The 1,000 dollar home: a scalable business model to build disaster relief dwellings and upgrade slums

by

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THE 1,000 DOLLAR HOME: A SCALABLE BUSINESS MODEL TO BUILD DISASTER RELIEF DWELLINGS AND UPGRADE SLUMS.

Abstract

This thesis proposes a new model for the private markets to build disaster relief dwellings or to upgrade degraded neighborhoods of very low income communities. The study offers a way to empower the dwellers of very poor communities or the victims of natural disasters not only by providing them with financial support, but equally important by also providing them with a construction method that allows for a progressive build up of their dwellings. In doing so, the author argues that the residents of poor, informal settlements could act as developers of good quality housing and successfully improve their communities. The analysis leading to the proposed new model is based on the following:

1. A review of other private sector precedents to empower the communities of impoverished settlements or victims of natural disasters. Such precedents have had varying degrees of success, and illustrate the difficulties in implementing a method that can be scaled up universally to meet the overwhelming need for low cost housing.
2. A specific technical solution to build low cost houses by relying on the use of stabilized earth compacted and packaged into polypropylene skin, forming a continuous durable brick, as the main construction material and a self-build approach that can guarantee the affordability while also providing for a safe and good quality dwelling unit.
3. A valid economic model that can be adopted by private entities, either for profit or non-profit. The proposed economic model focuses on creating for profit firms with social entrepreneurial capital. Such entrepreneurial firms can be scaled up to build large amounts of housing units. The business model has three different phases. First the clients will be NGOs doing development or emergency relief. Second, once footprint has been established, the clients will be multinational corporations that want to optimize their corporate social responsibility strategy. This multinationals will finance the projects of the new ultra-low-cost housing development firms as an indirect way to benefit their stakeholders, to increase their brand recognition and goodwill, or to do damage control. Third, the economic model will consider the dweller as the paying party. That will be achieved by adding microfinance service for the poor.

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1. Introduction to informal settlements

The physical forms of very poor informal settlements have evolved through time as governments and international agencies are continuously learning how to cope with them. For example, the traditional favelas of Brazil are purely unplanned and organically formed; in contrast, more recent favelas on the outskirts of Lima have a more regular layout directed by the implementation of "Large Spatial Planning Grids" (Susan Williams, 2005). Governments have evolved from an immovable determination to remove slums, to be directly involved in the process of empowering squatters to build a better urban form.

The role of professionals in upgrading poor informal settlements has also evolved through time, lead by the work of international agencies such as the World Bank or UN Habitat. Since 1972, John Turner's approach to empowering squatters ("Freedom to build", Pugh. 1990 p.57: van der Linden, 1986, p. 20) has been increasingly adopted as general consensus as we will see later. There is increasing evidence (Berner- Oxfam GB, 2001) that informal dwellers at slums if truly empowered, could not only successfully create dignifying urban environments, but also force their governments to stop neglecting their duty to provide urban services and an appropriate urban habitat for the poor. The cases of leverage and social pressure exercised by neighborhood associations in Manila's Tondo Foresore, Philippines or in Rio de Janeiro's Rocinha favela, Brazil, just to name a couple are good examples of how community participation can play a key role in improving the urban realm of very low income neighborhoods: both sites have now all basic services, paved streets, and land ownership rights.

Given the peculiar way in which informal settlements are formed, and the restricted access very low income dwellers have to assets, it has been shown that the physical form of typical urban slums evolves though a slow but continuous transformation referred to in the literature as "progressive settlements" (Ward, 1976). This transformation in neighborhood structure reflects the life cycle of the residents:

First, a sack or shanty made of found objects is planted to claim the space. Is intended as a temporary dwelling unit that can be dismantled or expensed if there is an eviction. Second, the shanty is gradually replaced by more permanent structural components, usually accompanied by the expansion in area of the dwelling unit. Third, as the unit and the whole neighborhood is rooted into place and services are added to the streets, the units tend to expand vertically in a reflection of the increase in value of real estate prices.

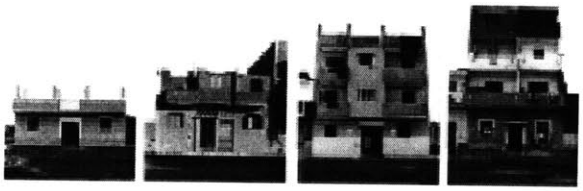


Figure 1 Typical progressive construction of very low income urban dwellers. Structures are gradually upgraded and expanded though time. Source: Special Interest Group in Urban Settlements at MIT

Since the problem of housing for the poor or victims of disasters has gain recognition in the agenda of governments and international agencies, many different models have been created to cope with such situations. The series of different models deployed could be interpreted as recognition of the partial failure of these agents to solve the problem of providing decent housing for very low income or displaced people, or as a sign of adaptation of institutions to an evolving problem (Buckley & Kalarickal, 2004).

In any case, the clear trend over the last two decades has been towards implementing strategies that mimic the process of informal settlements but in a rather controlled and improved way. Thus, the tendency has been to empower urban dwellers so they could build entire cities by themselves. Governments are even inclined to relinquish land property rights or partially subsidize its acquisition rather than choosing to evict dwellers of informal settlements. Under such trend, those initiatives advocated from the private sector that leverage community participation as a scalable model to provide for low cost housing, are of particular interest (van der Linden, 1994; Berner, 2001). Although many success stories have been coined in Latin America and Asia, a true successful model is only such that can be scalable to the point of eradicating the lack of supply of ultra low cost housing. The profits of the private sector seam a powerful driver to achieve the large scale needed. Moreover, the pioneer work done in microfinance for the poor by Grameen Bank in Bangladesh and the corporate movement to see very low income people as potential profitable customers (Prahalad, 2004) all point to private sector models. To put the scalability potential into perspective, just consider that the World

Bank's annual lending for urban projects amounts to $1-2 billion, while the private sector's annual housing investment in developing countries is at least 100 times that amount. Consequently, if the private financial sector can be mobilized, it will do far more for the urban poor than all the international agencies or governments.

Among those models that seem to promise sustainability and scalability in providing housing for the very low income population, three are of special interest: (1) Public site and services programs, (2) bank of materials, and (3) Land Subdivisions and sales. These are discussed in detail below.

1. Empowerment by Institutional programs: Site and services projects. The case of Dagat-Dagatan in Philippines.

The area of Dagat-Dagatan is currently a vivid low-income neighborhood of Metro Manila in Philippines. Thirty years ago, the government pushed for the expansion of a near-by industrial port of Tondo. The project forced over 180,000 squatters out of their settlements. The World Bank took the Tondo Foreshore relocation project as the impetus to introduce in 1976 a new "Site and Services" model to deal with informal settlements (World Bank, 1972). The near area of Dagat-Dagatan (a reclaimed land from fishing ponds) was subdivided in lots of less than 400 sq ft, and serviced with roads, water, sanitation, and electricity. Titles of ownership were granted to the relocated families and people moved in. Many people dismantled their shanties in Tondo, recovered the materials (mainly wood boards and metal sheets) and rebuilt the makeshifts in their new property. The result of the project was remarkable:

By guiding the development in a pre-established grid of already subdivided lots, the occupation of the land was ordered. Services could be deployed in an efficient way following the paths of straight streets. Streets were design in hierarchies of progressive widths to allow easy accessibility. Public spaces were preserved from occupation. At the same time, by focusing on basic public services, the World Bank and the government eradicated a highly degraded settlement and replaced it with a quite safe development in terms of hygiene and environmental conditions. According to the MIT Special Interest Group on Urban Settlements (SIGUS) the cost of subsidizing the Tondo project by the

World Bank was $92M which amounts to only one fourth of the cost of other housing projects for the poor. From that economic perspective, this model seams to be an effective one, although relays on heavy subsidies by institutions or governments.

Still, the physical form of the relocation project was a shanty town since many dwellers recycled their sacks. Pictures taken at the time in Tondo as well as in the relocation lots of Dagat Dagatan show similar characteristics of both slums (National Housing Authority, 1976). The biggest difference was the organized layout of the subdivisions and the clear grid of streets in the relocation site & services area. But tracts were covered with shanties in the new site & services project and other signs of degradation of space such as garbage disposal were evident.

The model proved to work over time. With the incentive of the land tenure, dwellers had a strong incentive to invest in the upgrade of their structures. Through the next 25 years the neighborhood has experienced an incredible amount of upgrading and construction of good quality structures. Most of the shanties are long gone and are replaced by 1 to 3 stories buildings, predominantly built with cement hollow blocks in a progressive manner.

The Site and Services model here described is a representation of the classical private-public partnership in which squatters are turned into private developers and act as principal actors in providing housing (Turner, 1963, 1972; Dunkerley, 1983). In this model the public sector finances the land and the services and the private sector in the form of the individual dwellers finance the construction of the houses. The model can also be combined with other public policies to further incentive the involvement of the dwellers such as subsidizing the construction materials, or providing with technical assistance.

This model has been extensively utilized since then and has evolved into other similar guided land development strategies. However, its use has neither solved the increasing problem of slums throughout the world nor the need of 5.7 million annual victims of natural disasters that are rendered homeless by catastrophes. It can be argued that several fundamental reasons restrain the scalability of the site and services model.

The first reason is the slow nature of the process of improvement. The model relies on self-help and enables communities to take control. Since the load of the construction is born exclusively by the impoverished dwellers, it must be done in small incremental portions over a long period of time to allow them to finance it's cost. Secondly, the economics of the project are based on a total reliance on subsidies. Land and services are provided by government and institutions. Although the scheme predicts that recipients of the land title would have to pay for it, cost recovery from residents is extremely difficult even at heavily subsidized rates (Wegelin, 2004).

2. Bank of materials. The case of Cemex in Mexico.

Squarely opposed to the notion of land ownership as the solution to unleash financial needs for the urban poor (de Soto, 2003) is another model that avoids the issue of property rights and focuses on providing finance and technical assistance to the individuals. A celebrated case is the Patrimonio Hoy business branch of Cemex, the third largest cement manufacturer in the world (Segel, 2003). Patrimonio Hoy has developed a 70 week program in which urban dwellers can sign up and receive 7 shipments of construction materials, while contributing with weekly installments of $11.50 per household. The microfinance program has many virtues inherent of adapting specific products to the needs of the poor (Prahalad, 2004):

The collateral used is not the real estate asset since in most cases the informal settler has no clear title on the property. Instead, the model teams up the beneficiaries in pools of 10 families that cross-collateralize each other. Peer pressure and the importance of personal equity in these groups are the guarantees of payment, since in case of a default the other members are obliged to fill the gap and pay themselves, or future shipments of materials to the group would be frozen.

