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Forum 3 The Limits of Megacities

Name Chris Butters

ARCHITECTS IN TIME AND SPACE: UNDERSTANDING SUSTAINABILITY

THREE FACETS OF SUSTAINABILITY

People in different ages and cultures understand the world differently. In our age, the environmental imperative is recognised by and unites all cultures.

Though it is not easy to define, sustainability as understood today always has three basic dimensions: ecological, economic, and social. No society can exist without a healthy natural base, hence environmental awareness and efficiency are crucial. However, the ultimate goal of sustainability is not just healthy ecosystems, but healthy community.

Planning, urban development and buildings are responsible for 50% of the total energy use, resource flows and emissions in our societies. They also represent over 50% of all real capital. Our profession thus has a major responsibility. In our age architecture is not complete, and is certainly not good architecture, if it is not reasonably sustainable.

So the goal of sustainability has far reaching effects for architecture. It is not an empty cliché; nor is it just about technical fixes for environmental problems. We have the three keywords:

Ecology: the "ecological footprint" resulting from our energy and resource consumption is of critical importance, and has been a main focus for ecological design. But eco-technology is only the material dimension of sustainability.

Economics: in its original sense economy refers not just to financial systems, but to the overall organisation and management of society. Economic sustainability thus includes issues of intergenerational planning, equity and participation.

Society: Similarly, sustainable development implies a healthy relationship between nature and culture. The dimensions of social and cultural sustainability are therefore just as important.

TRADITION, MODERNISM AND ECOLOGY

Traditional societies often had a holistic view of their place in the cosmos and their interventions in nature, and their architecture was well adapted to local environment. However their technology was often far from sustainable, in part due to a lack of the global awareness and scientific knowledge which we have today. Their sociopolitical systems - tribal, feudal, dictatorships or whatever - were not always something to get very romantic about either.

The modernist world replaced the gods of old with rationality and science. Modernism sought a new, universal vision, but in doing so discarded both tradition-based wisdom, and design based on local context. In addition, the specialisation of knowledge and

functions led to disorientation and fragmentation of the world, both physically and spiritually.

The ecological vision combines global view and a local context. And it integrates the dimension of time into architecture, so that both the global and the local, both the past and the future, become our informants in the act of design.

THE WHOLE OF SPACE AND TIME

The ecological paradigm places architecture in a new framework which encompasses the whole of space - and the whole of time.

As regards space: at the macro end of the scale, we know that our choices - our buildings, energy systems and materials - may have an effect on the ozone layer over Sydney or the rainforests of Brazil. At the micro-level, Sick Building Syndrome and the new science of building ecology have made us aware that we architects must consider the murky secrets of industrial chemistry, of formaldehyde and radon, PCBs and PVC.

And as regards time: we know that our cities and our buildings will have effects for many generations. Life cycle based production is becoming a requirement in modern economies; and architecture must consider the long term future, life time maintenance, deconstruction and recycling as well as immediate needs. This affects the way buildings are to be designed and assembled.

In a sense, this perception is not new. Pioneers such as the sociologist Le Play and biologist-planner Patrick Geddes developed wholistic models. These are reinforced by insights from thermodynamics and modern systems theory. The new view thus connects age-old wisdom in the forming and management of human settlements, with new scientific insights.

HIGH-TECH VERSUS LOW-TECH

The old polarity between high-tech versus low-tech is no longer relevant. In many cases these were little more than architectural metaphors anyway. An "organic" form was seen as being ecological even if it was built of polyurethane foam - or a house with "natural" timber facades, even if they were poorly designed and needed to be replaced every ten years. A high-tech building in stainless steel was seen as being energy intensive and not ecological, even though it might last five times as long and without any maintenance. Sustainable solutions may be both low-tech and high-tech - when seen in a life cycle context and on condition that they are used in the right ways.

The polarity of traditional versus modern also loses its sense. Many modern eco-buildings "rediscover" principles, such as thermal zoning, which are identical to those we find in traditional building. While modernism wished to cast off history, sustainable building is a conscious reintegration of the two forces of continuity and change, of old principles and new awareness. It is an architecture of evolution.

ARCHITECTURE – ELITISM AND ABSTRACTION?

Architecture can only be a resource in relation to the world as architects understand the world. And our world is a real world. Much of today's architectural practice, and discourse, is in danger of becoming increasingly irrelevant. It retreats into elitism, or into graphical abstractions.

Architects sometimes seem more interested in being exciting than in being relevant.

Some propose that the answer is a sort of enlarged modernism which includes ecological aspects. This attempt to "save" modernism doesn't take account of the fact that today's world is no longer the industrial-era world of the 20th century. Modernism does not necessarily provide modern architecture. The tools and methods of modernism are powerful, but they must be applied to an up to date vision of the world.

Others suggest that regional development and urban design are now subject to the so-called greater forces of globalisation and capital development. This is an abdication of responsibility, for cities are still real places. They are about infrastructures, energy, streets, buildings and people. They embody real environment, real economy, real community. So they must be designed – either well or badly – either sustainably or not.

