

Building Sustainable Cities

by Rainer Nordberg

A vast number of developing countries are trying to achieve sustainable economic growth and a more equitable distribution of the benefits of growth. In the attainment of these goals, the construction sector can play a major role. Construction accounts for a large share of total capital formation and it is often second only to agriculture as a source of employment. Hence it is important to examine this role and analyse some of the major problems confronting the construction industry in developing countries today, identify factors impeding its growth and suggest measures to be taken to promote sustainable construction in developing countries.

Implicit in the attainment of development goals is the development of physical infrastructure (water supply, electricity, roads, bridges etc.) and buildings (industrial and commercial structures, schools, hospitals and housing), i.e. outputs of the construction sector. In many developing countries, the construction sector constitutes one of the most important industrial sectors. There is not a single human activity in which construction is not involved. Indeed, the building materials and construction industries are the basic means for the construction, expansion, improvement and maintenance of all human settlements.

Existing situation in developing countries

In many developing countries, the construction industry is not fulfilling its potential role in development. A number of countries experience difficulties in the execution of construction projects. This is due to factors such as inadequate capacity for the planning and design of projects, difficulty in obtaining tenders for small projects in which international contractors are not interested or for projects which are too large for local contractors to handle, inefficiency in planning, design and construction, and difficulties in obtaining materials and other crucial inputs. Delays are common and represent a physical constraint on development.

Where construction projects are implemented, the cost is often higher than anticipated, and this represents a financial constraint on the successful implementation of development plans. This is due to various factors such as poor estimates, variations by the client, inappropriate technology and design, inappropriate tendering and contractual procedures, inefficient on-site supervision and construction management.

In a large number of countries, the import content of construction activity is high. It has been estimated that up to 30 per cent of the value of gross output may be accounted for in imports, which may comprise up to 60 per cent of all materials, as well as a significant percentage of professional, managerial, supervisory and even craft skills. In addition to finished products, developing countries are importing factor inputs such as machinery, energy and raw materials. In addition, most of the profits of foreign-based construction firms may be remitted out of the country. The increasing dependence on imports has imposed a severe strain on the balance of payments and fuelled inflation.

The construction sector as a whole requires a higher percentage of skilled labour than manufacturing. In addition, good management and supervisory skills are important for the efficient execution of construction projects. In most developing countries, there is a severe shortage of all kinds of skilled labour for the construction industry. Thus, a large percentage of the skills required are not available locally. Moreover, apprenticeships and vocational training schemes appear to be grossly inadequate in both quantitative and qualitative terms.

As a consequence, the local contracting industry is not sufficiently developed. The degree of local participation in contracting varies, but it is common for local contractors to operate only on small residential projects while the larger industrial and commercial projects are awarded to foreign-based construction firms. This is the case even in countries where there exists a strong entrepreneurial tradition.

The majority of small-scale firms are forced to operate informally because the construction in which they are involved does not comply with the building and planning standards. As compliance with the building codes would make construction costly, and thus unaffordable to the majority of the population, official building permits are seldom obtained. In addition, the administrative procedures to obtain building permits are time consuming and the process for registration of firms is complicated and costly, frequently due to corruption. As the small-scale firms operate informally, they cannot participate in competitive tendering. They are also not in a position to take care of insurance, bonds, nor to secure sufficient working capital and/or materials credit to finance projects when payment by client is delayed.

Although most developing countries are endowed with abundant natural resources that could meet the demand for basic building materials using largely indigenous inputs, the local production of building materials in a large number of countries does not meet demands. In many countries that produce cement, there are severe bottlenecks in the supply of this material due to demand fluctuations and lack of capital for the build-up of supplies, or inputs. In cement producing countries, cement is often regarded as a local product even when 60 per cent of the production cost is due to imported energy.

Likewise, there is a scarcity of many other locally produced building materials, such as aggregates, bricks, tiles, limestone, etc. In some countries where there is a monopoly in supply, shortages have been created deliberately in order to force up the price. The scarcity of building materials has also affected development plans in other sectors, including agriculture, health and education. The steep rise in prices of land and building materials has effectively removed decent housing from the reach of low-and medium income groups in most developing countries.



