Paper No. 351

New Trends and Strategies In Low Cost Housing

Engr. Abubakar Nazir Khan

NEW TRENDS AND STRATEGIES IN LOW COST HOUSING

By

Engr. Abubakar Nazir Khan[1]

ABSTRACT

Housing is known to be among the three most essential needs of man after food and clothing, it constitutes the third necessity of life. Low cost housing can be referred to as housing or subsidized housing facilities which is government sponsored Economic Assistance Programme aimed towards alleviating housing costs and expenses for needy people with low to medium income earners. Forms of subsidy include direct housing subsidies, non-profit housing, public housing, rent supplements and some forms of co-operative and private sector housing. Affordable housing projects are characterized by an increasing demand mainly due to urbanization. The selection of building materials should meet the needs of local conditions to improve quality of life for the most needed ones by building new structures and/or by improving existing structures. This paper on the use of building materials and engineering design in affordable housing projects in Pakistan. Although this study attempts to cover most of the factors influencing the use of building materials & construction with different methods & techniques of building materials for building construction & development of affordable housing model for urban areas and different strategies for Affordable Housing.

Keywords
Low-Cost Housing Units, Affordable Housing, Strategies, Challenges, Low Cost Housing, Engineering Design.

1. INTRODUCTION

A small house of his own to live in is the cherished dream of the little man in our country, whether he is a daily laborer, a small farmer, a low paid employee in Government or other service or a petty merchant. More often his dream remains unfulfilled. This is mainly because of the high cost of house building. What contributes to this high cost is not only the high cost of materials and the high rates of wages prevailing specially in our State; It is also because of the insane craze for the so called 'new fashions' in house building which the large majority of our engineers are

[1] abubakar 55.ak@gmail.com

advocating and persuading their clients to adopt. Very often the poor householder is at the mercy of the 'all knowing' engineer and he cannot or dare not have his way as to what sort of house he really wants. The result is that houses are built with lavish house of steel and cement and painted all over in garish colors. It is hardly fit, to live in, because it is hot as an oven, during summer. And for this reason the poor man has to spend his whole fortune. Such is the picture of the house – building activity in our State at the present time. People have begun to realize the foolishness of the whole thing and are seeking ways and means of building houses of reasonably good quality and capable of fulfilling their real needs.

LOW COST HOUSING as a concept is very generic and could have different meanings for different people based on differences in income levels. Affordable housing refers to any housing that meets some form of affordability criterion. Different countries have defined affordable housing to present the economic potential of an individual buying a house. In the United States and Canada, a commonly accepted guideline for affordable housing is that the cost of housing should not be more than 30 percent of a household's gross income which vary with regions and income levels. Another point to note is that the definition of affordable housing is not just restricted to the three categories mentioned above, but applies to people across the country. Affordable housing can be defined using three key parameters viz. income level, size of dwelling unit and affordability. While the first two parameters are independent of each other, the third parameter is correlated income. Housing costs here include taxes and insurance for owners, and utility costs. If the monthly carrying costs of a home exceed 30–35 percent of household income, the housing is considered unaffordable for that household.

Defining affordable housing in Pakistan is a difficult task given that at every square kilometer of the country, the dynamics of the market are different.

The rising demands on affordable housing in PAKISTAN and the increasing interest of developers to invest in affordable housing projects mandates a clearer understanding and appreciation of the lifestyles and cultural values of the local society. Dealing with affordable housing as products or commodities only results in less than appealing and depressing environments that do not meet basic needs or satisfy the preferences of potential users. The economic crisis shadowing Pakistan is leading to the rise of interest rate and credit unavailability. The real

estate developers in such circumstances are having difficulties to find buyers for premium housing units. This has inspired as well as impelled developers towards cost effective housing.

2. NEW TRENDS IN BUILDING MATERIALS

In addition to the conventionally used materials there are various alternative technologies and materials developed by various research organizations, innovators and manufacturers in world that are beneficial in the housing construction. As part of this study these alternatives and the information collected has been provided in the subsequent sections.

2.1. Structural Materials

2.1.1. Pozzolona Material (fly ash/slag/calcined clay) as Blending Material with Cement

Up to 35% of suitable fly ash can directly be substituted for cement as blending material keeping the structural considerations. Addition of fly ash significantly improves the quality & durability characteristics of the resulting concrete. Use of blended cement has now become quite popular world over, from durability and environmental benefits point of view. The advantages achieved with the use of blended cement in concrete are quite well documented: Reduced heat of hydration, improved workability & ease of pumping, superior microstructure leading to lower permeability, higher long term strength, better performance in aggressive environment (Sulphates, Chlorides etc.), reduced risk of alkali silica reaction and higher electrical resistance leading to lesser chances of reinforcement corrosion are some of the benefits of pozzolona material blends. While portland pozzolona cement saves energy by 20%, lime pozzolona mixture shows up to 70% savings in energy.

