Proceedings of the Sixth International Permaculture Conference
September-October 1996, Perth, Western Australia

Eco-village (Re)Structuring

Declan Kennedy and Margrit Kennedy (Germany)

[Submitted Paper]

The *initial approach* and objective of our study was to unearth practical experiences gained both in the planning phases and in the architectural implementation of medium-and larger-scale eco-villages and urban renewal projects and to ascertain whether general recommendations could be derived from these experiences for the future implementation of such projects. Here I present the findings of our study, focussing on several important issues. We would like to look at village (re)structuring in a holistic context, and to trace development curves which have defined ecological architecture since its emergence in the early seventies.

Optimisation of the whole

In practice, the concept of the "eco-village" is a multi-faceted one, encompassing the qualitative improvement of open spaces, traffic limitation, new social relationships and forms of organisation, strategies of energy and water efficiency, building biology criteria, the recyclability of building materials, aesthetic qualities and new cost/benefit analyses. What unites all of these aspects, however, is that they strive for, and to varying degrees attain, *an optimisation of the whole*, rather than a maximisation of individual parts – a permaculture principle – and thus a new quality of housing, and indeed of life itself.

The projects examined here differ considerably in their objectives, approaches and the individual circumstances in which they came about. But together they show that where there's a will, there's a way to make concepts for urban renewal and eco-village projects a reality. This study is aimed at indicating to people wishing to construct ecologically – be they decision-makers, initiators, people involved in building or restructuring, planners, architects or the future residents – what is possible and what is of real importance by comparing various solutions.

The outcome of the study is the following *findings*, namely that:

- ecological strategies are particularly feasible in the planning of larger-scale settlements that go far beyond the scope of measures that are feasible for a single-family dwelling,
- many basic principles of traditional architecture and urban design, such as regional architecture, are ecologically beneficial and easily incorporated into planning,
- new eco-village and urban renewal projects do not have to make building more expensive; quite the contrary, that they are often the most cost-efficient solutions, both financially and in terms of the wider economy,
- nonetheless, planning processes from start to finish still require considerably more time and energy and this is generally not appropriately remunerated,
- public funding plays a crucial role where large-scale projects are concerned
- holistic approaches are generally more successful than projects focussing on a one-sided optimisation of individual ecological aims,
- good results can be achieved with a moderate application of new technologies and with new techniques, if the planning process is appropriately designed,
- the commitment, courage and persistence of everyone involved are just as necessary as a carefully worked-out, clear strategy,
- successful implementation is a social skill,
- occupant input options are desirable within a clearly defined framework,
- an international exchange of experience can be a big help in successfully overcoming difficulties in the implementation phase.

These practical experiences, in combination with other models which have been built, can yield specific recommendations for priority areas in the planning and implementation of future eco-village design projects, although it is quite clear that at the moment, almost no other field of architecture is changing as quickly as "ecological architecture". Nearly every day, new technologies and ways of saving energy, water or materials are developed. Naturally, a talk like this one can do no more than convey the state of the art at a given period in time. Nonetheless, certain trends for future development do emerge from the brief history of "conscious" ecological architecture which roughly spans the past twenty years.

The rise in efficiency and sufficiency

Our forefathers constructed ecologically mainly because they had no other choice. Their buildings reflect the building materials available to them from the nearby area, which could be integrated back into nature without difficulty after use. Supply and disposal structures were on a human scale and organised in a way that individuals could comprehend. These are two reasons why traditions of regional architecture can hold some important lessons for contemporary ecological designs.

With the rise of industrialisation, it became possible to create chemical and synthetic building materials and construction methods which, while they had clear advantages from the standpoint of durability and cost efficiency, were generally not so easily integrated back into nature.

Hand in hand with urban expansion and the growth of the transport system came the development of large-scale linear and centralised supply and disposal systems which created a widening gap between producer and consumer, between cause and effect. The expansion of the drinking water system, for instance, and above all the sewage system, brought with it not only a decrease in the danger of epidemics and the elimination of a source of highly offensive olfactory pollution, but also a diminished awareness of water as a life element and of the impact of the individual's way of dealing with it. The same is true of the energy and food supply, and of refuse and wastewater disposal.