The affordability of the program, as compared with other standard borrowing solutions, is based on the efficiency of the distribution chain and the use of self-help labor. Construction

materials flow directly from the manufacturer or consolidator to the final user. Only one intermediary is used by the organization to sell the program, create the family groups of ten, and make the collections. Usually that agent is a local woman from the community.

The notion of self-help is also tied together with progressive building. The model is dimensioned to provide enough construction materials so poor families can afford the weekly installment. The physical product is normally a single room that is added to the dwelling unit to accommodate either an expansion in the family or a boarding rental business. Thus for a total cost of $805 and few hundred of hours of work contributed during a period of 70 weeks, the dweller can improve its housing space or add a big room to it. The company claims that according to its own market research the

The fact that the credit line is served in the form of a stream of shipments of construction materials adds efficiency to the model and decreases the risk of misuse of funds or default. Furthermore, the scheme becomes increasingly interesting once economies of scale are achieved, allowing for scalable distribution of low value but high volumes of construction materials. The literature on Patrimonio Hoy highlights their commitment to provide with technical advice to overcome possible safety and quality issues inherent to self-help construction.

The business model, still in its incipient stage of initial years, has reportedly reach break even already and keeps growing to its 5M customer's target. It is important to note that Patrimonio Hoy is a for profit organization with no subsidies or external help from any institution, therefore the profitability of its operations has enormous consequences for its sustainability and scalability. Free market models such as Patrimonio Hoy are however restricted in its penetration to the lower strata below the poverty line. A weekly contribution of $11.5 to $14 per household is significant in a country where 26.3% of the population lives with incomes of less than $2 a day (World Bank 2005).

The consideration of designing a profitable urban development business model so the private sector can expand it to large scale applications is a compelling one. The rational goes that the private sector will then act at large scale to maximize its profits, and thus solve the demand for affordable housing for the poor. As a counter argument, any model that requires substantial payments to cover totally or partially its cost is going to neglect the most marginal segments of society, those poor among the poor at the very base of the pyramid. In the graph below you can see the distribution of population based on its income level. To benefit the 1.2 Billion segment of the very poor of the world living in subsistence conditions, the cost of providing housing cannot possibly relay on those living under $1 or $2 of income per day. Private sector models are therefore restricted for those with some source of income. Penetration of those models can then be expanded by microfinance or even by contribution in non-monetary form, usually with their own labor or "sweat equity".

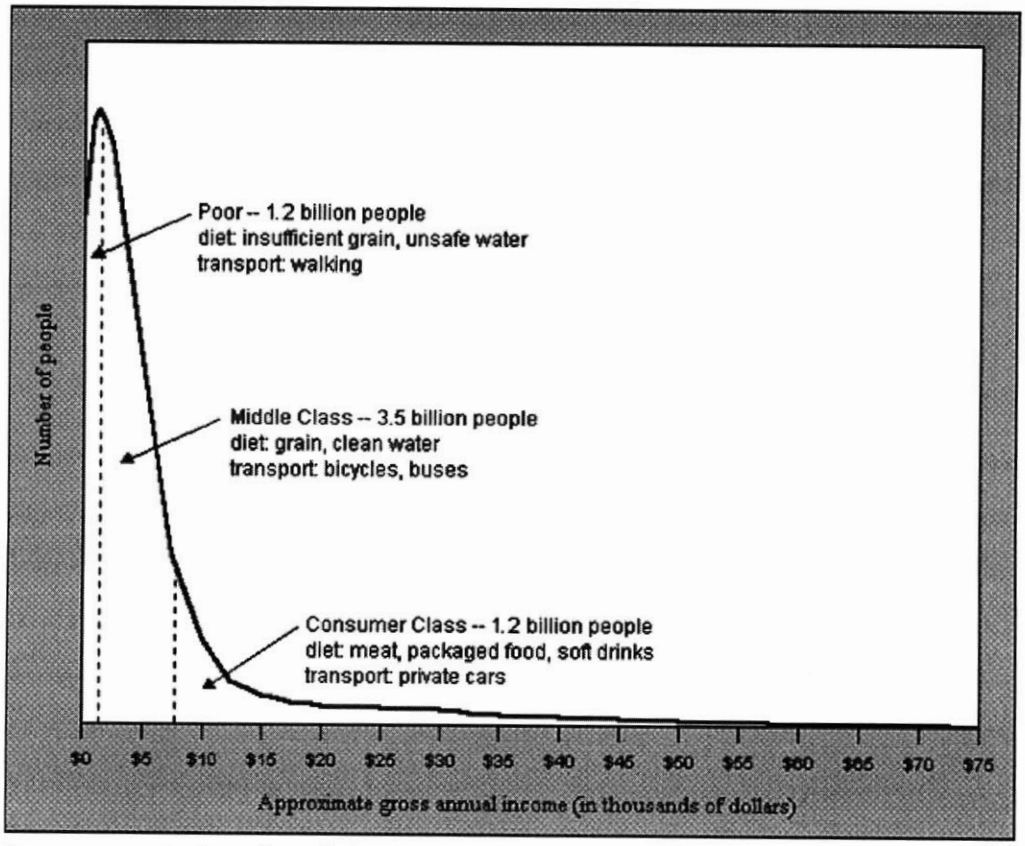


Figure 3 Distribution of population by income level. Source: Douglas Skinner, 1993

3. Land subdivisions and sales by a private developer. The case of Argoz in El Salvador.

We have seen an application of private markets empowering poor dwellers by financing their construction materials so they can build their homes in a self-help scheme. But private markets have also developed alternative models to provide for land. Most scholars tend to highlight the issue of land title as the principal reason why slums degenerate into unhealthy and degraded environments. Lack of ownership creates risk of eviction, unwillingness of investment, inability to collateralize, lack of urban planning, no enforcement of legal systems, and in essence a chaotic parallel world.

Argoz, a private for-profit entity created by Arturo Gomez in El Salvador has led since 1977 the path to recreate the optimal conditions to funnel the demand for very low-cost housing in a controlled manner. In the Argoz model, legal land titles are sold to very low income people once the land has been subdivided into lots. Argoz takes the role of a private land developer that adapts its business to the special needs of the poor. (Sevilla -World Bank, 2000) They buy raw agricultural land or urban land at market prices, normally in the fringe of urban areas and then subdivide it into privately owned urban lots. Although the ownership and title of the land is legal, the subdivisions might not comply with zoning and urban bylaws, although that extent is tolerated by the administrations. According to Argoz, it has created already a total of 300,000 lots as of 1999 and is currently financing other 250,000 lots supplying 10-year rent-to-own contracts for families with monthly incomes of approximately $170 (Ferguson and Hider, 2000). The company, which charges between $15 to $25 monthly payments for lot purchases, is expanding to other Central American countries, in what seams a successful scalable model.

The role of the land developer is three fold. First it gains legal control of the land and transforms it into subdivided lots of approximately 2,000 sq ft. By doing so it satisfies a market demand for land that the public institutions have failed to provide. The subdivisions are of unserviced, raw land. Sometimes such subdivision are not legal, since it doesn't comply with zoning or land use requirements, but the subdivisions are tolerated by the government in the belief that is the least harmful alternative to outright squatting. Argoz does the master planning design of the subdivisions.

Second, it provides financial aid for the lower income strata of society. Normally the land is leased with an option to buy at the end of a 10 year period. According to some data (Sevilla, 2000) Interest rates are set at interbank rates plus 400 basic points, but other sources argue that interest rates are masked and not disclosure to avoid tax levies on interests (Fergurson and Haider, 2000). No down payment or recourse is needed. Furthermore the company claims (Sevilla, 2000) that all the process has been streamlined and adapted to their client profile, who are usually in the bracket between 1 to 2 minimum salaries per household. Lease payments fluctuate between $15 and $25 per month in a country where the minimum daily wage is $4.80 for urban workers and $2.47 for rural workers according to the Country Report of the US Department of State.

Third, Argoz acts as a community empowering channel, by cultivating leaders, advising them, and organizing them so they can leverage their negotiating power with local governments to gain access to basic municipal services. The buyers of lots move into the land without any basic service in place, similar as if they were squatting on raw land. Shanties are built in the lots, and once a sizable population has been installed, communal mobilizations start to negotiate for basic services. Argoz's role in the process is not clearly defined in the literature available. However, it can be inferred that Argoz supports the grassroots mobilization with legal advice, helping organizing the new residents of the subdivisions into community associations. Furthermore, those community associations are then very active in lobbing with local and regional administrations to gain access to basic services. Services are obtained gradually, over long periods of time that can last 15 years. According to an interview of Arturo Gomez, president of Argoz, published in "Dia a Dia" a Spanish magazine in Los Angeles, Argoz facilitates the urbanization process by further providing for technical and financial support so the residents can build the infrastructures themselves. The negotiation power that community leaders can exercise over local governments and utilities managers is correlated with community cohesiveness and community strength.

Argoz also provides mortgages for housing. Since families are already servicing the debt from the land acquisition, mortgages are only offered to those dwellers with higher income levels.

The land subdivision model of Argoz clearly shows that land tenure is possible for at least a portion of the poor if other standards are adapted to the reality and the needs of those people. Community pressure, especially if guided by experienced hands, seems to work for flexing certain requirements or for gaining public intervention.

2. A business model to address housing needs for very poor families and disaster victims

Many are the bottlenecks that restrict access to adequate housing for the very poor. Access to land, cost of construction materials, specialized technical knowledge, specialized labor to build according to modern codes, and legal and financial requirements. None of them are aligned with the purchasing powers neither with the needs of the poor. Thus, $9.3 trillion worth of new dwellings remains untapped (de Soto, 2000).

Modern construction industry produces built structures at a price point prohibitive to billions of people worldwide. One of the reasons is because standard building materials like concrete, bricks, plywood, or prefab are too expensive and requires specialized labor. Another reason is because building codes and legal requirements are unrealistic for the very poor, by imposing strict standards. Very poor people has no alternative but to fall into illegal and neglected practices. Furthermore, vernacular or traditional architecture using low-cost materials are rarely covered by modern practices, code, or distribution channels. Technological solutions exist to build very low-cost and safe houses, but market, legal, and business practices neglects them in the majority of cases. A model that provides for housing for the very poor will have to use very low-cost construction technologies using alternative materials and non skilled labor.

Price and legal tenure of urban land is an increasing issue as urban population increase across the world. According to United Nations in 2007 urban population will surpass the rural population for the first time in Human History. The creation and expansion of Mega Cities, especially in costal areas of development countries poses great pressure into urban land value and land tenure. A model that provides with housing for the very poor will have to either empower informal settlers to consolidate their occupation of land, or provide for legal tenure of land at affordable cost for the very poor.