2.1.2. Recycled Steel Reinforcement

Steel reinforcement can be made entirely of recycled scrap iron. This material is salvaged from automobiles, appliances, and steel-reinforced structures, which include reinforced concrete pavements, bridges, and buildings. In general, steel reinforcement bars can be rolled out from either of the following: used scrap rails, automobile scrap or defense scrap, defectives from steel plants, scrap generated from ship breaking or discarded structures, ingots from induction furnaces, tested billets from mini steel plants and main producers. About 40% of the world's

steel is produced by electrically melting recycled steel. The key significance of recycled steel in the global steel industry has made it into a strategic raw material, and it has a price on the world market. Some steel products such as galvanized studs, cladding and roofing panels and tube assemblies may verifiably come from electric "mini-mill" processes where recycled content claims of 40% or more are justifiable. Strength is high, non-combustibility and the added advantage of not producing smoke or toxic gases when subjected to elevated temperatures, availability in a form that permits efficient and uniform application, sufficient bond strength and durability, resistant to weathering and erosion resulting from atmospheric conditions, resistant to termite infestation.

2.1.3. Ferro Cement and Precast Components

Precast Components are 85% recyclable, have low carbon dioxide generation and are energy efficient. They are eco- friendly, cost effective and easy to install. With use of precast components, wastes during operations are minimal, curing is not required, and structures are waterproof due to less water cement ratio, plastering is not required from the inner side of slabs and the components are corrosion proof. The components are also stronger than cast-in-situ structures, have longer life and have better load bearing capacity. Precast aerated/cellular concrete walling blocks and roofing slabs when used in multi-storied structures reduce weight, resulting in more economic design of structure, can be worked and handled easily, have high fire resistance rating and provide better insulation. The slabs are provided with interlocking system to avoid independent displacement of slabs. Slabs are manufactured with M 40 Grade concrete to give durable and stronger slabs than cast-in-situ slabs. No curing from inner side of the slabs is required which helps early utilization of construction. Precast brick panels used in combination with partially precast joists save in economic use of steel and cement and provide an alternative to reinforced cement concrete roofing/flooring where good quality bricks are available. Precast L-Panel Elements provide a better alternative to RCC sloping roofs. Water seepage can be eliminated in these panels where better quality control is possible. Precast technology also results in saving on expensive shuttering. Precast plank and joist for flooring/roofing consisting of precast RC planks supported over partially precast RCC joists with in-situ concrete are suitable up to a span of 4.0 m and ensure 12% overall saving in cost and 20% reduction in construction time. Precast chamber covers are provided with welded reinforcement to increase its life and avoid breakage at site after

installation. They are cheaper and stronger than cast iron chamber covers. Precast waffle units provide speedy construction with overall saving of up to 10% besides avoiding shuttering work. The shape is like an inverted trough with a square or rectangular plan having lateral dimension up to 1.2 m suitable for large spans beyond 6m in either direction. Precast channel units are easy to construct roofing/flooring with an effective saving in cost and time. These units are reinforced cement concrete elements, channel shaped in section and 2.5 to 4.2 m long providing for ceilings that looks like one-way rib beams. Precast cored units are simple to manufacture and provide a speedy and economical flush ceiling. They consist of extruded concrete section units with circular hollows and can be used up to 4.2m span and can be used for floors or roof in load bearing walls and framed structures. Precast in-situ thin ribbed slab are available, which are made from precast/in-situ ribs provided at a spacing of 1.2 m with cast- in-situ RC flange. These can be used for floor/roof slab. As the ribbed slab is thin, roof treatment should be provided over the slab for better thermal insulation. It is cheaper and easy to construct in comparison to conventional cast-in-situ RCC slab. 5

2.1.4. Precast R.C.C. / Ferro-cement Frames.

Precast R.C.C. frames are concrete doorframes with welded reinforcement. These are economical, environment friendly and durable.

