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LOCAL COMMUNITIES IN CONSTRUCTING SUSTAINABLE RURAL HOUSING IN DEVELOPING COUNTRIES

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ABSTRACT

Building constructing can contribute to global sustainability through sustainable communities, construction and technology. Thus, housing policies in rural areas could be a productive experimentation field for sustainable building practices considering the triple aspect of community, construction, and technology. In a complex setting of action, some fundamental aspects of the problem come out, such as forms for grass root involvement, introduction of common knowledge in re-qualification plans and construction of a new form of knowledge for sharing practices to be implemented. Therefore, the issue, in which this paper tries to address, is in what way more attention can be given to improve the policies for sustainable construction in the rural areas. To tackle this issue, Sustainability needs to be understood in an integrated view. Sustainable construction should not be viewed separately from sustainable urbanization and development. In order to conceptualize it, it is necessary to contemplate the natural, social and built up environment as manifested in the urbanization and the construction processes, and incorporating the urban and architectural design activities.

Keywords: Sustainable Construction, Rural Housing, Local Communities; Developing Countries.

1. INTRODUCTION

Sustainability needs to be understood in an integrated and integrated view. In this line, sustainable construction should not be viewed separately from sustainable urbanization and development. In order to conceptualize it, it is necessary to consider the natural, social and built up environment as manifested in the urbanization and the construction processes, and incorporating the urban and architectural design activities as spatial expressions thereof. According to the UN Agenda 21, sustainability has Environmental, Social and Economic aspects. (CIB & UNEP-IETC,2002)

2. SUSTAINABLE CONSTRUCTION; THE DEBATE

The issue of sustainable construction lies within a broader international debate on sustainable development. This debate has been hampered by the perceived ambiguity, and even contradictory nature of the concept and its associated terminology. Its all-encompassing nature and inherent complexity have also made the concept vulnerable to large-scale co-option by agencies within the international development community and multinational business arena. Agencies that very often use the term “sustainable development“ for promoting activities that remain essentially based on an unsustainable development model that is polluting the ecosystem, increasing inequity and social exclusion, and

consuming resources at a rate faster than nature can replace them. The terms “sustainability “and “sustainable development “are the main sources of confusion. They are often seen as describing two different ideologies, with sustainability seen either as pure economic viability, or as an environmental concept promoting the maintenance and repair of current environmental conditions and, in the extreme, a return to some kind of noble savage state. In contrast, sustainable development is seen as the more progressive approach promoting the goal of sustaining current development. However, within the construction sector we also find terms such as “sustainable settlements/cities“, “urban sustainability“, and “sustainable construction that need clarification. (UNCHS 1996).

2.1. The "Brown" and "Green" agendas

The Green Agenda concentrates on reducing the environmental impact of urban-based production, consumption and waste-generation on natural resources and ecosystems, and ultimately on the world’s life-support systems. In general, the Green Agenda, which focuses on the problems of affluence and over-consumption, is more pressing in affluent countries. The Brown Agenda, which focuses on the problems of poverty and underdevelopment, emphasizes the need to reduce the environmental threats to health that arise from poor sanitary conditions, crowding, inadequate water provision, hazardous air and water pollution, and local accumulations of solid waste. The Brown Agenda is therefore more pertinent in poor, under-serviced cities or parts of cities.(IIED 2001)

2.2. The relationship between terms

The relationship between these terms can be explained as follows: Sustainability is the condition or state which would allow the continued existence of homo sapiens, and provide a safe, healthy and productive life in harmony with nature and local cultural and spiritual values. It is the goal we would like to achieve.

- **Sustainable development** is then the kind of development we need to pursue in order to achieve the state of sustainability. It is a continuous process of maintaining a dynamic balance between the demands of people for equity, prosperity and quality of life, and what is ecologically possible. It is what we need to do.

- **Sustainable human settlements** are those cities, towns, villages and their communities that enable us to live in a manner that supports the state of sustainability and the principles of sustainable development.

- **Urban sustainability** is the broader process of creating sustainable human settlements, especially towns and cities. It includes sustainable construction, but also the creation of institutional, social and economic systems that support sustainable development. [Hall, P. and Pfeiffer, U. (2000)]

- **Sustainable construction** means that the principles of sustainable development are applied to the comprehensive construction cycle from the extraction and beneficiation of raw materials, through the planning, design and construction of buildings and infrastructure, until their final deconstruction and management of the resultant waste. It is a holistic process aiming to restore and maintain harmony

between the natural and built environments, while creating settlements that affirm human dignity and encourage economic equity. [Sachs, I. (1997)]