Last but equally important, a model that provides with housing for the very poor will have to be financially feasible for the families but also for all the other stakeholders in the equation, otherwise the solution will not be expanded to large scale production (Malhotra, 2003). That will mean that the solution will need to include a microfinance component, as well as a profitable result if is run by a private entity.

The model that is presented in this document incorporates all such issues. It is intended to be a business plan that could be started immediately by a group of entrepreneurial people willing to provide for very low cost housing solutions. The content takes the form of a formal business plan that can be used to raise the needed capital to set up the company and start the operations, therefore its focus is practical and business oriented.

Scope: victims of natural disasters and very low income families in degraded neighborhoods

While developing the business plan it was found that could be equally valid in cases of improvements of degraded neighborhoods of very low income families as well as disaster relief housing for the victims of natural catastrophes. Both situations involve vulnerable populations with very low income levels, and the need to build large amounts of dwelling units. Another communality is the temporal scope of the shelters. In the case of improving degraded poor neighborhoods, the concept of progressive construction concedes a degree of temporality to all hosing units. Neighbors and neighborhoods are in transition to better economic prospects and more consolidated structures. The construction is mainly temporary as families rapidly change in size and purchasing power. Similarly in the case of victims of natural disasters, transitional or

semi-permanent shelter solves the problem in a temporary form while a more permanent solution can be provided.

Parts of the proposed business plan.

The business model that is proposed in this document has the focus and parts required to a business plan to participate in the MIT $100K Business Plan Competition. The intend of the competition is to ensemble business models that can be carried out by profitable private companies. The focus of the plan is to be use as a tool to raise capital from private investors.

The name of the model proposed is Disaster Relief Dwellings (DRD hereinafter) since the first application that was found for it was focused on the reconstruction of shelter after natural disasters. The objective of the proposed business plan is to create a start up company that can later become a multinational builder of ultra-low-cost housing using sustainable building technologies that resolve the increasing need for shelter for people at the bottom of the pyramid Similarly as MIT has helped to mature the penetration of the Computer Industry from expensive early mainframes to the "100 dollar laptop", now the model proposed to build ultra low cost housing aspires to follow this path and provide the universal 1,000 dollar house.

The model presented here is centered around a building technology that uses earth as the basic construction material. Although earth has been use since prehistoric time to make adobe or rammed earth walls, the particular highly efficient method illustrated by the model was patented in 1997 by architect Nader Khalili with the US Patent and Trademark Office with patent number 5,934,027. The author of the present document has also filled a provisional application for patent on some improvements on the construction method. The patents provides for intellectual property rights in the US. The author recognices as well that other low-cost building technologies can be suitable for this business plan, particulary the work done by Gernot Minke (Minke, 2005) in Germany or the Auroville Institute of India

DRD will be a one-stop-shop company that provides for all the needs to build ultra low cost housing for very low income people or victims of natural disasters. DRD will provide the financing, the construction materials, the know-how and construction experts that can train

communities for self-help construction or alternatively can also hire directly non skill labor from those communities.

3. The Opportunity

In addition to the overwhelming need for affordable housing in very low income communities, there is also an overwhelming demand for post-disaster housing. 5.7 million additional people are becoming homeless every year, creating a housing need that is currently being addressed in an inefficient way. The fragmented chain formed by governments, private philanthropy, and corporations that fund multilateral agencies and NGOs, which in turn allocate funds among other smaller organizations, results in the drastic reduction of available funds directly delivered to housing. Funds are eaten up by to the cost of fundraising, cost of transactions, lack of coordination efforts, bureaucracy, as well as a long decision-making process. As a result, the demand for ultra-low cost housing is being served inefficiently or is not being served at all.

Typical disaster response is not only inefficient but also ineffective. Housing reconstruction invariably rates as the worst in recipient's ratings of disaster relief services: victims' satisfaction of Shelter Delivery rates 24% below average levels of other emergency relief aid: food, water, medical, clothing, sanitation. Additionally, permanent housing remains the most significant challenge. Nine months after a large catastrophe like the Tsunami in Aceh, Indonesia, only 9% is living in a permanent house, with 35% in semi-permanent shelters (Fritz Institute, 2005). The rest are in despair.

The proposed DRD model has not only an ultra-low-cost construction method to build homes, but also a business model departed from current emergency relief channels. The business plan's competitive advantage relies on an innovative and sustainable business model, for profit approach, and a patent pending low cost building technology. These elements are explained below.

Proprietary low cost building technology that decreases the cost of a dignified dwelling unit to a $1,000 level.

Low cost building technologies have been around since prehistoric times. Their merits and limitations are also well known. Among these methods, those who use earth as the basic construction material appears to be applicable in a wide range of situations and in favorable economic conditions (Minke, 2005). Building with earth has several variants: adobe, cobe or compressed earth blocks, rammed earth walls, straw bale and earth plaster, and earthbag. In this document we will consider the method known as earthbag construction (Khalili, 1999) and some variations of it. Architect Nader Khalili has been developing the technology for the last thirty years and has created the CalEarth Institute around such efficient building technology. The method is described with more detail in the Product and Technology chapter. The affordability of building with earthbags stems from its simplicity and use of low-tech materials and labor.

Figure 3 Earthbag construction based on stabilized and compressed earth packaged into polypropylene skin to form continuous bricks: Source: CalEarth Institute

- *Low cost construction*: DRD model uses unlimited and affordable soil as main building material. Our method is based on stabilized earth, packaged into a polypropylene skin or sleeves. These sleeves are stacked on top of each other and fastened with simple interlocking pieces, forming the walls and even ceilings to form a finished house in 5-7 days at a cost of ~$1,000 to $1,800 depending on the finishing desired by the client.
- *Durable and resistant dwellings*: The dwellings are durable and environmentally sustainable. Their solid walls have been shown to resist earthquakes, hurricanes, flooding and fires (Khalili, 1999)
- *Flexible and adapted to local needs*: The shelter designs are flexible to adapt to local needs and the houses can be easily personalized by the owners to convey a human sense of place to entire neighborhoods.

- *Scalable operations*: The construction process does not require transportation of bulky materials to the site, or the prefab of large stocks of materials, both resource-intensive tasks after a natural disaster. Furthermore, we will form partnerships with regional companies in order to reduce the cost of procuring the raw materials (woven polypropylene manufacturers like Basell, Innoven, or SuzanoPetroquimica in Latin America).. Logistics and lack of proper building materials are often the cause of derailment for reconstruction projects.
- *Impulse to local economies*: Our dwelling units are built on-site using community in the process, employ local unskilled labor and jump start the local economies. Capacity training of unskilled labor ensures that we bring more than just shelters to the communities.

DRD project, supported by the MIT department of Architecture, is currently conducting pilot testing in the department of Architecture's laboratory to further provide evidence of the benefits of our technology. Furthermore, DRD has recently signed a Memorandum Of Understanding with pioneer earth-building expert architect Nader Khalili and the CalEarth Institute to further promote this construction technology.

Innovative business model

DRD business model will be the direct link between increasing the funds available for construction and the increasing number of people that need them. The company will target private companies' funds that look for efficiency and return on their non-profit investments. When a natural disaster occurs, there are several stakeholders that suffer. The main and most obvious are the local people that are directly affected by the disaster and lose their homes. However companies that operate in the area are also hugely damaged by the disaster. Not only companies that directly operate in the area but also every company that depends on suppliers in the area will be significantly affected. DRD will target those companies as clients for the following reasons:

- *Follow the money*: Corporate social responsibility funds donated specifically to human services is a $5 billion market. More importantly, the investment is mainly concentrated among the largest companies that are precisely the ones with international operations that are usually affected by natural disasters in the third world.
- *Follow the need*: From our conversations with international corporations such as Green Mountain Coffee, when a disaster hits countries in which they operate (directly or through suppliers) their operations are jeopardized for long time, even months before their employees or the companies that supply them are recovered. The losses in production are enormous. Their choice to rebuild its employees homes and communities depend heavily on international agencies, are slow to respond, and obviously do not target the specific areas and people that the company needs to concentrate on.

  The strongest strategy in the DRD model will not focus initially on selling houses to individuals or international organizations, which would be a very long process, but instead to close the first sales quickly, gain reputation and then target other markets such as: Individual *progressive home builders* in developing countries through micro-credits and leverage of remittances ($167 Bn market) and institutions responsible for slum upgrade programs.

For profit approach

The current players in the industry have a non-profit approach and depend exclusively on charity, grants, and volunteer work, which is a primary reason that there is not a big player in the industry. The market is atomized with the biggest player having built 200,000 houses in total over the last 30 years (Loveman, 1993). Practitioners interviewed agreed that the current model is broken. The progress done by NGOs is hindered by their lack of scale and atomization, lack of focus into the housing problem, and lack of resources. On the other hand, international organizations and governments also lack the resources needed to solve the housing problem for the very poor.

As it has been argued at the beginning of this paper, the private sector offers a framework that can be scalable and that will have access to large capital markets if the venture is run for profit.

Response from the market towards Earthbag technology and value proposition

International corporations such as Green Mountain Coffee Roasters have expressed great interest in DRD's services. The VP of Corporate Social Responsibility of Green Mountain told DRD that they have been looking to build shelters for their farmer suppliers who have been hit by natural disasters. Talks are being conducted to produce a letter of intend.

- DRD has contacted a number of NGOs to assess how our technology would solve needs in developing countries. The response has been overwhelmingly positive. The NGO Gawad Kalinga that operates in the Philippines has agreed to carry out a proof of concept pilot with Earthbag technology.

- The American Sudanese Partnership for Peace and Development has signed a letter of intent stating their resolved interest to work with DRD in building a 500 unit village in Sudan refugee camps. In the sales and marketing section there is a more detailed list of all potential clients we have contacted.

- Luis Alberto Moreno, President of the Inter American Development Bank has asked DRD to send a proposal of collaboration to partner with DRD in a global project for slums upgrade in Latin America. The Inter American Development Bank has a long tradition in funding projects for the urban poor and its research efforts has produced abundant literature in the

subject of improving degraded urban neighborhoods of very low income people as well as disaster relief. The DRD model was also discussed with a bank official, Eduardo Rojas who argued that the building technology used could be advantageously applied in rural areas rather than urban slums. His rational was that very low income rural dwellers also leave in degraded neighborhoods but there land space is not a critical issue. Furthermore, access to soil could be easier in spacious rural areas than in urban slums where debris dumping and ubiquitous garbage might difficult the use of local soils for construction .