They are termite proof, fire resistant and corrosion proof. There is no bending or twisting, no warping, no shrinkage and no cracks. They are maintenance free and easy to install at site, provided with in-built high quality aldrop hold protector, stronger than other door frame material available in the market and are provided with two different types of hinge fixing arrangements to suite specific requirements. High quality plastic blocks for fixing hinges or arrangements for fixing stone hinges are available. Ferro cement frames are 1/3rd in cost, compared to even second grade timber. They can be manufactured at a small-scale level or for mass application, can be painted like timber shutters. They have higher strength to weight ratio than RCC and provide 20% saving on material and cost. Technical specification: 100 mm x 60 mm section, grade of concrete M 40, steel 6 mm dia, 3 no's, and stirrups, 6mm welded to main reinforcement.

2.2. Bricks & Blocks

Need for building materials is growing at an alarming rate and in order to meet the demand for new buildings, new ways and techniques must be evolved. Manufacturing of building materials like bricks/blocks, cement, steel, aggregates, etc. consumed in bulk quantities, puts great pressure on natural resources (raw materials) and energy requirements. The use of alternative materials for bricks should be encouraged in order to preserve precious fertile top soil. Described below are a few examples of alternative materials for bricks/blocks.

2.2.1. Fly ash – sand – lime bricks

To bridge the huge shortfall of bricks and to maximize reuse of fly ash waste, these fly ash- sand lime bricks should be used. These bricks provide the advantage of being available in several load bearing grades, savings in mortar plastering, and in giving smart looking brickwork.

2.2.2. Bricks from Coal Washery Rejects

Freshly mined coal is washed to remove impurities prior to its use or processing. This residual waste from the coal washery plants is a hazard to the environment and needs to be disposed or utilized in a manner which lessens its harmful effects on the natural surroundings. With a suitable binder such as cement or lime, bricks and blocks similar to those made using fly ash can be made using this coal washery reject material. These bricks are eco-friendly and waste utilizing. They reduce air, land and water pollution, are energy efficient and cost effective.

2.2.3. Building Blocks from Mine Waste and Industrial Waste

It is eco-friendly, utilizes waste and reduces air, land and water pollution. It is energy efficient and also cost effective. Majority of the large-scale industries and thermal power plants generate solid wastes in bulk quantities. Red-mud, coal ash, slag, fly ash, etc. represent such wastes unutilized for several decades. For example, more than 100 tones fly ash is produced annually (from thermal power plants) and only 2–3% is being utilized. Similarly, millions of tons of red-mud are stored near aluminum manufacturing units. Such huge heaps of wastes concentrated in certain specific localities cause environmental and pollution hazards. Such wastes can be utilized for the manufacture of bricks/blocks, substitute for fine aggregates in concrete, partial replacement of cement in concrete, lime–pozzolona cements, etc. Huge

quantities of solid wastes (generally known as mine tailings) are produced by the mining industries. Generally, mine tailings are accumulated in heaps near the mines resulting into huge hillocks.

2.3. Plaster

2.3.1. Calcium Silicate Plaster

Calcium silicate refractories are usually derived from calcium silicate or silicate bearing minerals such as hornblende, epidotic and diopside, often with calcite or dolomite or wollastonite. Wollastonite is a naturally occurring form of calcium silicate commonly used as filler. Portland cements are also based on calcium silicate. Calcium silicate plasters are economic, eco-friendly, produce less wastage, have wide usage, give a smart finish, are less energy consuming, do not emit Volatile Organic Chemical (VOC) and other toxic fumes and gases after application and are recyclable. They are safe in handling and usage, do not need skilled man power, are fast drying, durable, and have less water consumption.

2.3.2. Fiber reinforced clay plaster

Clay Plaster can achieve better sticking properties by reinforcing it with fibers. These fibers can be natural plant (cellulose) fiber or artificial fibers of polypropylene. Plant fibers in fiber reinforced plaster act as reinforcement and create voids thus controlling cracking due to drying shrinkage and thermal movements. The dried plaster is less brittle than conventional plasters and can withstand small movements of the substrate. Fibers made from 100% virgin polypropylene fibers are also available and can be used to achieve the similar properties. Use of these fibers can reduce plastic shrinkage, reduce permeability, and provide increased impact and abrasion resistance.

Strategies in place of driving towords low cost affordable housing

The proposed strategies will be vehicles to enable affordable housing providers to access lower cost debt for longer terms unlocking desperately needed "fit-for-purpose" funding into the sector in Rwanda.

To access the lower cost capital, it requires the government, private sector, institutional investors and non-profit organizations to work together in new and collaborative ways [Figure-1].

