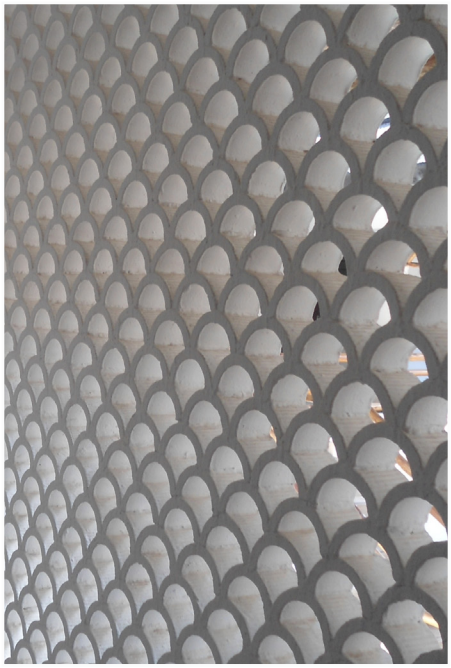

# Build Green

100 ways to save money and the environment

UN HABITAT
FOR A BETTER URBAN FUTURE

**Build Green:** 100 ways to save money and the environment



United Nations Human Settlements Programme (UN-Habitat)
P. O. Box 30030, 00100 Nairobi GPO KENYA
Tel: +254-020-7623120 (Central Office)
Fax: +254 20 7623477/4266/4267
www.unhabitat.org

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Project supervisor: Vincent Kitio
Principle author: Jerusha Ngungui
Contributors: Fredrick Ochieng'
Editor: Sue Ball
Design and layout: Jerusha Ngungui

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British High Commission, UGANDA © Adrian Hobbs

# INTRODUCTION

Are you thinking about building a new home or maybe renovating the one you have now? Why not make it "green"?

Green buildings are healthy buildings, both for the occupants and the environment. They are energy efficient, conserve resources, create healthier indoor environments and offer durable and beautiful spaces that use environmentally suitable materials. Ultimately, adoption of green building practices could lead to a paradigm shift in the building industry, with sustainability meticulously embedded in its practice, products, standards, codes, and regulations.

Constructing your home in an environmentally responsible manner requires a great deal of planning, as well as educating architects and builders and urging them to seek out greener materials and construction techniques. Local governments and private industry often do not have the resources to do the research that is needed to assemble information on sustainable practices, assuming such information is readily available.

The 'Build Green: 100 ways to save money and the environment' guidebook is written to fill that void. In its pages, we have consolidated and prioritized information from the scattered and growing body of knowledge of green building. The guidebook's primary intent is to provide a resource for building professionals in which they will find suggestions for green practices through the full cycle of a building project - from site planning to building design, construction and operation. Its most crucial consideration is balancing economic and time input with personal and environmental benefit.

This booklet is intended as a general guide to the basics of green building for your home. Exciting opportunities exist beyond its scope if you are planning a major commercial sized building project. We highly recommend that you tap into the references listed in this booklet for more detailed information, to make your project even greener. The building professionals who will find this guide a useful resource include; homeowners and developers, planners, architects, interior designers, engineers, contractors, property managers, landscape architects, product manufacturers, utility companies, building tenants, maintenance staff, and local government officials.

We hope that you will find this guidebook a valuable resource for advancing your adoption and daily practice of green building principles – a necessary and vital step towards recognizing the need to conserve our Earth's natural resources.

# A. SITE ANALYSIS

### 1. Select a suitable site

The location of a building within a piece of land can have a significant impact on energy bills. Make sure that the selected site allows for proper orientation of the building to minimize heat gains and take advantage of the prevailing wind.

Development of previously used sites such as brownfield sites is likely to improve the immediate environment and the community. However, wetlands, floodplains, steep slopes vulnerable to erosion and vegetated areas should be avoided to preserve the natural ecosystem.

### 2. Do not ignore the topography

Topography and adjacent landforms affect solar access, daylighting, airflow within the site, building proportions, floor elevations, drainage strategies etc. The slope of the land determines the possibility of using gravity drainage systems.