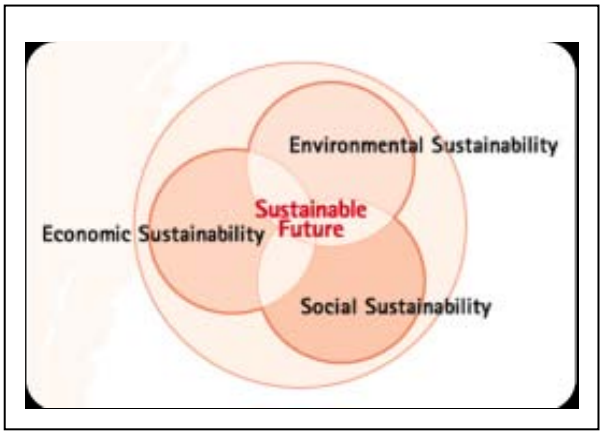

Figure 1. Sustainable construction Future

2.3. Weak versus strong sustainability

Depending on the willingness of stakeholders to accept and participate in change, efforts towards sustainability can be placed on a continuum between weak (false) and strong (true) sustainability, the key criterion being whether current development and consumption patterns will allow future generations to meet their basic needs. Key to this intergenerational equity aspect of sustainable development is the question of how much we can use now and how much to leave for future generations. To enable us to measure our resource wealth, four kinds of capital have been identified (Hawken, P.,1999)

- Natural capital: natural resources and the services provided to humans by the biophysical environment.
- Human capital: labor, education, skills, intelligence, culture and organization.
- Manufactured capital: buildings, infrastructure, goods, information resources.
- Financial capital: Cash, credit, investments and monetary instruments.

2.3.1. **Weak sustainability** is the idea that different kinds of capital are fully interchangeable and that natural capital can therefore be used up as long as it is converted into manufactured capital of equal value. If this rule is applied it would, for instance, be justified to run down the environment provided the proceeds of environmental degradation were reinvested in other forms of capital.

2.3.2. **Strong sustainability** is the idea that there are certain functions that the environment performs that are essential for the welfare and survival of the human species and which cannot be duplicated by humans. These ecological assets are called "critical natural capital" and cannot be traded for any of the other forms of capital, as their depletion would endanger human survival. Examples are the ozone layer, the carbon cycle and the hydrological cycle.(Turner, R.K. 1993)

2.4. Sustainable Construction Processes:

Sustainable construction processes comprise stages from the selection of the raw materials to manufacture of construction materials, components thereof and completed building

materials; and to the design of streets, highways, drainage systems, final garbage dumps for liquid and solid waste, pavements, etc. Also included is maximum preparedness for the development and agglomeration of people and vehicles to avoid or mitigate environmental contamination. A key point for sustainable construction is the consideration to minimize energy wastage, taking rational advantage of the natural conditions without altering them and allowing other living forms to live and be preserved. Sustainable construction processes introduce within the design of the elements of urbanization (buildings, streets, transport services, public spaces, etc.), criteria for recycling, the use of energy saving technologies and interaction with nature in urbanization and socialization processes, providing the necessary spaces and landscapes for human harmony and balance.

3. SUSTAINABLE HOUSING

The integrated concept of housing as part of the urban tissue of a city is not often contemplated by the construction industry, yet it is one of the most pressing problems of the developing world. Housing is far more than just shelter and is only one of the building blocks of human settlement. For housing to be sustainable, housing programs have to adopt a holistic perspective and include issues such as urban design, urban greening and the provision of social infrastructure such as schools and clinics. The problems of sustainable housing concern both formal and informal housing provision, as well as the policies that regulate housing provision. Housing is also often seen as a product to be fabricated and delivered, instead of as an enabling and empowering process. Urban housing, especially low-income housing, in the majority of developing countries as in Egypt is characterized by the following:

- Rapid growth of slums and unauthorized settlements.
- Overcrowding and Deteriorating quality due to poor maintenance.
- Slow supply rate of formal housing and shortage of skilled labour.
- Unaffordable land and housing prices compared to income levels.
- Strained physical infrastructure and social services.
- Insufficient attention to social, environmental, cultural and climatic factors in planning and design.

