7.

Approaches to sustainable habitation II

SUSTAINABLE NEIGHBOURHOODS

by Per G Berg

7.1 Six resources sustain living systems

When we design regions, cities and neighbourhoods to become more sustainable, it is difficult to use the conditions of life as tools when we suggest changes and when we measure the direction of progress. Instead it is necessary to use measurable or depict-able *resources* as indicators of change. At the UN *Habitat II* Conference in Istanbul in 1996, physical as well as economic, social and cultural resources were mentioned as important for maintaining life in human habitats.

In this chapter I suggest six key resources, that must all be managed properly - in cities as well as in neighbourhoods - if we wish to obtain sustainability in the townscapes of tomorrow. They are:

- physical: energy, water and materials;
- economic: buildings, roads and tools;
- biological: ecosystems and culturally moulded landscapes;
- organizational: infrastructures, service structures;
- social: relations in families, neighbourhoods, schools and at workplaces;
- historical or cultural: awareness of the past and meaning to human life.

For a more extensive description see the box.

7.2 Resource manage-ment in communities and neighbourhoods

In the human habitats surrounding the Baltic, the six resources are seldom studied on a local scale. The economies in cities and nations are today coupled in networks that reach all over the globe. When we make plans for resource management we often find it convenient to look at the macro-scale perspective.

But as the flows of physical resources in and out of the city have their origin in single households' needs and preferences, it would be more appropriate to study *individual* choices and actions. It is of course practically impossible to monitor and interview all households - especially if we wish to understand the complex effects that individual resource management exerts on the city level. One particularly fruitful level in between the city and the individual is the small community or the neighbourhood level.

There is an increasing need to create tools by which we can monitor changes regarding sustainability in our communities. Is resource management in our communities improving? Gary Lawrence is planning director at the Center for Sustainable Communities at the University of Washington (Oregon, US). He suggests that we use *sustain- ability indicators* since:

> *"Sustainability indicators can be an important tool in helping individuals, institutions, communities and societies make different and better choices about their futures".*

But many quantifiable indices on environmental quality - however scientifically convincing - may still not bring the inhabitants sufficient motivation to participate in more beneficent environmental behaviour. Therefore he also states that:

> *"Successful indicator projects will necessarily involve the community in how to translate the data into information that is accessible to those whose behaviours need to change... People are pretty good at figuring out solutions when they feel like the problem is theirs to solve".*

Neighbourhoods represent a manageable scale in our human habitats. The six resources become comprehensible and are comparatively easy to measure and imagine. The success of neighbours changing life-style and committing themselves to sound resource management depends, however, on whether they are personally involved in the *selection and definition of indicators*. What do the indicators signify and how can they be interpreted in the individual perspective? In the Hågaby case I shall present examples on measurable resources and also suggest some of their possible corresponding indicators.

7.3 Strategy for all cities around the Baltic

We already know a lot about the conditions for improving *physical sustainability* in the Baltic region - particularly from the work of the Helsinki Commission. Now we must go further to analyze sustainability in local communities, preferably by involving the people living in each habitat around the Baltic. We must all strive to understand not only the physical but also the economic, biological, organizational, social and historical resources of our neighbourhoods in cities, towns and villages. If the basic social units of cities and villages are both competent and committed to achieve sustainability locally, it will be comparatively easy to

Six resources sustain living systems

PHYSICAL RESOURCES,

such as energy, water and materials can only be used sustainably if they are renewable or renewably recycled.

ECONOMIC RESOURCES,

such as buildings, roads and tools can contribute to sustainability if they are handled carefully, if they are made durable and if they can be rebuilt, reassembled, reused, repaired or recycled. Economic resources are also defined as the potential knowledge and skills of individuals in human habitats. Only if the knowledge is used and transferred within generations and from one generation to the next, will these kinds of economic resources contribute to societal sustainability.

BIOLOGICAL RESOURCES,

such as individual species or entire biotopes, as well as natural ecosystems and culturally moulded landscapes are valuable to most human beings for a number of aesthetic, recreational, practical and existential reasons.

ORGANIZATIONAL RESOURCES,

such as infrastructures, service structures, human habitat structures, city and countryside structures as well as plans for the future, orders, formal and informal rules all contribute to stabilize and control societies sustainably. Other such resources are represented by the routines for the development, redevelopment or sheer maintenance of existing human habitats.

SOCIAL RESOURCES,

such as relations between humans in families, neighbourhoods, schools and workplaces - within and across cultural or professional boundaries - constitute the 'silent' or 'invisible' capital of human habitats. The pattern of relations in the Gemeinshaft sphere - between people of different ages - constitute one ultimate basis of a sustainable society. A relevant question is therefore: - How potent is the social 'glue' in any community - between children; between children and youngsters; between children and grown-ups and so on? The biocultural creature we call homo sapiens, was for millions of years probably moulded in long-lasting relations in families, tribes and ancient villages. Particularly important but poorly used social resources in modern Nordic neighbourhoods are the relations between children and the elderly.

HISTORICAL OR CULTURAL RESOURCES

are represented by human awareness of the past. It is the popular knowledge about signs of ancient culture in the habitat landscape that bring an 'eternal' time-perspective and meaning to human life: old habitation sites, monuments, graves, holy places and houses. The 'human memory' history of any place in the form of often-told stories, well-known documents, books, reports and letters over the last hundred years is equally important for preserving cultural man. Human consciousness of the 'near history' of communications, services, schools, infrastructure, struggles, plans and protection bills of an area are also crucial to create an understanding of the character of a place.

Cultural resources even encompass people's knowledge and insight of the present societal spirit as well as the local, regional and global cultures among children, youngsters and grown-up people of today.

take measures and to improve sustain-ability on the city and regional scales.