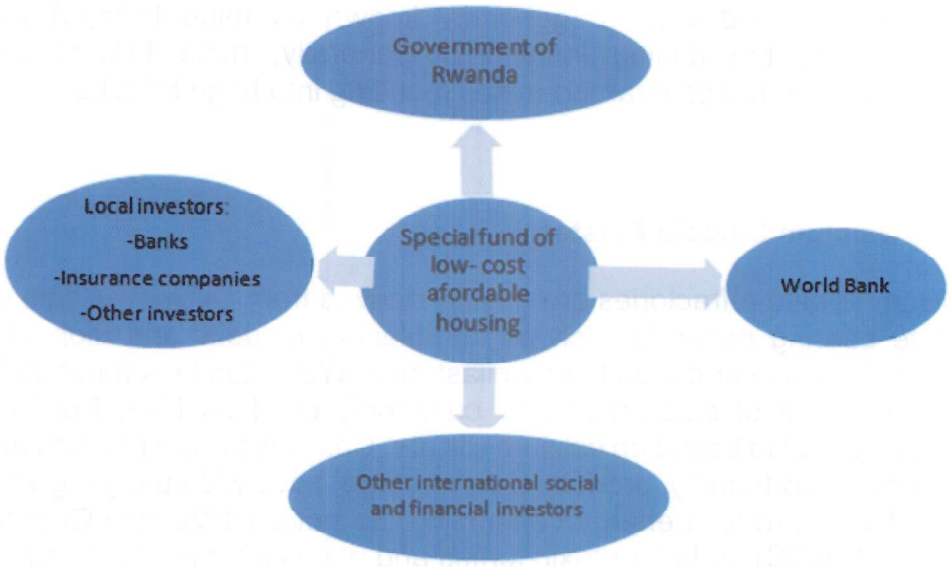


Figure 1: Low cost affordable housing Model

This model is a viable solution that, with Government support and institution investors in the line of Public Private Partnership could greatly contribute to increasing the stock of affordable housing across the country. The model would allow housing providers to access funding at lower interest rates and for longer terms. The benefits of this financial model include: -

1. Housing providers would have access to capital which is more fit-for-purpose, that is over longer term (of 15-25 years) and on lower cost terms.
2. Institutional investors will have a financing vehicle to achieve long term secure and stable returns as part of their portfolio whilst also supporting the affordable housing. The fund would have investment characteristics such as a Government-backed credit rating with appropriate risk adjusted returns that are similar to other asset classes that institutional investors are familiar with.

Possible Ways of achieving low cost and affordable housing in Pakistan.

This section offers a set of strategies that can be used in Pakistan to increase affordability while maintaining commercial viability. These strategies are not a formula, but suggested ingredients that we expect will improve the chances of success.

Strategy 1: Using simple materials and simple construction techniques

Currently, in Pakistan, some Actors are using simple materials and simple construction techniques to afford low cost houses. Indeed, with compressed earth block technology, people can construct a simple, efficient, cost-effective house.

This house will have all the advantages of concrete block construction without the costs. To achieve good results, however, some new construction techniques have been learned and simple machines and some tools are used to compress blocks. [Table1, Picture 2].



Picture 1: Low cost affordable house of 18 Million Rwandan francs



Picture 2: Tools to presses blocks in local raw materials

Table 1 - List of tools used to compress blocks Shovels	Wire	Wheelbarrow	Eye protection
Picks	Pliers	Calculator	Carpenter square
Watering can	Rubber gloves	Chisels	Measuring tape
Oil	Metal saw	Trowels	Wood Saw
Sieve	String	Surveyors level	Block press

There are many different types of block presses. Some are manually operated and others are powered with electricity or petroleum. Manual presses are operated by semi-skilled workers, whereas powered machines need more skilled operators and are more expensive to run. [Picture 3, Picture 4].

Bricks are either square or flat faced and they may interlock. This Interlocking blocks offer an advantage of requiring less (or no) mortar in joint of blocks. Square blocks are more versatile for making curves or intersection walls, as are conventional bricks.

However, in case no machine is available, a simple compressed earth block is produced with the help of a mold and a tool to ram the earth into the mold. If an appropriate mix is used and the bricks are well mixed and uniformly compressed, better strength is achieved than using traditional molding techniques. However, this technique is not consistent and does not achieve the same results as a machine press. Furthermore, this method has some downside of being very slow and only producing flat faced.