Over a relatively short period of a few decades in the nineteenth century, the vital processes of life in the city became completely invisible and were removed from the control and day-to-day responsibility of the individual. Public authorities and supply companies determine, procure and control who gets how much at what price.

This loss of an understanding of correlations results in growing quantities of refuse and wastewater, rocketing disposal costs and, not least, makes it increasingly difficult to find suitable locations to build disposal and waste industry plants. These are just some of the symptoms of an underlying crisis of material cycles at the core of industrialised society, which we seem prepared to accept, almost as a matter of course, as the downside of our prosperity.

One of the things industrial progress initially had to offer was a breathtaking rise in the standard of comfort. Thus, for instance, the average citizen of the world's highly-industrialised countries now enjoys a greater level of comfort than a king or emperor did just a few centuries ago, based on a comparison of the technical furnishings in their dwellings, their mobility or the range of food available to them, and no end to this development is in sight. The key question, though, is whether we can maintain this standard of living while solving the problems it presently causes, like resource consumption and the destruction of nature, or whether we have to accept that these problems can only be solved at the price of a significant drop in our high standard of living.

We could reduce our current rate of consumption to one quarter of its present level (Weizäcker-93), if we were to use the resources at our disposal more economically and efficiently, and were prepared to change our production processes and consumer habits.

The flow of materials in the rich countries could be cut back far more, to one-tenth of its present level (Friedrich Schmidt-Bleek-94). This be done not "only" by producing goods more efficiently, but above all by defining the services that they are intended to provide and then comparing the various options, including all of the material flows they involve, as well as their "environmental rucksacks". This requires a new way of thinking. Resource efficiency can be increased to seven times its present level using the example of a refrigerator which once it has been installed

in a kitchen, lasts for one hundred years, instead of needing to be replaced every ten. And thinking in terms of services can be "dematerialised" even more, if we can do without building. If, for example, we were to bring in outpatient care services instead of building a new hospital, resource efficiency could be increased to one thousand times its current level, and at the same time we would be making a number of contributions to social well-being; ie. by creating new jobs, keeping patients in their home environment, reducing traffic and cutting costs to patients. This concept envisages as a matter of course that technically feasible resource productivity would have to be supplemented by "an increasingly unquestioning frugality in people's way of dealing with material things" (Schmidt-Bleek-94, 171).

The building sector, which currently consumes material at a rate of 20 tons per person per year in Germany alone, would naturally be a prime candidate for the new processes, technologies and altered consumption behaviour of the kind described above.

Overcoming the divide between nature and technology

In the wake of the Club of Rome's publication of its report on "The Limits of Growth" in 1972, and the first oil shock in 1973, many highly-industrialised countries began *rethinking* their building priorities. It would be fair to describe the decade from 1975 to 1985 as the "pioneering phase of ecological architecture", and the decade from 1985 to 1995 as the "testing phase". Since 1995, Europe has been in the early stages of the "application phase". All three phases have existed parallel to one another to varying degrees and embody problems and opportunities of their own.

The pioneering phase *contrasted drastically* to the approach that characterised the era of industrial expansion which followed on the heels of the second World War, epitomised in the concrete jungles of the 60s, 70s and 80s in their remoteness from nature and their wasteful consumption of resources. The pioneering phase was hostile to technology in many ways. This was the period when permaculture was originally conceived.

The motto of the ecological architecture of the time was "back to nature", to small-scale, interlinked, self-sufficient and decentralised systems. Bengt Warne built his celebrated "Nature House" near Stockholm, an inspiration for all who came to admire it, from Armory and Hunter Lovins to Martin Küenzeln and the Oekotop Group, the avant-garde of American and German thinkers in this field. Rudolf Doernach advocated "*bio*versity" to replace the "*uni*versity". In Austria, Bernd Lötsch and Konrad Lorenz published a manifesto on "recreating semi-wild states", which were intended to replace sterile children's playgrounds, and did so in some places (Roland Rainer in Puchenau, Linz, Austria).