Strategy for complementing lacking resources

A suggested strategy to improve sustainability is thus to invent the present status of the management of six resources at the neighbourhood level. This is preferably done together with those who live at a certain site. When the inhabitants have defined meaningful indicators of change it is possible to change taxes and rules and it is conceivable to organize change towards sustain-ability in any urban environment.

A fruitful approach is then to *complement* or *replenish missing links* in the sustainability chain of neighbourhoods and other parts of the townscape. In some places there is a lack of physical resources. In other places the biological and organizational resources are not managed properly. In yet other places, the social resource potential is not used at all. The analysis must take place on a communal level but the initiatives and the interpretations must be done in cooperation with the engaged inhabitants in neighbourhoods. This is what the Agenda 21 process could, and should, be used for! In this article, three ways of analyzing sustainable habitation have been discussed (Table 7.1). They range from a theoretical approach to a more practical method which involves the people who are really concerned: people in their human habitats all around the Baltic.

Situation-, place,- scale -and

climate-adapted planning
Every human site is fundamentally unique. Every site has its own climatic, geographic, geological and topographic properties. Every human settlement is also affected by its scale: a small settlement must solve many problems more locally, with more informal rules and with more consensus in the democratic process; a larger and denser human settle-ment must use more representative democratic methods.

Any human site carries its very special situation properties: the position in the landscape and its relation to other human settle-ments, its economic, cultural and educational state as well as the sum of dreams and ambitions among its inhabitants. We should never forget the uniqueness of every human habitat when we construct policies with the aim to improve sustainability.

Thus, in some cases sustainable urban development may require a reduction of the traffic. In other instances, the key mission is to improve social standards to a minimum level in order to make people interested in common societal efforts. In yet other situations, the main task is to promote strong neighbourhoods, to enlighten the spirit of community and to inspire disillusioned people to start wishing something for the future.

Table 7.1 Three modes of analyzing sustainable habitation.

A. Five theoretical sustainability conditions for living systems in general.	B. Six measurable or depictable sustainability resources.	C. Conceivable popular indicators of change towards sustainability.
Five conditions for resilience and sustainability in living systems	**Six key physical and non-physical sustainability resources**	**Conceivable popular indicators of improved sustainability in habitation**
1. *Nourishment* (provision of energy and nutrients) 2. *Control* (cybernetics of living systems) 3. *Reproduction* (of individuals and systems) 4. *Boundary maintenance* (for identity and communication) 5. *Adaptation to Evolution* of system	1. *Physical resources* (such as water, air and soil) 2. *Economic resources* (such as buildings, tools, vehicles and human skills) 3. *Biological resources* (such as species, ecosystems as well as natural, cultural and recreational landscapes) 4. *Organizational resources* (e.g. laws, rules, plans, services and routines) 5. *Social resources* (such as relations between human beings in homes, schools and workplaces) 6. *Historical or culturally determined resources* (such as human consciousness of the life and purpose of earlier generations and places.	1. Creation of *Time* for recreation and other self-chosen purposes 2. Improvement of *Household economics* as a result of well-managed resources 3. Growing senses of – *freedom,* – *security or* – *togetherness* as a result of improved sustainability in nature and society. 4. Improvement of *health* or *existential well-being* as a measure of improved sustainability
The five conditions are preferably used as a:	The six resources may be used as a:	Popular indicators may be used as a:
Theoretical natural scientific basis for analysis of sustainability. It can also be used as a starting-point for sustainability research.	Practical natural and social scientific basis for studies; or for planning and evaluation of sustainable habitation.	Practical and participatory basis for planning and realization of sustainability

CASE : HÅGABY
– a model neighbourhood for Baltic cities

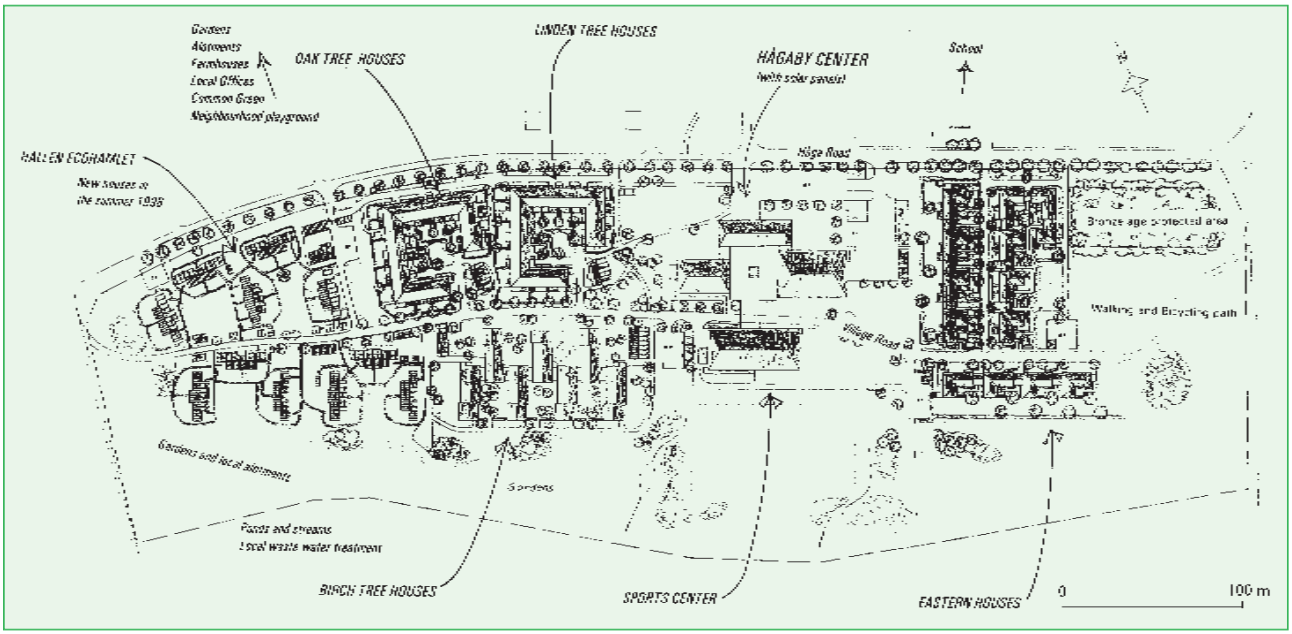

Figure 7.1 Drawing of Hågaby including the not yet built houses on the western side.

