. A well-designed sustainable landscape reflects a high level of self-sufficiency. Once established, it should grow and mature virtually on its own — as if nature had planted it. This self-sufficiency can be difficult to attain, however, due to the environmental stresses and artificial conditions placed on plants in urban areas. In addition, many residents may not be comfortable with the informality (less plant pruning, use of native plants which may lack the desirable aesthetic features of typical landscape plants, etc.) normally reflected in a sustainable landscape. Adjusting to an informal landscape may take time for many homeowners, but implementing just one or a few principles of sustainable design can significantly benefit home landscapes. These benefits may include enhanced landscape beauty; less environmental decline; more effective use of water, pesticides and other chemical resources; more valuable wildlife habitat; and cost savings from reduced maintenance, labor and resource use. (Rodie, 2010).

Under this awareness, several approaches and trends have been emerged as better practice concerning life and environments. These approaches can be classified according to their core principles, whether to be energy conservative, lesser consuming of resources, drought tolerant, naturalistic and edibility. These

principles were the initiators for such approaches as perm culture, natural landscape ,ecological landscape, sustainable landscape.

3 Productive Landscape: The Need and Discourse

Cities require vast areas of land for their sustenance and have come to depend on large amounts of food being brought in from outside the land area they actually occupy. Despite their inherent density, cities do have enormous potential for food growing. (Smit, Ratta & Nasr, 1996)

The challenge faced is whether cities can transform themselves into self-regulating, sustainable systems –the question, Is it possible to make a world of cities viable in the long term –socially, economically, as well as environmentally? , for the reason that today, urban dwellers don't really live in a civilization, but in a mobilization of natural resources, people and products.

Continuous Productive Urban Landscapes (CPULs) started to develop in London around2005. The world, though various attempts had been successfully started to integrate both continuous landscapes and urban agriculture into cities. As a strategy based on the genius loci of place. (Viljoen, Bohn &Howe, 2005)

3.1 What are CPULs?

Overlaying the sustainable concept of Productive Urban Landscapes with the spatial concept of Continuous Landscapes proposes a new urban design strategy which would change the appearance of contemporary cities towards an unprecedented naturalism. The main design implication of CPULs will be the introduction of agricultural fields into the contemporary city.

Continuous Productive Urban Landscapes (CPULs) will be open landscapes productive in economical and sociological and environmental terms. They will be placed within an urban-scale landscape concept offering the host city a variety of lifestyle advantages and few, if any, unsustainable drawbacks. (Viljoen , Bohn& Howe, 2005)

CPULs will be city-traversing open spaces running continuously through the built urban environment, There by connecting all kinds of existing inner-city open spaces and relating, finally, to the surrounding rural area. Vegetation, air, the horizon, as well as people, will be able to flow into the city and out of it. Partially, the city will become open and wild.

CPULs will read as parks or urban forests, green lungs or wilderness, axes of movement and journey, or places for reflection, cultural gathering and social play. They will be containers for an assembly of various activities that do not happen in buildings. CPULs will be green, natural and topographical (except when they happen on buildings), low, slow and socially active, tactile, seasonal and healthy. They will be well-connected walking landscapes.

CPULs do not seek a tabula rasa from which to grow. Instead, they will build on and over characteristics inherent to the city by overlaying and interweaving a multi user landscape strategy to present and newly reclaimed open space. That they will exist alongside a wide range of open urban space types. Complimenting their designation and design and adding a new sustainable component to the city tailoring their type and layout.

CPULs will be productive in various ways, but most uniquely, they will be productive by providing open space for urban agriculture, for the inner-urban and pre-urban growing of food. The urban land itself, as well as the activity happening on it, will become productive: occupants will act and produce on the ground and with the ground. Vegetation will appear ever new and exciting: it will get harvested, grow back, get harvest again, grow again, grow differently, grow less or more, grow earlier, later, it will seasonally change size, color, texture and smell.
As the ground – the earth – air and vegetation become vitally important for the productive success of CPULs, the effort to maintain their well-being ensures that natural conditions will be most significant features within the new urban landscape.
CPULS can be configured by merging two terms as follows:

