Climate change impact on urban ecosystems and sustainable development of cities in Romania

GABRIELA TEODORESCU
Department Environmental Engineering
Valahia University of Targoviste
Bvd Carol I, Nr 2
ROMANIA
theo_0200@yahoo.com

Abstract: - The urban development, the urban green spaces and the public transportation system must be linked directly in the current context of climate change. We have to take into the consideration that urban ecosystems are dynamic ecosystems that have similar interactions and behaviors as natural ecosystems.
Urbanization causes several forms of disturbance, such as alteration, fragmentation and isolation of indigenous habitats, changes of temperature, moisture and edaphic conditions and pollution. As environmental conditions have changed in the last decades, many species have become extinct and new ones have formed. The result of these changes is biological diversity or, biodiversity
The urban real state development determines the reduction of parks and green areas and, with this, the rising of pollution. In Romania there is a national plan to improve the quality of the environment by protecting and creating green spaces in urban areas. We consider that a large number of measures could be used for sustainable development of the cities and conserve the urban ecosystems.

Key-Words: - climate change, urbanization, biodiversity, cities, sustainability

1 Introduction

The sustainable development cities program objective is to make a relevant contribution to guiding the actual urban transformation towards a sustainable and healthy development, highlighting the good governance and citizen participation.

Romania is located in the South-Eastern part of Europe, facing the Black Sea and bordering Bulgaria, Yugoslavia, Hungary, Ukraine and Moldavia. The total area of the country is 237,500 sq. km, being ranked from this point of view as a medium sized European country. The population of Romania is over 21 millions inhabitants, the degree of urbanization reaching almost 53%. In order to provide safe traffic conditions, the urban planning regulations refer mainly to compulsory ensure:

- direct accesses from public roads and alignments/retreats for the new constructions,
- buildings conformation for ensuring proper visibility at crossroads,
- protection areas for public roads (depending on their category),
- parking spaces outside public roads

Concerning Romania, we consider that a large number of measures could be used for sustainable development of the cities and conserve the urban ecosystems.

One of this is the development of the cities in connection with GHG emissions cutting constitutes at the same time a challenge and an opportunity.

In this way it is important to have a master plan which will take into account as driving force emissions reduction and smarter use of energy.

Another measure regards the transport in urban areas. This requests a totally changed concept that will allow not only fuel consumption improvement, but also drastic reduction of GHG emissions.

Increased transportation, as an opportunity of the growing/globalizing economies, has led to pollution, climate change, traffic congestion, and sprawl - people are driving more cars further distances for longer periods of time. The result is environmental decline and poorer health for urban residents as well as a poorer environment for the city as a whole.

A reform in public transportation is doable and can contain the introduction of incentives for using more efficient and greener vehicles: hybrid, electric, bio-fueled cars, bikes. We may add opening of new roads, new itineraries which will better connect different parts of the city, better maintenance of the streets, intelligent systems for public transportation.

When public authorities propose new areas for urban development, the documentation is based on traffic studies as well as on studies approaching the

environmental impact, social-economic context.

Mitigating and reducing the impacts contributed by many urban activities is a significant challenge for urban planners, designers, architects and the local industry, especially in the context of population and urban growth, and the associated infrastructure requirements. It is therefore important to encourage environmentally sound management of urban areas through more energy and resource efficient eco-design, infrastructure development, and construction practices. A similar scenario can be drawn for urban transportation.

Sustainable development includes some specific measures like urban regeneration and improvement of the importance of the natural resources.

Urban regeneration as a goal of the urban society could include: rehabilitation, modernization, renewal of the urban constructions, purifying the environment of the residential areas, a sustainable development of all these components, in view of satisfying the comfort demands of the population.

The concept of *cleaner production* is related to other sustainability concepts such as eco-efficiency; environmental sound technologies; life cycle assessment; green procurement and zero emissions. For cleaner production to succeed, senior management support, staff awareness and participation, and staff input is required.

Eco-efficiency generates more value through technology and process changes whilst reducing resource use and environmental impact throughout the product or service's life. Eco-efficiency applies to all business aspects, from purchasing and production to marketing and distribution.

The main aspects of eco-efficiency are:

-Reduction of energy, water and virgin material use

-Reduction of waste and pollution levels

-Extension of function and therefore product/service life

-Incorporation of life cycle principles

-Consideration of the usefulness and recyclables of products/services at the end of their useful life

-Increased service intensity.