Financial returns

As it will be further discussed in the Financials chapter, we anticipate revenues of $100M and Net Income of $12.4M resulting in a gross margin of 12.4% after five years of operations. DRD business model will reach net income break-even in the 27th month of operations. DRD needs to rise $2.0 M from Venture Capital or other source of capital in order to scale operations and finalize our processes.

The main risks and challenges that DRD project faces

- *Introducing a new service for international companies*: DRD is initially targeting companies that have been affected directly or indirectly by natural disasters. Initial efforts to get in the door would be enhanced if it were a well-known technology. However our initial conversations with clients have been extremely positive and our value proposition is clearly understood. The strong needs of our clients and the lack of a similar competitive offering targeted to their needs will enable DRD to overcome this challenge.
- *Operations*: Building houses in developing countries at a large scale can constitute a challenge especially due to the lack of infrastructure and communications. DRD uses local materials for construction, reducing the need of complex logistics to transport bulky materials from other areas. Additionally, DRD plans to initially focus its sales and marketing efforts in selected countries (Latin America and India & China) to facilitate know-how transfer and rapid growth.
- *Customization of house design and acceptance of earth technology*: Other Relief housing projects have failed because they conveyed the stigma of a "foreign look" or designs

insensitive to local customs. Designs can be easily adapt given the simplicity of the technology. The houses can be easily personalized by homeowners to convey a human sense of place to entire new neighborhoods. Capacity building in the construction process also alleviates people's unrest for new construction methods.

4. Market and Competition

Disaster Relief Dwellings (DRD) business will be the direct link between the increasing stream of funds available for disaster relief and the people who need them. The company will target Corporations and private foundations that look for efficiency and return on their non-profit or CSR investments. The projects carried out by DRD will help recover the affected areas, where the targeted companies have important suppliers, manufacturing plants, or simply significant customers. Any corporation with a significant CSR investment and any of the above features located in a country subject to a potential disaster would be a potential customer.

In order to better illustrate DRD's product, we use the example of Green Mountain Coffee Roasters that have already expressed a strong interest in our value proposition.

An illustration of a potential client: Green Mountain Coffee Roasters

Green Mountain Coffee Roasters is a high-quality wholesale coffee company with suppliers located all over the world. The company is committed to improving the quality of life in coffee-producing countries by supporting projects that foster self-sufficiency and individual empowerment. While these programs contribute directly to the health, safety, education and security of coffee-growing communities, they also help to stabilize the supply of quality coffees, what is a critical business need for the company. Green Mountain best interest is aligned with the needs of its farming suppliers. When natural disasters regularly destroy their estates, Green Mountain takes an active role in the reconstruction of these areas.

The following are some examples of recent disaster relief programs:

- Hurricane Stan roared into Central America in October, 2005 causing devastating mudslides and wide-spread flooding. Whole villages were buried. Green Mountain Coffee responded with an aid plan of $115,000 in direct support of those communities, and additional matching funds that exceeded $50,000.

- Tsunami: Devastation lead Green Mountain Coffee' employees to donate over $45,000 to immediate relief efforts. Relief efforts included the reconstruction of homes in Takengon coffee growing communities of Sumatra.

EXAMPLES OF POTENTIAL DRD CUSTOMERS

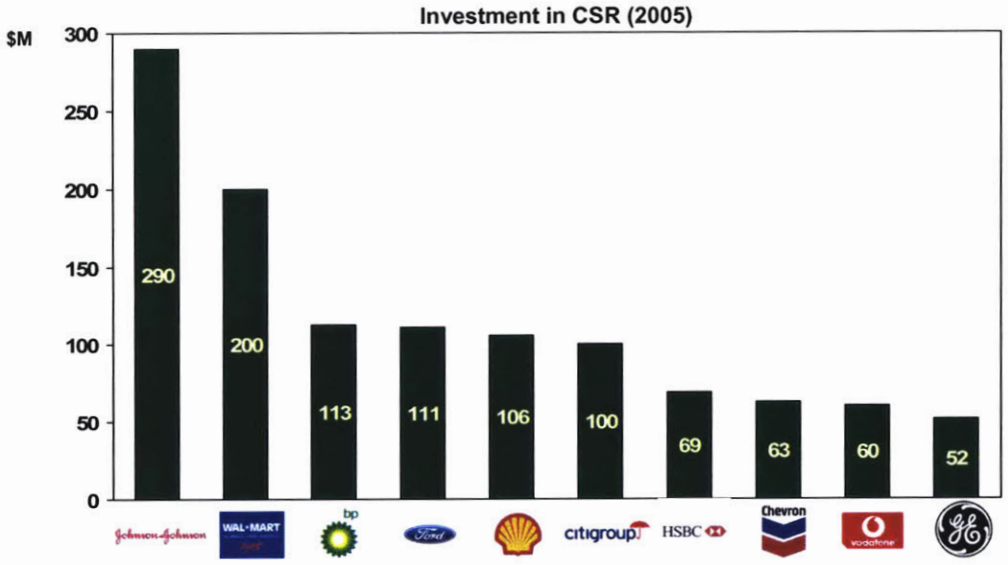


Figure 5. Example of Multinationals investing in Corporate Social Responsibility

Many other companies face situations like the one described above. Figure 5 details a short list of companies with significant CSR investment and a significant presence (via suppliers, manufacturing facilities or customer base) in countries with a high risk of disaster.

How would DRD would help companies like Green Mountain? In future cases similar to the ones described above, DRD will leverage the three dimensions of its product to ensure client needs are met:

- Patent pending ultra-low-cost housing technology results in more efficient deployment of CSR funds or grants by Foundations. Since the DRD building technology is more efficient than other constructions based on expensive materials that needs to be transported to site. Earth is readily available and non skilled labor can be hired locally or communities can perform the task themselves providing with sweat equity labor for self-help constructions.
- An efficient operations model to fulfill the housing needs of the affected areas, eliminating complex transactions of multilateral parties present in models affiliated with international agencies. Small start ups tend to be focused on results and lacks the highly bureaucratic operations of most governmental institutions in development countries.
- Return on their CSR Investment by allowing rapid recovery of supply chain. Our business plan can produce high quality and durable houses for $1,000 to $2,000 per unit will benefiting the communities and local economies. No money goes out as in the case of prefab buildings or modern construction materials

Market analysis and segmentation

US corporations and foundations invested $42 Billion in social responsibility in 2003, an amount that accounts for 17% of total donations in the US. From 1997 to 2003, corporate and foundation donations grew at a yearly average of 11%.

This growing trend will continue in the future. It is estimated that between 1998 and 2052, donations to charities will range from $21 to $55 trillion (including individual donations) (Schervish, Havens and O'Herlihy, 2002)

CORPORATE SOCIAL RESPONSIBILITY IN US: A $42Bn MARKET

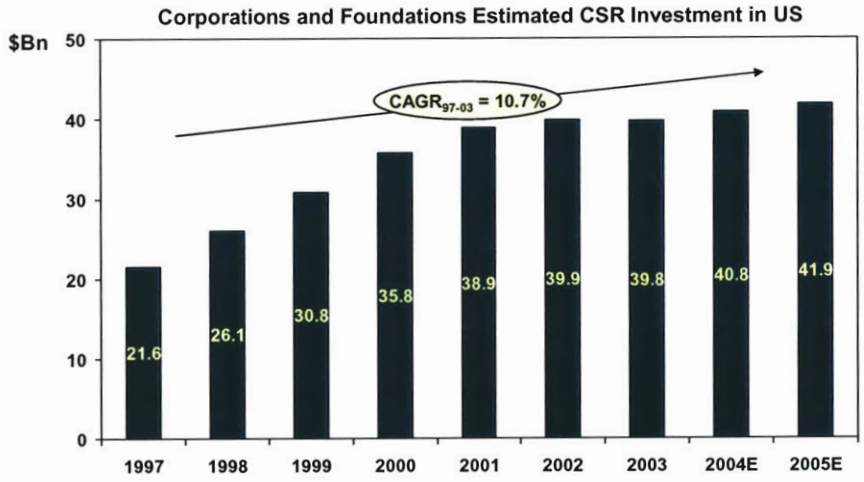


Figure 6. Corporate Social Responsibility investment in US. Source: Foundation Center Statistics, USA Giving Report

Corporate Social Responsibility (CSR) is becoming increasingly important, due to its impact on consumer decisions. CSR is increasingly used as a powerful marketing tool. As Milton Friedman wrote, "there is one and only one social responsibility of business–to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud". What we now call CSR is "one way for a corporation to generate goodwill as a by-product of expenditures that are entirely justified in its own self-interest" (Friedman, 1970)

Among major areas of CSR investment, Human Services and International Affairs received over $4 billion in 2003. Both areas of investment are growing even faster (growth rates of ~11% and ~12%) than the global CSR (growth rate of ~11%).

Corporate social investment is positively correlated with corporations' net profit. However, CSR investment as a percentage of net profit has increased significantly in the last several years (from 1.1% in 2000 to 1.6% in 2003) and is expected to continue growing.