Continuous landscape which represents a network of planted open spaces in a city which are literally spatially continuous, such as linear parks or inter connected open spaces that are virtually car free allowing for bicyclists and pedestrian movement (Viljoen, Bohn & Howe, 2005)

- Continuous production which mean at community scale; all individuals managing community gardens up tourban commercial farms are involved in food production, processing and marketing. (Crimm , 2005)

3.2 Why CPULs: The concept of urban food.

Producing food where one wants to eat it, or consuming food where it has just grown, establishes a healthy and sustainable balance of production and consumption. It is an effective and practical, but at the same time self-beneficial way of reducing the energy embodied in contemporary food production. This reduction of embodied energy is crucial for the reason that the energy mainly is non renewable production.

Urban agriculture is an important aspect of the wider issue of urban sustainability, both by being able to supply food from close-by and by offering livelihoods for city people. Another important issue is the efficient use of nutrients from the urban metabolism that would otherwise end up as pollutants in rivers and coastal waters.

Another important aspect of sustainable urban development is the creation of new kinds of eco-efficient fabric, There is a critical need to envision human settlements in more positive ways, first to reduce per capita impacts but then to

move to a new and more exciting possibility where cities begin to be a positive force for the ecological regeneration of their regions.
CPULs and Urban agriculture can result in environmental, social and economic benefits. That by reinventing the entire food system it would reduce the impact of many other issues as follows:

- Environmentally Productive

  As diabetes and other chronic diseases increase, health care costs will continue to raise Environmental health is an enormous concern of many organizations and individuals in the local food system movement. Environmentally productive as it would shorten the span between field and plate and reduce greenhouse gas emissions. (Crimm, 2005) CPULs also will be environmentally productive through several advantages and opportunities to improve the environment and ecology of cities. Urban farming can help to create an improved microclimate and to conserve soils, to minimize waste in cities and to improve nutrient recycling, and to improve water management, biodiversity, the O2 - CO2 balance, and the environmental awareness of city inhabitants (Rees, 1997)
- Economically Productive

  By designing our communities around food production and only increasing fruit and vegetable production our economy would be benefited greatly. That will be economically productive, provoking new strategic socio-economic thinking and changing local employment and product–cash flow patterns CPULs will provide a completely different concept for the use of the city. (Crimm , 2005)
- Socially productive

  That Develop a way of learning and acting together to deliberately redevelop the suburb and communities to serve the common good, also support the concept of participation , education and environmental learning, They will also be sociologically productive thus, their urban concept will involve, amongst others, cultural and leisure activities.

4 Productive Landscapes: Scales and Hierarchy

Other characteristics of CPULs will evolve in accordance with the landscape's ecological aims, the reason that Continuous productive urban landscape is a feature of the rural land which is depending on size and location for its grains, the spatial configurations and types of productive urban landscapes will range from small uni-crop to large multi-crop fields being placed within (and occasionally outside). Generally, any open urban space, communal or private, inner-city or sub-urban, small or big, could benefit from integration into a CPUL. Even fully laid out open urban spaces, i.e. parks, could allocate parts of their land for productive use, gaining in return access and connection to a continuous

landscape design, thereby becoming wider, wilder and healthier. CPUL can be represented in the community scale by the way that reflects the urban hierarchies and fragmentation of the urban fabric as shown in Figure 1 and Figure 2