A close dialogue between the public administration and researchers may help to reduce the vulnerability of Romanian municipalities to climate change by ensuring that resources are allocated on the basis of detailed knowledge instead of political trends. The impacts of climate change in our country will vary among regions and municipalities. The challenges must be met at the local level, and the municipalities are one of the key players in these efforts.

Most urban population in Romania is environmentally friendly and favorable to renewable energy.

It was created an instrument for local authorities, *The Covenant of Mayors*, founded in 2007 as part of the EU's energy and climate protection package. Through this instrument, local authorities are committed to go beyond the European Union's objectives for 2020 in terms of CO2 emissions and energy efficiency and to tackle climate change measures without further delay. The signatories also undertake to draw up a sustainable energy action plan, with civil society involved in its development, and to share experience and know-how with other territorial units.

A number of 11 Romanian towns (Aiud, Baia Mare, Brasov, Bucharest, Craiova, Giurgiu, Mizil, Ramnicu Valcea, Slobozia, Targoviste, and Targu Jiu) are signatories of Mayors' Covenant.

Quality of life is measured, evaluated and computed around the world from local level to the country level. Human satisfaction is one of the basic requirements which determine the quality of one's life.

Urban areas can not exist in isolation. They require inputs from, and waste assimilation functions of, other ecosystems. Ecological footprint analysis has shown that many cities require a productive land and sea area several times the city's size in order to support the population.

Cities have become the focal points of environment components as major consumers and distributors of goods and services.

Unhealthy urban ecosystems can lead to local and wider environmental degradation, social problems, economic decline, human health problems and further disconnection from nature.

However, many cities tend to be large consumers of goods and services, while draining resources out of external regions that they depend on. As a result of increasing consumption of resources, and growing dependencies on trade, the ecological impact of cities extends beyond their geographic locations.

There are considerable number of damaging practices and activities affecting urban biodiversity in Romania and the possibilities for reducing damage to biodiversity are large. The existence or absence of pollutants is related to the technology applied in different industrial branches, which proved to be inadequate in keeping the surrounding environment safe.

In Dambovita county it is more than evident the biodiversity damage because the Steel Factory emplacement and Oil equipment factory. The last one is emplaced in the center of Targoviste city. The question is how we can build a sustainable city surrounded these pollutants factors.

The first step is keeping the polluted vegetation at the best life parameters. That requires taking urgent actions in order to prevent or to stop its degradation processes. Another way to provide open space and control urban growth is to surround a large city with a greenbelt – an opera area used for recreation, sustainable forestry, or other non-destructive uses.
Another face of sustainable living is to help heal wounds we have inflicted on nature.

Luckily much of the environmental damage we cause is reversible. Forest can be replanted, topsoil can be replenished, streams can be cleaned up, and wetlands can be restored.
The most important aim for the research is the rehabilitation and restoration ecology devoted to renewing damaged areas and urban ecosystems.

The effects of these preoccupations are not enough for a significant improvement, on long term, in the inhabitants' life or the quality of the environment. Among the solutions meant to reduce the urban pollution the main one is to expand the green areas, the vegetation keeping the dust in the atmosphere, reducing the high temperature during the summer, offering the necessary humidity for the environment, shadow, improving the quality ofthe soil, protecting the wild birds and small mammals.

The term "green belt" tries to cover different ecological practices, meant to make the ecological function of the city more important. These refer to: urban forest, agricultural areas, parks, green spots, different trees, protected natural ecosystems, green houses, nurseries, the natural wet spots
Another important aim is the implementation of strategies for sustainable consumption and Zero Emissions.

Sustainable consumption targets everyone, across all sectors and all nations, from the individual to governments and multinational conglomerates.

Current unsustainable consumption patterns are destroying the environment; depleting stocks of natural resources; distributing resources in an inequitable manner; contributing to social problems such as poverty; and hampering sustainable development efforts. Focusing on the demand side, sustainable consumption compliments sustainable production practices and achievements.

Sustainable consumption requires a multidisciplinary and multinational approach. Teams composed from various disciplines are required to create and implement policies. Developed nations need to assist rather than exploit developing nations.

The Zero Emissions concept envisages all industrial inputs being used in final products or converted into value-added inputs for other industries or processes. In this way, industries are reorganized into clusters such that each industry's wastes / by-products are fully matched with the input requirements of another industry, and the integrated whole produces no waste of any kind. This technique is based on the well-established economic analysis tool known as the input/output approach.
From an environmental perspective, the elimination of waste represents the ultimate solution to pollution problems that threaten ecosystems at global, national and local levels.