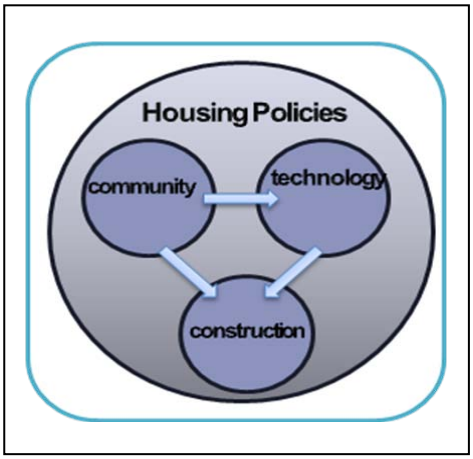

Figure 2. Housing Policies in Developing Countries

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Although sustainability at human settlement scale has received great attention so far in most developing countries, it still remains the most glaring challenge in terms of its demand on resources and expertise. The demand at human settlement level (especially for affordable housing) has become so much that there is hardly any spare capacity to be directed to the other levels of sustainability, especially with respect to the impacts and opportunities of the formal construction sector. On the other hand it is at settlement level where the developing world's contribution to sustainable construction becomes more effectively demonstrated, especially in terms of the community-based delivery processes that characterizes low-cost housing projects from South America to South East Asia. In many developing countries as in Egypt family members themselves in rural areas are building a significant number of houses, normally with help from family and friends.(CIB & UNEP-IETC, 2002).

3.1. Housing policies within sustainability: problems and perspectives

In the nineties housing policies has not been a relevant issue in the debate on urban futures for countries where the housing demand is no longer a basic need. Other more urgent themes have emerged in considering progressive environmental and social decay and of relevant economic and social transformations which have accompanied urban development. This sector has received attention in a broader context concerning problems of urban competitiveness, globalization of economies and their consequent erosion of the social state and the growing delegation of competencies to local institutions. Housing and building have represented instead themes proposed for the exploration of unusual solutions but suitable to the specific contexts in relation to the satisfaction of basic needs, to the problems connected with immigration and the multiethnic character of the cities, to environmental issues which require specific design practice and technologies.

Sustainability and, in particular, the promotion of best practices and local Agendas 21 have spurred research, more than housing studies did, to cope with specific actions aimed at environmental protection and real possibilities of experimentation in sustainable building. The debate on social exclusion has produced a complex vision of poverty. On the one hand, it has given a structural definition which has enlightened the relationship between economic and welfare state restructuring processes and the incidence of disadvantage over different social groups; on the other, it has posed the multidimensional character of the problem outlining its political nature linked to exclusion by decision processes and the aspect related to citizenship rights. (Turner, J. 1990).

3.2. Sustainable Rural housing

A shift in socio-economic patterns from traditional agriculture to monetary based agriculture and later to manufacturing industry has changed the planning patterns and construction systems in developing countries in urban as well as rural areas, as the adopted planning laws, building codes and regulations from the West often discourage, if not forbid, housing development based on traditional concepts.(Pearce, D. ,1991). However, in some cases rural housing still provides good examples of an alternative and perhaps more unsustainable model of development and construction. The following factors influence the production process and product quality of rural housing:

- Increasing monetization and commercialization of rural economy.

- Changes in social systems and relations that have traditionally encouraged/facilitated use of communities' internal skills and resources in construction of houses/buildings on a self-help, mutual sharing basis.
- Increasing alienation from the traditional natural building materials due partly to the "urban" influence of modernization, and party to the "unsatisfactory" performance of these materials.
- The gradual disappearance of traditional wisdom and knowledge of building science and materials.
- Legal status and insecurity of tenure, as well as depleting common property resources, are problems for poor households.
- A scarcity of professional services, especially locally based services.

Figure 3. Rural housing around greater Cairo region

3.3. Urban-rural linkages

The development strategy of industrialization, in which the construction sector plays a large part, focuses most of its activities in urban centers, causing labor in rural areas to migrate for employment. (Gordon, A. A. 1992) is of the opinion that industry has succeeded neither in achieving economic development for most countries, nor even in providing employment for all the hopeful job seekers. It has been found, though, that a small increase in the number of jobs available may stimulate migration to such an extent that unemployment actually increases as a result. Therefore it is necessary to reconsider current infrastructure and industrialization investment strategies in terms of their spatial location and the resultant effect on migration.

3.4. Sustainable Building Materials and Local Environment.

Construction of any urban neighborhood is needs building materials for: buildings, roads, services, infrastructure, landscape and other usages, the striking is that the usages of most of those building materials are: accounting for most of nature raw materials, consuming big amount of energy for its processes, resulting lot of pollutions and negative impacts for local nature, economic and social environment, also they are reducing the abilities of next generations to filling their needs of building materials. However, not all building materials are equal; green building materials are carefully selected for: low needing of nature raw

materials, low consumption of energy, low resulting of pollutions and negative impacts, low needing of maintenance and available for reusing and recycling processes. Building materials are forming large part of overall environmental burden of buildings and urban neighborhoods because they are acting on the local nature, economic and social environment.