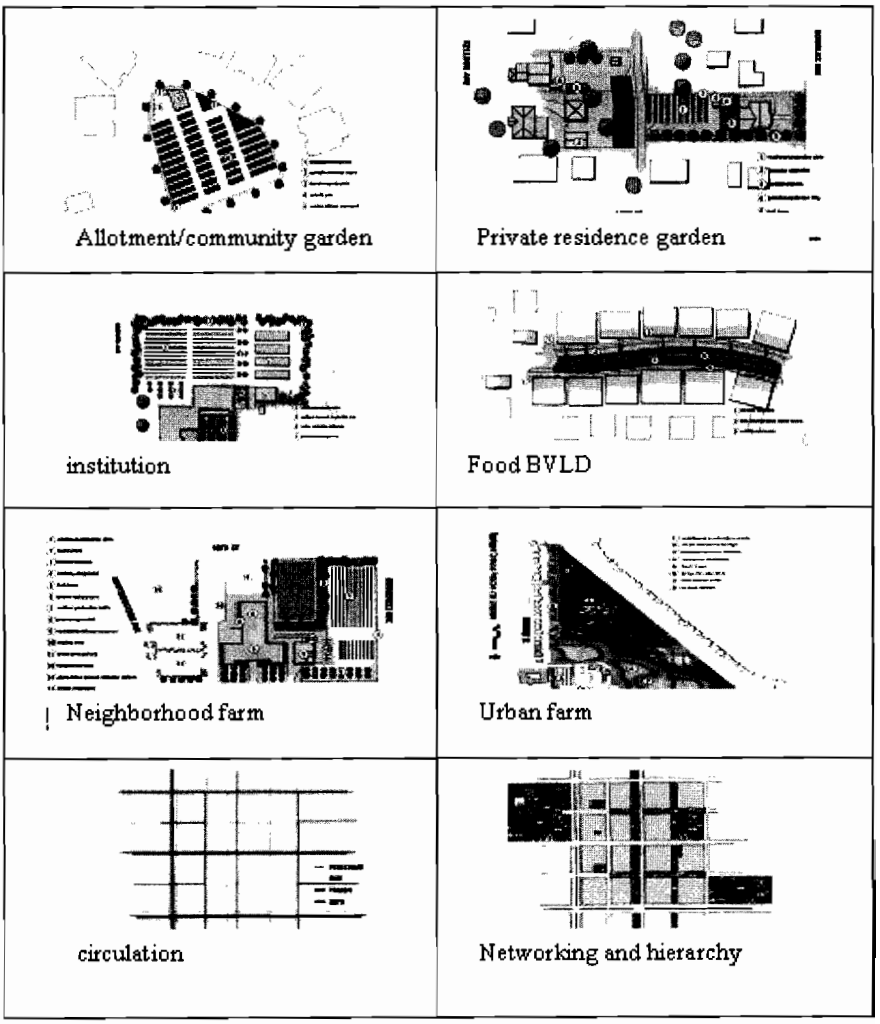

Figure 1: Productive landscape scales and hierarchy (Viljoen et al, 2005)

