The Redesigning of Saiban City, Lahore

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Abbreviations

HBFC	House Building Finance Corporation
IIED	International Institute for Environment and Development
KBCA	Karachi Building Control Authority
KKB	Khuda-ki-Basti
SM	Square Metres
SY	Square Yards

Preface

Saiban, a well-known Pakistan NGO, working for providing land and supporting incremental housing, has prepared a plan for its new project, Saiban City Lahore. I offered to redesign this plan on the basis of the guidelines developed by me and my colleagues (Architects Asiya Sadiq and Suneela Ahmed) through an IIED supported research project in 2009-2010. However, this simple objective turned into an exploration of looking at various planning alternatives for Saiban City. This exploration has raised a number of issues related to designing housing for low income settlements. These issues are discussed in Section 4 of the Study.

I would like to thank the IIED for its support in making this study possible. I would also like to acknowledge the three months' hard work and the dedication that Architect Durreshahwar Alvi has put into the design, drafting and various calculations for this study, without which it could not have been completed.

Arif Hasan
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by
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1. Background

In 2008-2009, the author and his colleagues were involved in a study of density-related issues in low- and lower middle-income settlements in Karachi. This study, which focused on three settlements and one apartment complex, was supported by the International Institute for Environment and Development (IIED), UK. The settlements and complex selected for the study were very different from each other in physical and sociological terms, as can be seen from the brief descriptions below.[1]

1. **Khuda-ki-Basti-3 (KKB-3)** is a recently developed suburban settlement with a density of 501 persons per hectare. It is estimated that in another 10 years, it will have a density of at least 1300 persons per hectare.

2. **Nawalane** is one of Karachi's oldest settlements. Its population density has increased over time, and now stands at 3376 persons per hectare. This high and unplanned density has created many social problems in certain parts of the settlement.

3. **Paposh Nagar** was built as a government scheme to provide single-storey core housing, with a planned density of 240 persons per hectare. Today it has a density of 1181 persons per hectare, and includes housing from two to five storeys high.

4. **Fahad Square** is a 10-year old apartment complex in a planned government sector. As such, it makes use of planned social and commercial facilities in the sector that are not found in the other examples. Its current density is 942 persons per hectare.

The number of persons per family and per housing unit varies from 5.7 persons per family in Fahad Square to 13.56 persons in Nawalane, and 6.7 persons per housing unit in KKB-3 to 36.8 persons in Nawalane. An additional study was also made of a 35-year old apartment complex Labour Square, in order to produce a comparative analysis of Fahad Square.

These settlements were hypothetically remodelled to explore several issues. Firstly, to see if the densities and land use prescribed by the Karachi Building Control Authority (KBCA) for apartment blocks for low-income groups could be achieved by developing individual houses on small plots in these settlements and in Fahad Square. Secondly, to identify and understand residents' preferred types of accommodation; and thirdly, to see the extent to which existing densities in these settlements and apartment blocks could be achieved by catering to residents'

11. Arif Hasan, Asiya Sadiq and Suneela Ahmed. *Planning for high density in low-income settlements, four case studies from Karachi*. Urbanization and Emerging Population Issues Series Working Paper 3, IIED, UK, March 2010.

preferences and replacing apartments and ad-hoc densification with planned densification on small plots. The results of this remodelling and comparisons with the existing situation are given in Appendix 1: Physical comparisons between the existing situation and the remodelling of KKB-3, Nawalane, Paposh Nagar and Fahad Square.

The high densities shown in the remodelling are due to a number of factors, most notably the widespread practice of housing an average of two families in each residential unit. Case studies indicate that this is common in Pakistan; and our study showed that apartments in Labour Square that housed one family 35 years ago are now home to two or more families. The high density in Nawalane is due to the large average family size of 13.5 persons, which gives an average of 27 persons on each plot. The matrix in Appendix 1 shows the other factors that contribute to the high population densities.

The main conclusions of this study are summarised below:

1. Higher densities could be achieved through planned clusters rather than gridiron-type developments.

2. The number of units could be substantially increased and infrastructure costs reduced by increasing the width-to-depth ratio of plots or housing units from 1:2 to 1:3.

3. Cluster planning can reduce the amount of space needed for roads and thereby increase public space for social activities.

