Permaculture and the sustainable city

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Preamble

In preparing for a seminar on *Permaculture and the Sustainable City* which was held at the Narwal, Wassenaar, the Netherlands, in July 1991, I used extensive sections of the book I had been presented with at the *Ecocity Conference* in Berkeley in March 1990 by Peter Berg, called A Green City Program for the San Francisco Bay Area and Beyond, written and edited by him, Beryl Magilavy and Seth Zuckermann. The text of this book arose out of a series of symposia on *Urban Sustainability in the San Francisco Bay Area*, held at Fort Mason Center, San Francisco, in the spring and summer of 1986. It was a collaborative effort of many groups and individuals and was first published in 1989. A revised edition came out in 1990 as part of an ongoing learning process.

My idea is to conclude this process, in using this material — not only the method but in many cases the framework of the formulations from the book. It is necessary, in my opinion, to develop the ideas and the concepts further, to bring them into the field of as permanent a system as the urban fabric will allow. Basing the sections of the seminar on similar sections — and their sequence — within this book, I aim at making them applicable to urban areas beyond that of the San Francisco Bay Area, as we need sustainability in all our old European cities, in the modern metropolises of Japan and Australasia, as well as in the huge conurbation areas of the "third" and "fourth" world.

I hope the authors of the book will be pleased with my additions and I wish to thank them again here for their clarity and for having made their contribution to this very important theme — sustainability — in a practical manner and in a way that everybody can understand, i.e. all the "actors" and affected people in urban areas.

Introduction

The term "Permaculture" defines a design method which abandons the linear sectoral organization of human support systems — such as: agriculture, energy and water management, architecture, urban planning, education, recreation, administration, etc. — in order to create linkages between the various elements needed for each specific task. Thus each element enhances the function of all others — similar to the way in which highly developed organisms work. The results are often stunning. Both in urban and rural ecological settings, permaculture examples demonstrate how the optimization of the overall "yield" saves work — i.e. time and energy — and creates beauty, flexibility and responsiveness. Applied on a larger scale, we could create abundance everywhere in the world. All we need is human intelligence, courage and insight.

Permaculture is a way of thinking to create an abundant future. By conscious design we can reverse desertification, make agriculture ecologically sound, reforest the planet and restore community life in urban areas. Everyone's contribution is vital. One can train in permaculture design, starting with this course, continue for a week at some time later; one can then employ permaculture design to make one's green dreams a reality. Permaculture is a design system for creating productive, diverse agriculture, sustainable cities and architecture which are essential to support stable life on this planet. It is based on the observation of nature and traditional farming and building systems.

Urban planting

The way things are now

Cities are more than often monotonous carpets of concrete and buildings. Urban buildings can be architectural marvels. But the city will look inaccessible and drab if there are few trees, parks or little natural landscaping to relieve an endless march of office buildings, shops and banks. This is not a necessity: tree-lined avenues and streets and a fair percentage of space as wild-life corridors are possible.

Yet the urban landscape in Europe has been increasingly defoliated over the past few decades. Large tracts of forest and grassland have been paved and built upon; street trees have fallen victim to neglect in the aftermath of budget cuts and street widening programs. Trees that

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have died of old age have not always been replaced.

These ecological insults and these areas of ugliness are not a necessary part of urban development: they are easily avoided or redressed.

What do we mean by urban planting?

By urban planting, I mean the restoration, creation and maintenance of plant life in and around cities. This includes parks, strips between dual carriageways, sidewalks and rooftops, public and private gardens, vacant and industrially used lots. It includes shade and fruit trees, vegetable patches, grasslands and scrub, mass transit embankments and river banks.

Sound urban planting practice includes a significant proportion of native vegetation, because natives require less maintenance and water than exotic counterparts, and provide places for native birds and animals to live.

What benefits can cities reap from urban planting?

The answer is:

• More livable settings: Cities typically devote almost all of their land to buildings and streets. That is an impoverishing choice — aesthetically, physically and spiritually. Trees, bushes and grasslands are beautiful, and can complement the beauty of the buildings. They can relieve the bareness of the concrete and asphalt that cover much of the city. They provide shade when it is hot and shelter from winter storms. Finally, people feel better in a setting that includes the natural as well as the manufactured. So, more livable cities.

 Improved drainage: Properly planted land absorbs the rain that falls on it, eliminating excessive runoff that now requires drainage with expensive storm sewers that often overflow and flood.

• Closer-knit communities: Sidewalk planting projects present an opportunity for residents to work together on bettering their immediate environment. Unified neighborhoods are less vulnerable to crime, litter and other problems of urban blight.

