

Resource development for sustainability in construction -A case study

Murtaza Ali Shah

*Director, Resource Development Institute, Rawalpindi, Pakistan &
Visiting faculty, Allama Iqbal Open University, Islamabad, Pakistan
E-mail: professional_rd@yahoo.com*

Attaullah Shah

*Project Director Allama Iqbal Open University Islamabad
and part time PhD scholar Engineering University Taxila-Pakistan & Visiting faculty Resource
Development Institute. E-mail: pdaiou@yahoo.com*

Abstract

The developing countries require extensive investment in the infrastructure sector to provide opportunities of better living, education and employment to the people. The Public Sector Development Program (PSDP) of Pakistan has soared up from US\$1.7 billion to US\$ 8.7 billion during last eight years. Construction Industry- a major developmental index has been increasing @ 12% per annum in the period. However there is a serious threat to the sustainability of the environment due to over- consumption of natural resources, poor quality of work, and lack of awareness on the sustainable construction practices. The dilemma is common to all developing countries

The case study focuses on Human, Material and Technological Resource exploration, development and their judicious utilization in the construction industry of developing countries with special reference to Pakistan. These sustainable practices if promoted and adopted will open business opportunities to international firms in the construction market of Pakistan with an annual turnover of more than US \$5 billion.

Keywords: Infrastructure, public sector development program, Human, technology, Pakistani.

Introduction

Sustainability is a theme. Peace and tranquility-a dream, which may come true if mutual cooperation and trade, are held in a high esteem at global canvas. The World Commission for Environmental Protection & Development (WCED) has described sustainable development as
"Development that meets the needs of the present without compromising the ability of future generation to meet their needs".

In thematic pursuance, though, it is true that the Construction Industry is one of the major developmental indices of a country, yet, there is a dire need to evaluate its adversities on the natural resources and ecosystems. In fact, the concept of sustainable development is probably the most pertinent theme for the Construction Industry as it consumes natural resources at an enormous scale.

The Construction Industry in many forms and manifestations is devoid of candor, trust and technology particularly in the developing countries. As, the natural environment is professed to be global property, therefore, the claims and blames should be equally shared by the global key players. They must come forward and invest in long term community, corporate and global gains by sponsoring Resource Development theme.

Resource Development theme is to carryout research and development in the field of construction with focus on grooming the professionals, exploration of compatible local building materials and induction of the latest technology. Institutional and industrial linkage in its true form is its guiding principle. An institute has already been created by one of the stake holders in Pakistan with a capacity building theme for a sustainability cause and community service. The institute provides a harmonious platform for a better resource and industrial linkage, funding, test trial and on-job training facilities. The organization which undertakes mega construction in the Housing Sector with a recurring budget of over 100 Million US dollars, is now exploring global partnership to expand its business through rapid construction technology, concepts of green architecture, ecological design and eco-friendly materials.

Scope

The scope of this paper is to elucidate the need for capacity building and resource development, specially, by the stake holders of Construction Industry for national and global sustainability. The paper also gives an exposé of the market opportunities and strategies in most simplified forms.

Case Study: Impact of delays on the cost over runs of the construction projects

Project as defined by PMI is an endeavor to create a unique product of services². The success of the project lies in the completion of the projects with in the constraints of cost, time, quality and scope. The end product must satisfy the customer to achieve the organizational objectives.

Despite the availability of funds, the projects in the developing countries take more time, thus, leading to tremendous cost over runs. There are under- construction residential colonies which are incomplete for the last 20 years in Pakistan³. Colonies are expected to remain in progression for the next 20 years, hence, defacing the entire environment due to inordinate delay.

This is also taking a heavy toll on the most valuable agricultural lands which are being reserved for such sick colonies. These lands could have been profitably utilized for a few more years for the agriculture produce rather than abandoning them much earlier for the incompetent handling of the constructors. These delays are basically due to lack of availability of the appropriate technology, poor project management and lack of strategic thinking. An audit of one of the best stake holders, involved in construction of over 1500 houses per year, shows a significant room for improvement only on grounds of time management. A cost analysis of the organization shows a loss of 60.06 M US dollars only on this one account - time delay. Be that as it may, the timely completion is only possible through availability of requisite resource in terms of human, material and technology means.