Picture 3- Manual presses machine



Picture 4 - Electrical presses machine

Strategy 2: Make land affordable

Land is so expensive in urban Pakistan that it alone can make affordable housing unviable. Additionally, banks in Pakistan are reluctant to finance the purchase of land. Therefore, creative methods often need to be used to secure land in a way that makes sense for the project. Below are a few possibilities:

i. Land as equity

Find a land partner who can come in with the land as equity. This means eventually paying for the land in the form of dividends, which may align nicely with cash flows since revenue comes in first and the whole payment does not need to be made at once.

ii. Concessionary land

Find an organization or government agency with an interest in low cost housing and receive the land at a concessionary rate. This is currently happening in Pakistan on land that belongs to Government. A low-income housing development is being planned on their land, enabling the project to have much more flexibility with pricing than is typical because the land is free. This same scenario could be replicated on government land or land belonging to individual owners with an interest in affordable housing.

iii. Land banking / Flipping land

Buying more land than is needed for the project and reselling it at an increased price can dramatically reduce the net cost of the land. Assuming significant appreciation of land value continues to be the trend, this can even make the land essentially free. However, it does not

solve the challenge of financing the land since the initial purchase still needs to happen upfront.

Strategy 3: Alternative Technologies

Using alternative technologies can be challenging in the Pakistani market, but if done correctly it has the potential to be an essential piece of bringing down the cost. The most important aspect to be aware of is ensuring that the look and feel of the home is similar, if not the same, as traditional techniques. When someone purchases a home, whether they are rich or poor, they want to put their savings into old-fashioned brick and mortar rather than a shiny new technology that is untested and unfamiliar.

Strategy 4: Creative Financing

Given the unfriendly nature of the lending climate in Pakistan, it can be hugely beneficial to think creatively about how to raise funds. Looking to international lenders for finance is one way to address this problem. Development Finance Institutions (DFIs) and other International Organizations can be sources of project finance with single digit interest rates. This reduced cost of capital (especially in such capital intensive and highly leveraged projects) can make a big difference in the final unit price.

Strategy 5: Subsidy

i. Government Subsidy

Cashing in on the subsidies offered by the government seems straightforward, but many developers seem unaware of what is offered, or simply disillusioned that it will be delivered. Therefore, it is important to be familiar with the incentives and the path to benefit from them.

ii. Building subsidy into your model:

While the best scenario is a development where every unit is profitable, this is not always possible if the goal is to cater to low-income populations. Therefore, the choice to incorporate cross-subsidy is worth considering. This can be in the form of traditional cross-subsidy, where the affordable units make a loss that is subsidized by middle-income units. Or the affordable units can make a small margin while middle-income units make a larger margin. Either scenario creates a mixed-income development. Many housing experts believe that in order for

affordable housing to be financially viable, especially in an urban setting and without alternative technologies, mixed income is the only way to go.

Strategy 6: Design

Innovative designs and layouts can help to use space efficiently and effectively. There have been many interesting experiments with creative designs for affordable housing communities that save on cost and space as well as create more community interaction and reduce the risk of ghettoization. Most affordable housing communities that fail to increase quality of life do so because master planning and design were overlooked. They ignore the benefits of creating mixed-use developments with community spaces and commercial areas. The importance of design should not be underestimated!

Strategy 7: Incremental construction

In some contexts, incremental construction increases the ability to provide homes at an affordable rate. An Acumen Fund portfolio company in Pakistan, Ansaar Management Company (AMC), provides an example of successful, developer-led, incremental construction.

AMC's model entails constructing and selling homes block by block to avoid the large amounts of capital needed at one time to build in the traditional fashion. This means that economies of scale are not achieved and therefore the profit per home is less than a traditional model. But in exchange for a lower margin, AMC is able to recycle capital and spread out demand, and the profits made from each block can be used to fund the construction of the next block.

Strategy 8: Self construction

Self-construction refers to homeowners driving the construction of their own homes, which allows them to work within their own financial requirements and timeframe. Self-construction can be integrated into a model in a variety of ways. It can range from a private sector version of the "site and services" model (infrastructure and foundations are provided, and the homeowner purchases a plot and builds their own home) to a simple ground floor structure constructed by the developer, leaving residents with the ability to expand as their financial situation allows.

The key to successful homeowner-led incremental construction is ensuring the quality of the construction both to maintain the look and feel of the development and to maintain safety standards. This can be challenging and requires a strong ongoing role from the developer or other affiliated agency, sometimes in the form of technical assistance through engineering and design support.

Strategy 9: Community supported labor

Labor costs can be cut by hiring the current or future residents as construction labor. This strategy was used by different investors and allowed them to both cut costs and to increase the residents' feeling of ownership in the project. However, it is worth noting that it may take more management and is only viable for certain project designs and construction techniques. Usually, the community workers must also be accompanied by skilled labor.