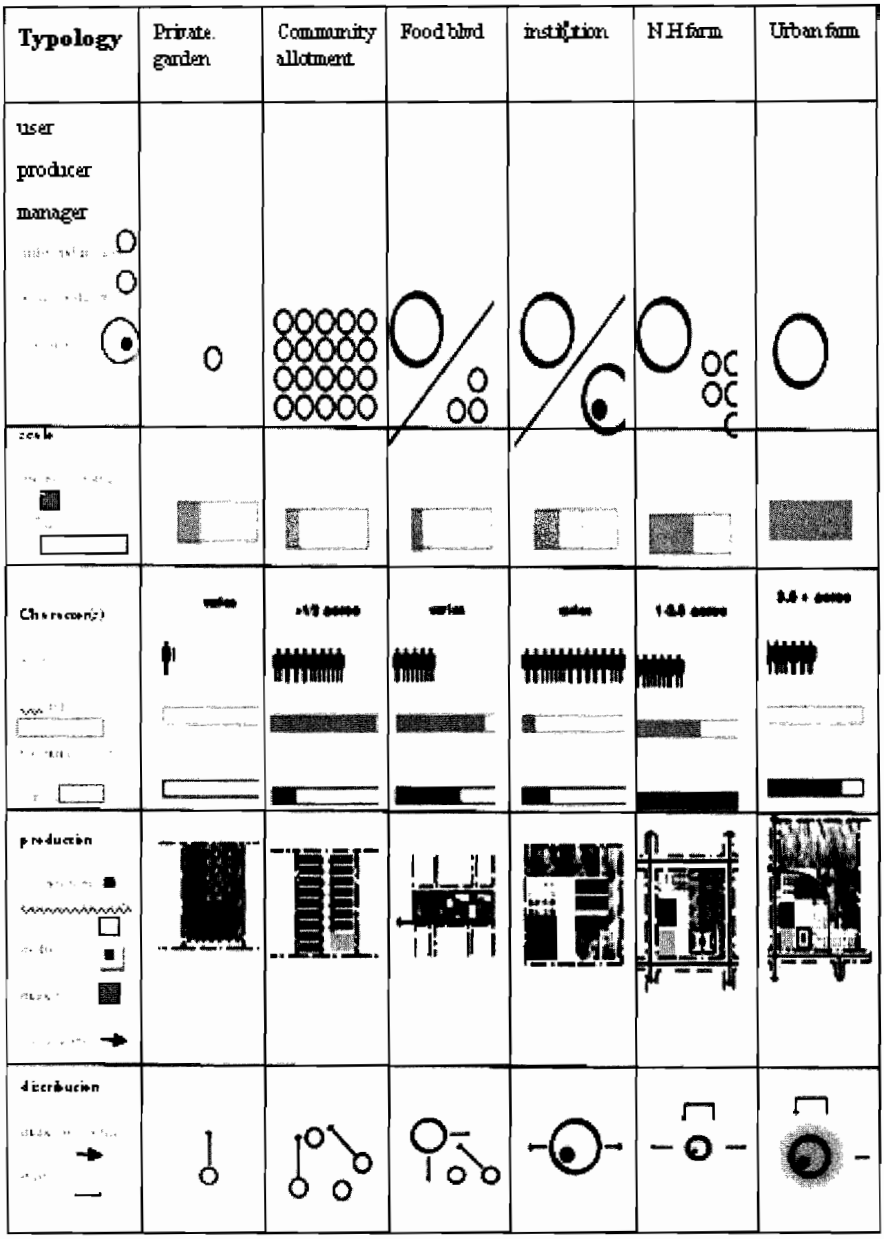

Figure 2: continuous productive landscape typologies (Viljoen et al, 2005)

This reflects the variety of scales and responsibilities that the landscape could be represented in whether the scale of concern is regional, concerned with the resource management and ecological print, or city planning which concerned by

standard, land budget, networks and allocations of open spaces or even the urban scale in which the varieties in elements, plantation media, water features and other complementary elements can be figured.

5 Productive Landscape: Appropriating Ruling Criteria

The principles and criteria of the landscape are the building blocks used by the designers to create beautiful and functional landscape. These principles provide a general context for quality in design. These criteria can be classified according to their interest whether aesthetic, functional, cost, maintainability and environment. (Vanderzen & Rodie, 2008)

These principles and criteria should be applied to achieve goals of sustainable cities that guarantee a long-term vision based on sustainability; intergenerational, social, economic and political equity; biodiversity and natural ecosystem.(Lovell & Johnston, 2009) , also should be applied in a setting that based on Sense of Place which recognize and build on the distinctive characteristics of cities, including their human and cultural values that empower people and foster participation and Partnerships which enable cooperative networks to work toward a common sustainable future (Mansvelt & Van der Lubbe, 1999)

For landscape whether urban or rural, both of them usually been affected by several forces which are represented in a variety of factors and guidelines, these factors can be classified as follows:

- Global discourses and concerns
- Recent issues of development(such as green dimension and sustainability)
- Contextual impacts (regionally, locally,)
- Strategic aims and program of development (Dee, 2002)

Landscape whether urban or rural depends on the appropriating of the existing conditions whether core (soil, aqua fare), or surface (topography, slopes, urbane factors, flora, fauna, climate) with the proposed system of landscape (softscape, hardscape, plants media...) according to a set of criteria and guide lines.

Concerning Farming in cities and urban fabric there are also special concerns concentrate on the major environmental constraints associated with urban agriculture and its potential role to improve the ecological performance of cities as follows: (Critchley et al , 2007)

- Space for growing food

  One of the major constraints is the lack of space in cities for growing food, thus, there has been concern about the suitability of contaminated urban land for food growing, and it has been suggested that it is prudent not to grow crops less than ten meters from busy roads, particularly in countries where lead fuel is still in use. Generally, land polluted by heavy metals, such as cadmium and lead, requires special precautions. However, research proved that these problems can be tackled in maintaining a high pH with additions of plenty of lime, and high organic matter levels through additions of

compost or manure helps to immobilize heavy metals in the soil. Taking into consideration that in many cities even those of high densities there are a lot of areas which are less suitable for housing, and often offer excellent positions to produce food.