Residents expressed a preference for houses on small plots rather than apartments, for the following reasons:

1. They can start by building a small house and enlarge it over time, making construction affordable.

2. Residents can carry out any kind of economic activity in a house as long as it does not create pollution in the neighbourhood. This is not possible in an apartment.

3. By building upwards on their plot families can provide accommodation for at least one married son, and thus save on rent or investment in a new housing unit.

4. Plot settlements create a sense of neighbourhood, while families in apartment blocks tend to feel more isolated.

The authors of the Karachi study also designed housing units for the remodelled settlements, bearing in mind the fact that residents' needs will be compromised above a certain density. Houses with more than three floors above ground level tend to be uncomfortable, with poor lighting and ventilation in the lower floors and less space for amenities and social facilities, which adversely affects residents' social and environmental conditions. Therefore, the designs developed in the re-planning exercises included a central courtyard to provide light, air and an open space for families to get together. They did not include houses with more than three floors above ground level, and avoided cutting back on amenities and social facilities.

1. **Saiban City, Lahore**

Saiban is a non-governmental organisation (NGO) based in Karachi that develops plot settlements. It sells unserviced plots to residents who can pay for the land over five years, allowing them build their homes at their own pace. They are expected to develop neighbourhood water and sewage infrastructures, while Saiban uses their repayments to develop the trunk infrastructure, and gets other NGOs to develop the schools, health clinics, parks and community centres that make up the social infrastructure. It also uses its links with government organisations and transporters to help in establish transport facilities for the settlement.

Saiban is planning to develop a 6.87 hectare site (17.18 acres) in Lahore on this basis, and has developed a concept plan for its 'Saiban City Lahore' project. When the author offered to re-plan the settlement following the principles developed for the Karachi study, Saiban agreed, with the following provisos:

1. The minimum plot size should be 62.6m² (75 square yards), rather than the 47m² in the study;

2. Saiban intends to have 40 larger, more expensive plots of 209m² (240 square yards) to subsidise the smaller plots and enable different income groups to live together;

3. About 50 per cent of the site area should be residential, in accordance with the zoning regulations in Lahore;

4. Space should be provided for a graveyard, and about 4 per cent of the area set aside for commercial facilities.

Developing the site according to these requirements would result in very low densities, so it was decided to look at various options in order to understand the impact they would have on density. Plans for three options were accordingly prepared and delivered to Saiban.

2. The options

The three options are outlined below, and the issues that they raised and lessons learned from them are discussed in subsequent sections.

A. **All plots to measure 62.7m² (75 square yards) or 209m² (240 square yards), as per Saiban's requirements**

1. Plot width-to-depth ratio: 1:3 for 62.7m² plots
   Plot width-to-depth ratio: 1:2 for 209m² plots
   Cluster plan

2. Plot width-to-depth ratio: 1:2 for 62.7m² plots
   Plot width-to-depth ratio: 1:2 for 209 m² plots
   Cluster plan

3. Plot width-to-depth ratio: 1:2 for 62.7m² plots
   Plot width-to-depth ratio: 1:3 for 209m² plots
   Gridiron plan

4. Plot width-to-depth ratio: 1:2 for 62.7m² plots
   Plot width-to-depth ratio: 1:2 for 209m² plots
   Gridiron plan

B. **Options tested with plots of 62.7m² and 60.5m² (75 and 72 square yards)**

1. Plot width-to-depth ratio: 1:3 for both sizes
   Cluster plan

2. Plot width-to-depth ratio: 1:3 for both sizes
   Gridiron plan

3. Plot width-to-depth ratio: 1:2 for both sizes
   Cluster plan

C. **Options tested for plots of 47.1m² and 47.6m² (56.3 and 56.9 square yards)**

1. Plot width-to-depth ratio: 1:3 for both sizes
   Cluster plan

2. Plot width-to-depth ratio: 1:3 for both sizes
   Gridiron plan

3. Plot width-to-depth ratio: 1:2 for both sizes
   Cluster plan

Detailed information on the issues raised by these options can be found in the following appendices:

Appendix 2: Density and land use matrix. This compares the different proposals for density and land use with each other and with Saiban's original proposals. The comparison also includes the results of the study on density in Bangkok conducted in 2011 with support from IIED.[2]

Appendix 3: Planning options. This appendix presents the layout plans used to develop the matrix in Appendix 2, along with detailed land use and cost calculations for each option and

22. Nattawut Usavagovitwong *et al*. *Housing density preference study for low and lower middle-income settlements in Thailand.* Asian Coalition for Housing Rights, Bangkok, April 2011.

separate colour-coded land use layouts. When redesigning the Saiban City options, care was taken to respect the bylaws and Saiban's desire to use only 50 per cent of the site for residential purposes. The commercial area was reduced from the 4 per cent proposed by Saiban to between 1.8 per cent and 2 per cent, in view of the author's observation that commercial areas tend to remain unoccupied for long periods and be used for speculation. Residents usually use home-based businesses to meet their needs.