Strategy 10: Avoiding speculation

What is the use of bringing down the price if it does not reach your target market in the end? There is no clear answer to keeping speculators from buying, especially since in many cases they are not wealthy individuals buying plots in bulk, but middle-class people who want to make little extra money. However, developing a strategy to avoid this cannot be an afterthought and must be carefully developed from the outset. Some potential strategies include:

- Developing strict criteria for buyers to qualify.
- Ensuring owner-occupation within a short time period.
- Limiting the number of homes that can be purchased by one individual.
- Withholding title deed for a period of time, such as 5-years, so owners are unable to re-sell.

Strategy 11: Develop contracts with suppliers

Given the volatile economic environment, materials prices can skyrocket and turn a healthy project completely unviable. In order to avoid this, develop fixed rate contracts with materials suppliers whenever possible. Some may even have Corporate Social Responsibility programs, so do not be afraid to market the social impact side of the project in order to negotiate better terms.

Housing supply: challenges

Challenge 1: Availability of finance

i. Project Finance:

Housing developments are extremely capital intensive and highly leveraged. Yet it can be difficult to secure debt, especially at reasonable rates, which are a key component of bringing down the cost for the end-user. In fact, the cost of finance is one of the most prohibitive factors in the Pakistani market. The loans and mortgage interest rates of over 15% in Pakistan are too high to afford for those people with low income wages. For the purpose of designing an affordable housing program, affordability can be approached in two ways: by household income categories, and by housing cost categories. Thus the Gop needs to decide and define the key household and housing unit categories to support; options include: a) Support affordability up to the lower to middle class households (say USD 100-1000 per month); b) Support only the low-income segment (say USD 100-300 household income per month), c) Some instruments to support the lower income and some for the middle income, categories; d) Support specific low-income employment categories like teachers, police, healthcare staff, or low-paid civil servants in addition to some general income based schemes.

Challenge 2: Volatile economic environment

Rapid inflation has caused large increases in the cost of materials and land. It is difficult to maintain a healthy margin with this level of inflation, especially if a large portion of the units were sold off plan at a price that failed to predict the inflation. This is yet another reason to leave a lot of leeway in your model and to understand that while there are many benefits to selling off plan (i.e. selling homes before construction begins or is completed), there are also consequences that should be thought through.

3. GOVERNMENT PROGRAMMES

As per the vision of The Prime Minister of Pakistan, Naya Pakistan Housing Program has been launched, with the aim to provide better livelihood and shelter to the low / middle income households. Construction of houses has been initiated, keeping in view the end user's functional requirements. The houses will be allotted at merit through transparent balloting.

Strategy

- PHATA has started construction of 2 Lac houses up-to December 2019 in 29-cities of Punjab on the land bank which has been established.
- Moreover, 12 Lac housing units will be constructed by Private Sector under PHATA Affordable Private Housing Schemes Rules in next 4-years.
- 1-Lac houses will be constructed by PHATA through Joint Ventures (JVs) in collaboration with Govt. Agencies (LDA / FDA etc.) and private sector.
- 5-Lac houses will be constructed, in 10,000 villages under Rural Housing Program in four years.

Table-2: Existing Land Bank S. No.	Land Bank	Total (Kanals)
1	PHATA	6240
2	State Land	15360
3	Pvt. Land	22920
4	PCBL	1840
5	PLDC	3200
Total		**49560**

Table-3: On Going Phase #	Scheme Name	Area	Housing Units	
3 Marla	5 Marla		Total	
1	Renala Khurd	52	340	519	859
2	Lodhran	50	371	522	893
3	Chishtian	50	1144	-	1144
4	Bhakkar	19.5	60	116	176
5	Layyah	21	-	128	128
6	Quaidabad	137	349	844	1193
Total	329.5		2,264	2,129	4,393

Table-4: Future Program for Other Cities #	City	Area (Acre)	Multi Storey Apartments/ Houses (Tentative)	Land Title
1	Sialkot	208	3000	PHATA
2	Gujranwala	200	6000	Private
3	Multan	117	2000	Private/State
4	Rawalpindi	200	6000	Private Land
5	Attock	100	1435	State Land
6	Sahiwal	37	3500	State Land
7	Jehlum	1000	2067	PHATA
8	Chiniot	150	3800	PHATA/Private
9	13 Other Cities	2500	37,500	State / PHATA / Private
Total		4,512	65,302	