What can cities do to promote urban planting?

Cities can do a great deal. They can, for example,

• Repeal decisions and procedures that stand in the way of the greening of cities — e.g. those that impede the planting of street trees and sidewalk strips — and codes that discourage or prohibit the planting of native species or of fruit trees in appropriate locations.

• Establish a consortium of several municipal and private groups dealing with urban planting to coordinate their efforts.

• Provide technical assistance and advice on tree care to residents who want to plant trees on their streets (e.g. jackhammers and operators to break up concrete sidewalks) or climbing plants for greening the facades of their buildings, and offer saplings and appropriate tools to such groups.

Make available some city park land for citizen planting and gardening and/or for permaculture parks; plant fruit trees in parks and maintain them as public orchards.

• Investigate the use of the unemployed as a labor force for planting median strips, sidewalk strips, etc., being careful not to use them as a substitute for neighborhood involvement. • Assist in the establishment of local composting centers to collect kitchen scraps and plant trimmings from those who do not want them for their own compost. Make the compost available to parks and gardens in the city.

Longer-term visions for municipal action

Municipal authorities could — and should — develop longer-term visions and also express them in concrete action on a variety of grounds. For example:

Offer, sponsor and subsidize classes in urban gardening and permaculture and publish or fund a city directory of urban gardens and gardeners and permaculture groups.
 Require developers to set aside a certain percentage of the area of their developments as plantable space, in sunny yards, on rooftops and balconies — to aim at replacing the space covered over by the buildings.

• Encourage the growth of local commons, either by offering incentives to landlords to donate or grant long-term leases on plantable vacant lots, or by acquiring land and making it available to local residents (e.g. community control over "vest pocket" parks).

• Encourage urban wild corridors, i.e. green belts which would ensure habitat for wild plants and animals. This suggestion can be balanced with preservation and restoration of wild places within and immediately surrounding cities.

Humane movement within cities

The way it is now

The transport systems of most large cities are under serious stress. Traffic jams are endemic to our urban and interurban roads and motorways and affect ever larger regions for increasing portions of the day.

Not only is it becoming difficult to get anywhere by car, but the neighborhood character of cities is being destroyed in the process. Busy, trafficked streets are inhospitable to pedestrians and to business that requires foot-traffic to draw customers.

With better transport, getting where we need to go will be more congenial, and the current systems' negative effects — pollution noise and land waste — will be reduced.

What do we mean by humane movement?

Humane movement means seeking appropriate, ecologically sound solutions to people's transport needs, instead of trying to solve them with more asphalt and single-occupancy combustion-engined vehicles.

It means using a combination of techniques — such as self-propelled transit (foot and bicycle), solar vehicles, solar filling stations, urban mass-transit networks, ridesharing and proximity (working and playing near home) — to eliminate the role of the automobile as far as possible.

It means giving preference to techniques such as cycling and walking that promote human-scale interactions and avoid air or noise pollution.

What benefits can cities gain from humane movement?

Cities may definitely benefit a lot in terms of really important issues. For example:

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• More workable settings: Decreased use of automobiles in favor of more attractive alternatives means less noise, cleaner air and unclogged roads. It means less disruption of neighborhoods that now are bisected by streams of arterial traffic. More walking and cycling makes for more face-to-face interaction between people and for fewer traffic injuries and is healthier for the body. So, more workable cities.

• Decreased dependence on imported energy: Presentday motor vehicles consume a large fraction of the fossil fuels used in cities and leave us vulnerable to price hikes and petrol shortages. Humane movement makes use of fuel-thrifty techniques that reduce those dangers, at the start. The aim must be to achieve self-reliance through the use of fuel made from locally available biomass, garden and farm wastes, etc., and/or photo-voltaic energy for electric vehicles.

• Reduced municipal expenditures: Decreased traffic cuts road maintenance costs, damage from accidents and municipal fuel charges. New developments that incorporate humane movement principles can slash infrastructure costs by narrowing roads, allowing tram lanes, for instance. Less land is used for streets and related services, freeing the land for people walking, for parks and urban planting. The cheapest and most energy efficient way of moving from one place to another is walking, then bicycling, then tram, urban boat service, bus, underground railway, and (way up the line) the singleoccupied combustion-engined vehicle.

What can cities do to promote humane movement?

Suggestions answering this question could include:

• Levy a local petrol tax, higher parking fees and/or a car tax to help fund public transit, compensating for nowaday subsidies for auto transit (e.g. road construction and maintenance).