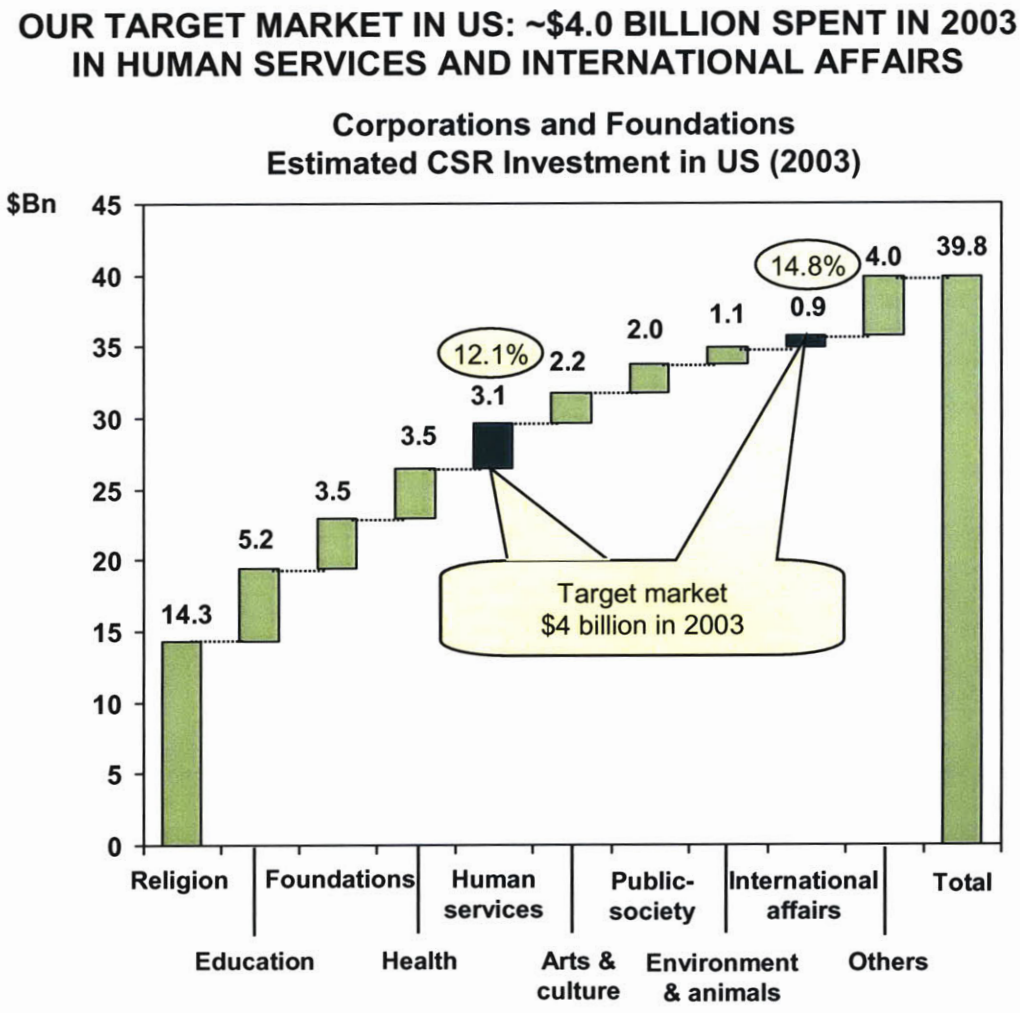


Figure 7. Expenditure in Human Services and International Affairs. Source: own analysis, business census, Foundation Center Statistics, USA Giving report 2004

DRD will compete with other alternatives in the *Human Services and International Affairs* categories of CSR. We will take advantage of the market growth to access corporate clients and foundations with increasing budgets to spend on CSR, seeking to obtain a higher return on their investments. However, our opportunity requires investors to shift from their current Human Services and International Affairs investment to our product, which we will achieve through customization to client needs, higher efficiency of our building technology, and higher impact on the targeted market as society becomes increasingly sensitive to natural disasters, resulting in higher ROI for our clients.

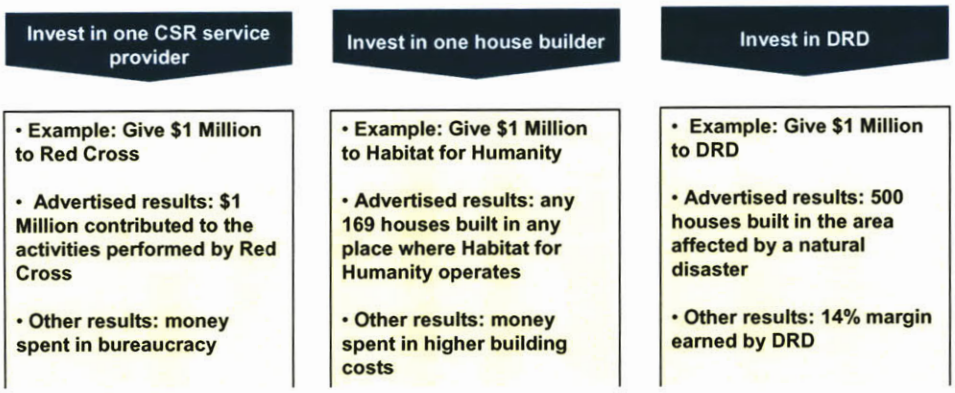


Figure 8. Competition by other service providers of scalable sources of ultra low cost housing

For Profit vs. Not For Profit

Mainstream philanthropy directed to non-profit charities is becoming increasingly challenged. Corporate foundations are progressively interested in investing in for-profit firms that pursue social causes, and

Social Entrepreneurship is on the rise. For example, Omidyar Network Foundation, has pumped $5.6 million into for-profits, including United Villages of Cambridge (MA), a $50K finalist hatched out of the MIT Media Lab. Additionally, Google Foundation will be joining other entrepreneurs toying with new approaches to philanthropy, and has announced hefty investments in for-profits firms. Private investors are starting to play a critical role in bridging the gap for entrepreneurs who have social ideas.

Segmentation

The objective of our market segmentation is to determine the types of potential customers. The first stage is to differentiate between corporations and foundations. The second stage is to classify corporations according to their size, and foundations according to their ownership. The next graph shows the 2003 $4billion market mapped in terms of distribution of total revenues.

Corporations account for 34% of the total market and foundations account for 66%. Within the corporations segment, large corporations account for 61% of the market, medium corporations for 31% and small corporations for 8%. Large and medium corporations are first-priority

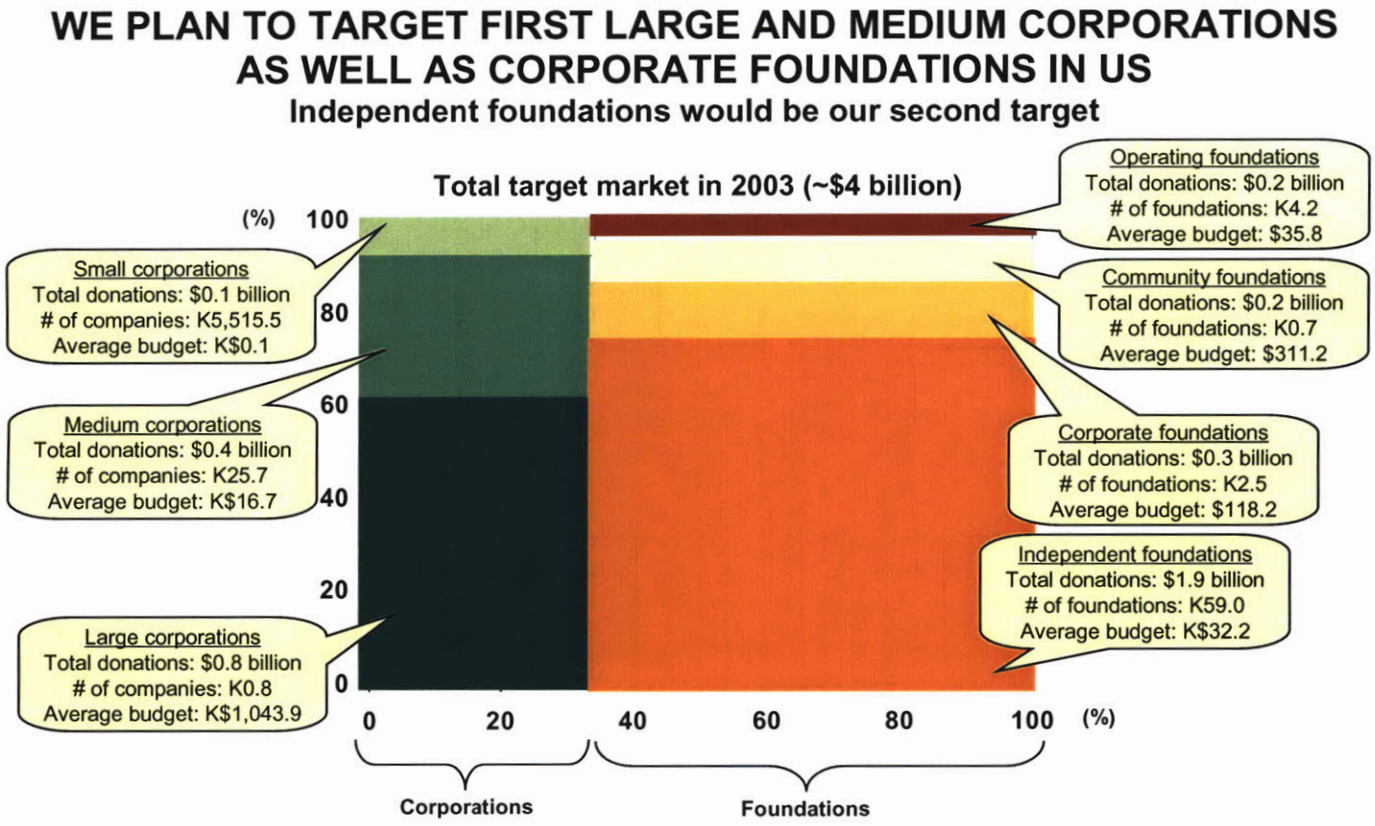


Figure 9. Corporations and Foundations in USA 2003.
Note: Market defined as total donations for "Human Services" and "International Affairs" provided by Corporations and Foundations.
Source: Own analysis, business census; Foundation Center Statistics; USA Giving report

segments. Within the foundations segment, independent foundations account for 74% of the market, corporate foundations for 12%, community foundations for 8%, and operating foundations for 6%. Corporate foundations are also a first-priority segment.

Sequencing markets

Our 5-year plan reflects the growth trend for each segment of the market (corporations and foundations). According to our projections our target market will grow at an average yearly rate

of 10%. The target market will vary in composition as it evolves and corporations CSR becomes increasingly important over Foundations.