Appendix 4: House plans. This appendix shows the house plans for different sized plots, with the possible stages, surface areas and costs of incremental development.

Appendix 5: Construction and land costs for different house plan options.

Appendix 6: What the poorer poor can afford as housing loans.

Appendix 7: The impact of Saiban's proposed cross-subsidy for land costs.

Appendix 8: Findings of the 2011 Bangkok density study.

Appendix 9: Quantities and costs of different house plans.

3. Planning-related issues

3.1 Research questions

The redesign options for Saiban City raise a number of research questions. Some of them can be answered intuitively with considerable accuracy; others need a better understanding of the issues explored below in order to develop a more appropriate design for Saiban City and similar settlements and complexes.

3.2 Population mix

In order to accommodate a mixed population, Saiban wants 40 large plots of 209m² (240 square yards), with the remaining plots no smaller than 62.7m² (75 square yards). It also wishes to subsidise the smaller plots by making the larger ones cost 20 per cent more per square metre than the smaller plots. The possible effects of this strategy are outlined below:

40 larger plots will reduce density:

- Scheme 1: with larger plots included in the mix density will peak at 859 persons per hectare
- Scheme 5: without large plots but with Saiban's minimum plot size of 62.7m², high density will be 1018 persons per hectare
- Scheme 8: with plots of 41.7m² (as in the Karachi study), the highest density will be 1277 persons per hectare
- Scheme 1 would result in the lowest density (159 fewer persons per hectare than Scheme 5, and 418 fewer persons per hectare than Scheme 8).

Subsidising the cost of the plots:

The effect of subsidising the cost of the plots costs is shown in the table below. Detailed calculations are given in Appendix 7.

Table 1: Impact of subsidising the cost of land (cost in rupees per plot)

	Scheme 4 Saiban requirements	Scheme 5 with Saiban minimum plot size	Scheme 8 as per 2009-2010 Karachi study
	40 x 209m² plots and 466 x 60.5m² plots	590 x 60.5m² and 62.7m² plots	740 x 47.1m² plots
Cost of land without subsidy	58,608 rupees (for 60.5m² plots)	56,497 rupees	44,449 rupees
Cost of land with 20 per cent subsidy from commercial areas	58,021 rupees	56,452 rupees	44,051 rupees
Cost of land with subsidy from large plots	54,786 rupees	-	
Cost of land with subsidies from both	54,198 rupees	-	

(138 Rupees = 1 Pound Sterling)

This table shows that the 40 large plots in Scheme 4 would reduce the cost of the small plots by 6.2 per cent. If all the plots measure 62.7m² (as per Saiban's minimum requirements), they would cost 6.25 per cent more than the subsidised plots in Scheme 4. With Scheme 8, where the plots are smaller (47.1m²) and more numerous, each plot costs 18.86 per cent less than the smaller plots in Scheme 4.

We can see that this cross subsidy does not significantly reduce the cost of the smaller plots, and that far more bigger plots would be needed to make a substantial difference. It is normal practice in Malaysia (as it used to be in Karachi) to set aside fewer plots for low-income groups (15 to 30 per cent)[3]. This certainly lowers the cost of smaller plots, but also further reduces density. The most effective way of reducing the cost of land is to have a larger number of much smaller plots, as in Scheme 8, which shows an 18.86 per cent reduction in the cost of land – although it is worth noting that this percentage will increase substantially once Saiban's overheads and development expenditure have been factored in.