SUSTAINABILITY IS NOT A STYLE

The modernist approach is no longer enough: nor is a purely traditional approach. Above all, we are still far too concerned with aesthetics and trends in architecture. Style, by definition, is not sustainable; therefore, sustainability can't be about style!

Architecture is often still seen as a linear progression of historical styles and technologies. This overlooks both the underlying premises, and the ecological content. Evolution is not about surfaces. If we ask, what will tomorrow's architecture look like, then we are asking the wrong kind of question.

The grand idea of functionalism, that form follows function, has little meaning. Many modernist buildings were never more than metaphors of functionalism, or of technicism, whereas many extremely fine, functional buildings have non-specific if not entirely circumstantial form. There is not necessarily an explicit relationship between content, function and form.

The idea of ecology as leading to some kind of new architecture needs to be discarded. Sustainability concerns processes and resource cycles, not buildings as objects. It concerns all the "invisible" contents of architecture which lie under the surface - site impact, energy systems, unseen effects of components and building materials. If ecological buildings can be high-tech or low-tech, traditional or modernist, then this means that they can take many forms. On the other hand, when we work from the starting point of local climate, site, solar energy, natural ventilation, then sometimes these parameters in themselves are the generators of new, exciting formal solutions. So ecology can lead to some new forms, too!

NO EASY SOUNDBITES

Recent Nordic examples show interesting links between tradition and modern sustainable design; as well as a humanist approach which combines high quality in design with a sense of global responsibility. Similar signs can be seen in other regional responses to the need for sustainable building. Tools and discourses for evaluating sustainability are however as yet not well developed. Sustainability is becoming fashionable, even with some famous architects, but there is not enough critical evaluation of high profile projects. There are many traps in so-called sustainable architecture. The message is getting confused with the meaning, and the content with the form.

If we could make some nice, clear, concise soundbite statement about what sustainable design is, then that statement would certainly be wrong. Because reality is more complex - and so is architecture. It is not this, not that, both, and, neither, nor. Avoiding the tendency of rational western thought to categorise things, may be our biggest challenge.

The imperative of sustainability opens new, inspiring perspectives for design. Global solidarity becomes as important as local context; the past becomes as important as the future. The care for attractive, high-quality detail which our profession loves, takes on a more complete meaning.

Ethics and aesthetics need not be in contradiction. There arises an aesthetics which embraces both product and process, both form and content. Both must be beautiful - the surface of architecture, as well as what is under the surface, and the processes that go into making it, where it comes from, and where it is going.

Things must change - but first of all we must change our way of seeing.

NATURE

Design strategies such as permaculture and ecological architecture in general strengthen the positive links between people, buildings and natural systems. Environmentally sustainable design covers four main areas.

Sustainable energy supply and use:

All buildings can and should be designed for very efficient energy use. The connection between local climate and indoor climate is the starting point for energy efficient design. In the Nordic context a main issue is efficient space heating, in other regions efficient cooling. The purpose of the building has a large influence on the energy design. Housing calls for other measures than public buildings. Energy use in buildings must be planned as integrated systems and on a life time basis. Extra attention must be paid to the use of high quality energy such as electricity.

On the larger scale, energy planning is essential. Transports account for a major part of our total ecological footprint, so integrated area use planning as well as collective transport solutions are essential.

Materials flows:

Buildings represent very large amounts of embodied energy and assembled material. Buildings have a long lifespan, including many modifications and ongoing maintenance. Hazardous building materials are to be avoided. Sustainable design provides healthy, recyclable materials, and as a rule will avoid composite components that are difficult to reuse or disassemble.

Land use and biodiversity:

Planning and building must reduce the ecological footprint and overall use of land to a minimum, as well as seeking multi-use solutions where space is saved and natural ecosystem functions are maintained or enhanced.

Both in urban planning and building design special attention should be paid to biodiversity and to the "green infrastructure". Apart from evident practical uses, such as filtering polluted air and creating a better urban climate, the presence of natural elements is a psychological need, a reminder for all that we are part of and dependent on nature.

Water use, sewage and waste cycles:

Without water, no life! Efficient use of water saves both nature and money. As with renewable energy, local flows of rain can be used, thus minimizing other sources. The treatment of contaminated water is usually a matter of urban infrastructure, not isolated building design, but solutions on site can enhance environmentally friendly treatment. The separation of flows, especially storm water, from other sewage is nowadays to be considered as basic technology, as is separation of wastes.

CULTURE

Architecture and the built environment represent huge social investments – more than 50% of the total capital in a country. They also constitute the framework for everyday life – and the quality of that life. In terms of society and culture, Resource Architecture also covers four main areas:

Appropriate function - Indoor and outdoor health:

Towns and buildings, as well as the technologies they contain, sustain life. Their first requirement is therefore functionality.

Shelter - a healthy and functional indoor climate - is the basic purpose of all architecture. At the urban level, town planning, transport structures and green spaces all determine the outdoor microclimate and the environment where we spend much of our time.

Access, identity and community:

Architecture and urban space should be supportive of identity and community. Man should not be man's worst enemy. Good design nurtures community and contact between people, poor design separates and alienates them.