2 Material and Methods

Changes in regional and local climatic conditions will influence ecosystems as well as man-made settlements and infrastructure. The expected shifts in temperature and precipitation patterns may result in the modification of vegetation periods and displacement of the borderline between forests and grassland. Extreme weather events (storms, floods, droughts) may appear more often and the related risks and damages may become more significant. Areas affected by dryness have increased over the last decades in Romania.

Environment quality indicators can represent an ideal approach to check, physical, chemical and biological condition and in addition to monitor changes incoming on the areas of particular interest.

A very important task is to development of suitable techniques in order to analyze problems related to polluting agents.

The concept of sustainable urban development is nowadays a new dimension of the urban design. It involves in an integrated way different levels of the society in the planning of the new urban areas in connection with the historical protected zones.

Urban sites are often harsh, characterized by many pressures and threats, from limited growing space to adverse climatic conditions and air pollution. This type of ecosystem focuses on urban green space comprising of tree stands as well as individual trees (Konijnendijk et al., 2006).

An important goal in coming decades should be to make urban areas more self-reliant, sustainable and enjoyable places to live. As the era of cheap oil and gasoline comes to a close over the next few decades, urban sprawl and car-culture cities are likely to become unaffordable and unsustainable luxuries. In ecologically sustainable cities people would walk or use a bicycle or tricycle for most short trips and walk or bike to bus, metro or trolley

stops for longer urban trips. Such ecologically healthy cities would be energy efficient, rely mostly on renewable energy resources, recycle or reuse almost everything, encourage rather than assault biodiversity, and use composting to grow food and to create rather than destroy soil.

Using the industrial ecology concept, industry interacts with nature and utilises the wastes and by products of other industries as inputs into its own processes. Industrial ecology ranges from purely industrial ecosystems to purely natural ecosystems with a range of hybrid industrial/natural ecosystems in between. Covering both industrial management and technology, industrial ecology encompasses other sustainability concepts and tools such as material flows analysis; environmentally sound technologies; design for disassembly; and dematerialisation.

The benefits of industrial ecology include: cost savings (materials purchasing, licensing fees, waste disposal fees, etc); improved environmental protection; income generation through selling waste or by products; enhanced corporate image; improved relations with other industries and organisations and market advantages. Limitations to industrial ecology include: no market for materials; lack of support from government and industry; reluctance of industry to invest in appropriate technology; perceived legal implications and reluctance to move to another supplier

Another way to provide open space and control urban growth is to surround a large city with a greenbelt – an opera area used for recreation, sustainable forestry, or other non-destructive uses.

Trees and plants adapted to the local climate and soils are planted throughout the ecocity to provide shade and beauty, to reduce pollution and noise and to supply habitats for wildlife. Such a sustainable and ecologically healthy city-called an ecocity or green city-creates far less pollution and waste than conventional cities.

Because land is such a valuable economic resource, land-use planning is a complex and controversial process involving competing values and intense power struggles. Most land use planning is based on the assumption that substantial future growth in population and economic development should be encouraged, regardless of the environmental and other consequences.

Living trees, shrubs, vines, groundcovers, annuals and perennials are usually the most important materials in landscaping. Their selection, placement and maintenance are the main criteria the layman uses to evaluate landscape work. It is extremely important, therefore, to select plants that will serve the function as dependably as possible. For every landscape need there are numerous plants to choose from.

There are some important considerations to make when deciding which shrubs and perennials to plant:
-Determine the amount of sun will receive. There are plants for every light situation except total darkness.
-Choose plants that have the same water requirements and match them to your soil conditions.
-Pick out the plants whose full mature size will be appropriate to the place where they are planted.
-Choose plants with foliage that is attractive for a longseason.
-Choose plants that display your favorite color scheme and choose a variety of plants that bloom each month from late February to November.

Plants that are naturally found growing beneath trees will be accustomed to receiving light much of which has already passed through the foliage of the trees. To cope they tend to rely heavily in the other pigments, using the wavelengths of light that have not already been absorbed.

Landscape design involves much more than placing trees, shrubs and other plants on the property. It is an art which deals with conscious arrangement or organization of outdoor space for human satisfaction and enjoyment. Some of its major goals include:
-Organizing and developing the site for maximum use and pleasure.
-Creating a visual relationship between the house and the site.
-Reducing landscape maintenance to a practical level.