Create auto-free pedestrian areas not only in dense shopping sections of towns but also in predominate dwelling areas elsewhere to encourage foot and bicycle traffic, to reduce noise and prevent congestion. Where necessary, allow access by commercial vehicles at restricted hours.

 Allow bikes on trains, trams and buses to facilitate the bike-to-mass-transit connection and reduce the need for parking and shuttles at transit stations.

• Adopt mixed-use zoning policies to enable dwellings, workplaces and places of entertainment to be near each other for access by proximity instead of by car. Discourage housing-only subdivisions, commuter suburbs and urban sprawl.

• For a start, promote services such as car- and vanpooling, which require low capital investment and offer high flexibility.

 Greatly expand facilities for cyclists, such as racks, lanes and offstreet paths.

Coordinate local transit scheduling with that of surrounding transit districts, for better transfers and connections between systems.

Longer-term visions for municipal action

Municipalities may:

 Require developers to shoulder some of the transport costs generated by their development. For example, allow no housing or industrial development without a mass transit connection.

• Reduce the width of all inner urban streets and their maximum speed limits to 30 km per hr — to make the streets more hospitable to pedestrians and cyclists.

• Design some streets to include cul-de-sac connections for bike paths, thus making the bicycle a swifter vehicle than the car in many instances.

Speed traffic trips by giving transit separate rights of way and the ability to pre-empt traffic signals and offer limited stops and express services on major routes.
Change approach to land use planning. Patterns of settlements in which people live near where they work and play can reduce the need for transport services.

Renewable energy in cities

The way things are now

At present, cities depend heavily on energy sources oil, coal, nuclear power — that pollute the air and water and are generally projected to become scarcer, more expensive and more dangerous. In addition, fossil-fuel use exposes cities to possibilities of energy cut-offs caused by accident, sabotage, natural disaster, and geopolitical conflicts many thousands of miles away.

The vulnerabilities are easily reduced by using energy more efficiently and by shifting to decentralized renewable energy sources such as solar power, hydropower, wave, wood and wind energy.

What do we mean by renewable energy?

Fossil fuels such as oil and gas come from finite reserves created by the decay of plants over millions of years, which cannot be regenerated on a human time-scale.

In contrast, renewable energy sources come from natural flows in the environment, such as sunlight and falling water. If permaculture designers take into account fluctuations in weather and climate, these flows are consistent and dependable enough to serve as reliable energy sources.

Coupled with improvements in the efficiency of all energy use, renewable sources can supply all of a city's energy needs — with our present technologies.

What benefits can cities gain from renewable energy?

Renewable forms of energy imply, by their nature, many environmental and economic benefits. Let us mention some of the most obvious of these benefits.

• Reduced pollution: Renewable energy technology produces much less pollution than do conventional sources. Air, water and land will be healthier than they are now for generations to come.

• Lower energy costs: The first prerequisite for smart energy use is improving the efficiency with which we use energy. Conservation costs a fraction of the price of a kilowatt-hour or liter of petrol. The next cheapest energy strategy is conversion to renewable sources: these sometimes cost more to build than other technologies, but they cost much less to run because they are "fuel free." Once devices powered with renewable energy are built, they are protected from inflation, shortages and cut-offs.

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• Improved base of local jobs: Money spent on oil leaves the city and enriches people in faraway places like Texas and the Middle East. With renewables and energy efficiency, much of the work takes place in the communities or regions where the energy is to be used, so money spent on energy keeps circulating in the area, creating more jobs through a "multiplier effect." For example, the people who build your solar greenhouse spend their wages at local restaurants, barbershops and grocery stores.

What can cities do to promote renewable energy?

The answer could be threefold — as in the case of any other general issue of this importance (fig. 1):

• Help people find out what works, and particularly:

• Set an example of smart energy use by demonstrating applications of energy efficiency and renewable energy in municipal buildings, such as libraries, schools and firehouses;

Sponsor energy education programs, displays on renewable energy, and the distribution of information by either city staff or city-funded community groups;
Make vigorous efforts to reach low-income households (e.g. the Global Action Plan — GAP) and finance their insulation and weatherizing programs.

• Remove existing barriers, and more specifically:

 Pass resolutions that homes and apartments are required to weatherize and insulate when sold, re-rented or by a certain deadline;

 Find out if and how building codes impede the use of solar and other renewable energy sources. Revise restrictions for renewables when appropriate and streamline other application requirements in the case of greenhouses and other passive solar proposals.