Hågaby

Although we can assume that every human habitat is unique, it may still be useful to describe resource management in a case. *Hågaby* in Uppsala, in the middle of Sweden, is a community of great potential value as a model for managing the six resources mentioned above. One main reason is that Hågaby has a combination of urban-rural properties. A second reason is that this little habitat in the long-term perspective has a great potential to obtain equitable *environmental space* with regard to its physical resources. A third specific advantage with Hågaby is that it exhibits new technology, new ways to organise basic social, working and practical life *as well as* conventional technical, organizational and workplace solutions.

It is not possible to extrapolate the experience from this example entirely to other - often more densely populated - places around the Baltic. The multi-resource approach should however be generally applicable to any Swedish, Nordic or Baltic human habitat.

Hågaby is a mixture of a modern urban quarter and a non-densly populated rural village. It is situated precisely on the three-part boundary between the dense Uppsala townscape, the thinly populated countryside and the great western forest of Uppsala. The small Håga river is running north and east of the site. Uppsala population is 180 000. Hågaby is rebuilt (74 appartments, previously an institution for mentally retarded) and new-built (22 appartments) between the years 1995 and 1998. The old village consists of another 15 households. Hågaby will in the year 1998 thus have a population of 350 inhabitants, whereof 120 are children up to 15 years, in 110 households. The population is predicted to grow 1-2% per year for 10 years, mainly due to childbirths, but not furher since a Nature reservation surrounds the built area.

The houses will according to plans be equipped with far- *as well as* near-produced heat, water, electricity, transportation, communications and waste management. The average income of the inhabitants can be estimated to be average with Swedish standards. The inhabitants of Hågaby can partly choose to work, educate themselves, organise social, recreational or economic activities locally *as well as* in far-situated places in Uppsala or Stockholm.

A little more than one half of the final population was already living in Hågaby in the beginning of spring 1997, whereas the rest moves in during spring and summer 1998. In the rebuilt houses, a sustainable resource management will gradually be introduced at two different levels. A third level is represented by the new houses (with 22 appartments) which will exhibit advanced sustainability solutions. There are also plans to rebuild three barns during the years 1999-2001 to become a small experimental community center with advanced solar cells, new sewage treatment plants, a telecommunication center, local workplaces, shops, workshops and assembly rooms.

The present village center of Hågaby contains four buildings with local offices, a restaurant and assembly hall, a sports center and a conference center. The greater Hågaby area also contain a school (grades 1-7), two day care centers and two smaller farms. These non-habitational houses constitute work at present for around 70 people. The schools and day-care centers have room for 130 children.

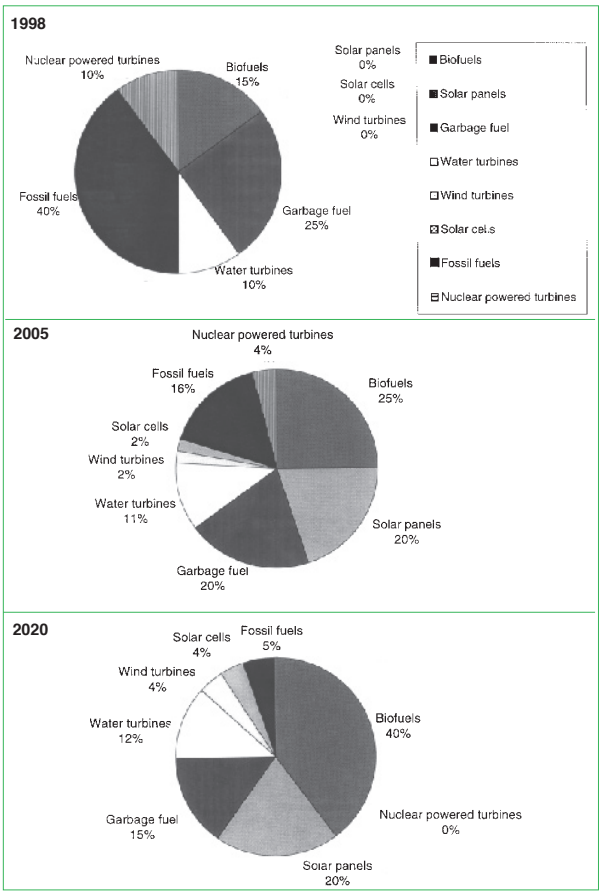

Figure 7.2 Mix of energy sources in Hågaby 1998.

1. Physical resources

Today Hågaby is provided with district heating, district sewage-treatment and district garbage handling - with all physical support sources situated 7 km from the site. Services like shops, post-office, bank, library, health-care and chemist's are situated 2 km away. Most of its inhabitants are car-bound or to a lesser extent use bicycles or the local bus. Hågaby is thus still an urbanized human habitat of the city of Uppsala. The level of physical consumption is comparable with the mean water, energy, material and food consumption in Sweden.

