

Design and Development of Cost Efficient Houses

The challenges and prospects of Affordability



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Introduction

To start with shelter is one of the basic human needs and addressing its challenge has major significance particularly for the poor. Ethiopia being one of the poorest nations in the world, it is not unusual to find a large portion of its population living in slums and much depleted houses. The main reasons are shortage of land for construction and affordability of construction materials due to ever mounting cost of living. This paper will spot and discuss the potential problem and future challenge of the shelter sector in Addis Ababa city - affordability. Many types of data are used in different section of the paper from various sources yet it is unfortunate that there is no correspondence in most of the data. Some of the divergence may even lead to conclusions that are at odds to the facts on the ground. Simple example: life expectance is figured as 52.92 (M) and 57.97 (F) years by CIA-Fact book (CIA, 2009) where as the same is figured as 47 (M) and 49 (F) years by Ethiopian federal ministry of health. (FMoH, 2009). Other data including the GNP, GNI and population sizes which have major influence on shelter analysis have also some discrepancies. I have however taken the data that sounds reasonable to my perception and experience form various sources explained.

Lastly, there are a lot more to do as explained in the proposal for change section of this paper. Any type of questions, comments and/or suggestions regarding the paper can be forwarded to my business mail address: melakumohammed@yahoo.com

1 Shelter Situation Analysis

1.1 Basic General Data

Ethiopia strategically located in the horn of Africa, lies between 3 and 15 degrees North latitude and 33 and 48 degrees East longitude, has seen human habitation for longer than almost anywhere else in the world, possibly being the location where humans evolved. The capital Addis Ababa¹, established merely more than a century old, is the last in a long succession of capital cities dating back to the first century. The pre-Christian city of Axum was followed as capital by Lalibella, Gorgora, Gondar and Mekelle, all of which are located in northern Ethiopia. The primary reason for the continuing relocation of capitals was exhaustion of wood resources for fuel and construction. New capitals were prosperous for several decades until the sparse forests around the city became depleted. Each capital went through a stage of decline and was finally abandoned in favor of a new site. Addis Ababa became Ethiopia's capital when Menelik II became Emperor of Ethiopia in 1886 with initial 50,000 inhabitants. The town grew by leaps and bounds from that time on and has an estimated population of over 3 million by now. Addis Ababa is the head quarter for African Union, the United Nations Economic Commission for Africa and many other international organizations.

Despite its age, the infrastructures of the city are not developed. Housing is also one of the most serious problems. Existing houses are characterised by slum, poor sanitation, congestion, poor access, insufficient quantity, old etc. To alleviate the housing problem, Ethiopia was allocating 2.6% of the GNP during the late 1970s and early 1980s. However, during the late 1980s investment in housing accounted only for 2% of the GNP. This was obviously low rate of investment in light of the large and fast growing housing needs which mainly results from the accelerated growth of the urban population. During the period 1976 – 1999 about 64,828 houses worth Birr² 771.0 million were constructed. This is an estimated average of 2,818 houses worth Birr 33.5 million/year, a figure that was very low as compared with the required number of houses (Abraham, 2007). Currently the annual rate of urbanization is estimated to be 4.3% and 17% of the total population lives in the urban centre. (CIA, 2009)

¹ Addis Ababa means 'New Flower' in the national language (Amharic)

² Birr is the national currency of Ethiopia. 1 Dollar = 12.723 Birr and 1 SEK = 1.787 Birr (September 8, 2009)



Figure 1 High rise buildings and slums co-existing in Addis Ababa

The low level of housing development and huge unmet demand could be partly due to ever mounting cost of living and labor, rising prices of building materials owing to devaluation of local currency, escalation of land lease price, lack of periodic repair on government houses, etc. Subsidies given to housing sector by the government and other donors to date were considerable which currently virtually non-existing. These subsidies have been given in terms of housing plot allotment, loan with low-interest rates, technical assistance, provision of building materials at cost, etc. The opportunity cost of the urban land during the 1980s was estimated to be Birr 36.00 per m². These days, it is not uncommon to hear prices well over Birr 5,000.00 per m².