A self-help housing estate in Latin America: Lack of affordable building materials impedes self-help construction efforts.

The lack of affordable building materials impedes self-help construction efforts, especially in slums and squatter settlements, where the majority of the urban poor live. This forces the urban poor to use inappropriate building materials such as cardboard or mud to improve or build their housing.

Underlining causes of the problems

There are many reasons why the construction industry in the majority of developing countries is not presently fulfilling its potential role in development. A number of factors, such as inadequate infrastructure, poor transportation, lack of capital and, low level of skills are problems that may be expected to occur in any developing country. However, because government policy actions set the economic and legislative environment in which the construction industry operates, public policies have far reaching effects on the industry.

In many countries, public policies and regulatory frameworks do not encourage the development of the construction sector. Policies that negatively affect the growth of the industry are often related to technology imports, government subsidies for certain materials, distribution and pricing control of the industry. Other constraints include barriers for small firms to register, prejudices against small-scale firms participation in competitive tendering, and monopolistic trends in the large scale sector. The small construction firms, which build most residential construction, are particularly affected by the restrictions imposed by outdated building codes. In many countries, construction of low-cost housing is made illegal through building codes that forbid the use of low-cost materials. As banks and insurance companies do not approve loans for buildings constructed with these materials, low-income households which can only afford low-cost materials are excluded from housing loans.

In order to meet the demand for building materials, many governments have played an active role in the supply of basic building materials such as cement. In countries where cement is not produced, governments have either controlled the price or provided import tax relief on imported cement. This has often curtailed competition, distorted the market and impacted negatively on local production of building materials. For instance, in Mayotte, the importation of cheap cement from neighbouring countries has negatively affected the earth construction programme that has been successfully implemented over the past twenty years.

The situation is aggravated by the widespread adoption of designs and technologies, that have been developed in a very different context in advanced industrialized countries. These designs and technologies are often unsustainable and



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inappropriate in light of supply of local resources and indigenous social and economic conditions. They increase dependence on imported plant, materials and equipment, as well as foreign professionals and contractors, while inhibiting the development of local resources. This applies to construction of infrastructure as well as buildings, in both the public and the private sectors.

The acceptance and use of technological innovations by the industry has been slow due to various factors. Innovative materials and technologies developed by government research institutes are seldom used by governments in their own construction activities. Frequently, even government tenders for low-cost housing projects specify expensive conventional building materials and technologies instead of proven low-cost technologies developed by government research institutions. Due to lack of public sector demonstration projects, contractors stick to the "proven" technologies that are often unsustainable from the social, economic and environmental point of view, and wide application of new innovative building materials and technologies is impeded.

The role of governments in the construction process

Yet, governments can play a crucial role in reversing the trends and ensuring the development of a sustainable construction industry. They can do this both indirectly, through legislation and planning controls, and directly, through their involvement as client, designer, supervisor and/or producer in the construction process itself.

Firstly, governments in all countries are responsible for the formulation of general economic and social policies and for the enactment and enforcement of legislation to ensure that these policies are carried out. Thus, governments can indirectly stimulate construction in the public as well as private sector, through fiscal and monetary policies. Such policies may include the protection of local industry through the imposition of restrictions on imported machinery, plant, equipment and building materials industry, provision of tax relief to the local contracting and building materials industry, the stimulation of employment through the provision of subsidies and the promotion of apprenticeship training through the operation of a grant/levy system involving local and international contracting firms.

Secondly, governments can influence the construction sector through the enactment and enforcement of building codes and planning legislation **that encourages self-help building**. Outdated building codes, often inherited from the colonial era, hinder technological innovations and curtail new housing construction. In many countries, only the top 10 per cent of the households can afford houses that meet local building codes. Where most houses are built from earth, there is a need to prepare an illustrated Earth Building Code (following the example of India, Australia, Mexico and many States in the USA) to improve the quality of earth-based building materials and to guide artisans, contractors and self-help builders in the construction process. Similar handbooks have been prepared for the use and manufacture of other locally available building materials, such as bamboo, stone, timber etc. This, in addition to simplifying cumbersome bureaucratic procedures for obtaining building permits, could stimulate housing construction undertaken by the small-scale contractors and self-help builders.