As Hågaby enters a strategy for sustainable resource management, a shift is made from *output management* to *input management*. This means that efforts will be made to *reduce* the need for physical resources rather than just choosing the most appropriate handling of the waste. The potential for reducing physical resource consumption is - during the first 20 years - roughly 50%. The most important measure with regard to the choice of technology is the transition from non-renewable energy to renewable energy sources. In the examples and calculations presented below, only households are included, although a transition to sustainability is expected to comprise the whole of Hågaby.

Energy

Today the average Swedish household consumes around 25 000 KWh total energy per year, whereof 4 000 KWh is electricity. The average living space per person is 45 sqm per person. In Hågaby the average living space will be at most 34 sqm per person, and total energy consumption 25% lower than the national average. In addition by the year 2005, 75 of the 110 households will be 10%, and 22 households 30%, more energy efficient than the average Swedish house. The entire habitat will thus consume 1 800 MWh per year whereof 290 MWh is electricity.

The heat for keeping the houses and hotwater warm is today provided by district heating. This is expected to become much more expensive. It it will then be profitable to invest in a local furnace and the need for locally grown biofuel will increase. Up to 25% of all heat and hot-water needs in Hågaby will be satisfied with 1000 - 2000 m^2 active solar collectors. Electricity consumption in Hågaby will be lower and its use will be more limited to purposes where it is exclusively needed: *i.e.* for light, electrical appliances and engines.

Water and waste

The average water consumption in Sweden is 220 liters per person per day. In Hågaby it can be estimated to 140 liter, and about 110 liters in the 22 most efficient households by the year 2005. In the Nordic countries this consumption is most probably sustainable, whereas southern Baltic cities may have a problem with such a high water consumption.

At present all of Hågaby's waste water is pumped to the central sewage treatment plant in Uppsala. In the year 2005 some 40% is treated in a local biological sewage treatment plant. In the farsight scenario there are strong economic reasons to believe that all waste water is locally treated, in local plants or in special greenhouses.

The solid waste will according to plans be reduced radically in Hågaby over the next 20 years. In 1998 at least 95% of all solid waste is collected and burned to produce district heating in the Uppsala Energy Plant. The year 2005, 50% of all waste, i.e. the entire organic part, is predicted to be composted locally in Hågaby. A 30% decrease of the other waste fractions can be estimated, due to improved packaging systems and to a decreasing consumption. A predicted decrease in income among the population, may motivate people in general to develop local recycling and habits to reuse materials and goods.

Transportation and life -support

In the end of 1996 the private transportation volume in Sweden can be estimated to 40 km per person per day, where almost 90% of the transport work (expressed as person kilometer) is carried out by car. Bus travel only account for 5% of all transport work. The bicycle is used a lot but the total travel length can be estimated to less than 2 % of the transport work.

In Hågaby the transport need for its inhabitants can in general be estimated to be roughly 30% lower in the year 2005 than the Swedish average. For the 22 most efficient households transportation by car is estimated to be 60% lower than the

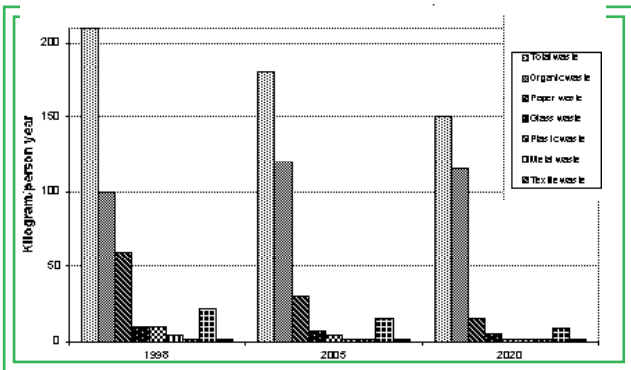

Figure 7.3 Production of solid waste in Hågaby 1998-2020.

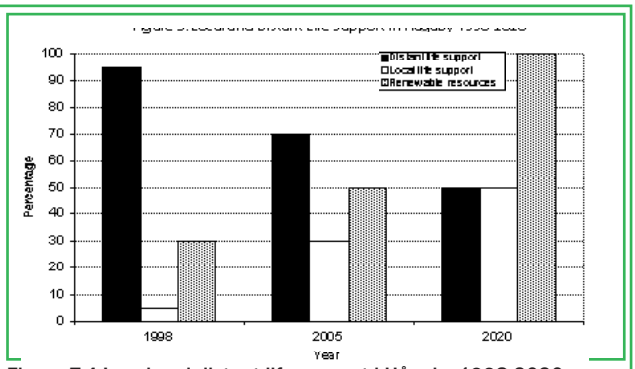

Figure 7.4 Local and distant life support i Hågaby 1998-2020.

Swedish average, since Hågaby is rather close to the city center. Other reasons are to be found in less need for leisure travel, as the Hågaby environment has rich opportunities for recreation, sports and nature experiences.

Hågaby of today imports more than 95% of all food, energy, water, material, goods and services from long distances. The hinterland and supportive service structure of Hågaby thus coincides with that of the city. By the year 2005 10% of the food can be estimated to be grown in the local area. The 22 most efficient households are estimated to have reduced the dependence of distant life-support systems to a sustainable level: water is taken from the Uppsala ridge which is reasonably sustainable; waste water is treated locally; local solar energy is used to cover 25% of the heat demand. Half of the food is provided from local farmers or by plots at the site. All organic waste is recycled.