This has in general discouraged individual construction very largely. There are few if not none who construct their houses and are mostly through cooperation. However, housing cooperation has ceased currently. The freeze of cooperation has caused increase in price of land for construction and housing rental cost. The government however, has continued constructing cost efficient houses in all sub cities of Addis Ababa and other major cities of the country to fill the high demand for housing (backlog over 300,000 and 100,000 new each year). This target figure has never been achieved due to many natural and manmade constraints. Before five years 453,081 peoples are registered to benefit from the program launched by Addis Ababa housing development project office through integrated housing program. So far only 60,058 peoples have already got the house (AAHDPO, 2009) and the government has spent Birr 6,900,000,000 in the construction of cost efficient houses for the “poor”.

Some private real state developers are also contributing their part in developing luxurious apartments and middle class houses while at the same time making business. There are more real state developers in the country currently than were before. Some real state developers however trade the plot without any construction despite the rules and regulations as the escalated land price has benefited them.

Geography and Administration

Ethiopia has a total area of 1,104,300 Km² (1,000,000 Km² dry land and 104,300 Km² water). It is a landlocked country since the secession of Eritrea with total boundary length of 5,328 Km (bordered by: Djibouti 349 Km, Eritrea 912 Km, Kenya 861 Km, Somalia 1,600 Km, and Sudan 1,606 Km). Ethiopia has elevation limits ranging from 125m below sea level (Danakil depression) to 4,533m above sea level (Ras Dashen Mountain). Ethiopia has a federal government comprises of nine regional states and two autonomous city administrations. The capital Addis Ababa is located about 2,500m above sea level at 9.03° N 38.74° E. The estimated land area over which the city is spread is about 530.14 Km².

The built up area of Addis Ababa covers 222 Km² in the shadows of the Entotto Mountains. The lowest point in the city is around the Bole International Airport in the southern part of the city, while the Entotto Mountains are the highest point in the city, located to the northern side. The geographical location of Addis Ababa also influences the climatic conditions of the place. It is quite chilly during nights and warm during the day. The temperature drops down abruptly after sunset. Addis Ababa has a time zone of UTC³ + 3 (East Africa Time Zone). Addis Ababa has the status of both a city and a state, with a charter endorsed by the federal government. The mayor is the chief executive of the city government. The second tier of government refers to the sub cities. Addis Ababa is divided into 10 sub cities with significant responsibilities regarding municipal and non-municipal services. The ten sub cities are Akaki Kality, Addis Ketema, Arada, Bole, Cherkos, Gullele, Kolfe Keranio, Lideta, Nefas Silk Lafto, and Yeka. The lowest tier of government is the “Kebelle”. Each sub city has on average about 10 “Kebelles”, and hence the city is divided into 99 “Kebelles”. “Kebelles” together with the sub cities are now responsible for the provision of most of municipal and non-municipal functions.

³ UTC stands for coordinated universal time



Figure 2 Ethiopia and its regional states

Demography and Health

Ethiopia has a total population of 85,237,338⁴ which makes the 14th most populous country in the world. The country has a population growth rate of 3.208 % (CIA, 2009). There are more than 80 ethnic groups in the country; the majors are Oromo 32.1%, Amhara 30.1%, Tigray 6.2%, Somali 5.9%, Guragie 4.3%, Sidama 3.5%, Welaita 2.4%, and other 15.4% (CSA, 1994). Based on the preliminary 2007 census results, Addis Ababa had a total population of 2,738,248, consisting of 1,304,518 men and 1,433,730 women. The population is however estimated to reach 3,230,771 by 2009. Addis Ababa contains 22.9% of all urban dwellers in Ethiopia. With an estimated area of 30.14 Km², this chartered city has an estimated population density of 5,165.1 inhabitants/Km² (UN, 2009). All the Ethiopian ethnic groups are represented in Addis Ababa due to its position as capital of the country. This ethnic blend gives the city a diversity of culture making the capital even more attractive. The major ethnic groups and the smaller ones live side by side with no recorded inter ethnic tensions. Religion wise 60.8% of the populations are Christian (Orthodox 50.6%, Protestant 10.2%), 32.8% Muslim, 4.6% traditional, while the remaining 1.8% are followers of other faiths (e.g. Catholic, Hindus, Jews, Baha'is, Agnostics, etc.) (CIA, 2009)