Housing is not just a question of trading architecture on a market. The economics of building must be reasonable and equitable. Economics in its broad sense includes both costs and issues of ownership and management.

Planning and management - participation:

Building is a process, not a product. As Agenda 21 stresses, participation is essential for the sustainable planning and operation of human settlements.

Designers can not predict or dictate the behaviour of users, but design which takes life time costs and maintenance into account will make it easier to take care of buildings and their technology: the use of energy, wastes, water use and other resource flows.

Aesthetics

Human settlements and architecture are more than a collection of functions. Even in the most environmentally adapted society, people need the extra touch of joy, luxury, confidence or unexpected aesthetic pleasure. Architecture always carries a message, an expression; the message of sustainability should not be one of negative restrictions and sacrifices. It should carry positive messages of a timeless aesthetic quality. The goal of all sustainable design must be to combine resource efficiency and beauty.

THE EXHIBITION CONCEPT

The concept for the exhibition is for the individual Nordic countries to present themselves at least to some extent with in a shared Nordic continuum. Nordic traditions of natural materials, social integration and humanism are important pointers to modern forms of ecological and sustainable design.

From the overall context of a region or location down to the details of construction, we can distinguish three levels on which sustainability may be expressed in architecture and the built environment:

- Landscape
- Urbanity, Settlement
- Building

Projects on exhibit are principally housing projects, all with a considerable environmental focus according to the criteria described. Projects of high aesthetic and technical quality, well integrated in nature and built of natural materials, are also considered as reflecting the theme of sustainability even if the design and construction are not radically "ecological" in the profound sense of the term.

1. LANDSCAPE

Landscape, embracing both nature and artefacts, is about space and time - where culture and nature meet. The shaping of landscape is traditionally to a large extent generated by functional needs and ecological criteria, and the characteristics of the landscape are to be found in local climate and materials. The different characteristics of nature work as the generators for Nordic architecture. Mountains and fjords (Norway), windswept coastlines (Denmark, Faroe islands), tundra plains (Iceland and the shared northern belt), forests and lakes (Sweden and Finland) - and of course combinations of these - give climatic, visual and functional frameworks. Nordic architecture is anchored in locality, with materials such as wood, stone and clay. The special luminosity which characterizes Nordic architecture has often been noted. Wind, rain, snow loads and low solar angles are determinants.

Until the mid 20th century, Nordic settlements were mostly rural. These characteristics have since then developed into Nordic interpretations of urbanity - also heavily influenced by international architecture. In architectural works like Lise-lund and Drottningholm, for example, a Mediterranean influence enlightens and lifts the formerly heavy, grounded architecture.

Some of the housing projects on exhibit combine international trends with Nordic cultural characteristics - humanism, natural materials, modest scale, close relationship to surrounding landscape and climate. Modern landscape projects often apply simple means to enhance existing nature.

2. SETTLEMENT

Just as modern agricultural landscapes reflect technology which is not respectful of nature, so modern settlements often clearly show their lack of adaptation to climate and resource cycles. Traditionally, like individual buildings, the form and placement in the landscape of villages and settlements was often shaped by specific climatic, ecological and functional conditions. In urban areas, of course, these relationships are more difficult to perceive. Moving from the overall scale of landscape to the scale of the settlement illustrates how scale, place, cultural traditions and social relationships are expressed in architectural planning. In modern times, too, the settlement, housing group or neighbourhood defines social structures as well as a certain relationship - or lack of relationship - to nature. Sustainable design updates traditional approaches. By highlighting the Genius Loci - the unique identity and quality of the site - distinct patterns emerge in the detailed development plan. The placement of building volumes reduces wind and promotes shelter. Building orientation exploits passive solar energy. Vegetation and biodiversity provide ecological, climatic and psychological qualities. Priority to bicycles, pedestrians and public transportation enhances user safety and pollution-free neighbourhoods. Reduced use of non-renewable resources provides healthy settlements with minimal environmental impact.

3. BUILDING

Sustainable building is a synthesis of nature and artefact. Aesthetics, form, function, technique and material are all influenced by the ecological factors. Some of these factors are determined by local context, others relate to determinations which are even global in nature.

Although the placement of individual buildings on site and their overall form may express ecological concerns, we have to look beneath the surface. Sustainable design of buildings is at least as much about content as it is about form.

Technical components, building processes, energy control systems, construction materials within the walls, are all examples of sustainable features which are usually not immediately visible. This is not always the case: design for solar energy and natural ventilation for example, often leads to new forms which clearly express their ecological function.

A building may appear "ecological" because it is built in wood and stone; but if the timber is rainforest hardwood from an illegal logging operation in Asia, and the stone is transported from a quarry many hundred kilometres away, then the ecology is deceiving. Such architecture may be no more than a metaphor for closeness to nature.

Evaluating sustainability in architecture thus requires scientific analysis, energy calculations, life cycle assessments, as well as aesthetic and metaphorical judgments.

Other Nordic projects could be found which, in style, look very much like the ones exhibited here. The difference must be judged by in-depth assessment and by evaluation over a considerable period of time.