And, finally,

Develop longer-term visions for municipal action, for example:

• Encourage the installation of utility meters that are more useful to the general public, showing the cost of energy in the local currency as well as the raw consumption data;

 Consider the energy potential of municipal discards, including the conversion of sewage to methane gas, provided that environmental quality and recycling options are not compromised;

• Collect garden and park clippings for processing into liquid or gaseous fuels such as alcohol and methane. Provide for separate pickup of this plant material. Cycle leftover grocery foodstuffs into composting and fertilizer operations.

Urban wildlife habitat

The way it is now

Cities, with their millions of human inhabitants, are obviously dominated by an artificial environment.

But just as people enjoy bringing domesticated animals into their lives, so city dwellers would benefit from the integration of wildlife and wild habitat into the urban environment.

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Fig.1: A typical exercise-procedure for cities to promote Issues favoring sustainable development.

It will counteract the overwhelmingly human-controlled flavor of the city and make our surroundings a healthier, more balanced and appealing place to live — for all living creatures.

What do we mean by urban wildlife habitat?

Urban wildlife habitat is a place for untamed animals to live within and around the metropolis.

It includes parks, marshes, lagoons, estuaries, and streams where mice, eagles, squirrels, deer and even foxes might live. It can include also less obvious homes such as falcon nests on the ledges of highrise buildings.

It requires not only physical room for animals to live and roam but also freedom from harassment and enough territory to support the rest of the food chain that the animals depend on.

What benefits can cities gain from urban wildlife habitat?

Improved quality of life: The existence of wild animals and their habitats nearby takes that enhancement of pets for urban dwellers one step further, adding a deeper understanding of humanity's place in the web of life. Wild habitat makes undomesticated animals a visible — not just a storybook — reality, especially for children.

• An indicator of ecological health: The vigor and robustness of these native animals and plants indicate how clean the air and water are, and can help us assess the health and life-supporting capacity of the entire urban ecosystem.

• An awareness of the natural cycles of the life-place: By having wildlife close at hand, city dwellers can see how other species respond to the changing seasons, bringing them close to the natural systems of which they are a part.

• Nearby opportunities for sightseeing and outdoor activities: A rich cosmopolitan environment with the presence of wildlife will be even more attractive to visitors than it already is. It will save all the trips for such activities which nowadays make up as much as 50 percent of car usage by families.

What can cities do to promote urban wildlife habitat?

The answer is obviously multiple. Cities could:

 Restrain the release of toxic chemicals that risk poisoning urban plants and animals.

• Require development to stay a certain minimum distance (setback) from streambanks and marshlands, in order to preserve the unique habitat that occurs where water meets land;

• Protect and restore wildlife habitat where possible within city limits. Such set-asides should be minimum requirements for any developments that are approved by the planning authorities.

• Establish mechanisms to fund the maintenance of existing urban wildlife habitat and the creation of new wild places — e.g. tax reductions or prize bonds.

• Educate citizens on a local level about the wild plants and animals in their immediate area. Encourage teachers to develop courses in local biology and ecology beginning with first grade in primary school.

Longer-term visions for municipal action

In the field of urban wildlife habitat, municipalities need longer-term vision to guide their action. They could, for example:

• Establish corridors of wilderness linking regions of wild habitat, so that territories for specific animals can be large enough to support viable, self-sustaining populations. Or,

• Bring rivers and streams above ground from the storm drains where they have been confined by primitive methods of flood control. Such streams could constitute the wild corridors mentioned and could be managed to become healthy riparian habitats which help control floods naturally by absorbing overflow.

Sustainable planning and permaculture

The way it is now

Development in most metropolitan regions has not taken into account the natural carrying capacity of the land — how many people it can support over the long term in a sustainable manner — and in what patterns of settlement.

As a result problems have arisen, such as the conversion of vast tracts of productive agricultural land into low-density suburbs and the consequent importation of food from progressively greater distances, congestion of transport arteries with attendant inconvenience and effects on air quality, redevelopment and gentrification of neighborhoods whose former character was an integral component of the diversity of cultures in the area.

Sustainable planning can focus on these prospective problems before they arise, or conceive of ways to reduce their impact once they do.

What do we mean by sustainable planning?

Sustainable planning refers both to the process of planning and its focus. Good planning examines the overall, cumulative effects of proposed changes in land use, and judges them in the context of the region's natural features such as climate, watercourses, seismic history and animal and plant life cycles. In addition, sustainable planning considers the connections between these aspects in a holistic manner.

It aims at self-reliance for the region or the city involved, with emphasis on decentralization and multifunctionality.

Sustainable planning is also developed at the grassroots level with active citizen participation in setting the agenda and proposing policies.