Native plants are rightfully gaining a prominent place in the landscape. Although we have seen an increase in planting and preserving native plant species, we are still a long way from maximizing their potential. Often the native plants are more resistant to drought, insects and disease. If species are selected that are native to the immediate vicinity of the home building, there is an additional bonus of visually relating the new landscape to the natural environment.

Diverse temperatures, topography, soil, give every part of the area an unique character. We can develop more functional and attractive home landscapes by utilizing native plants.

Plants are basically used as specimens, in lines, in groups or in masses. Each method creates a different effect. Using plants as specimens is a good way to emphasize a character shrub or an unusually beautiful tree. Lines of trees, shrubs and other plants

can effectively carry the home's architectural lines into the landscape. Straight or curved lines of tree plantings can shade parking or play areas or serve as a windbreak. Grouping is a relatively natural way to use plants. Place several trees, shrubs, etc. fairly close together for a more massive effect. Since plants are often grouped naturally, this is a good method to relate your landscape to the natural environment. The mass is really just an extension of the group. In mass plantings, individual plants tend to lose identity. Mass plantings are especially useful in relating large buildings to the site since these plantings can be large enough to be in good scale.

Using plants as specimens is a good way to emphasize a character shrub or an unusually beautiful tree. If used sparingly, accent plants create interest and contrast. Too many specimens, however, result in visual chaos.

Using the ornamental plants in urban ecosystems: *Annuals* which come in all colors of the spectrum, provide brilliant temporary color and last for one or two seasons. You can plant them from seed. Use annuals to fill beds, borders or containers with color. *Perennials* continue to grow and produce blooms for many years to come without reseeding or replanting. Stream or pond sites, shady areas, dry spots, walls, sheds, borders and beds can all be improved with flower and foliage perennials which, if chosen with seasonal effect in mind, can provide features all year round.

One of the function of ornamental plants is to reflect some of the light, as most of these silver foliage plants originate from hot, sunny areas.

Colour in the hard-landscaping involves the colour of walls, furniture, paving and structures. In plants it is more complex as plants can have flowers and leaves in different colours, and colour changes with the seasons and with the light

One of the most important problems of a city is improving energy performance of buildings. Since it was adopted, the European strategy has been received with enthusiasm by local authorities, and now more European cities are starting to work on the insulation performance for public buildings, which significantly reduced consumption of heating and air conditioning.

Beside the use of RES that are environmental friendly, there are several energy sources that their use is less cost effective and less pollutant than the classic ones. Their exploitation is an initial stage.

Recent experience in Romania showed some important errors when the concept have been implemented, especially long delays because using conservative approaches regarding energy utilities and not taking into account possible innovative solutions with a higher degree of renewable participation.

Many of the global environmental problems that we are currently facing - climate change, biodiversity loss, desertification etc. - need at its core a campaign towards cleaner and greener energy that will stimulate action in other fronts in governance, education and technologies.

Inefficient energy management and use greatly affect air, water or land quality that ultimately impacts human health. Switching to a cleaner form of energy is in itself a significant multiplier for improving human health.

Three key issues will define the shape and future of energy in cities:

Sustainability - how much and at what rate is energy consumed, and its effect on long term sustainability; the quality and quantity of available alternative/renewable forms of energy; and the effect of existing energy use on the global environment as a whole.

Efficiency -the technology, planning and management of energy systems that will facilitate efficient use of energy for human activity.

Equity - the appropriate financial mechanism for research, development and use of finite and alternative energy forms, and their equitable distribution for all humankind.

3 Results

Urban ecosystems are dynamic ecosystems that have similar interactions and behaviours as natural ecosystems. Unlike natural ecosystems however, urban ecosystems are a hybrid of natural and man-made elements whose interactions are affected not only by the natural environment, but also culture, personal behaviour, politics, economics and social organisation.

Urban areas generally have few trees, shrubs, or other natural vegetation that absorb air pollutants, give off oxygen, help cool the air as water evaporates from their leaves, muffle noise, provide wildlife habitats, and give aesthetic pleasure. As one observer remarked “Most cities are places where they cut down the trees and then name the streets after them”. Cities also produce little of their own food. However, individuals can supplement their food supply by planting community gardens in unused lots and by using window-box and balcony planters and gardens or greenhouses built on the roofs of apartment buildings.