- Microclimate conditions
  If appropriately planned and integrated into urban design, urban agriculture can contribute to the comfort of citizens. Green spaces around blocks and Houses, as well as neglected spaces in the city, help to improve the physical Climate because vegetation can help to increase humidity, lower temperatures and introduce more pleasant odors' to the city; capture dust and gases from polluted air through deposition and capture by the foliage of plants and trees, and soils, also help break wind and intercept solar radiation, creating shadow and protected places, also Appropriating the climate elements as a system with the nature of the edible media is must
- Conservation of urban soils
  Creating fertile soil is not usually a problem in cities because, by definition, they are places where fertility accumulates in great abundance. There is little need to use fertilizers, A great variety of materials are available that can be composted and incorporated into soil. Provided that organic amendments are not contaminated, the use of abundant fertile materials and the growing of trees, crops and other greenery in cities will help keep urban soils fertile. Natural soils are rich in life; there are numerous "recycling" systems at work in the top layers of the earth. Through urban agriculture, soil systems can be kept in balance.
- Waste and nutrient recycling
  A key factor in urban ecology is the process of waste management and nutrient recycling. The metabolism of many traditional cities was circular, whereas that of most "modern" cities is linear: Resources are funneled through the urban system without much concern about their origin and about the destination of wastes; inputs and outputs must be treated as largely related. (Deelstra & Girardet, 2009)
- Water management
- Agricultural activities in cities can indirectly improve urban water management, because green spaces with permeable land surfaces allow rainwater and runoff to drain through the soil Landslides. The need for water sewers and drainage can be minimized when enough green space is available. To invest in urban agriculture, therefore, is just as necessary as developing a network of channels and drains. The direct use of recovered wastewater for food production in cities can also improve the efficiency of water use
- Biodiversity
  Urban agriculture must have a positive use on increasing biodiversity. The urban environment is often already richer in flora and fauna than rural farm land; this is because cities are often home to more trees and flowers than intensively-farmed agricultural land with large fields, limited crop diversity and little uncultivated area.

- Global warming and atmospheric pollution
  Urban agriculture can help and contribute to reducing the net discharge of CO2, one of the gases contributing to global warming. If more cities were to produce food within their boundaries, bringing places of production and markets closer to each other, the transport of products can be reduced; this would contribute to reducing emissions of CO2 and other polluting gases. Urban agriculture is also a means for reducing the net discharge of these emissions, because of the ability of plants and trees to capture these entities. (Bodlovich , 2001)

6 Towards an Adapted Model

The objectives for an agenda of urban design in a regime of sustainable development would emphasize conservation of both the natural and built environments. (Moughtin & Shirle, 2005) There is a need to use already-developed areas in the most efficient and effective way, while making them more attractive places in which to live and work. For sustainable development the regional setting is the primary consideration. The function of the bioregion and its landscape is to maintain environmental services including waste management, water, energy and food supplies for the regional populations together with the maintenance of biodiversity, (Yvonne & Frank, 1998)

An assumption of urban landscaping is that the city is not, apart from a few token allotments, can be changed to consider a city as a place where food is grown. The city can be the location for trees and bushes bearing fruit, where groundcover is edible, or where vegetables are used as decoration and this, of course, can be applied to have the same qualities of urban (non productive) landscape. Trees like puncia , apple, peach, mulberry, pear, eureka, mandarin and plum cherry also species as basil , mint and a wide range of vegetables (beans ,potato, carrot,....) can be adapted in landscape setting aside the softscape media to elaborate the landscaping values. Urban farming is clearly alive and well in many countries. New ways of marketing urban product are helping to advance the case for urban and urban-fringe agriculture. (Koc, 1999) Also Promoting integration and participation represent challenges to urban planners and policy-makers' .Urban agriculture can reduce the "ecological footprint" of cities when environmental goals are combined into an overall urban policy. The Implications for urban policies and programs have to focus on maximizing short-term profits in addition to long-term environmental management of local resources, also the implications for managerial and control concept such as surveillance and territoriality is a must. Towards an adapted model for urban productive urban landscape with special concern to sustainability, the model can be segmented or read in various levels as follows:

- The criteria ruling the efficiency of urban landscape (environmentally, ecologically, cost...)
- The criteria ruling the efficiency of rural landscape (environmentally, ecologically, cost...)