In Australia, David Holmgren and Bill Mollison published their books "Permaculture One and Two", which became bestsellers overnight, leaving a string of permaculture projects in their wake, from Hobart in Tasmania to Crystal Waters in Queensland, and enriching the green movement in North and South America, Africa and Asia, Europe, particularly in the Eastern Block countries (after the changes), and even making themselves felt in our own project: Lebensgarten, Steyerberg, in the German state of Lower Saxony (Kennedy-82,-88).

In North America, the "Rocky Mountain Institute" and the "New Alchemists" worked on models for a sustainable way of life and of work, as did the "Centre for Alternative Technology" in Wales and the "Langenbruck Eco-centre" in Switzerland.

This initial phase was characterised on one hand by endless difficult planning, permission and building processes, and on the other, by an irrepressible enthusiasm and a sense of breaking new ground shared by advocates of alternative lifestyles. It was also defined by a deeply-rooted distrust of the political and economic establishment and the established sciences.

The pioneers who built the first ecological buildings and small settlements had to weigh up every aspect from the standpoint of whether conventional supply and disposal system solutions were optimal in terms of resource consumption and had to prove time and time again that there were less wasteful alternatives. But they were also faced with the challenge of fulfilling increasing demands on the planning process and of developing new technologies. As was to be expected, they only succeeded in negotiating these difficulties in some cases, and produced a number of plans which failed, providing the opponents of change with abundant ammunition for criticism and condemnation.

If in the pioneering phase people had still thought in terms of blatant opposites – the conventional large-scale centralised supply and disposal systems on one hand and the ecological small-scale decentralised supply and waste disposal systems on the other – it would have become clear during the "*testing phase of ecological architecture*", which occurred roughly between 1985 and 1995, that considerably more differentiated planning approaches were involved.

As it is still impossible to replace existing large-scale centralised systems with decentralised systems in the time available to us, the aim now was supplementary or parallel use, as well as combination options and composite systems. Thus, in contrast to the pioneering phase, the testing phase from 1985-1995 was characterised by a step-by-step convergence of centralised and decentralised systems, and the integration of low-tech and high-tech, of nature and technology.

By now it had also come to light that decentralised systems designed for *single-family dwellings* alone were expensive and difficult to implement. Instead of proposing smallest-scale decentralised systems as the alternative to large-scale centralised systems, planners increasingly opted for solutions somewhere in between, that serviced an entire settlement. In other words, one spoke increasingly of "medium-sized" supply and disposal systems, or rather expanded the term "decentralised" to a new scale. These medium-sized systems include the various nature-based wastewater treatment systems which collect wastewater from an eco-village, extract the resources it contains and purify the water before returning it to the natural water cycle, as well as cogeneration facilities or large-scale solar hot water storage tanks which supply an entire residential area with heat.

Self-contained cycles, which could still be contrasted to *linear systems* relatively straightforwardly in the 80s, had now become considerably more complex, and used technical symbols with the same matter-of-factness as they accepted an optimal *combination of outside and self-generated services*.

Since the mid-1990s, one can safely speak of the "application phase" of ecological architecture. Many fundamental problems have been solved technically or organisationally, others by new legal regulations, and still others can now be circumvented without incurring too high extra costs. The solutions to these problems include improved building insulation, rainwater seepage, low-flush toilets and water-saving fixtures, planting measures, limited traffic zones, waste separation and prevention and to a certain extent the use of pollutant-free building materials. Nowadays, very little can be marketed without the prefix "eco" or "organic", be it washing powder, cars or buildings. And as always, when a movement gains in size, it loses its contours. Different experts within the same discipline are likely to have very different definitions of what "constructing ecologically" currently entails. This is reflected in the fact that strict demarcation lines are often drawn between aspects focussed on by different architects within the field of ecological architecture. Advocates of "cost- and space-efficient" building can be the most vocal critics of "green solar architecture", and experts in "recycling-conscious building" do not necessarily go along with the "building biology" approach.

"Green solar architecture" has long since established itself in the area of administrative buildings – particularly bank buildings – of superior quality, extolling the integration of nature and technology (Foster's Commerzbank building in Frankfurt is temporarily the latest epitomy of this trend), while "cost- and space-efficient building" will have to keep producing increasingly economical solutions in the public housing sector for a long time to come. As always, architecture is a perfect reflection of the money and power relations of its era (Kennedy-91).