Urban areas act as population centers providing goods and services not only for its population, but

also for populations worldwide. Urban ecosystems can no longer be considered as a separate entity to the environment as they have direct and indirect impacts on the immediate and wider environments.

Cities as they are designed today are not self-sustaining. They survive only by importing food, water, energy, minerals, and other resources from nearby and distant farmlands, forests, mines and watersheds. They produce enormous quantities of wastes that can pollute air, water and land within and outside their boundaries.

Ecology deals mainly with interactions among organisms, population, communities, ecosystems, and the ecosphere. An organism is any form of life. The place where a population normally lives is known as its habitat. Populations of all the species occupying a particular place make up a community or biological community.

As environmental conditions have changed over billions of years, many species have become extinct and new ones have formed. The result of these changes is biological diversity or, biodiversity. It consist of the forms of life that can best survive the variety of conditions currently found on earth and includes genetic diversity, species diversity and ecological diversity. Ecological diversity is the variety of forest, grasslands, streams, lakes, oceans, and other biological communities that interact with one another and with their nonliving environments.

Since agriculture began about few thousand years ago, human activities have reduced Earth's forest cover by at least one third to about 34% of the world's land area. Forests give us lumber for housing, biomass for fuel wood, pulp for paper, medicines and many other products. Many forestlands are also used for mining, grazing livestock and, recreation.

The nonliving or a biotic component on an ecosystem is physical and chemical factors that influence living organism. Important physical factors affecting ecosystems are: sunlight and shade; average temperature and temperature range; average precipitation and timing; wind; latitude; altitude; nature of the soil; fire (land ecosystems); water currents (aquatic ecosystems); amount of suspended soil material (aquatic ecosystems).

The following are important chemical factors affecting ecosystems: supply of water and air in the soil (land ecosystems); supply of plant nutrient dissolved in soil moisture and in water; level of toxic substances dissolved in soil and in water; salinity of water; level of dissolved oxygen. An ecological principle related to the law of tolerance is the limiting factors principle: two much or too little of any a biotic factor can limit or prevent growth of a population even if all other factors are at or near the optimum range of tolerance. Such a factor is called *limiting factor*. Limiting factors in terrestrial ecosystems include temperature, water, and light and soil nutrients. For example, suppose a farmer plants corn in phosphorus-poor soil. Even if water, nitrogen, potassium, and other nutrients are at optimum levels, the corn will stop growing when it uses up the available phosphorus. Here, phosphorus determines how much corn will grow in the field. Growth can also be affected by too much of a biotic factor. For example, plants can be killed by too much water or too much fertilizer.

The urban ecosystem contains both individual and layered (nested) systems from three spheres: (a) the natural environment, (b) the built environment and (c) the socio-economic environment. In order to develop policies and programs that advance sustainable development and the equitable allocation of resources, each system within the urban ecosystem needs to be recognised as a living entity that constantly changes.

In order to limit the economic and social costs of climate change in Romania, the knowledge on impacts of climate change, vulnerability and adaptation will be increased The specific objective therefore is to incorporate climate change issues in education and research, and to increase the level of awareness and public participation of stakeholders in Romania on climate change issues.

In Dambovita County was registered an extension of green urban spaces from 194 ha in 2000 to 246, 2 ha in present, represent 3, 74 % from total surface of green urban spaces. In urban space the parks surface is 84, 44 ha and the total of green surface represent 330, 64 ha (5, 05% intravilan territory).Table 1, Table 2.

Regarding the education an action plan for education, training and public awareness on climate change issues will be developed. This will include the elaboration of specific training programmes and preparation of curricula on climate change for schools and universities, as well as elaboration of training and information materials.

Romania will benefit from all of the above actions to increase the capacity and knowledge of stakeholder groups within the field of climate change: An improved scientific basis for climate change policy and increased co-operation between the scientific community and policy makers will increase the efficiency and effectiveness of those policies.

Increased public awareness, education and public participation in decision making will facilitate the implementation of those measures that

require the active support of stakeholders in society.

Multidisciplinary in nature, urban ecosystem management requires a composite of social, environmental, economic and decision making tools and institutions that are flexible and can adapt quickly to changes in one or more systems.

The urban ecosystem approach encourages the alignment of cities to that of natural ecosystems where resources, process and products are used more effectively, creating less waste, requiring less input and viewing by-products as resources.