⁴ Estimates explicitly take into account the effects of excess mortality due to AIDS; this can result in lower life expectancy, higher infant mortality, higher death rates, lower population growth rates, and changes in the Distribution of population by age and sex than would otherwise be expected (July 2009 est.)(CIA, 2009)

Table 1: The population of Addis Ababa from 1984 till 2009 (CSA, 2009)

Year	Population	% Increase	Data Type	Source
1984	1,412,575	–	census	secondary
1994	2,084,588	47.57	census	secondary
2004	2,805,000	34.56	estimate	Official
2005	2,887,000	2.92	estimate	Official
2006	2,973,000	2.98	estimate	Official
2007	3,059,000	2.89	estimate	Official
2009	3,230,771	5.62	Calculation	-

Access to health care and social services is extremely poor in Ethiopia. About 20% of Ethiopians have real access to some form of primary care and live within a few hours walk of a health care facility. Each day people are suffering and dying from the lack of sufficient health facilities, insufficient medical equipment and shortages of medical supplies. Health care facilities are extremely limited in the major cities and completely inadequate outside of the cities. Birth rates, infant mortality rates and death rates are lower in the city than in rural areas, clearly a function of a more educated female population and better access to hospitals and other health services. The 2009 estimated life expectancy is 52.92 years for male and 57.97 years for female (CIA, 2009). Most of the diseases are largely preventable and curable with minimum inputs. Poor hygiene, sanitation and the lack of clean drinking water are some of the primary causes to the major health problems in Ethiopia. In many parts of the country the lack of safe drinking water is one of the main problems for children and adults. Accordingly the United Nation has pointed out that only 30% of the rural population and 24% of the total population have access to clean and safe water.

For the rural communities the only sources of water are ponds and puddles, causing them to suffer and die from such diseases as cholera and dysentery. Even worst only 6% of rural and about 20% of the total population have access to adequate sanitation. Around one million people live with HIV/AIDS in Ethiopia. Approximately, there are 125,000 new infections every year. At present, 65,000 children below the age of 14 years live with the virus. In Ethiopia there is about one physician for every 40,000 people and one nurse for every 14,000 people (FMoH, 2009).

Economy

The Human Development Index (HDI) calculated yearly by the UN puts Ethiopia in position 169 of 177 countries in 2005. The GNI per capita is \$220 between 2000 and 2005 (UNICEF, 2007).

Ethiopia's poverty-stricken economy is based on agriculture, accounting for almost half of GDP, 60% of exports, and 80% of total employment (CIA, 2009). Ethiopia is the birth place for coffee and it is critical to the Ethiopian economy with exports of some \$350 million in 2006, but historically low prices have seen many farmers switching to qat⁵ to supplement income. The war with Eritrea in 1998–2000 and recurrent drought have buffeted the economy, in particular coffee production. Often the agriculture sector suffers from drought and poor cultivation practices leaving over five million people in need of food assistance each year. The image of famine and drought has long defined the world's view of Ethiopia. For many years war and natural disaster have contributed to the deterioration of the quality of life.

In November 2001, Ethiopia qualified for debt relief from the Highly Indebted Poor Countries (HIPC) initiative, and in December 2005 the IMF forgave Ethiopia's debt. Millions are suffering from the lack of basic needs of life, such as food, health care, housing, education, safe and healthy environment. Ethiopia's rapid population growth presents great problems for a nation struggling to be self-sufficient in food. Approximately 45% of the populations are below the ages of 18 (CIA, 2009).