As security of tenure has proven to be the best impetus for self-help housing construction, governments should increase the supply of serviced land. To this effect, governments can create land banks, streamline acquisition procedures, ease leasing conditions, update land cadastres and taxation systems. To reduce the price, instead of providing "fully serviced" plots, municipalities could offer land that is only serviced with minimum utilities. There is a need to develop innovative solutions and appropriate designs for small plots, thus reducing the land and the overall development costs for the poor.

One of the key factors for the success of self-help building is training. Lack of the "know-how" and building skills is often a major obstacle confronting self-help builders. Therefore, there is a need to reinforce and build up local capacity in self-help building. Training of local builders should combine theory, experimentation and practice through the actual implementation of small-scale housing and community projects.

Thirdly, governments can have a more direct influence on the construction process through their role as "clients" of the construction industry. Central and local government programmes account for a variable, but generally large, proportion of total construction output. Responsibility for the commissioning of construction projects is often widely diffused

throughout the public sector of the economy. Those most directly concerned are the agencies responsible for transport and communications, defence, education, health, housing, local authorities and parastatal organizations.

Most countries have one central government department, often referred to as "public works", which is responsible not only for a large part of the central government's building programme but also for the main network of infrastructure (roads, bridges, harbours, airports etc.). As "clients", governments are in a position to exercise a great deal of control over the type, standards, technology and methods of execution of construction projects. This is so even if governments merely commission the services of the private construction industry for the design and execution of their construction programme. In order to boost local production of building materials, government agencies responsible for construction works could insist on the use of locally produced materials. In the selection of consultants, preference should be given to those who have a proven record of thinking low-cost.

In many countries, the public sector can exercise even a greater degree of control by assuming direct responsibility for the design of their projects themselves. Many Public Works ministries have their own "in-house" designers and construction, maintenance and repair teams. In some cases, specialized ministries or departments of central government may have the mandate for the design, construction and maintenance of their facilities. Such "in-house" teams may even be found at the local government level.

The experience gained by UNCHS (Habitat) over the past decade in its effort to promote local capacity building in the building materials industry provided some important lessons on how to improve productivity, especially in the construction industry. Briefly these are:

- (a) Improving the efficiency of investments and stimulating private sector investment in the sector through fiscal policies;**
- (b) Restructuring the industry with increased vertical and horizontal integration through such mechanisms as sub-contracting, industrial estates, etc.**
- (c) Provision of industrial extension services to small construction firms in the following areas:**
 - Credit support
 - Marketing support through industrial cooperatives, producers associations etc.;
 - Technical advice in feasibility studies, tendering, construction management and quality control
 - Procurement of raw materials, equipment etc.

In order to promote appropriate planning, design, construction and maintenance, the Habitat Agenda, adopted at the United Nations Conference on Human Settlements in June 1996, recommends specific action, *inter alia*, in the following areas:

- Supporting research in appropriate planning and design techniques, norms and standards
- Strengthening the capacities of training institutions to increase the supply of skilled construction workers
- Making use of contracts with CBOs and the informal sector for construction and maintenance of housing and services
- Providing training to professionals and practitioners to update their skills
- Facilitating access to credit for the private construction sector at reasonable interest rates
- Providing technical assistance to CBOs and others engaged in self-help.

To promote local production of environmentally sound and affordable building materials, the Habitat Agenda recommends that governments take the following actions:

- Supporting small-scale building materials industries through legal and fiscal incentives, access to credit, research and information.
- Providing policies to facilitate fair market competition
- Promoting information exchange of appropriate building technologies
- Reformulating and adopting building standards and by-laws to promote the use of low-cost building materials
- Promoting partnerships with the private sector and NGOs for the commercial production and distribution of building materials.

These recommendations should be taken seriously in order to build cities which are truly sustainable.

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