Naturally: Exploring, extraction, production, transportation installation, maintenance and demolition processes of building materials are cause lot of negative impacts to local nature environment such as (Committee, 1999):

- Raw materials exploring and extraction are damaging nature ecosystem and reducing water and air quality.
- Manufacturing and production of building materials are resulting toxic waste and other nature environment negative impacts.
- Many building materials once installed releasing toxic gases which negatively affected on buildings indoor quality.
- Some of building materials cleaning and maintenance processes are causing health risk and toxic waste.
- Transportation of building materials and building demolition waste are cause more waste and its negative impacts to nature environment.
- Demolition and disposal processes of buildings produce huge amount of negative impacts for nature environment.

Economically: Exploring, extraction, production, transportation installation, maintenance and demolition processes of building materials are costing a lot of money and consume huge amount of energy. In addition, choosing wrong building materials can negatively acting on building's interior spaces and facilities performance and efficiency then increasing buildings economic costs strategies.

Socially: Exploring, extraction, production, transportation, installation, maintenance and demolition processes of building materials are cause lot of negative impacts on general human life, health, comfort, performance and satisfaction. Thus, sustainable building design can solve all those problems which associated with building materials lifecycle by three main concepts (Denver AIA, 2007):

- **Firstly:** Minimizing the amount of required building materials for buildings and urban neighborhoods.
- **Secondly:** Choosing building materials types which generate less negative impacts to local environment through its lifecycle and enhance the performance of its usages.
- **Finally:** Using building materials which can be reused recycled and can be safely returning to nature environment at the end of its useful life.

Therefore, designers, planners, social and other responsible people should working together to provide convenient sources and to fill the needing of building materials to buildings and urban neighborhoods with conserving local nature, economic and social environment. (NCARB, 2001)

4. MAIN OBSTACLES TO SUSTAINABLE CONSTRUCTION

4.1. Lack of capacity of the construction sector

The most critical obstacle to sustainable construction is the lack of capacity of the construction sector to actually implement sustainable practices. This lack of capacity is a factor both of the number of human resources and the skills levels of these resources. There simply are not enough professionals, tradesmen and labourers who have been trained to support sustainable construction. In fact, the capacity of the construction sector in many developing countries as in Egypt can barely deal with the demands of routine construction. The vast majority of construction firms are small enterprises that rely on outsourcing personnel as required. This has severely affected skills training and the retention of expertise in the industry as construction workers become highly mobile, walking in and out of the industry, depending on performance in other sectors of the economy.

4.2. Doubtful economic environments

In developing countries as in Egypt the private sector has a very narrow market base and the formal construction industry overly relies on the government for work. However, government construction orders fluctuate with income, especially multilateral and unilateral financial assistance, which often facilitate the foreign exchange devoted to imports, including construction materials. There has also been a reduction in public spending as services previously provided by governments are privatized because of fiscal prudence, or simply because governments are bankrupt. Often reductions in public spending area precondition for financial support from the World Bank or International Monetary Fund.([Wells, J. 2001).

4.3. Poverty and low urban investment

The cities of the developing world as in most of the Egyptian cities show a low rate of urban investment against a high rate of demographic growth. This has evolved into the accelerated degradation of the urban quality of life. This process affects not only the urban poor and their surrounding environment, but has a negative impact on the city as a whole. Even with efforts by national governments and the private sector to promote urban investment and reduce environmental degradation, the benefits have been able to reach neither the lowest income population nor the city as a whole.[Ebohon, O. J. (1996)]

4.4. Technological inactivity

Another barrier is the unquestioning application of building codes and planning concepts from Western countries introduced during the colonial period. These regulations favour the use of construction materials such as brick and reinforced concrete, and discourage any alternatives to these building materials and types of services. To introduce any new technologies or use a broader spectrum of technologies, including some traditional technologies, is incredibly difficult. This results in technological inertia and ultimately in technological dependency on the developed world from which many developing countries have to source the materials and technologies that comply with the inherited practices.

5. OPPORTUNITIES TO SUSTAINABLE CONSTRUCTION

5.1. Innovation in materials and technologies

In developing countries as in Egypt the availability of conventional construction materials will fall considerably short of their demand, despite improved productivity, and several

alternatives for them are being developed. R & D institutions in India have developed a number of technologies for production of new building materials that are cost-effective and eco-friendly with special attention to utilization of industrial and agricultural waste. However, most of these technologies are still in the experimental or demonstration stage.

5.2. Re-evaluating the traditional

The concept of sustainable development as seen within the environmental movement was well understood by the early traditions in human civilization. The indigenous people of developing countries have practical experience of the fact that humans are dependent on the earth's life support system and traditional cultures have practiced sustainable resource use for millennia, [Scwelferger, F. W. (1982)]. Traditional communities have always used the natural materials of their immediate environments for construction and the resultant buildings have been well integrated into the natural environment. Such indigenous architectural precedents, using different materials in different circumstances, can be found across the developing world. Traditional building materials have the additional advantage of being cheap and easily accessible. (Fathy, H. ,1973).