3.3 Accommodating mixed population groups

In mixed developments where most of the housing is for lower-income groups, it has been observed that the larger units tend to be bought for speculative purposes. The people who purchase them do not wish to live in poor neighbourhoods, and if they are obliged to build on their land, will aim to accommodate several low-income families or rent out the buildings. Where most of the units are for higher-income groups, they tend to end up purchasing the smaller units as well. The location of the site is also critical. If a site or apartment complex is in an area where real estate prices are high, middle- and higher-income groups will buy the smaller and larger units or plots.[4] The population mix and related issue of subsidies raise three questions: i)

33. For details see E.G. Pryor, *Housing in Hong Kong*. Oxford University Press, Hong Kong, 1993.

44. Authors' observations. See also Arif Hasan, *Housing for the Poor* (City Press Karachi, 2000) and Chapter 1 of *Comparing Cities*, edited by Adnan Asdar and Martina Rieker (OUP Karachi, 2009).

Should population mix be promoted? ii) If yes, then how can mixed settlements or apartments be promoted? and iii) Should the mix be determined by subsidy or sustainability?

3.3 Width-to-depth ratio

To facilitate cluster planning, it is helpful for the depth of the plot or unit to be a multiple of its width. The remodelling of settlements in Karachi for the IIED study in March 2010 showed that a width-to-depth ratio of 1:3 (as in Scheme 9, where the density is 1277) resulted in higher density and lower infrastructure and land costs than a ratio of 1:2 (as in Scheme 10, where the density is 1155). However, the plans developed in Appendix 4 show that a ratio of 1:2 allows for more flexible planning and the possibility of developing an additional independent unit with separate access on the floor above, which can be rented out. This observation poses a new research question: whether it is fair to deny this flexibility to low-income groups for the sake of increasing the density by 122 persons per hectare.

3.4 Plot size and related environmental conditions

The size of the plot makes a considerable difference to the built density per capita, which works out at between 8.775/m² and 9.6/m² for plots of 62.7m², and 6.85/m² for plots of 47.1m². The house plans for these two plot sizes show that the 62.7m² plot has larger rooms, better ventilation, more than one toilet and much more roof space, which people in Lahore use for various social activities and as a sleeping area in summer. The costs of land and construction differ considerably between the two options (see Appendices 4 and 5 for details), but not enough to make larger plots unaffordable for the better-off poor. Should they be denied this option? If not, there could be a mix of the two smaller plot sizes within clusters or around the lanes of gridiron developments.

3.5 Gridiron versus cluster planning

The IIED study conducted in March 2010 established that a gridiron plan gives lower densities than cluster planning in large settlements; although cluster planning can help decentralise the management, operation and maintenance of infrastructures to the cluster level. However, for a 17.18 acre scheme such as Saiban City, the same densities can be achieved with cluster and gridiron planning.

Scheme 8 shows seven clusters of approximately 100 houses that can manage, operate and maintain their infrastructure and tax collection independently of a central, settlement-level management committee. This would force 100 or so house owners to work together to look after their area.
The gridiron plan in Scheme 9 would achieve the same densities as the clusters in Scheme 8. Scheme 9 has about 18 lanes, with an average of 39 units per lane. These lanes would have to be represented in the settlement's central management committee, which would need to be stronger to coordinate 18 groups rather than the 7 involved in Scheme 8. Experience with the Orangi pilot project has shown that the best coordination and management occurs when the unit of

organisation involves 20 to 40 households, as there is a greater level of trust between individuals in a smaller unit than in a larger one. The lanes can also be designed so that they do not carry thorough traffic, and can therefore be used as public spaces. The question here is at what point (site size) cluster planning becomes necessary. Should this decision be left to the designers, or should the communities concerned decide? If it is the latter, the community should pre-date the design exercise, which means that this option is only possible for redevelopment projects and cannot be considered for new developments.

3.6 Built density per capita

The per capita built density is related to family size, as this determines the size of the housing unit. When the planning options for Saiban City were reviewed, it was assumed that there would be 12 persons per housing unit, working on the basis that the average family size in Pakistan is 6.7, and that there will be two families on each plot. We also assumed that families have become smaller since the last census in 1998, and accordingly developed house plans covering between 82.2m² (for plots of 47m²) and 115.2m² (for plots of 62.7m²). In the first stage of incremental growth, the built-up area is between 32.5m² for plots of 47m², and 49.7m² for plots of 62.7m² (further details can be found in Appendices 4 and 5). This makes the situation very different from Bangkok, where the average family size is 4.33 and there is only one family per unit, giving an average built-up area of 39.32m² (see Appendix 8 for details of the Bangkok findings).