There is a good reason why this talk examines the building materials and construction systems characteristic of three different trends: reducing resource consumption, recycling-consciousness, and healthy buildings, without being able to compare these three with one another. The reason is that the integration of these three areas is a new field for the pioneers. There is still a great deal of research and testing to be done here, in connection with the issues of energy-efficiency and ventilation, among others. Thus, the pioneering and testing phases continue on, parallel to the application phase.

If, until the mid-90s, planners were satisfied with achieving an optimal combination of outside and self-generated supply and disposal with water, energy and the necessary materials, current innovation aims higher still: zero-energy buildings are well on the way to becoming "mega-out". What we are aiming at now are buildings that produce more energy than they consume – that is really designing for sustainability. Water-saving technologies should make way for self-contained water cycles, or failing that, wastewater-free buildings which produce compost and "industrial water", and green spaces that produce fresh food without requiring much input – thus becoming edible parks. The emphasis is not so much on self-sufficiency as on sustainable husbandry, orienting ones production and consumption on the carrying capacity of the land.

Higher quality at a lower cost

The most advanced projects that we came upon have already attained the goal of keeping outside services to an absolute minimum to the extent that cycles are self-

contained, just as Per Krusche's original vision foresaw. If this goal also leads to a reduction in investment and running costs, as for instance in the Bielefeld-Waldquelle and Hamm-Heesen projects, these settlements can be seen as new milestones in the ecological pioneering and testing phase.

It has also become clear that the real issue is not just new technological solutions, but rather a holistic approach which reinstates the responsibility of the individual and recreates the visibility of the individual elements which our very survival depends on. In this vein, drinking-water is extracted on site and rainwater and greywater are allowed to run off into open bodies of water, or water gutters, or are purified in planted soil bed filters and water polishing ponds. Waste, or at least its organic components, are composted together with faeces. Witnessing stinking garbage turn into aromatic humus is a very special experience. Thus, village (re)structuring manages to combine *apparent contradictions*: centralised/decentralised, hi-tech/low-tech, very high quality/very low costs – another permaculture principle.

The examples studied demonstrate that all of the issues and aspects which come with the territory of constructing ecologically, when they are implemented on a larger scale, lead to cheaper solutions for the individual and the municipality. Our findings suggest that the real obstacles are generally experts with little experience, politicians lacking courage, and administrative regulations that are too narrowly defined: not the commonly-cited occupants and costs.

We saw in the *Analysis of costs and benefits*, that the older the building, the cheaper the eco-village becomes. This is also true for ecological urban renewal projects, as the Wilhelmina (NL), Fredensgade (DK) and Aarepark (CH) projects demonstrate.

If energy, water, wastewater and refuse disposal rates continue to climb as they have over the past few years, every project which manages to lower running costs will become increasingly economically attractive in the future. "Non-ecological living" will become more expensive, be it food, cars or buildings. The motto is "using together instead of consuming individually": the full extent of its potential has only been touched upon by the projects examined here. A real opportunity for the way ahead lies in the plummeting costs of information technology and in direct links between groups with similar goals through global communication networks. These options will allow us not only to exchange information more cheaply and quickly, but also help us locate the right car, bicycle or building at the right time, in the right place and at the right price.

Renewal instead of new construction

The biggest challenge for everyone involved in building (I can only speak for Europe but I guess it applies also all over the planet) is the ecological renewal of existing buildings, especially existing suburbs. Renewing ecologically means converting and renovating buildings with a view to a "sustainable" use of resources. This involves, for instance, procuring non-renewable materials such as copper, aluminium or iron from dismantling operations in cities and reusing them efficiently, rather than mining them from the earth. It also means allowing wastewater to flow back into the groundwater, or into rivers and lakes, in a state that is just as clean or cleaner than when we extracted it as drinking-water; keeping the air clean, so that we can once

again smell the scent of plants; planning quietness and reducing noise; and providing a diversity of uses in a small area, so that living, working and leisure can be combined to reduce transport distances and improve the quality of life. In almost all our cities we are still very far away from this vision. However, the examples we studied indicate that there are ways and means of *getting closer* to these goals. What we need now are examples of ways of *attaining* these goals. And these we were unable to find.