Indicators for physical resources

Sustainability in communities rests on the involvement of its inhabitants to assess the quality of their own habitat. Chemical, physical or medical limit values are often too abstract to be meaningful. So, what indicators will emerge, when inhabitants choose for themselves? The experience is that indicators often reflect everyday concerns to people: household money, employment, health, access to nature, rise and fall of popular species in the environment, biotopes or landscapes, security and - available time (see Table 7.1). The indicators used to measure improvements in physical sustainability in Hågaby, will thus answer questions like:

Will renewable energy, within a reasonable time, save money to our family and contribute to the conservation of rare orchids and birds, which are important to us?

Will recycling of water add to my family's strength and health?

Will a better management of soil and solid waste improve my sense of security?

Will a reduction of household transportation on long distances give me and my family more time together or more time for individual development?

Physical resources in a neighbourhood of our urbanized world are often byflows of the large streams of waters, foods and fibers that support our cities. In Hågaby some of the physical life-support will in the future be provided locally. In Table 7.2 the figures of physical variables are extrapolated to a household as well as to the city and country levels, although the conditions for reducing physical resource consumption vary greatly in Baltic cities. Note that the 1998 figures of energy and water consumption is already more than 30% lower than the national averages in Sweden.

Table 1. Comparison of predicted consumption rates for three strategic physical resources at various townscape levels. The expected consumption in Hågaby is extrapolated to individual households, but also to a middle-sized city (100,000 inhabitants), a capital city (1,000,000) and a substantial part of Baltic townscapes (10,000,000). (The figures in brackets are the actual (predicted) figures for the respective level. Note the prefixes. 1 Mwh =1,000 Kwh; 1 Gwh = 1,000 Mwh; 1 Twh = 1,000 Gwh. 1 Kbm = 1,000 litres; 1KKbm = 1,000 Kbm. 1 Kkm = 1,000 Kilometres).

Year	*Household (in Hågaby)*	*Neighbourhood 350 inh (Hågaby)*	*Middle sized city 100,000 inh*	*Major city 1,000,000 inh*	*Country 10,000,000.inh*
Total heat and electricity consumption					
1998	16 600 kWh	1 660 MWh	470 (705) GWh	4,7 (7.1) TWh	47 (60) TWh
2005	15 000 kWh	1 500 MWh	430 (650) GWh	4,3 (6,5) TWh	43 (55) TWh
2020	13 000 kWh	1 300 MWh	370 (500) GWh	3,7 (5,0) TWh	37 (50) TWh
Total water consumption					
1998	150 l/day	53 m^3/day	15,2 (22,3) km^3/day	150 (220) km^3/day	1 500 (1 000) km^3/day
2005	110 l/day	39 m^3/day	11,2 (15,2) km^3/day	110 (150) km^3/day	1 100 (900) km^3/day
2020	80 l/day	28 m^3/day	8 (10) km^3/day	80 (100) km^3/day	800 (800) km^3/day
Total private transportation					
1998	40 (90% by car) km	14 000 km	4 000 (4 000)	40 000 (40 000) kkm	400 000 (200 000) kkm
2005	25 (50% by car) km	8 800 km	2 500 (3 500)	25 000 (35 000) kkm	250 000 (200 000) kkm
2020	15 (20% by car) km	5 300 km	1500 (2 000)	15 000 (20 000) kkm	150 000 (150 000) kkm

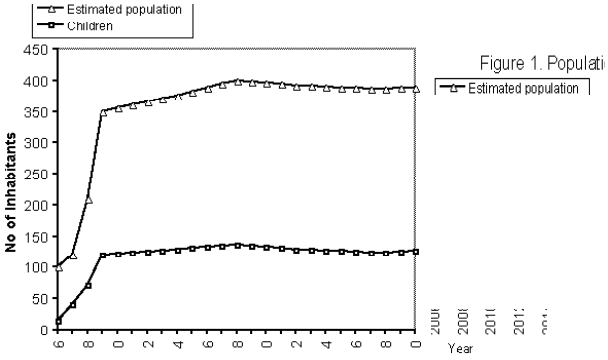

Figure 7.5 Estimated population in Hågaby 1998-2020.

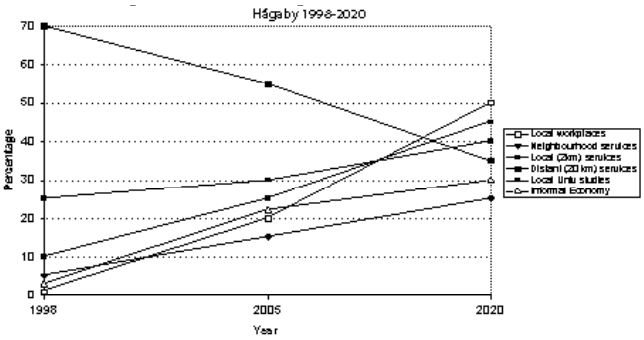

Figure 7.6 Local and distant organizational resources in Hågaby 1998-2020.

2. Economic resources

The economic resources in Hågaby before reconstruction comprised 25 houses with room for about 80 apartments with around 130 residents, three major school buildings and a village centre consisting of 4 larger service and recreational houses. A two kilometre long, ten metre wide road connects Hågaby to the rest of Uppsala City. Two smaller, six metre wide village streets, run through the neighbourhood and the school area and five short streets connect the inner streets with the main road. The parking area is large (2 cars per built household) but, as Hågaby is also a popular recreational area and as the village centre is rapidly being used for local services, the parking area will be needed for visitors and the local workforce. Existing economic resources also include sewage and water supply pipes, electric and telecommunication cables as well as garages and a large cellar storage capacity.

Land-related economic resources are two small forests (5 hectares), three smaller agricultural fields (4 hectares), a park area of 1 hectare by the school, a grass football field and a skating ground for children.