5.3. Improving the construction process

Defects and inefficient processes are expensive forms of wasting environmental resources and pose a danger to both construction workers and the end-users of the product. Badly performing construction products also reduce the quality of life of those using these products. A first step towards sustainable construction is to improve the quality of construction products and the efficiency and safety of the construction process.

5.4. Innovation in building materials

It is a priority for the construction sector to reduce its use of resources. This can be done by direct or indirect means, each posing a different challenge. Sustainable construction can make a huge difference not only to global environmental sustainability, but also to socio-economic sustainability through the equitable sharing of the world's resources as promoted by the Fair Shares concept, (Hille, J. ,1997). The Kyoto Protocol requires a substantial reduction in greenhouse gas emissions. This will have serious implications for the construction sector, as the built environment is a substantial contributor to greenhouse gas emissions. Coping with these kinds of restrictions will require an entirely new design paradigm, one more far-reaching than the move from brick and mortar to steel and glass at the beginning of the 20th century.

5.5. Environmental health and safety

As the materials used by the construction sector are responsible for a large percentage of the global toxic burden, more research needs to be done regarding the environmental and health impacts of manufactured building materials and finishes, and strategies for dealing with harmful materials like asbestos need to be developed and implemented. Further investigation is also needed regarding the environmental impact and health threats presented by activities on building sites, especially regarding the loss of topsoil and vegetation, as well as dust and noise pollution and the storage of harmful chemicals.

6. CASE STUDY; AL-SAWADA VILLAGE PROJECT

6.1. Project Summary

The main problem facing al-Sawada village lay in the fact that most village residents live in houses that lack the elements of adequate housing, notably secure tenure, physical security and general hygienic standards to the degree that they are not appropriate for human habitation. The project arose in response to the village popular leaders' initiative to improve the living conditions of the village people and to make use of their potential capabilities through social participation in the building and repair of their houses.

The project was to provide loans for housing improvement and to assist those in need and others living in harsh housing conditions by offering aid to build new houses (107 houses) and repair old ones (238) and to furnish these houses with the appropriate hygienic and housing conditions. And the project was carried out with the participation of the NGOs represented in the Better Life Association for Comprehensive Development (BLACD), located in the city of al-Minya, the people and the popular leaders, with support from international donor institutions.

The project managed to attain its objectives through house upgrading and providing appropriate housing conditions for those in need. It did not seek only to provide solutions for individuals or promote private ownership, but surpassed microcredit objectives by developing and enhancing social capital through the spirit of collective work. These comprehensive and collective dimensions have made al-Sawada Village Project a model for future experiences. . (Heneen, Maher, 2002)

Tab 1: Basic data for the project:

Geographic location	al-Sawada village, Governorate of al-Minya, Arab Republic of Egypt
Project start date	October 1998
Number of workers	Field coordinator, accountant, secretary, five volunteer leaders (four men, one woman)
Target population	Most of the population at Sawada village: 435 families (3,000 persons)

6.2. Social, Economic and Urban Conditions before the Initiative

Al-Sawada village of 8,000 inhabitants lies on the East of the Nile River, in the Upper Egypt Governorate of al-Minya. The high unemployment and dismal economic conditions at al-Sawada village thrust many inhabitants into poor housing living conditions. Several elements of adequate housing, namely security, safety and human habitability were also lacking. Sawada village is known for its strong social and family ties and for the dominance of rural and tribal customs and traditions, which enhance the spirit of cooperation among individuals of the society. The average monthly income of families ranges from LE 100 (US$16.13) to LE 150 (US$24.19).