Details of the model under discussion

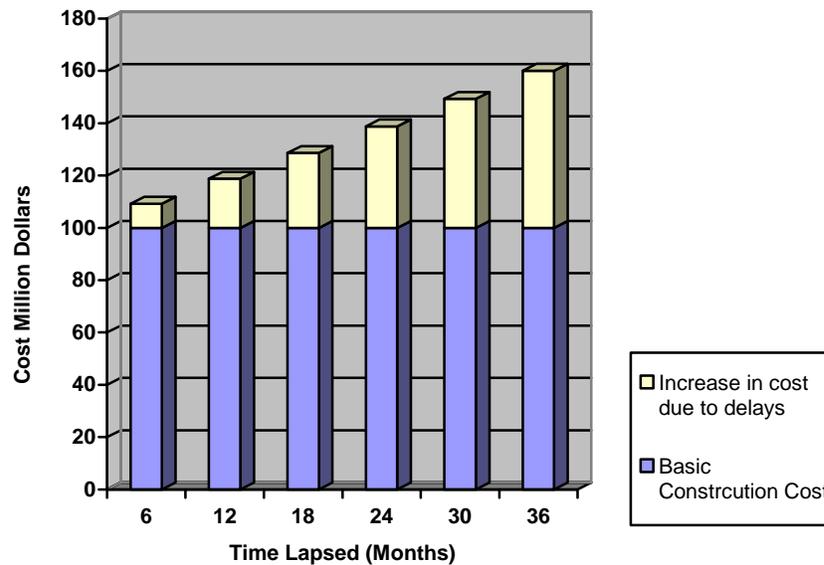
Total no of houses	-	1500 per annum
Average covered area	-	400 sqm
Total covered area	-	0.6 M sqm
Average construction rate including 10% profit margin	-	167 US dollar per sqm
Total cost	-	100.20 M US dollars (Say 100 M US dollars)

Table 1: Cost over runs due to delays of project and poor quality of work.

	Items of cost impact due to delays.	Cost over runs in(Million US \$)						
		Basic price	Time lapsed due to delays(months)					
			6	12	18	24	30	36
	Basic Project Cost : US \$100 Million							
1	Management @ 10%	10						
	Increase of 5% every 6 months due to increased salaries & benefits (Compounded 6 monthly @5% half yearly)		0.50	1.03	1.58	2.16	2.77	3.400
2	Escalation in basic prices due inflation @ 7.5 % per annum (compounded @ 3.75% half yearly)		3.75	7.64	11.68	15.87	20.21	24.72
	Wastage/ Leakage @ 5% (Compounded@2.5% half yearly)		2.50	5.06	7.69	10.38	13.14	15.97
3	Defects/Rework shall increase@ 5 % (Compounded @2.5% half yearly)		2.50	5.06	7.69	10.38	13.14	15.97
	Total		9.25	18.79	28.64	38.79	49.29	60.06
	Revised Cost of project		109.25	118.79	128.64	138.79	149.29	160.06
	Average % increase in cost.		9.25	18.79	28.64	38.79	49.29	60.06

Note: The inflation has been estimated on Inflationary trends give by Pakistan Statistical Bureau⁵.

The cost over runs are graphically depicted in the Fig1



Findings

The delays in the completion of project, besides the cost over runs lead to the following indirect costs;

- Poor image of the organization.
- Frustration and dissatisfaction of the end user.
- Poor quality of work as the quality is traded off for completion of the projects.
- Wastage, Re-work and pilferage of material.

Hence the construction industry, specially the housing sector, in the developing countries can not deliver the desired results unless proper resource and time management is followed religiously.

Unfolding of Research Development Institute (RDI)

Realizing the grave effects of delays in construction, the stake holders (Askari Colonies Developers) felt the necessity to form a body of experts for the guidance of their professional and unskilled construction staff. The aims visualized for this body were to suggest and conduct appropriate training in robust construction techniques, good designing and engineering, enforcement of construction standards and to carryout research for further improvement in this industry. This setup, now known as Resource Development Institute (RDI), is also tasked to train the raw younger lot in various fields of construction. The RDI works with the following objectives:-

- To develop, impart and promote the science and art of safe and sound construction techniques and technology through global affiliations, certifications and manifestations.
- To promote good engineering, designing, consultancy and construction standards/practices with emphasis on professional harmony and ethics.
- To motivate, educate and facilitate the younger individuals to acquire knowledge and skill and provide them certification, diplomas, degrees and matching employment opportunities.
- To sponsor entrepreneurs into big construction firms through construction management / capital in order to control the construction cost and enforce the construction standards.
- To conduct high-quality research to improve construction processes, by engaging highly qualified and motivated research scholars.