- The integrated part between them which leads to the concepts o CPUL
- The conceptual and strategic frame supporting them
- The contextual criteria to sustain such a discipline as shown in Figure 3

This model needs the whole community to be perceived as a whole system that can provide a higher quality of life and can actually enhance, rather than degrade, the environment, Looking at flows and rates of resources like money, food, water, energy, wastewater, solid wastes, communication, and people, be tapped by gradually implementing the following ideas as comprehensive forces :

- Develop a way of learning and acting together to deliberately redevelop to serve the common good, also Celebrate diversity and actively promote inclusion of all people.
- Implement a community-wide energy and water conservation programs.
- Create public spaces that are safe for children and wonderful gathering places for adults.
- Create income-generating community businesses by thinking about all wastes as resources, also value the capacity for individual and collective learning.
- Evaluate ways of reducing transportation and its impacts.(Jenks & Dempsey, 2005)

Some principles can be enhanced and assessed by applying CPUL, there are 10 key principles; Human Scale as some basic physical relationships can create resonance in a community, including focal points, a sense of transition, and a sense of enclosure in key places, resource responsibility , the community development of an everyday ethic that includes efficient household resource use, recycling, community gardening, shared transportation, and energy generation at the neighborhood level, it stands a better chance of being economically and socially viable. The third principle is walk ability, the activity of walk is considered a good measurement of the health and a sustainable environment also emphasizes the sense of place, also applying certain pattern of Open Spaces, whether they are common backyards, vacant lots, or areas reclaimed for cars , open spaces can be used for picnics, community gardens, and as places for conversation, reading, and relaxation.

A community that becomes a "we" rather than a string of "me's" will probably want to create a place where neighbors can gather, establishing public facilities , also enhancing streetscapes, By working with the city or county, neighborhoods can create well-landscaped, people friendly public areas in and around streets, also the variety through Landscaping and as a tools for creating diversity in subdivision neighborhoods, also mixed uses. will make neighborhoods more lively and productive. The other principles is coordination, this refers to how streetscapes, colors, and materials work together to create a sense of harmony and resonance.

Global discourses and concerns
Recent issues of development (such as green dimension and sustainability)