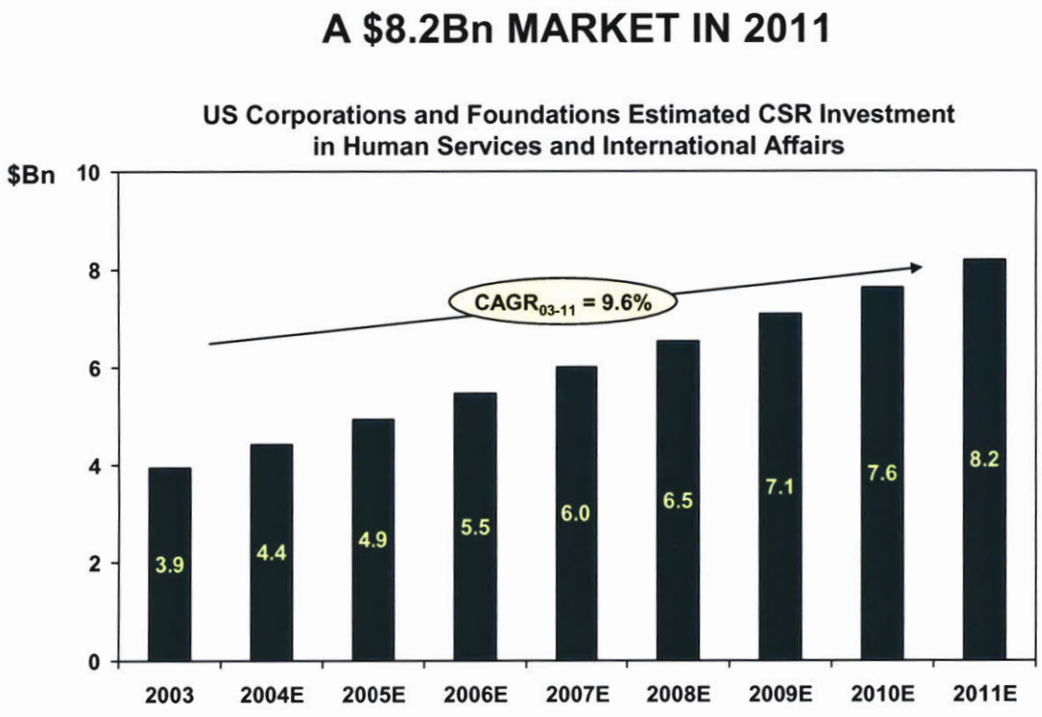


Figure 10. Projection 2011 Corporate Social Responsibility investment
Source: Own analysis, business census; Foundation Center Statistics; USA Giving report

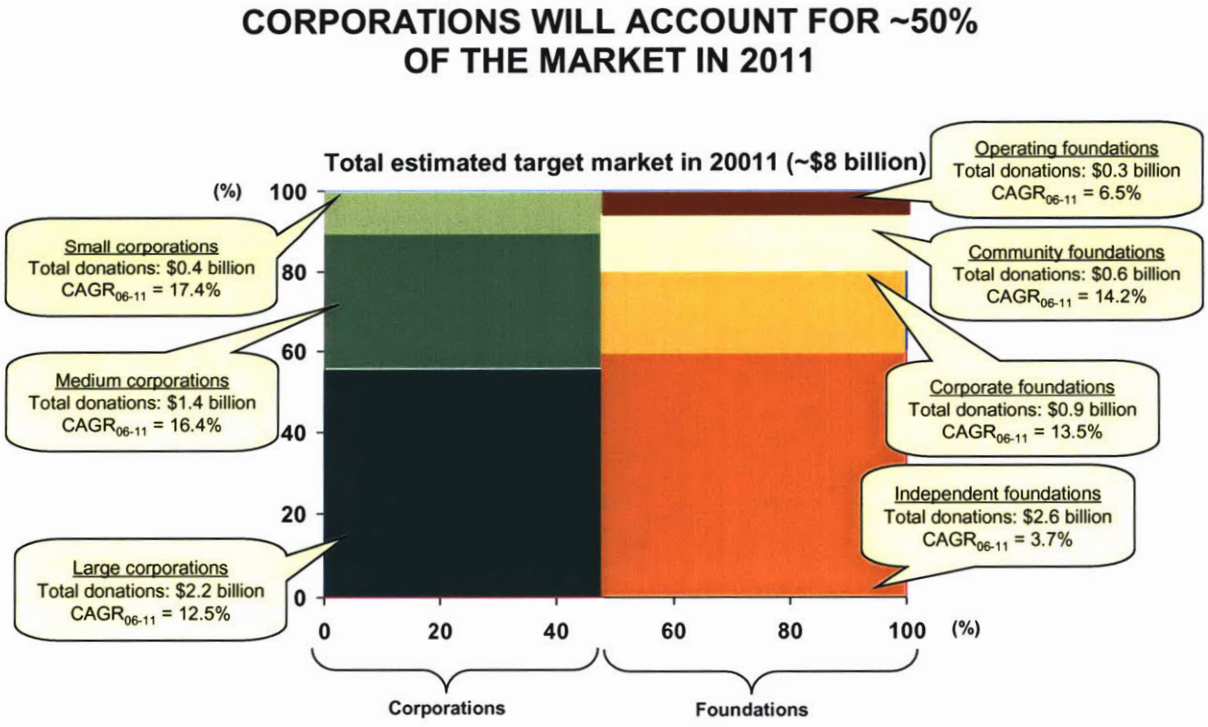


Figure 11. Projection 2011 Corporations and Foundations in USA 2003.
Note: Market defined as total donations for "Human Services" and "International Affairs" provided by Corporations and Foundations.
Source: Own analysis, business census; Foundation Center Statistics; USA Giving report

Future expansion of Customer Base and Products

DRD has designed an expansion plan to leverage our technology in the future, by broadening both our markets and products. In the long term (5 – 10 years from now), we plan to expand to:

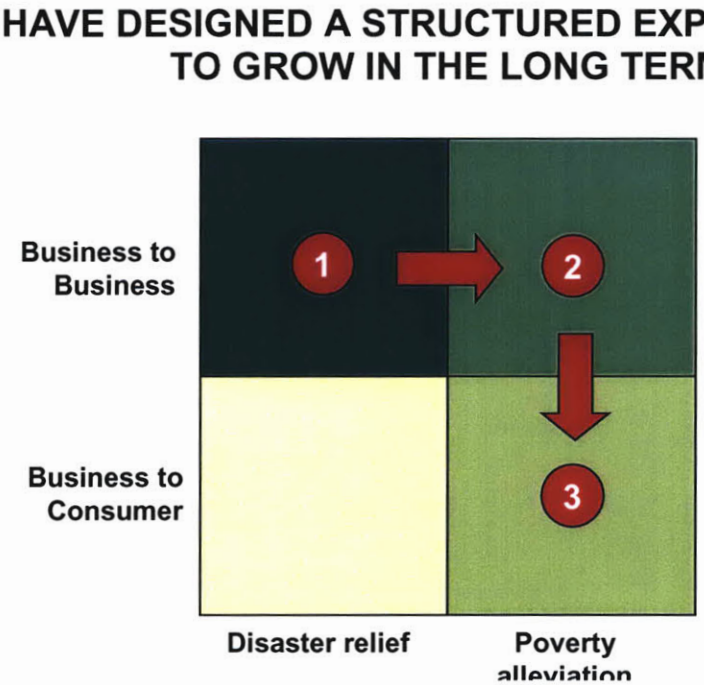


Figure 12. Expansion strategic plan

- *Poverty Alleviation – CSR*: Our vision consists of targeting the same type of clients (companies and foundations) while exploring a more permanent shelter, producible by making only minor modifications to the temporary dwelling, which will then be used to provide an efficient solution to communities requiring slum upgrades or ultra-low-cost housing.

- *Poverty Alleviation – Microfinance*: DRD will seek microfinance institutions (MFIs) to provide housing loans to its 16M end consumers (Center for Urban Development Studies at Harvard Graduate School of Design, 200). The microfinance industry for income generating activities is growing, and MFIs are looking for new products. Housing upgrades is a preferred option given the strong demand and superior economics. We would actively

seek partnerships with MFIs as well as explore the possibilities of the $167 B remittances market (funds sent by immigrants to their home countries).

Competition analysis

Our competition is diverse and atomized. They are all non-for-profit (except for Cemex) or multilateral agencies, and multipurpose. Even those organizations which started as pure housing providers have evolved in their objectives toward a broader range of humanitarian and social spectrum. We think this environment will allow DRD to differentiate as a for-profit run firm specialized exclusively in resilient ultra-low-cost housing.

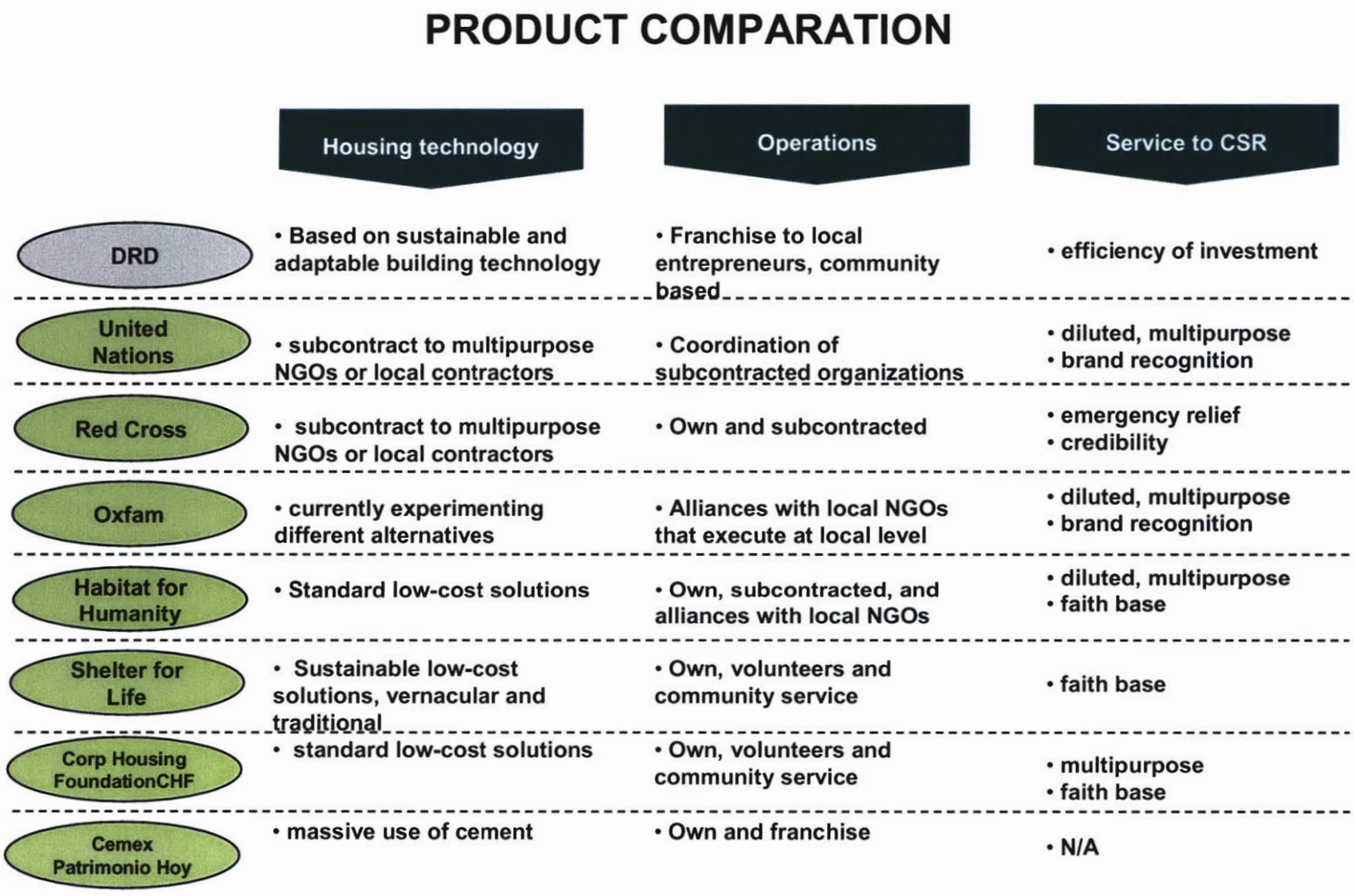


Figure 13. Product Comparison with Competitors

- 1

We have mapped our competitors in three different categories based on their product/service:

- *Materials Provider* – The agent (usually a private firm or the Government) sells materials to the end consumer, who in turn builds their own shelter. The product is also includes financial assistance to allow for affordable payments, and technical assistance.