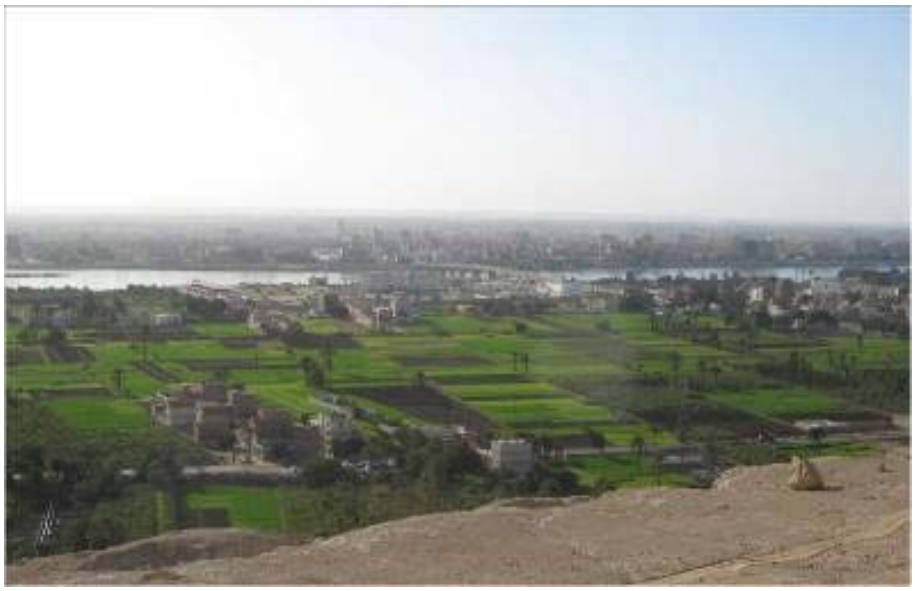

Figure 4. General View of villages along the nile in upper Egypt,

6.3. Main Problems the Initiative Aimed to Address

The initiative and project focused on solving several problems led by supporting the poor who suffer harsh living and housing conditions. It provided housing improvement loans to enable them build new houses or repair their old ones to ensure adequate health and housing conditions. Loans were extended according to the following conditions:

- Building a house of area ranging from 50–75 m$^{'}$
- Provision of clean drinking water and hygienic restrooms,
- Supplying the houses with doors and windows,
- Restoration of old houses,
- Building cement roofs to replace those made of palm branches,
- Separating houses from barns to have hygienic living conditions.

6.4. Primary and Secondary Objectives

6.4.1. **Primary Objectives;** The project contributed to solving housing problems by means of cooperation and integration among all sectors of the society, including individuals, authorities working together to provide safe healthy houses for the village residents; improvement of the quality of the house; building the local community's potentials of societal participation.

6.4.2. **Secondary Objectives;** The project undertook to build 107 new houses and to improving 328 old ones. It also aimed to build the potential of the local volunteer activists and popular leaders to enable them to manage the project locally. To achieve this, the project supplied the benefactors with information to help them maintain their houses and a healthy living environment in a cooperative community spirit. . (Heneen, Maher,ibid, 2002)

Figure 5. Roofless al-Sawada houses before upgrading & Neighbours join forces as upgrading begins, (Source: BLACD)

6.5. Institutional arrangements for the project:

6.5.1. The Actors

- **Initiators;** The initiative came as a response for the initiative of the popular leaders at al-Sawada village to improve the housing conditions of the population. It was also the result of BLACD's concern to provide the right to adequate housing by making use of potential capabilities through community participation in building and repair of houses.

- **Participants;** The preparation and implantation of the project involved a distribution of efforts through: nongovernmental organizations (represented by BLACD), local community represented in the population and popular leaders of the village, and international funding institutions.

6.5.2. **Legal and Administrative Framework;** The Better Life Association is a nonprofit civil institution that was established in May 1995 and recognized by the Ministry of Social Affairs under resolution No. 7 (2003). The local and central authorities operate under the Egyptian Constitution of 1981. Article 151 of the Constitution recognizes the local application of human rights treaty obligations, which includes the State's ratification of the International Covenant on Economic, Social and Cultural Rights in 1982.

6.5.3. **Decision making process;** Management of the project and decision making were carried out through:

- A field coordinator for the project monitored the roles assumed by the local village committee and wrote the contracts for the benefactors. He also conducted meetings for training of benefactors, introducing them to the practical importance of participation and cooperation. He also monitored the implementation of loans in the first and second stages;
- The project accountant handled the distribution of loans, writing of cheques, submitting monthly reports for the authority and preparing the budget.

- Volunteer local leaders of the project announced the project, collected requests of the benefactors and made decisions on their behalf. They collected installments from the benefactors to pay them to the project accountant, as well as followed up the collection of loans from defaulters. They took part with the committee members in preparation of the construction camps and in the mobilization of the volunteers.

6.5.4. **People's Process in Strategic Planning;** The biggest role in the planning of the project was handled by the nongovernmental organizations (NGOs) represented in BLACD, the popular leaders and the village residents. The role of the funding institutions was confined to providing the necessary financial loans for building and repair.

6.5.5. **Determining the Needs of the Target Group;** The real needs of the village people were determined through a questionnaire and through public meetings with the popular leaders and the people themselves. These needs were defined as follows:

- Provision of loans for 107 families for the demolition and rebuilding of 107 new houses;
- Provisions of loans for 328 families for the sake of repair of 328 houses.