Naturally, renewing ecologically requires greater sensitivity, patience and a openness to teamwork than developing new eco-villages. One of the differences to new building projects, which caused us a great deal of trouble in the case studies on ecological urban renewal, was that it was considerably more difficult to find ground-breaking models and documentations of such projects, probably because ecological urban renewal projects are less spectacular. At first glance, they generally appear to differ very little from completely "normal" projects, and, with the exception of the Danish project in Kolding with its "bio- factory" – a glass pyramid, in which all the wastewater is purified – they tend toward the conventional, and are almost a little boring from the design point of view. However, a closer look at the planning processes reveals that they are far more diverse and complicated than new development projects.

As with the new settlements, the examples of renewal projects range from socially-oriented processes with a very high degree of occupant input, as in the Swiss "Aarepark" residential settlement in Solothurn, to more hierarchically organised planning processes with low occupant input, as in the Fredensgade project in Kolding, Denmark. The examples illustrate how the people living nearby a demolition project, the former Wilhelmina Hospital in Amsterdam, can work with experts to develop plans for preserving and converting a complex of this kind, and can bring about the funding and implementation of this planning with the support of clients and administrative authorities. However, they also show the extent to which authorities can block ecological planning. In Vienna, it emerged that permission to plant climbers in the street area had to pass through at least 14 different authorities. As a result, it is less time-consuming to plant climbers in planters attached to the building wall, than to plant them in the ground.

If new settlement design can lean on something resembling a model of an eco-village, this is not the case with urban renewal projects. Bearing in mind how much more important is the use of the various existing resources and potentials, both physical and social, in the urban renewal process, this is more than understandable. The upside is that the solutions in these projects are often more diverse, imaginative and better tailored to the needs of the occupants.

With both new construction and renewal, the key to success lies in winning over the support of everyone involved to goals of environmental quality, and making the planning and building process a joint success despite, or perhaps because of, the many participants, all of whom are pursuing different interests. The examples show that the quality of life and of housing gained through the juxtaposition of old and new, past and future, is well worth the effort in the present.

The eco-village vision

When an eco-village works well both technically and socially – and this concept covers both new construction and renewal projects – it is not only the highest quality product that building and conversion can offer at the present time, but also a process of development. It is a process that changes people and their relationships, as well as buildings, open spaces – and supply and disposal technology. The aim is to make this entity easier to live in, easier to love and more sustainable. In combining our old love of insisting on people's participation in planning and our newer love of permaculture, our vision of an eco-village looks like this:

- *An eco-village of diversity*: where living and working are reconciled and long trips to work disappear; where social and cultural activities, recreation and further training, community and individuality can exist side by side.

- *An eco-village on a human scale*; with neighbourhoods to which residents can develop a direct relationship or a personal bond, but which have their own character as well. An eco-village of natural corridors, with woods, orchards, streams or wetland marches separating the individual areas and linking them to the surrounding landscape. A place where plants and animals have scope to thrive, something that has become all too rare in our civilisation. An eco-village which fits, in terms of its own bio-region, its landscape, its climate, its flora and fauna and the local culture. One where open spaces and bodies of water (typical of the area) provide biological enrichment and orientation.

- *An eco-village which uses as little space as possible*: the size and density of the settlement depends on the degree to which the area it requires for its supply and its waste disposal are really available, without being a burden on the region. Where expansion beyond this size leads to the founding of a new settlement. This creates a network, instead of the cancer-like urban sprawl typical of our times. Four- to five-storey terraced buildings or multi-family dwellings with maisonette apartments and a construction method density which yields a floor space index of between 0.6 and 0.8. Every neighbourhood has the shops, businesses, nurseries and schools it needs. Only about 20% of the surface area is built up, with the rest used for reduced traffic, leisure and recreation, water supply and wastewater treatment, energy plants and the natural corridors described above.

- *An eco-village of short distances*: The density described above leaves our eco-village not much larger than 1.5 – 2 km in diameter, meaning that everyone can walk from one end to the other in twenty minutes, or bike or drive their solarmobiles across in five minutes. Car-and minibus-sharing is available to the community for all medium distances. Public means of transport – buses and trains – are faster and cheaper alternatives for longer journeys. Efficient infrastructure planning is facilitated by service centres specialising in different aspects and located at public transport pick-up points.