- *Builder* – **T**he agent (usually a not-for-profit NGO) acts as developer or general contractor. It does all the fundraising, project management, and finds local NGO partners to run the operations, leaving the agent to only coordinate and audit activities. Most of these organizations are multipurpose, and their objectives are wide in the Humanitarian spectrum. Rebuilding infrastructure and other activities involved in Emergency Relief is only a small part of their broad agenda.

- *CSR Management Service Provider* – The agent (usually an international agency or a not-for-profit NGO) is an integrated organization that specializes in fundraising and then channeling money through the pipeline of hundreds of organizations. On occasion, they might be vertically integrated like Red Cross or Gawad Kalinga who perform all the tasks though the value chain. All of these agents are multipurpose.

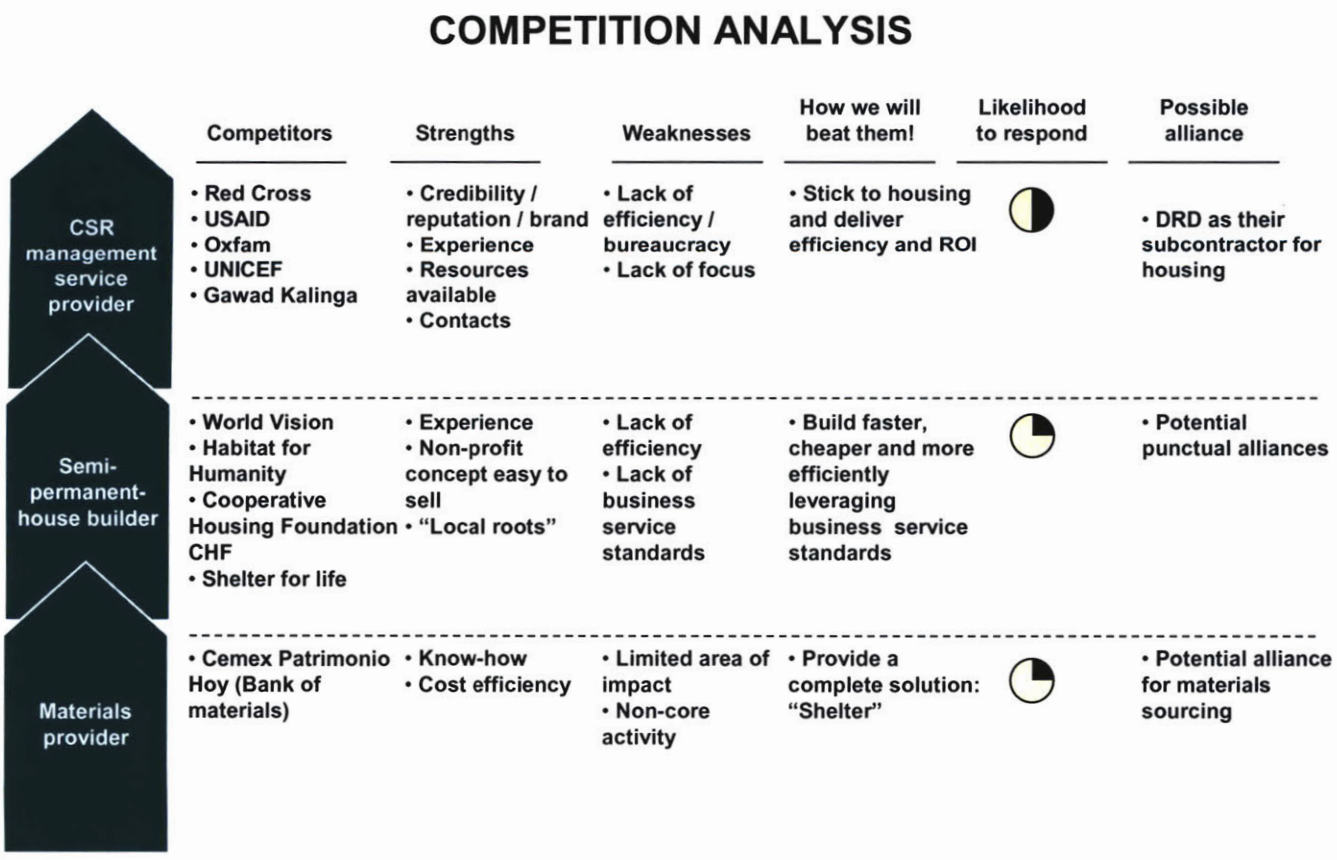


Figure 14. Competition Analysis

Main Competitors in a Nutshell

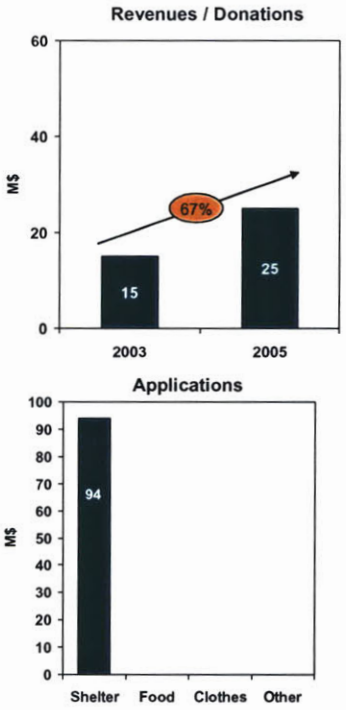
The following Figures collects all substantial public information presented by the latest Annual Reports of each competitor:

CEMEX Patrimonio Hoy
Competitor profile (I)

Year of creation	1998	Revenues 03 (M$)	15.3	Rev. growth 03-05(%)	67% CAGR
Activity	Provides Construction materials micro credit and technical assistance.			Employees (#)	480
Geographic scope	Mexico				
Alliances		Key donors	Cemex invested $12M to start up the venture		

Opportunities	Threads	Strengths	Weaknesses
• Alliance for cement	• Expansion to disaster relief projects • Become competitive as gains volume discounts	• Reputation • Financial Back up • Distribution Channel • Scale	• Cost • Not focus on disaster relief, but in slum upgrade • Depends on purchase and payment by the recipient • Only in Mexico

Other relevant info	42,500 customers in 2003 $2M net profits in 2005 65,000 new houses in 2003 since inception of project $175M of non-cement material sales in 2003 Cost for home owner is $1,300 in materials, plus sweat equity



ure 15. Cemex Patrimonio Hoy in a Nutshell.
urce: Annual Report

Habitat for Humanity
Competitor profile (I)

Year of creation	1976	Revenues 2004 (M$)	170	Rev. growth 00-04(%)	7.6%
Activity	Construction of houses for homeless in USA and other countries			Employees (#)	800
Geographic scope	100 countries worldwide				
Alliances	All operations (fund raising, building site selection, house construction and mortgage servicing) managed by 2,100 independent, locally run non-profit bodies	Key donors	Mostly Individual donations, Government Grants		

Opportunities	Threats	Strengths	Weaknesses
• Partnership: Affiliation with local NGOs for program implementation	• Preferred choice of investment given its established brand name • Huge international presence	• Reputation • Financial Back up • Worldwide network • Scale •Volunteer support	• Lack of focus on post-disaster housing • Greater focus in the US

Other relevant info	Non-profit, ecumenical Christian housing ministry Built 200,000 houses so far since inception 67% of program expenses in the US Provides interest-free mortgages for 7-30 years 2,100 active affiliates in 100 countries

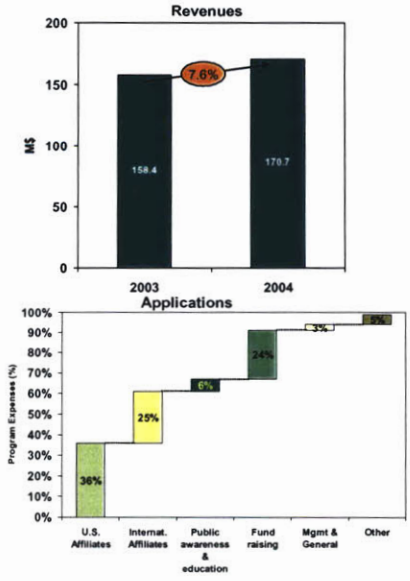


Figure 16. Habitat for Humanity International in a Nutshell.
Source: Annual Report

World Vision
Competitor profile (I)

Year of creation	1950	Revenues 2004 (M$)	1,546	Rev. growth 00-03(%)	15% CAGR
Activity	Humanitarian, education, economic development, emergency relief, children, advocacy, peace			Employees (#)	22,500
Geographic scope	Worldwide, 96 countries				
Alliances		Key donors	Religious donations		

Opportunities	Threads	Strengths	Weaknesses
• Become preferred contractor for disaster relief housing reconstruction	• Deep pockets, might become bigger player in the housing reconstruction segment	• Total independence from governments • Long track record • Scale	• High rate of personnel turnover • "Strident military views" associated with religious affiliation • No focus

Other relevant info	Faith-based organization. Headquarter in Monrovia and California. Liason Office in Geneva. 10% of expenses go to fundraising. 80% funding through private sources, 20% through government and multilateral agencies

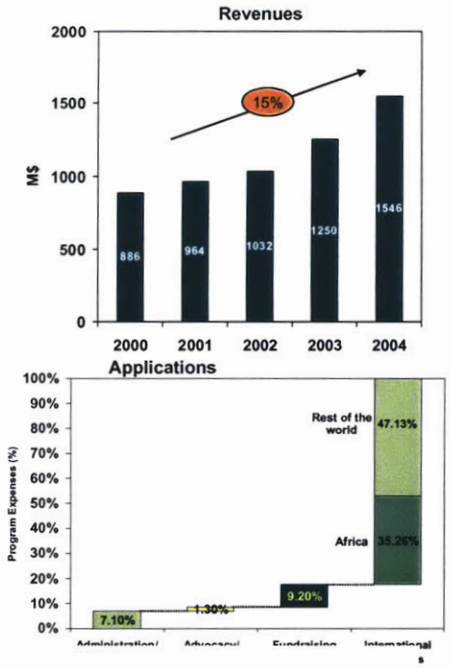


Figure 17. World Vision in a Nutshell.
Source: Annual Report

CHF International
Competitor profile (I)