For many years, natural and man-made disasters have rendered Ethiopia heavily depending on external food assistance. Significant part of the country's population cannot produce or purchase enough food to meet minimum requirement. Ethiopia evidences some of the worst malnutrition found in the world. Urban poverty is manifested by persistently growing unemployment, poor quality dwellings and homelessness, increasing number of slums and squatter neighborhoods, congestion, lack of basic services and infrastructure. According to 1994 census, the unemployment rate for urban areas, stood at 22 %, with the highest rate recorded amongst the youth (15–19 years). According to a 1996 ILO report, the informal sector accounts for 61% of total employment, 70% comprising women.

⁵ The leaves of the shrub *Catha edulis* which are chewed like tobacco or used to make tea; has the effect of a euphoric stimulant

1.2 Shelter Related Fact and Figures

Access to Shelter

Addis Ababa is characterized by a poorly developed economic base, high levels of unemployment and incidence of poverty and slum habitation. Unemployment is 28.6% in the city. Available data also indicate that nearly 40% of the nation's urban dwellers live below the poverty line. An indicator of the magnitude of urban poverty is the proportion of the urban population that lives in slums – about 70% of the urban population is estimated to live in slum areas. According to CSA 2004, 97% of the total housing stock of the city are single storied buildings, 41% of the housing units are overcrowded with an average number of rooms per housing unit being 2.6 and an average of 2.1 person per room, 67% of the units lack toilet facility (CSA, 2001) and the 1994 population and housing census has revealed that 82% of the housing units are made of wood and mud wall while 53% of the units have soil floors.



Figure 3 Large number of poor urban population live in such type of “houses”

Achieving Millennium Development Goal 7, Target 11 – improving the quality of lives of slum dwellers is a major challenge in Ethiopia. Studies made in the last five years conclude that currently a housing shortage of between 900,000–1,000,000 in urban centers and only 30% of the existing urban housing stock is in good or fair condition. However, these results can be considered as a mere indication of quantities camouflaging the real characteristics of the existing housing stock. Out of the total estimated existing housing stock, 80% found in the inner city is in an extremely dilapidated condition needing to be replaced.

The MDG's Urban Sector Assessment Study revealed that 80% of the housing units and neighborhoods are slums and that 50% of the housing units need to be replaced by 2015 to meet the MDG target. As a result of nationalization the local and federal governments owned 37.92% of the total housing stock (CSA, 1994). In 1991, during the change in government, few houses owned by the federal government were privatized reducing the number of public house ownership a few steps back to 34% (AACA, 2004). It is quite significant to note that the public houses owned especially by the city government, the "Kebelle" houses, are rented with very low price and remain the same for the last 30 years resulting in poor housing condition due to lack of finance for basic maintenance. Paradoxically the rate of the very low rent can be at certain places 50 times cheaper than renting a privately owned house of the same size, quality and location.

The informal housing sector, mostly built at the periphery of the city on farmlands acquired through purchase from the farmers, also contributes about 20 % of the total housing stock (ORAAMP, 2001). The ever-increasing cost of construction material as well as the frequent occurrence of shortage of supply soared the housing construction cost beyond the capacity of the majority of the population. Current cost of housing with minimum habitable construction, estimated with unit area cost per square meter, could fall in the range of Birr 60,000–180,000 for housing units of 20–60 square meters. These facts clearly indicate that the majority of the low income group, the unemployed and people working in the informal sector accounting to more than 60% are unable to afford even the down payment required which is in the range of Birr 5,000–15,000.

The amount of people benefiting from the integrated housing development project is 50% of the total selected mainly as the result of affordability. People living in the slum area of Addis Ababa are unable to cope up with the ever increase cost of housing. The price for the same size of house has doubled in the last five years even if the government is subsidizing 10%–20% of the construction cost in addition to providing land for free for construction and allowing tax free construction materials. The cost of house has increased from 500 Birr/m² to 1571 Birr/m² in the last five years. This is currently a serious treat for IHDP as it only uses the money collected from the beneficiaries for the construction of the upcoming phases.