Table-5: Price of Houses #	House	Covered Area (sft)	Tentative Price
1	3 Marla (One Bed)	600	16 Lac to 20 Lac
2	3 Marla (Two Bed)	730	19 Lac to 24 Lac
3	5 Marla (One Bed)	850	20 Lac to 25 Lac
4	5 Marla (Two Bed)	1070	25 Lac to 30 Lac
5	Apartment	550	15 Lac to 20 Lac

Financial Model

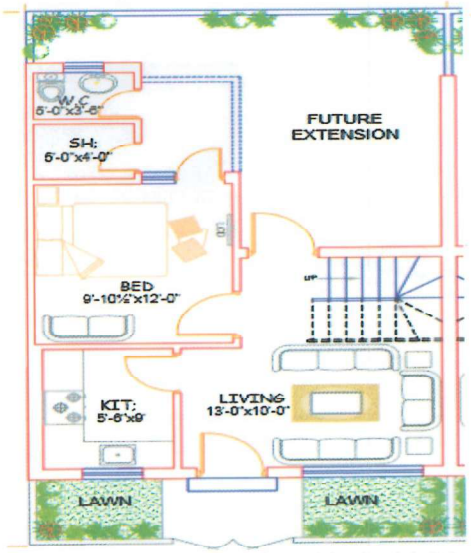
- Self-Finance (No Profit No Loss)
- Rs. 10,000/- with application
- 10% down payment after balloting

- 24 installments in 24 months
- Mortgage facility available from Bank of Punjab and HBFC
- Payment to contractor, Land Cost and infrastructure Cost
- 7, 10, 20 Marla Residential Plots and Commercial Plots will be auctioned
- Subsidy per unit is 3 Lac to 6 Lac

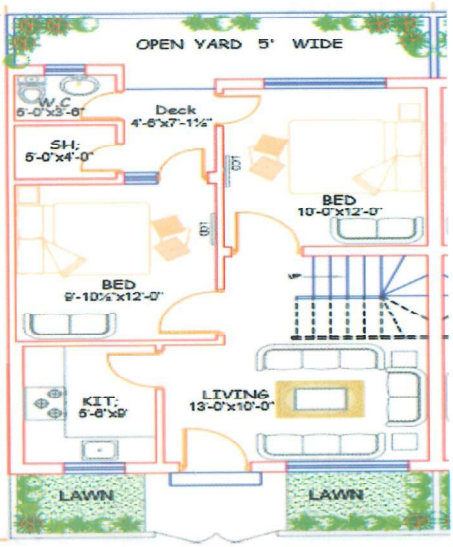
Table 6 - 3 Marla House Design Sr.	Accommodations	Area (Sft)	Cost Estimate (Rs)
Proposal : 1	One Bed, Living, Kitchen, Shower, WC, Staircase	600	16,00,000
Proposal :2	Two Bed, Living, Kitchen, Shower, WC, Staircase	730	1,935,500

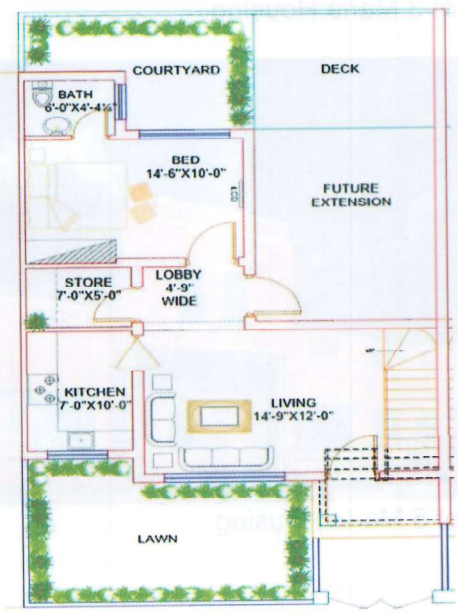
Table 7 - 5 Marla House Design Sr.	Accommodation	Area (Sft)	Cost Estimate (Rs)
Proposal : 1	One Bed, Living, Kitchen, Bath, Store, Stair Case	850	2,070,000
Proposal :2	Two Bed, Living, Kitchen, Bath, Store, Stair Case	1070	2,525,000