To benefit from passive solar gain for heating, a south facing slope is best in the northern hemisphere while a north facing slope is preferred in the southern hemisphere.

### 3. Check the groundwater and surface runoff characteristics

When deciding on the location of a building, you should take into account natural storm runoff channels according to the slope of the land. This helps to divert stormwater from the building as well as to determine the most suitable location for runoff detention ponds.

### 4. Consider the solar access

The position of the building should take maximum advantage of solar access for passive solar heating (in cold climates), daylighting and generation of electricity by using photovoltaics.

### 5. Make use of diurnal and annual patterns of air movement

The prevailing wind patterns and their average speed and direction on a particular site should be investigated as they influence the siting of multiple buildings. The wind should be exploited to improve natural ventilation, therefore, providing fresh air for building's occupants as well as maintaining acceptable levels of air quality. It is also useful for passive cooling in warm weather.

### 6. Check the characteristics of the soil and its load-bearing capacity

When selecting a site, it is very imperative to check the soil as it determines the most appropriate type of foundation to be used. It also influences the choice of the most suitable stormwater drainage. The soil should be tested to check its suitability for backfills, slope structures, infiltration rates and compactibility as well as to identify the presence of contamination from industrial activities. These tests are crucial for determining the feasibility of the site and for identifying the most suitable construction methods.

### 7. Consider the surrounding buildings in your design

Neighbouring buildings should be considered in the design of a proposed development as they have the potential to affect it in terms of daylighting, shading, ventilation etc.

### 8. Consider sources of pollution

Select a site away from major sources of pollution. Activities that are likely to cause air or noise pollution should be sited away from areas where they are likely to cause disturbance to occupants. However, if the site is located near noisy areas such as roads, the building should be set as far back as possible. In addition, non-occupied spaces such as parking lots and landscaping features such earth berms may be used as sound buffers.

## 9. Design for your climate

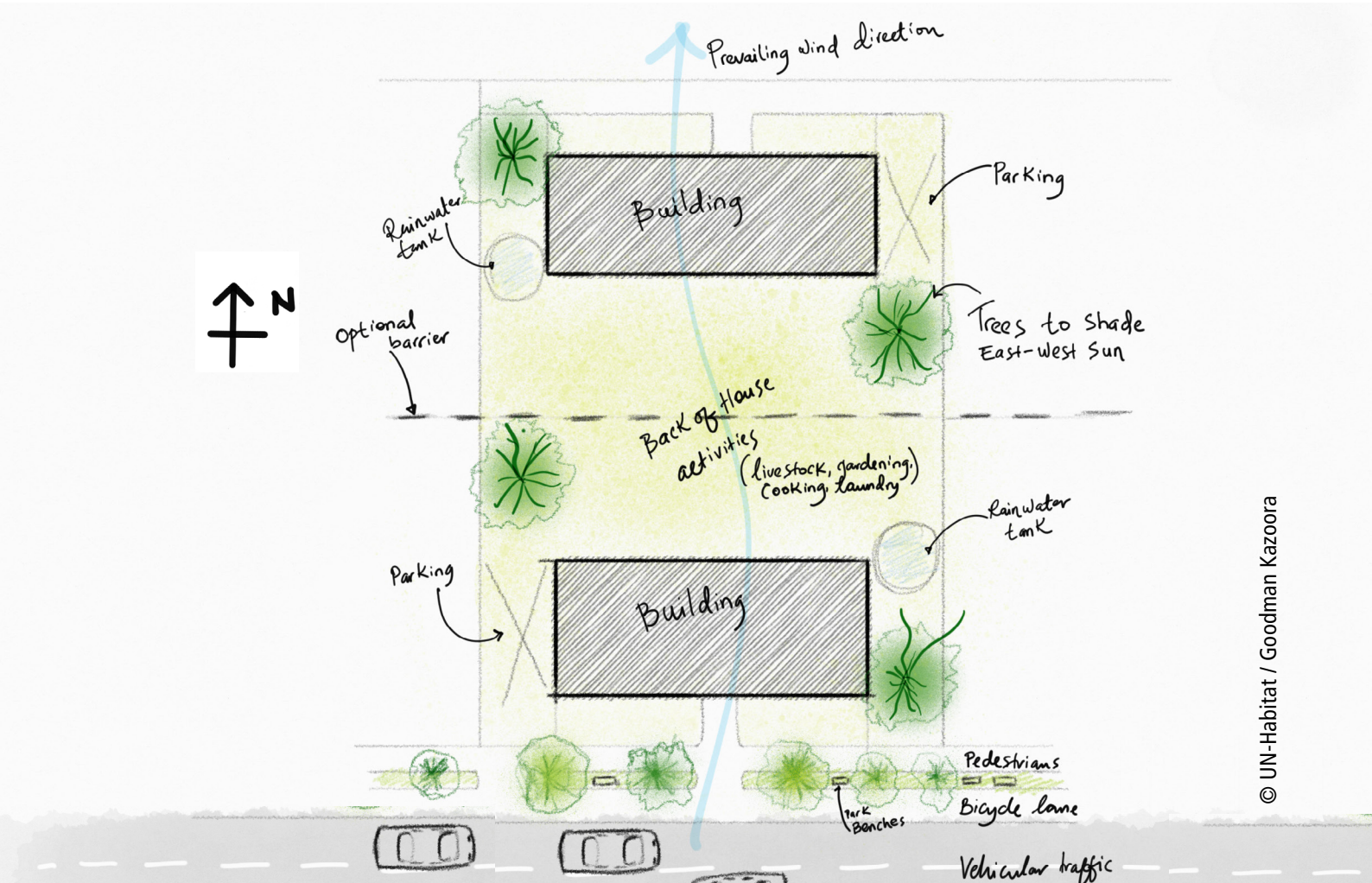
It is critical to consider the local climate at the start of the design process. Climatic factors including air temperature, wind, solar radiation, humidity and rainfall have a major influence and should be considered in the energy-conscious design. These factors affect the layout and orientation of the building and they enable selection of the most appropriate building materials for a particular climate.