Figure 4 buildings implemented by the integrated housing development program

Access to and cost of Basic Services/Infrastructure

Water supply, sewerage system, solid waste management, access roads, transport, electric and telephone services are the basic infrastructure services, which are crucial elements, that needs to be linked with the housing sector development. The coverage of water supply in the city in 2004 was 69% (AAWSA, 2004); the sewerage system of the city is able to connect only 1,600 housing units (AALTIDP, 2005). Similarly, the development of solid waste management, transport and access roads are sluggish. The cost of transportation is increasing everyday and becomes challenge to live in the outskirts of the city.

Bad odours are common on every corner of the city including main roads as the method of disposal of swages is not well established. Dry wastes dispersed every where are mostly causes of diseases. The modes of urban transport system in the Addis Ababa are categorized in to motorized and non- motorized traffic. Motorized transport includes public bus; minibus; taxis while non-motorized transport includes walking and animal carts dominant in the periphery. Currently, taxis, city bus and private cars altogether cover 30% of the urban mobility, that is, 26% bus, 72% taxis and 4 % private cars, while 70% of urban mobility is covered on foot.

Access to and cost of Education

Education is a vital tool to empower people to break the cycle of poverty and take control of their lives. The education system in Ethiopia is however the worst in terms of quality and quantity. In rural Ethiopia, over half of all children do not have access to basic education. There are many barriers to accessing education, the biggest one being a shortage of schools and classrooms. With demands on children's time to help at home and the hidden cost of schooling, such as the cost of stationary and uniform, many children are still denied an education. The Education Sector Development Program (ESDP), a program developed by the Ethiopian Ministry of Education, envisages the expansion of educational opportunities so that by 2015 Ethiopia will attain universal primary education. The primary focus of the ESDP is on the improvement in quality of education and expanded access to education. It will emphasize primary education in rural areas as well as the promotion of girls' education. The ESDP is estimated to cost \$1.8 billion and will be derived from domestic sources and external funding. The government is committed to financing 73% of the program cost. Since ESDP began in 1995 student access to text books has improved significantly.

In 1995/1996 there were nearly 2.3 million core primary textbooks in circulation in schools. This increased to over 20 million textbooks in 2000/2001- an over nine fold increase. However, despite this significant increase, the pupil/textbook ratio is not 1:1 yet. The pupil/textbook ratio for the different regions ranges from 1:1 to 1:3, reducing the national average to a ratio of about 2.5:1 which formerly was 5:1 in many cases. Similarly, enrolment has increased by 60% from 1996 to 2000, exceeding the goal of increasing enrolment to 7 million. This has resulted in the overcrowding of classrooms, despite the construction of an additional 1,386 schools bringing the total to 11,780 schools in 2000. This problem is compounded by the lack of a sufficient number of qualified teachers. 70% of teachers in grades 5–8 are under-qualified. Moreover, attempts to narrow the gaps in regional and gender disparities have been slow. Female primary and secondary school enrolments lag behind males by about 25%, while female enrolment in higher education is less than a quarter of male enrolment.

Illiteracy rates for Ethiopian women are about 70% nationally and as high as 94% for women in the Afar region. Gender and regional disparities persist in quality indicators such as dropout rates, repetition rates, etc. Repetition averages 12.5% across all primary grades and the dropout rate averages 15.2%. About one-third of grade 1 pupils dropout before reaching grade 2. Teachers are not motivated due to low salaries, the lack of incentives, and absence of a proper career structure.

1.3 Housing Policy

Regional governments and cities had been attempting to deliver houses, but the strategies were unclear and the achievements too small in comparison with the magnitude of the problem. City administrations entrusted to develop and administer public land have also been delivering land for private and cooperative housing construction. Yet land development and management remains one of the areas where significant improvement in terms of governance is required. This point is more vulnerable to corruptive act as well. At the federal level the main objective has been to secure funding to support city level delivery of housing, infrastructure, services and facilities. It was only in 2004 however that a clear policy direction was initiated that later was translated into a formal policy statement of the government and a detailed program. Ethiopia designed the Integrated Housing Development Program (IHDP) in 2006 to be implemented between 2006 and 2010 by proclamations No. 15/96 and 23/1997.