Organisational / Functional Tiers:

RDI is linked in institutional and corporate chains. The institutional chain conducts:-

- Craftsmen Training
- Technical Education
- Executive Management Courses
- IT Courses

The Corporate chain is organized into 3 major groups:-

1. Design & Consultancy Group
2. Construction Group
3. Research & Development Group

Local Perspective

There are organizations and firms which badly need resource development for human, materials and technological advancements. Though, there are a number of institutes available, yet, the true industrial linkage is missing. Resource Development Institute (RDI) is one such big theme which provides full solutions related to construction and its allied fields under one roof. The organization has trained over 1000 individuals related to the industry in past one year. Besides training,

design/consultancy and construction business is amounting to 100 M US dollars, with a rapid expansion.

Global Perspective

While the advanced knowledge and technological superiority give an upper edge to the developed countries, the global sustainability theme also entrusts them with a responsibility to assist the developing countries in technological reforms and capacity building. Apart from the very lucrative and significant markets provided by the developing countries, the developed countries also have a moral onus to invest here with the noble and global objectives through trade and Construction Industry. Although, the marketing through governmental levels may not be very viable due to bureaucratic procedures, yet, the major stake holders, like RDI can provide guaranteed business to their global partners following fields:-

- **Human Resource.** Highly educated and experienced research scholars and master trainers from advanced countries have excellent employment opportunities in Pakistan and the trained and educated craftsmen, supervisors and construction managers can be provided to developed countries on most competitive rates.
- **Material and Technology Development.** Local resource, compatible and environmental friendly materials and technologies are required to be improved so as to be brought to the international levels. The green building concept and the Eco factor are most needed in the developing countries⁵. At least Pakistan is in an urgent and dire need of pre-cast technology to meet the ‘Do It Yourself (DIY)’ concept. Had this trend been brought into practice, the earthquake affectees would have found shelters long ago. Therefore, any advanced technology in construction would offer enormous profits to the investors.
- **Alternate Means of Energy.** Pakistan is best suited for Solar Energy System due to round the year availability of shiny sunny days⁶. To off set the unaffordable initial cost the concept of BOT is to be adopted. There are companies and organizations which can jointly invest and can encourage/help foreign investment and technology. The RDI is involved in the development and management of colonies comprising over 25000 houses which can be provided with solar energy on BOT basis, if affiliated with foreign concerns/investors.
- **Environmental Engineering.** There are enormous environmental hazards due to abandoned open waste and flawed sewerage disposals. In Pakistan, the establishment of modern

environmental engineering on BOT basis would be a welcome step through a Joint Venture (JV) undertaken by Resource Development Institute (RDI) and the foreign investors. A venture to recycle the sewerage and waste water can prove to be exceptionally profitable. The recycling of waste for agricultural use can provide a great opportunity.

- **Information Technology in the Construction industry.** There is an excellent scope for software development related to the Construction Industry. Animation business has a great opportunity due to affordable infrastructure and human resource.

Conclusion

RDI is the outcome of a sincere, earnest and holistic thinking with an aim of promoting sustainable construction practices with training & development of human resource, infusion of innovative technology, use of appropriate local building material & techniques and creating awareness in the people towards safe building construction. Today RDI has emerged as a company and an institution having a guaranteed and recurring indigenous business and a strong say in the field of construction in Pakistan. RDI invites the firms of repute to join it for the august and profitable global partnership.

References

1. United Nations Report of the World Commission on Environment and Development our Common Future UNA/42/427, 1987.
2. “Project Management Body of Knowledge”- Project Management Institute of USA.
3. Official Record of Construction Firms dealing with Askari Colonies – Pakistan.
4. Time to propagate Green Building Construction Concept for saving precious Resources/Sustainable Development, by Mr Zahid Ali NISTE Islamabad Pakistan
5. Prospects of Renewable Energy Technologies in Pakistan by Tajammul Hussain, Amir Siddiqui, Pakistan.
6. Solar Cities by Susan Roaf Manuel Fuentes and Rajat Gupta.