It is interesting to note that the built densities per capita in the Bangkok study and the redesigned options for Saiban City are not dissimilar, standing at 8.79m² in Bangkok and 8.04m² in Saiban. Compare this with 3.20m² in Hong Kong,[5] where living conditions in apartment complexes have been widely criticised. The remodelling for Nawalane (for the IIED study in March 2010) worked out at 3.87m², which is an improvement on existing conditions but still insufficient for the number of people living in each space.

The Bangkok study and re-planning options for Saiban City suggest that the built density per capita should not be less than 6.5m²; however, high land prices, construction costs and existing lending arrangements make such a high built density per capita unaffordable for the poor (see Appendix 6). The question is whether the design and size of housing units should be determined solely by their affordability (which can result in sub-standard conditions), or whether it is more appropriate to focus on environmental and social concerns and find ways of making them affordable.

While it is difficult to set adequate housing standards for the poor because of their poverty, this does not excuse the promotion of what is essentially sub-standard housing by the United Nations, national governments, developers and housing projects funded by international financial institutions, which has also been justified by a number of professionals in the field.

55. Nattawut Usavagovitwong *et al*. *Housing density preference study for low and lower-middle income settlements in Thailand*. Asian Coalition for Housing Rights, Bangkok. August 2010.

3.7 Residential footprint

There is a difference between planning for new settlements and for blocks of land in a sector of the city that is already covered by formal plans. The former will require new amenities and commercial areas, road systems and related public spaces; while in the latter case, provision will already have been made for these facilities in the sector plan.

The remodelling exercise to design individual houses on 47m² and 30.72m² plots in Paposh Nagar and Fahad Square (IIED study, March 2010) suggests that up to 58 to 60 per cent of the site can be used for residential purposes in a new settlement plan, and 77 to 80 per cent in an officially planned sector. In Bangkok, there are schemes where only 8 per cent of the plot is left as open space (see matrix in Appendix 2).

3.8 Density achieved with individual houses and apartments

A comparison of the remodelling case studies from Bangkok, Karachi and Saiban City clearly shows that building small apartments of 32m² to 35.75m² can achieve much higher densities of between 2275 and 4184 persons per hectare. On the other hand, building individual houses on small plots can produce higher densities than the 1225 persons per hectare prescribed by KBCA regulations (up to 1300 persons per hectare).[6] The question here is the extent to which peoples' preferences and what they can afford should be prioritised over higher densities. Ideally, we need to establish the optimum relationship between immediate needs, human and financial resources and standards, while understanding and accommodating the fact that they may all change over time.

3.9 Social relations: individual houses versus apartments

The Bangkok density study clearly establishes that social relations in low-income housing settlements are better than in apartment complexes, especially in terms of security, community activities, and entrusting neighbours to look after houses and children (see Appendix 8 for details). The study on three settlements and an apartment complex in Karachi (IIED, March 2010) also indicates that social conditions in the settlements are better than in the apartment complex, even though all of the settlements were informally planned and at least one had a number of social problems. Given the high land and construction prices associated with formally developed housing, to what extent should the issue of social relations determine whether apartments or individual houses are built on a particular site?

3.10 Affordability

Critics of the Saiban concept complain that the houses in such self-build schemes are shabby and create an unattractive environment. They argue that the street facades should be properly built, and there have been proposals to make homeowners responsible for completing the frontage, structure of the house and internal finishes at their own cost. These proposals negate the concept of incremental building that is affordable for low-income households.

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67. See Appendix 8 and IIED study of March 2010.

They also raise the question of what the poor can afford to pay for formal housing. The figures for a 15-year loan in Appendix 6 show that the poor cannot borrow enough to complete the building process, although they may manage to finish the first stage of construction and repay their loan within 15 years.

There are various ways of resolving this issue: i) by subsidising about 50 per cent of the construction costs; ii) extending the loan period to 20 years, which the House Building Finance Corporation (HBFC) is unwilling to do for persons over 40 years of age;[7] and iii) offering owners who build their houses incrementally small loans for large items such as roofs (which represent about 20 per cent of the cost of construction[8]) and utilities. Any solution should include design, technical and management advice to help plot owners create a pleasant social and physical environment. The question is, who will provide these design and technical services, and how can they best be delivered?