## 10. Create walkable neighbourhoods

Ideal sites are either where occupants can walk or cycle to the shops or their workplaces etc. or are located close to public transport nodes. Therefore, sites for new buildings should be selected where the energy consumed for transport can be minimized. Short streets encourage pedestrian movement. They also provide air movement corridors for natural ventilation and passive cooling.

## 11. Use appropriate construction methods

Sustainable construction methods that eliminate unnecessary site disruption, as well as degradation of the natural resources at each step of the building process, should be used. In addition, the building process should be planned in such a way that there is an orderly sequence from site clearing to end of construction. This ensures that there is minimal damage to the site and reduces costs.



# B. BUILDING LAYOUT

### 12. Base the orientation of rooms on the movement of the sun

Orient the building according to the movement of the sun in order to avoid unwanted heat gains or losses.

Generally, the ideal orientation of buildings in a tropical climate should be along the east-west axis with the long façades facing north or south and the shorter sides facing east or west. This gives good access to daylight and reduces unwanted heat gains from early morning and late afternoon solar radiation on the east and west façades respectively.

Spaces that are used the most should be oriented to face north in the southern hemisphere and south in the northern hemisphere in order to minimize heat gain and maximize daylighting. Building services such as elevators, lobbies, toilets, ducts, stores and staircases should ideally be placed on the east and west sides of the building to act as buffer zones against the intense solar radiation that strikes the building in the morning and afternoon.

### 13. Build better, not bigger

Through careful design and optimization of interior space, you can achieve a well-designed building with a smaller carbon footprint. Smaller, more efficient units use significantly fewer resources for construction and less energy to operate.

### 14. Design for efficiency

An efficient building layout can be achieved by locating spaces with similar technology requirements such as plumbing, HVAC systems etc. close to each other, in order to minimize materials and energy losses. As already mentioned in 12., secondary spaces such as toilets, staircases, elevator shafts, stores and ducts should be located on the east and west sides of a building to act as buffer zones against the intense morning and afternoon sun.