What benefits can cities reap from sustainable planning?

Cities can benefit in many ways. For example, in terms of: • Livability on a long-term basis: The prosperity of the region is rooted in the health of the ecosystems that support it — the land, the air and the water. Sustainable planning considers proposed development with a view to re-establishing, preserving and improving these systems. What does paving large tracts of a valley do to its micro-climate? What health effects (on humans and animals) stem from the use of pesticides in an urban park? Unless these questions are on the agenda, they are sure to be disregarded.

• Reduced food costs: While short-term economies may be realized through chemical farming and wetland filling, in the long run these strategies will prove expensive if water must be purified before it can run into the sea, if farm productivity drops because the soil is used up — or if the organisms low on the food chain are crowded out and cannot support valuable species such as crab or seals.

• Improved community participation: Just as neighborhood level action involves people in setting the destiny of their own neighborhoods and thus gives them more of a sense of ownership and responsibility for their immediate surroundings, sustainable planning involves people in the choices that determine the ecological functioning of their regions and thus brings home the effect of people's actions on the environment.

What can cities do to promote sustainable planning?

The spectrum of cities' initiatives is quite wide. Cities, for example, could:

• Establish a staff to serve as sustainable planning advocates. They would be there to counterbalance powerful monied interests that exert pressure on the planning process. They would help the public find out about the planning process and make its voice heard.

• Actively solicit neighborhoods' visions of their futures through vision quest methods, preference polls and wellpublicized, on-going meetings with simulation games, etc. Elicit people's thoughts on what constitutes appropriate density and carrying capacity for their neighborhood: How many parks? What proportion of open to retail to residential space?

Prohibit the conversion of valuable agricultural land into housing suburbs especially if they require a high investment in roads and city services and increase dependency on the car. Promote instead proximity policies that encourage people to live near their workplaces or

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PERMAKULTUR INSTITUT E.V.

THE GLOBAL ACTION PLAN



Joining a "Household EcoTeam" will give you support for getting your life in balance with the Earth

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Fig. 2: Permaculture - a Global Action Plan. (Source: Permaculture Institute of Europe).

within walking distance of a transit stop.

Illustrate and celebrate the community's ideals about livability by underwriting the construction of exemplary and unique buildings and public spaces. Develop a guide to instances in which planning for livability has succeeded.

• Raise citizen awareness of elements, techniques and importance of sustainable practices, using a variety of media in order to reach a broad cross-section of the population — as in the case of the Global Action Plan (fig. 2). Include such points as the benefits of moderate-density living, the relationship between city and country, and the need for open space and wildlife habitat within urban areas.

Long-term visions for municipal action

Municipalities could:

• Emphasize a long-term, regional perspective in city planning. Develop information about potential effects on the entire region, not just on the area within a city's jurisdiction. Base it on the concept of bio-regions. Use that information in planning decisions. Examine the cumulative impact of development schemes, not just the incremental change resulting from each one.

Identify "sacred places" — ranging from parks to historic buildings to cafés and teenager hangouts that may not be removed or disturbed.

 Use city money to buy, move, demolish or refurbish buildings that are located in ecologically sensitive or

Ekistics 348, May/June 1991 349, July/August 1991 valuable areas — e.g. along waterfronts, streams or hilltops — and are near the end of their useful lives. Adopt "Statutes of Responsibility" that delineate the obligations of officials and agencies to preserve the health of the city and its inhabitants and to make it as selfreliant as possible, and that require developers to bear costs generated by their development and currently paid by the public. These range from water and sewer use to air pollution and encroachment on open space.

All these proposals can be advanced through appropriate zoning policies and should be considered in light of their impact on the health of the entire bio-region and on planet earth.

Note

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In developing this course outline and expanding on it during the three-day seminar on *Permaculture and the Sustainable City* held at the Narwal, Wassenaar, the Netherlands, the author was inspired heavily by three books:

- 1. Bill Mollison (1988), *Permaculture: A Designer's Manual* (Tagari, Tyalgum, Australia).
- 2. Peter Berg, Beryl Magilavy and Seth Zuckermann (1990), *A Green City Program for the San Francisco Bay Area and Beyond* (Planet Drum Books, P.O. Box 31251, San Francisco, CA 94131, USA).
- David Gershon and Robert Gilman (1991), Household Ecoteam Workbook: A Six-Month Program to Bring Your Household into Environmental Balance, a Program of Global Action Plan for the Earth (GAP), 57a, Krumville Road, Olivebridge, New York 12461, USA (Telephone: int + 1 914 657 -8081, Fax - 8044).