3 Marla One Bed

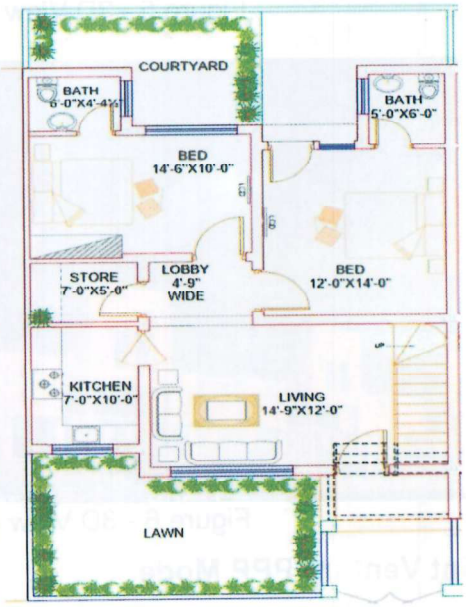


3 Marla Two Bed





5 Marla One Bed



5 Marla Two Bed

Private Mode

- Private Sector is being encouraged to participate in NPHP under **"PHATA Affordable Private Housing Scheme Rules, 2019.**
- One window facility will be provided to Private Developer to launch housing schemes and fix minimum 20% residential area for NPHP.
- The houses will be constructed by private sector and sold on reserve/fixed price under the umbrella of NPHP.

• Circulatory Consultation Process followed - ABAD, PDA, PHTF and other agencies.



Figure 5 - 3D View of 3 Marla Housing



Figure 6 - 3D View of 5 Marla Housing

Joint Venture/PPP Mode

- International and Local Investors are being encouraged to provide unsolicited proposals on state/PHATA Lands
- Various Models are under discussion (JV/Land Sharing/Cross Subsidy etc.)
- PC-II Consultancy to Develop PPP Models for both PHATA and Private land in Chiniot is already initiated. Technical Evaluation of firms is in process.
- Huaxin Technomen International and Sunrise Construction Company, China have shown their interests for investment in low cost and energy efficient technologies.

- MOU has also been signed with the Sunrise Construction Company China for construction of 20,000 apartments which will energy efficient and cost effective.

Rural Housing

- 50 Houses in each village
- 25,000 villages in Punjab (10,000 Target in next 4 years)
- Minimum 3 Acre State Land or donated land
- Development of Infrastructure by PHED
- Construction of Houses by Akhuwat Loan
- Tentative cost of House: 5 to 7 lac.
- Facilities of Park, Sewerage, Soling and solar grid etc

Rural Housing

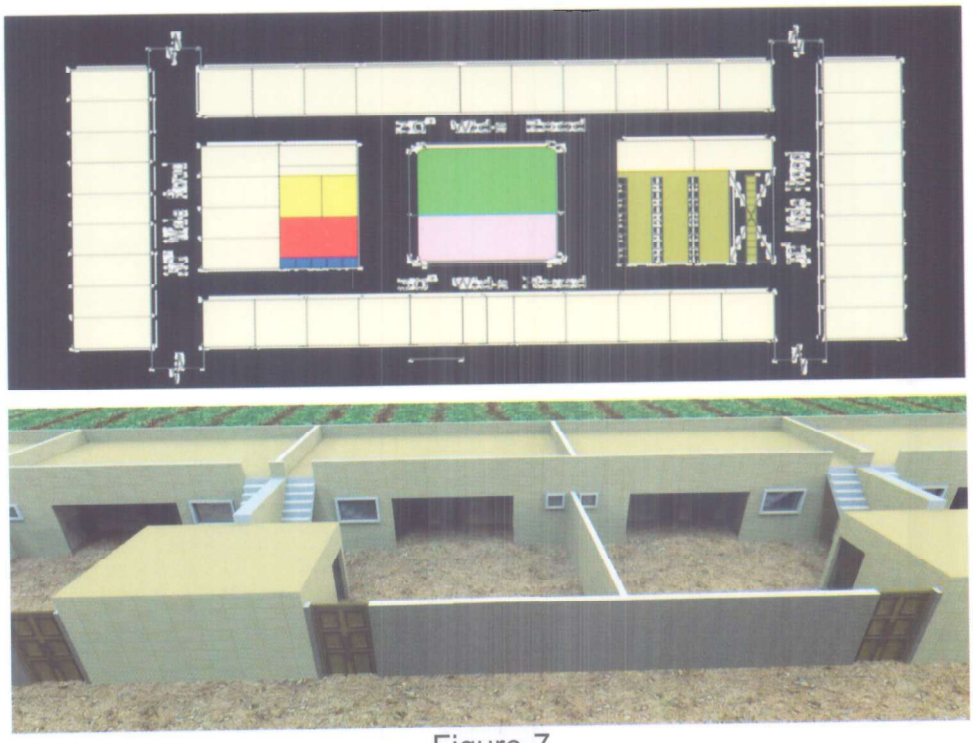


Figure-7