4. Conclusions

4.1 General conclusion

The issues raised in this study are important for a number of reasons. In many Asian cities state-subsidised public housing solely consists of schemes to redevelop so-called 'squatter' settlements, which mainly involve replacing them with apartment blocks. The evidence suggests that residents are unhappy with these schemes because they cannot run businesses out of their homes, and are burdened by loans they have to take out for apartments that destroy existing community networks and create social problems.[9] It is true that some more sensitive alternatives have been developed, but none are on a sufficient scale to properly address the problem.[10] In the meantime it has become difficult, if not impossible, to create the kind of informal settlements that were common before the 1990s.

The resulting gap in supply and demand for low-cost housing is increasingly met by real estate developers, who can often obtain market-based subsidies and long-term housing loans to support their enterprises. Housing units are becoming smaller in order to make them affordable, sometimes shrinking to as little as 15m² to 18m².[11] These trends are creating a degraded physical and social environment that will further deteriorate due to densification and maintenance-related

78. HBFC website: www.homespakistan.com/Home-Finance/House-Building-Finance

89. See Appendix 9: Quantity and costs for house plans.

910. Han Verschure *et al. Evaluation and recommendations for Tan Hoa-Lo Gom Canal sanitation and urban upgrading,* 28 April 2006; and *Mission to Istanbul, Republic of Turkey, June 08-11, 2009*, UN Advisory Group on Forced Evictions.

1011. See, for example, the work done by SPARC in Bombay and by CODI in Thailand.

1112. Author's observations and conversations with residents, developers and professionals in Bangkok, Delhi and Karachi.

problems. What will they look like 10 years from today? Self- or community-built incremental housing would seem to be the only affordable way of improving living conditions for low-income groups, provided there is sufficient guidance and the issues raised in this paper are taken into consideration.

This study clearly shows that subsidies are required to provide 'adequate' housing for the poor. Such subsidies are not in place because planning in Pakistan has traditionally catered to the economic interests of the elite, and now also serves the economic interests of the upwardly mobile middle class. The situation is exacerbated by a very strong and deeply-rooted bias against the poor, and lack of funding for urban development that can be largely ascribed to a taxation system that refuses to tax the rich in proportion to their wealth. The institutions responsible for planning and implementation lack the technical capabilities and capacities to fulfil their functions, and politicians, bureaucrats and professionals have little interest in ensuring that they can do so. There are various laws, policies and constitutional provisions that support the promotion of justice and equity in development processes, especially with regard to shelter, but most remain ineffective concepts as there are no rules, regulations, procedures or back-up institutions to enforce them.

4.2 Conclusions regarding Saiban City

A number of specific conclusions regarding the future design of Saiban City are presented below. These mainly relate to the issues raised in Sections 3 and 4.

1. Plot sizes in settlements should be mixed, ranging from a minimum of 47m² to a maximum of 62.7m², and width-to-depth ratios should vary between 1:2 and 1:3. Plots of different sizes and ratios should not be segregated from each other, but woven together in clusters or along gridiron roads. The cost of a square metre of land should remain the same for all plots to enable residents to choose what they can afford or what they prefer.

2. Commercial plots should not cover more than 1.5 per cent of the site, and should cost 50 per cent more per square metre than residential plots. This is because commercial plots are seldom occupied or used for the residents' benefit; their needs are served by shops operating out of houses along the lanes in these settlements. The provision of small plots for commercial activities within clusters should be explored, as in Schemes 5 and 7.

3. The residential footprint should expand to 65 to 68 per cent of the residential area. This will increase the number of plots and considerably reduce their sale price. The results of the remodelling for the Karachi study show that increasing the residential footprint does not have an adverse effect on the physical and social environment.

4. Critics of the Saiban initiative argue that housing should be partly built by contractors. This would not be affordable and could not be incremental, and should therefore not be considered. People should build their own houses, with support from a design and construction supervision unit. The best way of organising, financing and sustaining such a unit needs to be determined.

5. Separate loan packages should be developed for roof elements and materials such as cement, bricks, utility connections and tiling for wet areas to make them hygienic. The tiling option should have a low or zero interest rate, and owners should be able to choose the package they prefer.

6. The possibility of a loan package for solar-powered DC fan and light appliances should be developed. Various companies in Pakistan charge 16,000 rupees for a package consisting of a fan, two lights, dry batteries and a solar panel to fire them. The long-term benefits of this type of initiative have been shown in numerous reports and news items.[12]

12[13]. Arif Hasan, Mansoor Raza. *A Study into the acceptability of alternative energy sources for Urdu Bazaar Karachi*. Unpublished draft report, January 26, 2011.