In the future the economic value of the houses, the infrastructure and the landscape will probably increase as the whole area is reconstructed and the land is replanted and developed for cultivation, fruit production and park recreation. The 22 new-built apartments will add to the economic value of the site, as this subproject, according to plans, will restore three barns to a small village centre and a modern office area. Additional economic resources will be realized successively as families and individuals move in and start various formal and informal economic and educational activities.

Houses, infrastructure and equipment

A rough estimate is that the reconstruction cost will be *less than half* of what it would cost to build the area from scratch. Basements, walls and roofs of houses, pipes, roads, lamps and even furniture are partly reused as the whole area is renewed. In the village centre, the old offices are becoming new modern part-time local workplaces. The old restaurant has been refurbished to a café and a small restaurant. The old asylum gym has been redeveloped to a combined swimming, indoor sports and work-out centre for the inhabitants and for guests. The old day-care centre for mental patients is being reorganized to become a budget conference centre. As smaller parts of land in Hågaby are rented, sold or informally left to the inhabitants to manage, a local economy will eventually evolve. By the year 2005, this informal, local economy can be estimated to account for about 10 per cent of the total economic activities in which the inhabitants are involved. By the year 2020 this figure may be more than 50 per cent - all depending on the development of the national and global economies.

Living costs and economy of inhabitants

The living costs in Hågaby can be estimated to be on the average Swedish standard in 1998. As a result of the rise of the local economy, decreasing need for distant travel, successively lower running costs for maintenance, local planning and administration and because of the development of local physical resource management practices, living costs can be estimated to be at least 5 per cent less by the year 2005. The potential is however much larger - up to 30 per cent lower living costs are fully possible.

The productivity of the workforce in Hågaby can be estimated to be on the average or slightly below the national average in 1998. This is mainly due to the investment in both time and money that all households need to make, to create the sustainable neighbourhood. It can be estimated that, by 2005, productivity will have increased above the average. A cautious guess would be that productivity in the local and the distant-economy will be at least 20 per cent above the average. By the year 2020 the local economy may have developed further, while the central economy in the dense cities can be predicted to have stagnated or recessed due to rapidly growing environmental costs for city life support.

Indicators for economic resources

One important indicator for economic resources is of course national money. It is likely, however, that *informal money* will be also already be in use by the year 1998 and increasing at least until the year 2005 in Hågaby. The share of informal economic turnover may be a new indicator on overall economic activity. A fruitful alternative individual indicator may be *the time* the inhabitants experience they have for free purposes as a result of (possibly) well-managed economic resources.

3. Biological resources

Biological resources are unique for every human habitat. Three aspects, however, imprint the landscapes surrounding any urban or rural neighbourhood. We may talk about the *natural*, the *cultural* and the *recreational* landscape depending on what specific biological resources we refer to.

Natural landscape resources

The natural landscape contains the valuable species, populations, ecotones and ecosystems, which are optimal with regard to soil, climate and present stage in the evolution of natural regions of the world. The natural landscape resources would exist without man. What may be addressed as valuable biological resources will, however, still rest on human judgement on which species of flowers, insects, other animals or micro-organisms we think are really precious.

The biological resources of the natural landscape surrounding Hågaby are particularly linked to the ecotones by the Håga river. There are, for instance, orchids and grasses linked to streaming water and a secluded, damp forest creates very special conditions for life. A large proportion of the Håga river is heavily eutrophicated, due to nutrient run-off from nearby agriculture. Some rare species of birds are therefore the result of man's actions, but they are still designated as valuable 'natural' resources.

Cultural landscape resources

The biological resources associated with the cultural landscape are partly the flora and fauna related to the agricultural practices on the site and partly the rich flora and fauna related to the grazing pastures of the site. In both cases, human manipulation of the natural landscape is the key prerequisite for sustaining the valuable species and populations that we humans value so much. Valuable cultural landscape bioresources are found in the eastern part of Hågaby near the centre of an old bronze age habitat, where horses and sheep graze the land today.

Recreational landscape resources

The recreational landscape bioresources are much more difficult to capture than those of the natural and cultural landscapes. These biological resources are characterized by their contribution to human times of rest, contact with nature, contemplation and outdoor exercise. The openness of the landscape, its variations in flora, its indentations due to forest islands, bays and glades, its visibility due to plants growing in different sizes, its colours mostly due to the composition of plants are all ingredients of the valuable recreational landscape resources. Recreational values are also coupled to the anciently imprinted desires of being alone in the forest, of experiencing bright sunlight, coloured clouds and real dark skies and bright stars. This is, on a macro scale, also coupled to the ecosystems of the site.

Indicators for biological resources

When biological resources become depleted, we must of course use scientifically founded methods to find out how diversity is changed, if valuable species are threatened or to what extent recreational landscapes are bulldozed. But we also have to couple this to the values of ordinary people in their human habitats. What is the value of biological resources in everyday life? It is probably not primarily numbers of species or monetary values of protecting biological habitats.

A good indicator may be *time quality*. It can be argued that biological resources helps us to transform linear time to circular. Linear time can be sectioned and planned whereas circular time need not or cannot be measured. Circular time can only be experienced by the individual and it reflects moments of meaningful existence without appointments. Another probable indicator may be *health improvement*.

Figure 7.7 Kings lilly (Fritellaria meleagris) is regular in the Håga river valley.