Table 1. The situation of green urban spaces in Dambovita County - Romania (ha)

City	Surface Intravil. (ha)	Green spaces (ha)	Park (ha)	Total green space (ha)
Târgovişte	1966	43	57,7	100,7
Pucioasa	422	6,02	3,74	9,76
Fieni	1831	122,4	0,5	122,9
Moreni	610	61,4	1	62,4
Găeşti	779,28	5,08	19	24,08
Titu	933	8,3	2,5	10,8
Total urban area	6541,28	246,2	84,44	330,64

Table 2. The situation of green urban spaces/capita in Dambovita County

City	Green space in intravil. (%)	Green sp/lcitizen. (mp/cit.)
Târgovişte	5,12	11,26
Pucioasa	2,31	6,41
Fieni	6,71	160,4
Moreni	10,23	29,8
Găeşti	3,09	15,48
Titu	1,15	10,56
Total urban area	5,05	20,79

The urban development, the urban green spaces and the public transportation system must be linked directly in the current context of climate change. We believe that currently only few cities have truly engaged into the sustainable urban development process and this concerns an increasing number of citizens' world wide.

The World Health Organization recommends that each city provide at least 26 square meters of green space per capita. Not many cities possess this minimum requirement. And yet most of these cities continue to diminish their existing green spaces in their urban development process. In most cases this turns cities into toxic living places and its inhabitants into sickness prone people. Thus the cities become the places that people want to escape from when possible, but we gradually see that nature is no longer an ideal place to escape to, as climate change affects everything.

The urban planning and architectural indices are selected to describe the building volume of the area and its development in relation to the road network.

These include: the building permit limit, the plot coverage percentage, the building system, the existence of green elements, etc.

4 Conclusion

Climate change is caused directly or indirectly by human activity that alters the composition of the global atmosphere and which is observed over comparable time periods in addition to natural climate variability.

In Romania, the impacts of climate change on agriculture, forestry, water management and human settlements are a growing concern.

Many of the environmental problems faced today (eg global warming, water and air pollution and inadequate access to safe drinking water) can be traced back to cities and lifestyle choices. With urban population levels expected to reach 60% in the next 30 years and the majority of urbanisation to occur in developing countries, urban environmental management is being increasingly important.

Our natural landscape gives us hints of types of architecture, color and culture that fit with the area. Bright red, orange and yellow are more visible in the full sun and blend with the local flavor. In older established neighborhoods, lighter colors work well where trees shade streets and houses, on the north side of buildings, against lots of dark green evergreens or large expanses of lawns.

There are some methods used in urban environment to arrange space so that people will find it useful, beautiful, meaningful and functional:

-Observing and analyzing the habits of the people who will be using the space, including their needs,

desires and how much space each of their activities requires.
-Studying past methods.
-Surveying available materials to solve design requirements.
-Analyzing the environment of the site including the view in and around the site. The ecology of the site should be carefully analyzed since it is an important design determinant.

Good landscape design can significantly improve the building's appearance by adding warmth, liveability and personality. It can also relate a building to its site and environment and give it the desired degree of dominance.

It is very important to use the colors in urban environment. Some rules regarding of this aspect are:
-To brighten shady areas use light-colored annuals such as white, pale yellow, and light pink. Dark colors tend to get "lost" in shady areas. You can still use deep colors in a shady area, but be sure to use lighter colors around or behind them to provide contrast so that they can stand out and be seen.

The above principle also applies to sitting areas that will be viewed in the evening. White flowers virtually glow in the twilight, while deeper colors become invisible in the fading light.
-For maximum effect, think about how the colors of plants will blend or contrast with their surroundings. For example, deep red flowers planted against a red brick wall or redwood fence will not stand out as well as white or pink flowers. And white flowers will not stand out dramatically against a white fence or white siding. Think of using a more dramatic color scheme, such as purple or magenta, against a white or light-color background, and something lighter, such as peach or pink against darker surfaces.
-Repeating the same colors in plant with different heights and textures can also create a unified look. If red is your theme color, for example, combine tall red hollyhocks, the spiky red flowers of bee balm, and a low-growing scarlet verbena. Do the same thing with your accent color, which might be white or lime green.
-Use color in a way that enhances the emotional effect of the garden. Bright colors such as red and golden yellow are exciting.