- *An eco-village based on occupant responsibility*: All occupants are involved to the extent they can and wish to be in local, community self-administration, and in formulating and implementing eco-village (re)structuring. All decisions

are made on the lowest level possible, based on the principle of subsidiarity. As far as possible, everyone uses the local range of services, production and trade, education, and leisure, and supports links and communication with regional, national and international groups and networks.

– *An energy-efficient eco-village*: Energy-saving options and the rational use of energy for heating purposes, and of electricity and transport cut energy consumption to less than 10% of its current level. Energy is primarily generated on a renewable basis through sun, wind, tides, geo-thermal energy and organic mass. All buildings are oriented towards the sun for optimum passive gain, used for cooling and heating. Intelligent designs achieve a maximum annual consumption rate of 20 kwh per square metre of living space.

– *An emission-free eco-village*: Reducing energy consumption, treating wastewater in nature-based systems, limiting traffic and coppicing streets trees, all lower CO^2, SO^2, NO^x and other toxic gas emissions, as well as reducing dust particles. Sod roofs and façades covered in climbers, as well as wildlife corridors between individual neighbourhoods, improve the air and temper climate extremes.

– *A quiet eco-village*: by limiting traffic and noise pollution from production processes, which, where necessary, are surrounded by dense green belts, the settlement is a place of calm and quiet. Most sounds heard here are made by birds, playing children and the parties occupants celebrate together.

– *An eco-village which values water*: On-site rainwater seepage and the blanket ban on all toxic substances entering the groundwater allow the settlement to have its own drinking water supply. Water-saving fixtures and the separation of faeces and all other organic waste for composting and fermentation cut drinking water consumption to less than 60 litres per person per day. Graywater from washbasins and baths, showers, washing machines and dishwashers is purified in nature-based treatment processes, and then seeps back into the groundwater. The settlement preserves natural drainage conditions. This means that wherever possible, storage rooms at ground level replace basements. Vertical and horizontal filters become just as much an integral component of open spaces in the form of constructed wetland marches, as rainwater, which is creatively allowed to come to the fore in flow forms, open gutters, streams and ponds.

– *A waste watching settlement*: Governed by the principle that "waste is resources in the wrong place", the settlement belongs to a regional, national and international network specially devoted to this aspect of sustainable husbandry, which helps to prevent over 90 percent of the current volume of waste. Be it domestic waste, excavation soil, building materials or waste from commercial or industrial production, the little waste still produced here is sorted on-site, before entering the respective recycling, downcycling or re-use process.

– *An eco-village of healthy buildings*: Building materials and construction systems used in all buildings that are converted or constructed are healthy, save

primary energy and go easy on resources in their production, use and dismantling (from cradle to cradle). They are (re)planned for multi-purpose use, easy conversion and expansion or reduction in size. Organic materials are compostable and can be returned to nature without difficulty. Electrical cables and appliances are installed and connected in accordance with the latest findings to generate as little electrosmog as possible. Before planning commences, zones of geopathological interference are detected and efforts are made to avoid building bedrooms and living spaces on top of them.

– *An eco-village full of productive plants*: Special care is placed on the selection of plant types, sizes and growth times. Thus, the settlement contains fruit-bearing bushes and trees, gardens, lean-to greenhouses, façade espaliers and herbaceous soil coverings that meet a good proportion of the settlement's needs for fresh fruit, vegetables and salad all year round, without much extra effort – in other words, leaning towards a permaculture settlement. The district dividing corridors, streams, ponds and wetland marshes also produce edible and medicinal plants for human and animal consumption. These products are fresher and cost less in terms of embodied energy, waste and money than imports which have travelled great distances, although these can occasionally be used to ensure added variety at the table. The exchange of "surplus production" can be organised in communally-run shops or markets, which in turn creates permanent jobs.