The development of the national program in 2006 in Addis Ababa has benefited some urban dwellers. Based on the achievements in Addis Ababa, the program has been scaled-up to cover 36 cities in 2007 and 59 cities in 2008. The main objectives of the integrated housing development program are:

- Reduce slum dwelling
- Reduce urban unemployment and poverty
- Promote development of the private sector
- Provide adequate housing both in terms of quality and quantity
- Enhance and build the capacity of the domestic construction industry:
 - Enhancing the capacity of the domestic construction industry and thereby, continuously improving construction designs to ensure affordability, social mix and mixed use in settlement planning and development
 - Capacity building for improvement of building materials, including improved use of local materials, development and use of alternative cost-effective construction materials and building technologies and promotion of production capacity of domestic firms
- Promote urban areas as engines of economic growth – by increasing their contribution to GDP growth and strengthening urban-rural linkages.

The program is being successfully implemented in Addis Ababa and no significant progress is recorded in other parts of the country.

Various studies however indicate an enormous and varying gap between demand and supply of housing, ranging between 250,000 to 450,000. The market mechanism has failed so far to deliver affordable houses to the majority of urban dwellers over the past years, and is not expected to respond to such huge housing needs in the foreseeable future. To meet this huge need will require a substantial effort not only from the public sector but also from the private sector and beneficiary communities. Specifically the government aims to achieve this MDG target of housing needs by delivering at least half of it (i.e., constructing 100,000 housing units per annum) and supporting the private sector to deliver the other half (support the construction of 125,000 housing units per annum).

The major goals of the IHDP for the plan period 2006-2010 are:

- Construct 400,000 housing units (100,000 pa)
- Create 200,000 jobs and thereby contribute significantly to the national target of reducing urban unemployment by half
- Promote the development of 10,000 small enterprises on a sustainable basis in the construction industry
- Deliver 6,000 hectares of serviced land per annum for housing & other investments;
- Enhance and building the capacity of contractors, consultants, engineers and foremen as well as suppliers of construction materials
- Support private sector to produce 125,000 pa through provision of land and infrastructure and conducive legal and policy framework

1.4 Actors in Shelter Delivery and their Roles

The major actors in the housing delivery program are the government through development of cost efficient houses and private real estate developers. In the majority of construction the contractors, consultants, micro and small enterprises, suppliers and manufacturers are involved. The contractors will be responsible to build the houses; the consultant will design, supervise and control the quality of the works being constructed and materials being produced. The enterprises, suppliers and manufacturers provide different types of construction materials (cement, reinforcement bars, paint, glass, door and window, HCB, slab blocks, precast beams ...) for construction. At the moment 700 contractors, 10 private consulting firms, 1,500 micro and small enterprises are participating in the IHDP.

1.5 Shelter Design

In designing the houses for Addis Ababa housing development project office (AAHDPO), major emphases were given to functionality and economy. Initially the stair used for the buildings were made of steel and it was located outside the building, now the stairs are made of concrete and they are also located inside the building.

The functional relations between the rooms are also made in such way that the dinning room is near to kitchen and the toilet near bed rooms. It is also aimed to create social and cultural interaction by implementing more studio and one bed room buildings than two and three bed rooms. The ground floors of most buildings on road sides are used for shops. The cost of shops is determined by bidding and the money collected will be used to subsidies one bed room and studio as the owners are from the poorest community. Sofar 30% priority is given to female applicants by supplying 53.7% females and 47.3% males in Addis Ababa housing development project office. The housing development has also created 60,000 job opportunities for the urban populations as the designs needs the provision of precast elements and HCB that must be produced by micro and small enterprises.