6.5.6. Resources

- **Material Resources;** The project was in need of financial, technical and human resources. Partners and participants were determined as follows: NGOs represented by BLACD, popular leaders, village inhabitants and international funding institutions. Accordingly, a project budget was prepared and the international funders approved the finance plan in the form of a loan administered through BLACD. In turn, BLACD managed the technical aspects as well and the human resources, while also exerting efforts to mobilize popular participation in the building and repair of the houses. The total loans distributed among al-Sawada village people exceeded LE897,000 ($149,500). The biggest loan stood at LE4,000 and the smallest LE600, with the average of LE2,500. After the repayment of the first loan, another loan was presented as the second stage, in order to complete the utilities of the house. . (Heneen, Maher, ibid 2002)

- **Social Capital;** The implementation of the project revealed the potential social capital and the enormous human resources employed and invested in the project. Most of the village people did not only build their own houses, but they also took part in the building and restoration of their neighbors' houses, which crystallized the concept of collective work and community participation. Ultimately, 38% of the village residents directly benefited from the project.

6.6. Selection of Building Materials

The selection of building materials for creating sustainable building projects is the most difficult challenges which face all the project team. To select a building materials; the important thing to consider is the effects of using these building materials over the lifecycle on the local environment and how much of each building material required to perform the same functions, the other thing to considering is the availability of building materials reusing and recycling potentials. Thus, to achieve sustainability in this issue there are some criteria that should be take advantage when choosing building materials such as:

- Building materials impacts on global nature environment, containing no CFCs, HCFCs or other ozone depleting substances.
- Materials usage negative impacts on local nature environment such as: air and water pollutions, waste and other negative impacts.
- Cost of building material and impacts on economic environment.
- Amount of energy needed to exploring, extraction, production, transportation, installation, maintenance and demolition.
- Building materials which obtained from local sources.
- Quality of available building materials and its impacts on occupants, social environment and general human life, health, comfort, performance and satisfaction.
- Low or no chemical emissions or toxic compounds and low building materials maintenance requirements.
- Building materials which are derived from renewable sources and biodegradable when disposing.
- Building materials potential for reusing and recycling processes.

Thus, selection of building materials should be considered early within designing and planning processes. (Thomas, Randall, 2003)

6.7. Local Building Materials Usages

A healthy community has a healthy local economy. So, sustainable building design and construction can aiding by using local available building materials to be more sustained than importing from other places. Some of local building materials such as stone and timber also can give more quality for buildings and urban neighborhoods and reduce energy and environment negative impacts of long distance transportation. Specifying building materials from local or regional sources has other many beneficial results such as:

- Stimulating local and regional economy.
- Reducing the pollutions caused by transportation from far distant sources.
- Promoting the awareness of the origin of the materials used in our projects.
- Increasing the opportunities for regional control over sources.

As a result, local building materials usage should be taking the first priorities when choosing building materials for any buildings and urban neighborhoods to achieve sustainable architecture and gaining all its benefits in this field. (DDC. 1999)

6.8. Implementation

The State assumed no role in the implementation of the project. The role of the international funding institution amounted to providing the loan. Civil society, through the efforts of BLACD, shouldered the burden of management, planning and implementation of the project with the participation of the local leaders and village residents. BLACD built and developed the potential of the local leaders needed for the management of the project though a number of training courses on the following subjects:

- How to present a project within the community;
- Training on criteria of selection of beneficiaries;
- Training on technicalities of the project such as examination of loan applications, monitoring the implementation of the loans, means of collection and following-up with defaulters;

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- Training in the use of environmental resources and specifications of a “healthy house”;
- The human right to adequate housing and secure tenure;
- Collective work and community participation.

By providing the training courses for the beneficiaries in their homes before they received the loans, BLACD managed to develop the potential of the villagers by addressing the importance of participation and cooperation, the use and preservation of environmental resources, the care and management of building materials, and the importance of paying the installments on the due dates.

6.8.1. **Overcoming Obstacles;** The project faced several impediments during implementation that the concerned parties managed to overcome. These problems included:

- Some families’ requesting loans were in no need of any repair or rebuilding. This was overcome by means of awareness campaigns that the administration of the project carried out to clarify the loan beneficiary criteria;
- People’s lack of commitment to pay the installments on the due dates, as most people depend on seasonal income from tourism, which sector was undergoing a recession;
- Some benefactors did not abide by the technical specifications of construction, for example, by increasing the number of stories, reducing the thickness of the walls. This was overcome through meetings and awareness campaigns for the beneficiaries during the implementation process.

Figure 6. Social production of new homes in al-Sawada with microcredit resources,

(Source: BLACD)

6.8.2. Fields of Service; The project served a number of fields, including:

- Exchange of expertise between BLACD, the village people and the popular leaders at the village;
- Capacity building through developing the potential of the popular leaders and the people in community participation in different stages of the project, and developing the popular leaders’ capacity to manage the project and finding successful means for collection;
- Social mobilization of the village residents to organize themselves, join their neighbors in the building and restoration processes of their houses;

- Improving the housing conditions by providing loans for families to demolish and rebuild 107 new houses, and 328 families to repair their old houses;
- Urban development though improvement of the living and housing standards and making the people qualified to make use of the local capital so as to contribute in the future urban development process of the rural society;
- Education and training of the people to make use of the natural resources in the environment, on collective work and community participation, and training activists and popular leaders to manage the project locally. This was done by supplying the beneficiaries with information that helped them maintain clean houses;
- Funding by providing loans that ranged from LE600 to 4,000 per unit, in the first stage;
- Infrastructure/utilities: providing another loan in the second stage to complete the utilities of the house;
- Water and sanitation was improved through the provision of clean drinking water and hygienic restrooms.