– *An eco-village of creative conflict-solving*: conflicts are seen and dealt with as creative learning processes. This facilitates individual and collective growth. (Whenever conflicts are not settled openly, this growth stagnates or they end in hot or cold wars.) "Using together instead of consuming individually", sharing jobs, cars, fruit-trees, playgrounds, buildings and open spaces for play, sport, leisure and communication also means going through learning processes together, leading a richer life, but also a more difficult one as well. Like most Europeans, our upbringing does not prepare us for such processes. We need to learn these skills. If we take in the gender problems and start really solving the conflicts that are basic to men and to women and their relationship, then we will be having An eco-village that contributes to *essential peace-making* (Parry & Brusseau).

– *An eco-village of human values*: historic settlements, and even restructured suburbs, can be seen as collective artworks. The individual and collective efforts of many generations lends them a special, unmistakable character. Nowadays it is possible to simulate this historical development and make various alternatives clear in quick motion. Thus the complex process of coming to a consensus on the demands of the occupants, the administrative authorities, the neighbourhood, the economy and the environment can be altered until sustainable planning can be carried out that is tailored to the combined needs of the occupants, investors and the authorities. It takes time to make this shared vision a reality, but it forms the basis of the settlement's spiritual, intellectual and technical capacity.

The Club of Rome made an appeal to humanity: *We need a vision.*

Global problems cannot be solved by market mechanisms alone.

They saw the way ahead in the thousands of small, smart decisions that reflect a new awareness, shared by millions of people, and that help ensure the survival of society and the planet. The strategy of building many rural and urban eco-villages has the advantage of not only being feasible, but also corresponding to the vision many people share of a world they would like to live in. Making the vision a reality only requires the will to take a calculable risk and shed old prejudices and patterns of behaviour. In view of the problems bombarding us from all sides, this can only be seen as a hopeful perspective.

References

- Haldemann, Willi: "Umsetzung in der Haustechnik" (*Implementation in Technical Services and Equipment*) in SIA, Swiss Association of Engineers and Architects (eds.): **Integral Planning**, F H E Trade Conference, Zurich, 1993
- Kennedy, Declan, Margrit Kennedy, Ulrike Löhr, et al.: *Umwelt-Kultur-Park Dortmund* (*Dortmund Environment-Culture-Park*), Ed. Permaculture Institute, Steyerberg, 1988
- Kennedy, Margrit & Declan: "Permakultur: Beispiele aus der Bundesrepublik Deutschland" (*Permaculture: Examples from Germany*), in *Informator* No. 2, Lucerne, 1988
- Kennedy, Margrit (Ed.): *Öko-Stadt, Band 1: Prinzipien einer Stadtökologie, Band 2: Mit der Natur die Stadt planen*, (*Eco-city, Volume 1: Principles of an urban ecology, Volume 2: Planning cities with nature*), fischer alternativ, Frankfurt am Main, 1984
- Krusche, Per, Maria Krusche, Dirk Althaus & Ingo Gabriel: *Ökologisches Bauen*, (*Constructing Ecologically*), Bauverlag, 1982
- Parry, Danaan, *Warriors of the Heart* **,** Earthstewards Network, Bainbridge Island, WA, USA, 1992.
- Schmidt-Bleek, Friedrich: *Wieviel Umwelt braucht der Mensch? MIPS das neue Maß für ökologisches Wirtschaften* (*How much environment do human beings need? MIPS the new standard of ecological husbandry*), Birkhäuser Verlag, Berlin, 1994
- Weizäcker, Ernst-Ulrich von: *Erdpolitik – Ökologische Realpolitik an der Schwelle zum Jahrhundert der Umwelt* (*Earth politics – Pragmatic ecological policies on the threshold of the century of the environment*), Wissenschaftliche Buchgesellschaft, Darmstadt, 1993

This paper is based on the last chapter of a new book, edited by Declan Kennedy and Margrit Kennedy, to be published in 1997, entitled *Designing Ecological Settlements*.

Professor Declan Kennedy is Irish Architect, Urban Planer, Permaculture Designer and Ecologist. He is a founding member of the Permaculture Institute of Europe. He has

been teaching and practicing urban design, landscape and agricultural planning coupled with holistic implementation strategies since 1972, presently in special intensive Permaculture seminars – organised in many countries – and formerly as Professor of Urban Design and Infrastructure at the Architectural Department, Technical University of Berlin.