Table 2: Distribution of cost efficient houses by IHDP in the last five years (AAHDPO, 2009)

<i>No</i>	<i>Type of Room</i>	<i>Female</i>	<i>Male</i>	<i>Total</i>	<i>Composition</i>
1	Studio	7,263	5,211	12,474	20.77%
2	One Bed Room	11,563	9,618	21,181	35.27%
3	Two Bed Rooms	10,300	10,245	20,545	34.21%
4	Three Bed Rooms	3,108	2,750	5,858	9.75%
	Total Sum	32,234	27,824	60,058	100.00%

At the moment 19,993 houses are also under implementation in different areas of Addis Ababa. It is however unfortunate the project office doesn't hit the target of construction 50,000 houses each year due to many problems. The designs are always aimed to use the most cost efficient ways construction and materials, but the majority of the urban poor are not benefiting from this program as it is still unaffordable. It is however very interesting to note that it is greatly solving the housing problem in the city. More innovative designs and cost efficient constructions are still being utilized to make the houses available for the poor.

2 Organisation

Net Consult Consulting Engineers and Architects is a non government organization founded in 2000. The number of professionals is justified by the capacity of the firm to mobilize qualified professional personnel all at its avail at any required time. The firm is registered under the relevant issuing authority i.e. Trade tourism and Industry bureau in 2000, under trade license registration number 1084/92, for doing professional consultancy services.

The firm has also obtained a due recognition from Ministry of Economic Development and Cooperation (MEDaC). Currently the firm has more than 120 permanent employees and intermittent staffs with an annual turnover of over 12 million Birr. The firm has been working with AAHDPO for the last three years rendering consulting services in construction supervision and quality control works for Bole and Yeka sub cities housing development project branch offices in the construction of residential and commercial buildings. Currently the firm has deployed more than 60 professionals for the full construction supervision, quality control and contract administration works of Arada sub city housing development project branch office in the construction of 172- G+4 residential cost efficient houses being implemented at Bole-Summit area in addition to many undergoing projects. 4482 units of houses are under construction by 78 contractors. So far the construction has progressed 60%.

The services rendered by the firm includes detailed design of highway and bridges, construction supervision of highway and bridges, tender document preparation, tendering and bid evaluation, design review of highway and bridges, feasibility study of highway projects, study of rural infrastructure development schemes, design of irrigation schemes, design of diversion structures, design of water supply networks, architectural design, structural design and drafting, construction supervision of buildings, quality control and contract administration works.

The firm has the following unlimited basic objectives:

- Savings in construction economy
- Provision of required professional services
- Playing a significant role in national development
- Creating equal opportunity employment environment and
- Adaptation of beneficiary new engineering and construction technologies

3 Shelter Problem

Ethiopia being the poorest nation has many problems in every sectoral development. The major problem in relation to the development of cost efficient houses is affordability. Let's have a look at the following to better understand the problem.

Cost!

Let's consider an average Ethiopian family having an annual GNI of \$220.00 (3,115.20 Birr) per year (UNICEF, 2007). According to research conducted by World Bank in many parts of sub Saharan African countries and in the poorer countries of Asia, many households typically spend only 5 to 10 percent of their income for housing. (World Bank, 1993). If we take the maximum value:

- $3115.20 \text{ Birr/year} \times 10\% = 311.52 \text{ Birr/year}$
- The cost of house per unit area is 1571 Birr at AAHDPO
- If the family is to own a studio or one bed room building with an area range of area between 30 and 35m^2 (Average = 32.5m^2). the total cost for the house will be:
 - $1571.00 \text{ Birr/m}^2 \times 32.50 \text{ m}^2 = 51,057.50 \text{ Birr}$
- The family should settle the 20% amount initially to accept the house and the remaining 80% will be covered by the bank as a loan with a compounded interest rate. The 20% down payment will be:
 - $51,057.50 \text{ Birr} \times 20\% = 10,211.50 \text{ Birr}$
- The number of year required by this family to get the amount of 10,211.50 Birr will be therefore:
 - $10,211.50 \text{ Birr} \div 311.52 \text{ Birr/year} = \mathbf{32.8 \text{ years}}$

Look! Despite many subsidies and all the benefits of the IHDP, a family should save for more than 32 years to pay only the first 20% down payment. If the family is established at the age of 18 years which is not the usual case in most part of the country, the house will be available after 50 years. Imagine how long it will take the family to settle the remaining 80% with interest. The family will pay the remaining settlement through out their life. Obviously, the program is not benefiting the poor. That is why those who were arbitrary selected for the program retreat to own the house despite their first interest. You can witness this also by looking at the current owners of these houses also own very luxurious vehicles and uses expensive finishing materials after putting of the cost efficient materials provided by the program. More efforts are being undertaken to solve the problem at large to benefit the urban poor.