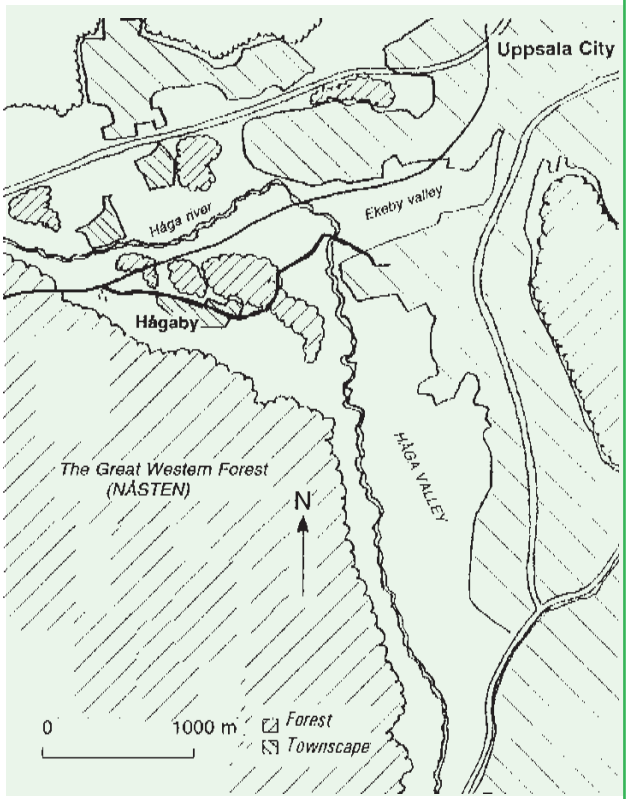

Figure 7.8 Map of western part of Uppsala with the Great Western Forest, Håga Valley, Håga River and Hågaby.

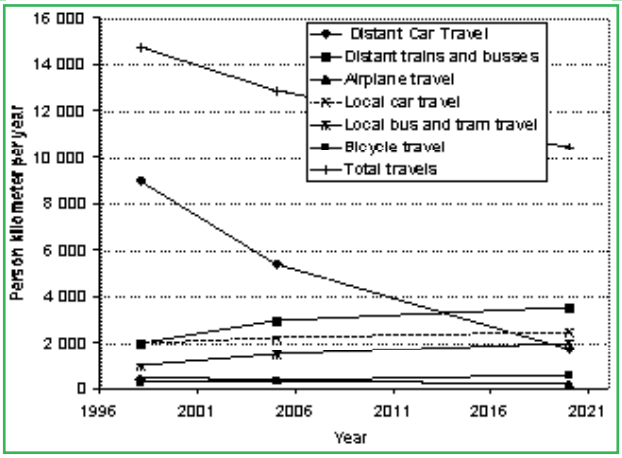

Figure 7.9. Transportation modes in Hågaby 1998-2020.

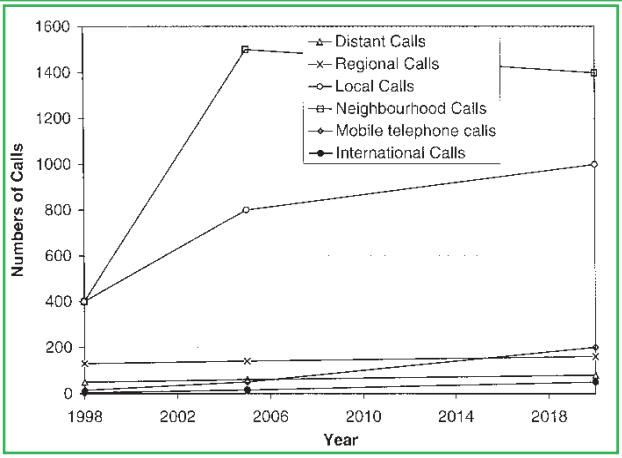

Figure 7.10. Telecommunication in Hågaby 1998-2020.

The Hågaby neighbourhood will be organized for distant as well as local life-support. This means that the provision of heating, electricity, food, waste treatment, garbage collection and other services will be dependent on the large-scale infrastructures and orders of the city, but also on local organizational resources. This may be done by developing local infrastructure and neighbourhood plans. The centralized systems can furthermore be criticized for their vulnerability, their shaky economy, and their insufficient environmental standards.

Local and distant workplaces

Hågaby will to start with (1998) only have a small percentage of local work places. But it is estimated that, by the year 2005, at least 20 per cent of paid work will be carried out in Hågaby. The increase is due to the successive introduction of information technology, a presumed persistence of unemployment in the formal economy, but also to changing popular attitudes regarding the importance of home places. By the year 2020, this trend may have consolidated further, mainly because of deepening resource and environmental crises which will have a great impact on the world economy. My estimate is that more than half of the paid work will take place in the local or semi-local level for Hågaby by the year 2020. Many inhabitants will thus organize local workplaces to minimize work travel.

By the year 1998, local services like shops, banks, libraries and schools will be available - like today - within a 2 km radius from the site. It is reasonable to believe that, by the year 2005, Hågaby will be locally equipped with neighbourhood related services such as a cooperative basic store and a combined bank, postal and primary care service. At the same time, the nearby small service centres may have recessed according to current trends. A substantial amount of food will be 'imported' from local farmers - partly to ensure a certain quality and partly to decrease the cost of living. Several small shops and cafés as well as a local cinema, library, basic medical care for children and the elderly may also have been introduced at the neighbourhood scale at Hågaby.

From 1998 to 2020, schools that cover the first nine years will be available in the area. It is a fair estimate that, by the year 2020, at least half of the university and college training can be carried out at a distance from Hågaby.

National and neighbourhood economics

What will happen in the Baltic region with regard to the partition of activity between national and local economies? This is of course hard to predict. But it is a fair assumption that the importance of neighbourhood economic cooperation will increase in many Baltic townscapes for the reasons mentioned above. To start with this may in some places result in far-reaching attempts to replace the formal economy with a local one.