6.9. Evaluating the Social Product

Extent of Success in Achieving Objectives/Social Gains; The project managed to achieve its objectives represented in the building of 107 new houses and the repair and restoration of 328 houses, in spite of the impediments that had emerged at the beginning. The project succeeded in furnishing the village people with adequate, healthy houses and improved their living conditions. The biggest social benefits were represented in the following:

- Social awareness built by efforts of BLACD,
- Building the capacity of the village people and involving the popular leaders' roles (existing social capital),
- Training the people to make use of the natural environment responsibly,
- Developing the people's awareness of their human right to adequate housing,
- Enhancing protection of the right to secure tenure,
- Realizing the importance of collective work and community participation in building the society so as to eliminate spirit of individuality and isolation.

6.9.1. **Degree of Social Production;** The project represents social production of habitat to a great extent; the experience of the housing improvement loans at al-Sawada village and the role played by the popular leaders and village people made the project a success and demonstrated the constructive role that the civil society can play in sustainable development and in improving living conditions. It is worth mentioning that the State did not contribute with any sort of financial or technical support and that the whole burden was shouldered by the civil society organizations and the village people. The inhabitants of al-Sawada village proved the benefits that arise from any project that depends on the social production of the community individuals, who depend on themselves collectively to develop and make use of the local capital to contribute in the development process. . (Heneen, Maher, ibid 2002)

6.10. Results and Lessons Learned

The chief lessons learnt from al-Sawada Village Project are:

- The importance of cooperation and participation between individuals of the community and the creation of the volunteerism,

- The importance of establishing a training methodology for workers and local leaders during the planning stage of any project,
- The importance of making use of, and enhancing social capital in the development process,
- Determination of the benefactors' needs as essential,
- The benefit of the awareness courses for the community.

6.10.1. **Potential for Replication;** The project managed to create a state of psychological tranquility, peace and security for the families benefiting from the project. Hence, some surrounding villages have asked for a similar project. BLACD accordingly seeks to apply the experience in another five villages in al-Minya Governorate. In addition, the experience can be transferred and applied in several communities and regions that live similar circumstances. BLACD seeks to attain greater success for the project by means of increasing the value of the loans in the future.

6.10.2. **How the Parties Promoted their Experience;** The participants and BLACD have promoted the experience of al-Sawada through presentations in international forums and conferences and in exchange visits of concerned parties. This has included also presenting the experience through various mass-media outlets. BLACD has documented the experience through video tapes to record the different stages of the project: during the demolishing and rebuilding of the houses, and the repair of the old houses with the participation of the village people.

7. CONCLUSION REMARKS:

- The construction industry needs to be completely reinvented, from the materials used and how they are manufactured, to how performance is viewed and the criteria set for it. In a way, this shift would be easiest for the developing countries. Not only do they in many cases still have a living memory of existing in another paradigm with other values, they are, by nature of the survival challenges experienced, used to innovation, adaptation and doing more with less.

- It may be that, through their cultural heritage, innovative home-grown solutions and adaptability, the developing countries are holding one part of the key to sustainability. However, we have to remember that both developed and developing countries hold knowledge and values that can contribute to a new vision for development, as well as the practical know-how needed to make it work. Most importantly of all, we have to acknowledge that people are at the centre of sustainable development. In its deeper meaning sustainability has ethical and moral connotations that imply attitudinal changes and value reorientation.

- Therefore, the success of the sustainability drive will ultimately depend on each individual's conscious choice to adopt or reject the principles of sustainable development. Sustainable construction in developing countries as in Egypt will therefore only become feasible if it meets the needs and requirements of the people in these countries, and does not conflict with their culture and values. Finally, more active involvement of government, industry, non-governmental organizations and professionals is needed if sustainability is to become a generally accepted driver for change.

- The circle of discussion and dissemination thus needs to be widened. At national level

a strategic alliance between the different levels of government, the broader construction industry and universities and research centres could work as an effective mechanism to boost the importance of the topic and to encourage coordinated action. At international level, cooperation and concerted advocacy can play an important role in influencing governments and the construction sector in developing countries to give the necessary attention to issues related to sustainable construction.

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