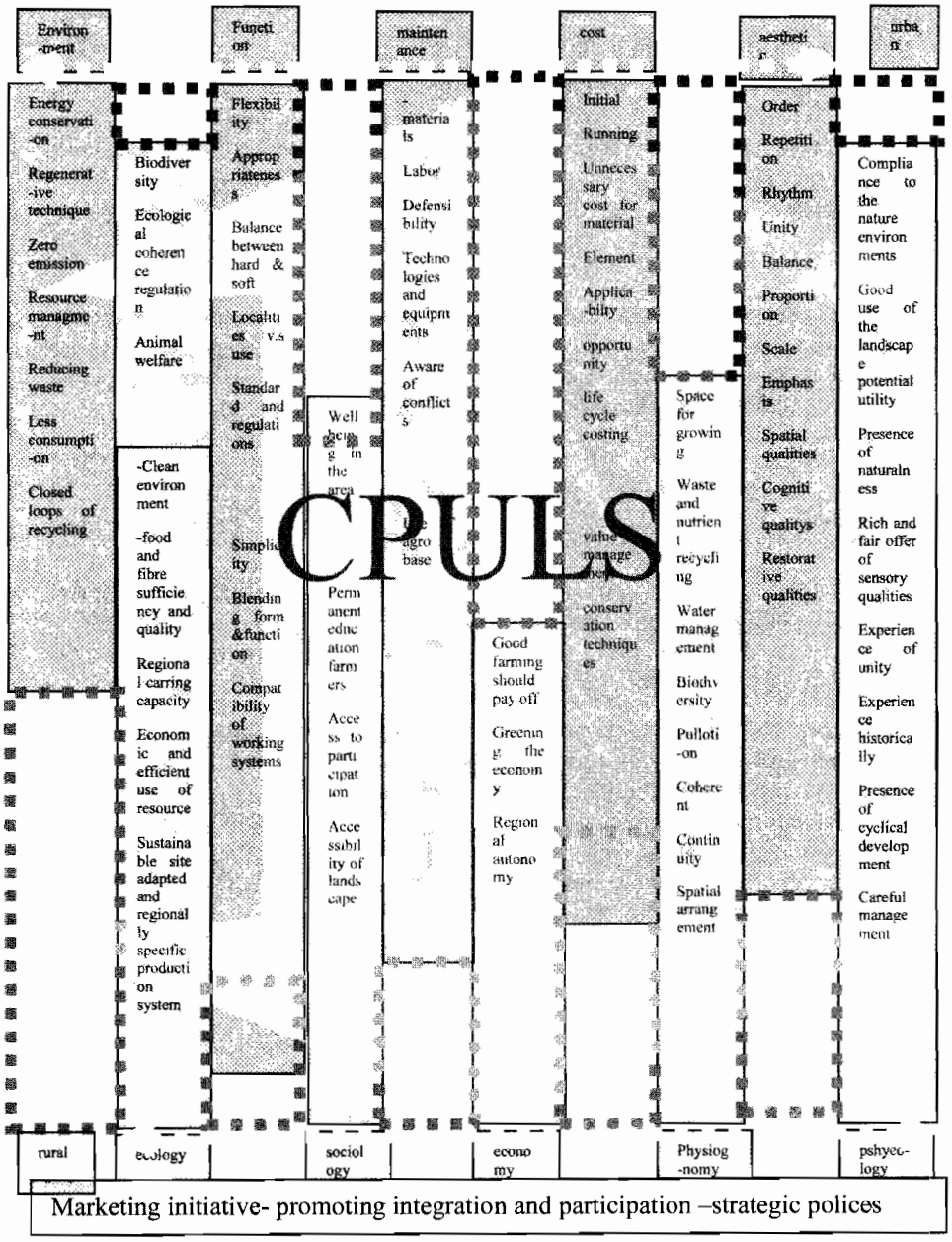

Figure 3: Adapted model for CPULs

7 Conclusion and Discussion

Prospects for urban farming are good in many parts of the world. However, it is crucial that planners start recognizing the importance of urban farming in the rich mix of activities that can characterize modern cities. As the world urbanizes, greater local food self-reliance, using nutrients accumulating in our cities, must be regarded as an important aspect of sustainable urban development. Together with initiatives on energy efficiency, high resource productivity and policies for containing sprawl, urban agriculture has an important contribution to make towards shaping the cities of the future.

The concept of urban agriculture and continuous productive urban landscape can be applied in the urban fabric to achieve the same qualities generated by the traditional non productive urban landscape ,taking into consideration the special need and factors which domains the nature of farming or agriculture .

Applying urban agriculture and the concept of productivity in the urban fabrics, nowadays, represent one of the appropriate approaches that help in sustaining our environment and can have major contributes whether environmentally, economically and socially.

The interaction between the forces affecting both urban and rural landscape is the core configuration of productive urban landscape. Applying the concept of CPUL successfully depend on the comprehensive integration between natural social and cultural reference for the communities.

The forces that affect the workability and ability of application of both urban and productive landscape is of great importance to be handled as a core systems , also to be embodied within the other forces which can be perceived as a surface systems. Affordability of food is not the only benefit from CPUL, but also the perceptual qualities of the edible spices is of great importance when appropriated within landscape settings to meet the required function, uses, landscape values and according to the formation concepts.

Finally, Urban Agriculture and continuous productive landscape can have a positive effect on the availability of healthy, nutritionally balanced and culturally appropriate food. Since food is a basic requirement for a healthy life, this should be seen as an absolute priority in urban policies.. Productive landscape can be adapted as an approach in developing urban communities taking into consideration the criteria and forces that rules both rural and urban aspects, also the contextual domain.

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