Transportation and communications systems

The transportation need in Hågaby is assumed to decrease over the next 25 years. Major planning measures to ensure such a development locally have already been taken. The city bus line has already by 1997 more than doubled its journeys. By the end of 1998, the number of bus passengers can be estimated to have increased by at least five times compared to the low level of 1996. This will result in a decrease in car travel by at most ten per cent. The need for car travel can be estimated to have decreased by the year 2005 to 30 per cent of the national average of today. It is reasonable to believe - from the standpoint of environmental space - that car travel will have decreased further to 60 per cent of today's values in Hågaby by the year 2020.

On the other hand, communication activities can be predicted to increase. With the aid of a local telecom system, neighbourhood messages are estimated to increase rapidly: Distant communication is also likely to increase but at a much slower rate.

Travel over large geographical distances in a resource-depleted world is assumed to cause costly friction as distant communication promotes long-range travelling - a strong current well-documented trend.

5. Social resources

Fruitful relations between human beings constitute one of the greatest potential resources that we

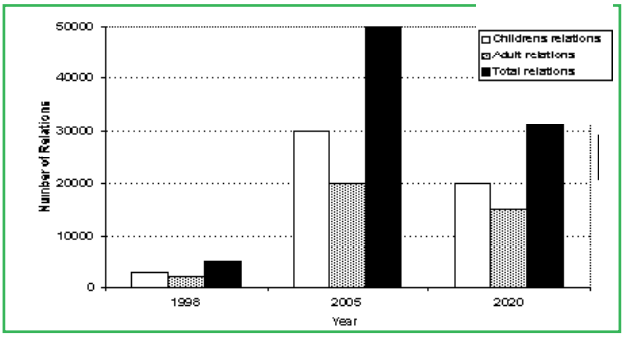

Figure 7.11 Estimated numbers of relations in Hågaby 1998-2020.

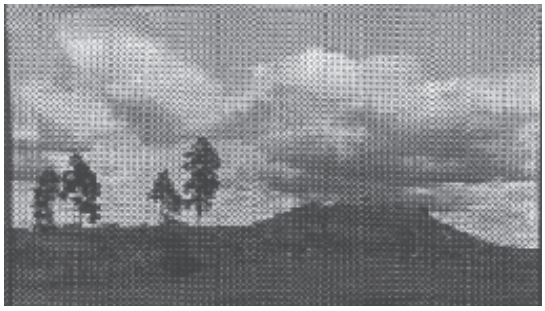
Figure 7.12 The mound of King Björn. Bronze age burial in Hågaby. Photo: Ola Ehn, Upplandsmuséet.

can imagine in a community. Peaceful, empathetic and considerate relations between people in families, in neighbourhoods, in workplaces and schools represent an ultimately scarce resource that has to be caught and nurtured if we wish to hope for a better future at all. Basic for social resources are that people are healthy and that they live basically meaningful and satisfied lives.

To release social resources, we must rely on the social upbringing, the 'village culture' of neighbourhoods and the social competence of inhabitants, which are founded from earliest childhood. The relations we must nurture are of many kinds, for instance: between children; between children and youngsters; between children and grown-ups. One particularly important inter-age relation is that between children and youngsters on the one hand and elderly people on the other.

Social competence of inhabitants

What will the social competence be among the inhabitants? An already known basic resource is that a large number of households moving to Hågaby have declared that they feel committed to environmental issues or that they are especially attracted to the landscape of Håga. Another crucial question is if time will be sufficient for the local inhabitants to communicate? Are the inhabitants willing to help and get help or advice? Many people moving to Hågaby are families with children. The estimated number of children is around 120 (up to 15 years of age), which will ensure that there will be many practical parent-to-parent problems to solve. Elderly people moving to Hågaby bring time and life experience into the neighbourhood, which in turn may be released as social resources if these groups experience the neighbourhood as considerate and secure.

The number of relations in Hågaby (weak to strong) will probably be low in 1998. The 350 people can be estimated to know on the average 5 to 10 neighbours or friends in the autumn of 1998. By the year 2005 this figure will probably have reached its maximum: a fair estimate is on the average 20 relations per person.

6. Historical resources

Hågaby has a history of human settlements that is more than 3000 years old. This means that more than 100 generations of people may have lived on this site. What is the importance of knowing this? It is my strong belief that sustainability requires time-conscious humans. The very word suggests long time spans and responsibilities towards future generations, to which present generations in turn will constitute the historical ancestors.

An awareness of the history brings us possibly existential comfort from the thought that we are a link in the chain of human effort, knowledge and experience. By knowing the history of our communities, we will grow roots and love for the places that we call home. Thus it can be argued that historical awareness promotes rootedness, stability and social sustainability in any community.

Historical time-spans

History can, however, mean different things to us. The far history tells us of our own species' character over the millennia. The modern history of the site brings stories to our imagination, by which we can understand its unique properties. The near history lets us know how other people in nearby towns and villages, how city officials, interest groups and older inhabitants have recently valued the place. The current history of the site teaches us about its present use and its changes in a modern societal context.

Hågaby has no dramatic history. No battles were fought, no plagues were raging and no well-known starvation catastrophes were knowingly linked to the site. But it carries an impressive history of sustainable living through many generations. There are some remnants from the Stone Age and rich traces of Bronze Age people, at that time living in a flourishing and abundant landscape.

Its modern history brings the story of a rural and recreational site with only a few farms and some soldiers' cottages. The Håga river had its great times when the old mill was still working during the first part of this century and when the water ran clean and vividly along its path.

Its near history tells the story of the home for the mentally retarded - in the beginning an almost entirely locally supported human habitat. It also tells us the history of our own time: the story about national and local interests in the natural, cultural and recreational landscapes of the place.