The Romanian landscape is characterized by a large biogeographically diversity, with natural resource which constitute a natural heritage able to assure a harmonious and sustainable development of the country now and in the future.

There is no independence in nature. Cultivation is not the only way people simplify ecosystems. Another problem with the simplified ecosystems and habitats we create is that they leak. Nutrients are quickly lost from monoculture crop fields, tree farms, cities and suburbs and most be replaced at great financial and environmental cost.

To support that we can implement the *green procurement* concept. Green procurement is the purchase of environmentally friendly products and services, the selection of contractors and the setting of environmental requirements in a contract.

Green" products or services utilise fewer resources, are designed to last longer and minimise their impact on the environment from cradle to grave. In addition, "green" products and services have less of an impact on human health and may have higher safety standards. Whilst some "green" products or services may have a greater upfront expense, they save money over the life of the product or service.

Before a green procurement program can be implemented, current purchasing practices and policies must be reviewed and assessed. A life cycle assessment of the environmental impacts of products or services is required and a set of environmental criteria against which purchase and contract decisions are made has to be developed. The outcome is a regularly reviewed green purchasing policy that is integrated into other organisational plans, programs, policies.

A green purchasing policy includes date-stamped priorities and targets, the assignment of responsibilities and accountability and a communication and promotion plan.

The promotion plan have to implement the value of green spaces in socially life:
- In all walks of life, green space draws people outside and fosters social contact.
- Provides open green spaces where people can congregate and opportunities for positive social interaction and supportive friendly environments.
- Studies have found that residents living near green common spaces "had more social activities and more visitors, knew more about their neighbors, reported their neighbors were more concerned with helping and supporting one another and had stronger feelings of belonging" (Environmental News Network).
- Green spaces promote safer neighborhoods. When residents have more vested interests in a place, their participation in community vigilance increases, and they will watch to make sure it's not being misused, damaged, etc.
- Natural areas promote livability and vitality of communities. Recreational opportunities, good air and water quality and scenic beauty will attract new residents, families and tourism.

- Green spaces will attract middle class residents to move into areas of the city that may be lower income without practicing gentrification.
- Green spaces attract businesses, create jobs and raise property value.

It also strengthens social bonds in places where those kinds of ties are so badly needed.

The National Strategy on Climate Change of Romania (NSCC) outlines Romania's policies in meeting the international obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol as well as Romania's national priorities in climate change.

National strategy for Romania's medium-term economic development" will be achieved by means of the building of the legal and institutional framework to facilitate and encourage the dialogue between authorities and the civil society concerning the strategy, policies, programmes and decisions related to environment and the social-economic development of the country.

We want to speak also in Romania about creation of the *green communities*. Green Communities are "sustainable communities": communities that integrate a healthy environment, a vibrant economy, and a high quality of life. Green Communities strive to:

- Comply with environmental regulations, reduce their consumption of natural resources and practice pollution prevention.
- Actively involve all citizens and incorporate local values into decision-making.
- Support locally-based businesses. Encourage walking, biking, and mass transit.
- Provide open space.

We also need to respect the principles for the sustainable development of cities:

- the necessity to preserve the Earth's capacity to support life and its diversity
- the respect of the Earth's natural resources' limits
- ensuring a high level of environment protection and improvement
- the prevention and reduction of environment pollution
- the promoting of sustainable production and sustainable consumption to exceed the border between economic growth and ecological degradation.

We need to take into the consideration some of the ecological benefits of urban green ecosystems:

- Green spaces can reduce noise pollution, by dense screens of trees and shrubs, and can even cleanse partially-treated wastewater.
- Green spaces and their inhabitants are a good indicator of overall ecological health of the ecosystem. This is an important measure in judging the ecological sustainability of the community.
- Vegetation has been shown to lower wall surface temperatures by 17'C, which led to a reduced air conditioner use by an average of 50% (McPherson, 1994).
- Plants have been shown to reduce the urban heat island effect, directly by shading heat absorbing surfaces, and indirectly through evapo transpirational (ET) cooling.

The development of an environmental education strategy is an important step in providing the leadership and the framework to point us all in the same direction.

Environmental education activities are already taking place within a wide range of sectors, for example, educational institutions, government departments, local authorities and non-governmental organizations. The diverse and extensive nature of these activities is a necessary response to specific needs and local circumstances.

Environmental education contributes to the communication of information and to the development of understanding, skills, attitudes and values that influence the behavior of individuals and communities

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