4 Proposal for Change and Improvement

Although there has been significant progress in the formulation and implementation of housing policies and to some extent strategies in the past decades as summarized earlier, many constraints still effectively hinder progress in housing development in Ethiopia, particularly for low income groups. These constraints and subsequent proposals for change include but are not limited to the following issues:

- **Effective implementation strategies**

This is the first and most important step in the challenge of providing cost efficient shelter for all. The key for overcoming these constraints is to promote an effective facilitative role in order to harness the full potential of all actors in housing production. The governments has adopted enabling shelter strategies and initiated actions to support the actors in the housing delivery process. There is however extensive room for improvement and articulation in this area and close the gap what is on paper as a policy document and what is really happening on the ground. In our case too much eagerness and starting construction of many houses at a time has resulted in labour price escalation, material shortage and delayance of construction period. No project in the history of IHDP has been finalized with the speculated project time and cost.

- **Utilization of local building materials and technologies**

Building materials often constitute the single largest input to housing construction in Ethiopia. It is estimated that the cost of building materials alone can take up to 70 percent of a standard low-income formal housing unit. Despite the fact that we are endowed with abundant natural resources that can meet our need for building materials production, we depend largely on imported building materials and technologies. No considerable research is conducted in Ethiopia that initiate and disseminating findings to the potential users. Currently, Agro stone is being used for partition and other ancillary works. The raw materials for agro stone are agricultural raw materials as filler (70-75%), minerals as binders and bond accelerators and fiberglass as reinforcement. The materials are non poison and has good resistant to radiation, it is sound proof, water proof and acid resistant, it can withstand fire up to 118 minutes, ...etc. The technology is imported form china and we now have qualified professionals and production centres in Addis Ababa.



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(Bagasse or straw)

Mg(OH)₂

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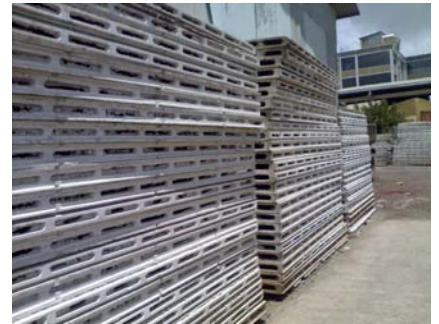


Figure 5 some of the products of Agro stone include partition boards, ceiling and wall finishes and doors

- **Adjusting standards for building and land subdivision**

In Ethiopia, standards for building and land subdivisions do not consider affordability issues and have a general nature. This results in large plot sizes and high infrastructure costs. Building standards are also high urging and encouraging needy groups to get involved in informal building activities. These regulations and standards should be adjusted also in consideration of affordability criteria.

- **Promotion of community participation and self-help**

Policies and practices of provision of ready housing units by governmental agencies to the needy households have failed almost everywhere. This approach is simply not sustainable and cannot reach the scale. On the other hand, the poor have demonstrated that they can effectively participate in the housing process provided that they are assisted. Most rural migrants bring with them a self-help tradition that could be used for the construction of dwellings. Self-help and community participation however does not develop by itself.

Successful community involvement requires support from the public sector such as provision of training, credit and technical assistance. Initiation of experimental pilot projects Pilot projects aimed at developing innovative approaches will be very useful. These approaches can, for example, involve housing cooperatives and may be centred on projects, which practice cross subsidies, land sharing schemes and utilization of local building materials. Experimental projects with new standards for subdivision and building materials with semi-serviced and non-serviced plots can also be initiated. Such experiments can facilitate the learning process for up scaling.

- **Providing Low Rent houses**

Other option that we must look in to is the provision of cost efficient houses in rent. In this regard the poor will at least acquire the house through long rental period without being forced to pay any down payments.

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