Year of creation	1952	Revenues 2003 (M$)	69.4	Rev. growth 00-03(%)	% CAGR
Activity	Humanitarian, economic development, disaster relief, community growth, micro credit			Employees (#)	66
Geographic scope	30 countries				
Alliances	Basically US Government, although they display a long list of "partners". Only $330K are received by partners or private donations.	Key donors	USAID, several departments of UN, US Government. Philanthropy donations amount only to 0.5% of revenue		

Opportunities	Threads	Strengths	Weaknesses
• Become preferred contractor for disaster relief housing reconstruction • Training programs on site	• Preferred choice of investment given its established brand name • Potential change of strategy to fundraise from Corporation's CSR and Foundations	• Network of connections with government officials • Long track record • Brand recognition and credibility	• Lack of focus • Known for slum upgrades and economic development • Reliance on USAID funds that are decreasing

Other relevant info	13,000 disaster relief shelters 13% administrative cost in 2003 $15M receivables in their balance sheet

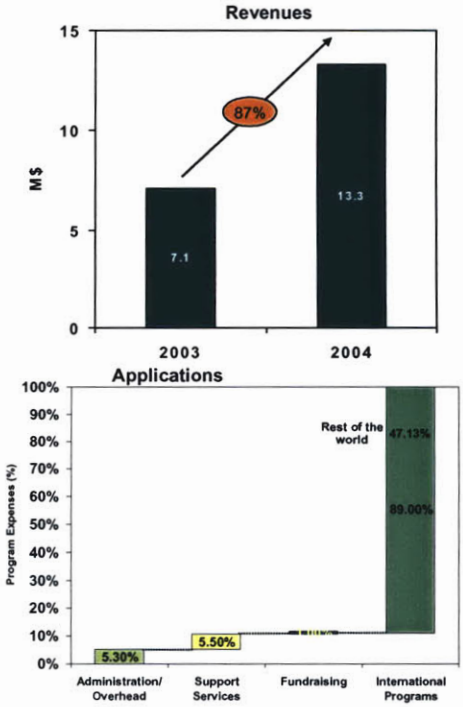


Figure 18. CHF International in a Nutshell.
Source: Annual Report

Shelter for Life
Competitor profile (I)

Year of creation	1984	**Revenues 2004 (M$)**	13.3	**Rev. growth 03-04(%)**	87 % CAGR
Activity	Housing and community development in areas of conflict and disaster			**Employees (#)**	600
Geographic scope	7 countries				
Alliances	Basically US Government, although they display a long list of "partners". Only $330K are received by partners or private donations.	**Key donors**	Mainly US Government Other: businesses, churches, private organizations, schools, and individuals		

Opportunities	Threats	Strengths	Weaknesses
• Become preferred contractor for disaster relief housing reconstruction	• Preferred choice of investment given its established brand name • Focused on post disaster housing	•Brand recognition and credibility • One of the new organizations on disaster housing • Grassroots focus: Works with communities	• Limited international presence, geographically main focus on middle east

Other relevant info	85% revenue comes from US government Christian Humanitarian Organization Constructs physical infrastructure (clinics and schools) along with shelter Works on transitional, permanent, and disaster resistant shelters

Figure 19. Shelter for Life in a Nutshell.
Source: public information in web page or Annual Report

UNICEF
Competitor profile (I)

Year of creation	1946	**Revenues 2004 (M$)**	1,978	**Rev. growth 00-04(%)**	15% CAGR
Activity	Humanitarian and medical support for children in developing countries.			**Employees (#)**	+10,000
Geographic scope	Worldwide				
Alliances	Numerous: Save the Children, Action against Hunger, Oxfam, Citigroup, AmEx, many airlines, Starwood Hotels, GE, KimberlyC	**Key donors**	Governamental: USA, UK, Japan, Norway, European Commission Humanitarian Aid Office Other: UN Foundation, Rotary Int, AIDS Fund, ...		

Opportunities	Threads	Strengths	Weaknesses
• Alliance for rebuilding schools and medical facilities • Participation in UNICEF's "Back To School Campaigns" run by its Children In Emergencies Program.	• Preferred choice of investment given its established brand name	• Reputation • Financial Back up • Worldwide Distribution Channel • Scale	• Lack of focus on construction, reliance in outsourcing

Other relevant info	7% overhead Non Governmental and Private Sector fundraising accounts for 29% income $391 M dedicated to emergency relief work in 2004 60% expenditure in Africa, 18% in South Asia Immersed in program to reduce transaction cost

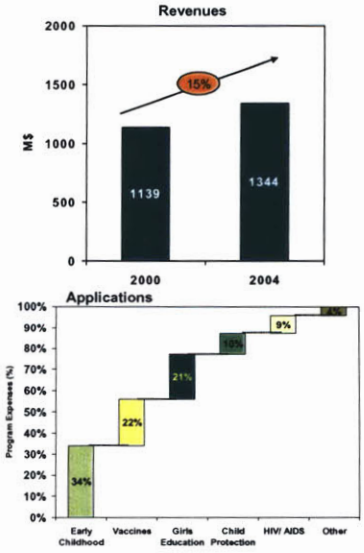
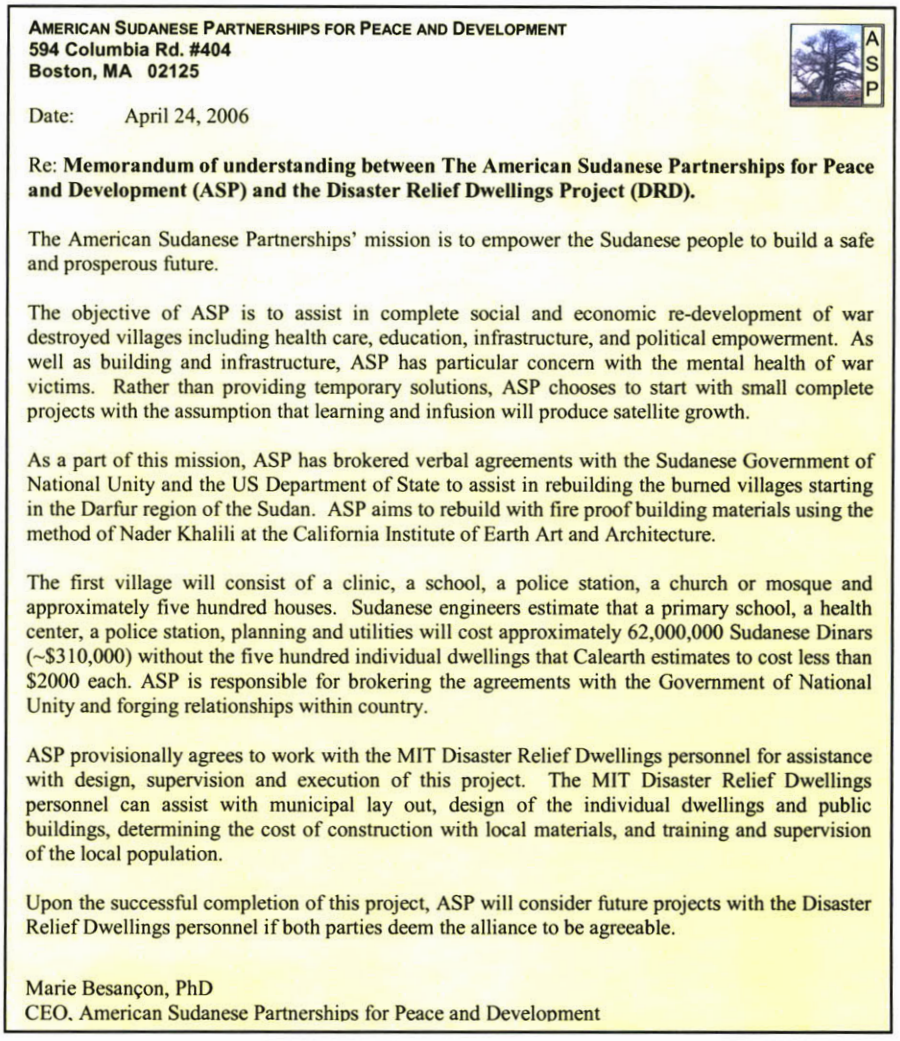


Figure 20. UNICEF in a Nutshell.
Source: public information in web page or Annual Report

4. Sales and Marketing

Our easily scalable project is a departure from the current inefficient channel of financing emergency relief though a long chain of Agencies and NGOs. Our clients are Corporations that are increasingly adopting Corporate Social Responsibility as part of their double/triple bottom line strategy. The sales strategy is similar to raising capital for an investment fund.



AMERICAN SUDANESE PARTNERSHIPS FOR PEACE AND DEVELOPMENT
594 Columbia Rd. #404
Boston, MA 02125

Date: April 24, 2006

Re: **Memorandum of understanding between The American Sudanese Partnerships for Peace and Development (ASP) and the Disaster Relief Dwellings Project (DRD).**

The American Sudanese Partnerships' mission is to empower the Sudanese people to build a safe and prosperous future.

The objective of ASP is to assist in complete social and economic re-development of war destroyed villages including health care, education, infrastructure, and political empowerment. As well as building and infrastructure, ASP has particular concern with the mental health of war victims. Rather than providing temporary solutions, ASP chooses to start with small complete projects with the assumption that learning and infusion will produce satellite growth.

As a part of this mission, ASP has brokered verbal agreements with the Sudanese Government of National Unity and the US Department of State to assist in rebuilding the burned villages starting in the Darfur region of the Sudan. ASP aims to rebuild with fire proof building materials using the method of Nader Khalili at the California Institute of Earth Art and Architecture.

The first village will consist of a clinic, a school, a police station, a church or mosque and approximately five hundred houses. Sudanese engineers estimate that a primary school, a health center, a police station, planning and utilities will cost approximately 62,000,000 Sudanese Dinars (~$310,000) without the five hundred individual dwellings that Calearth estimates to cost less than $2000 each. ASP is responsible for brokering the agreements with the Government of National Unity and forging relationships within country.

ASP provisionally agrees to work with the MIT Disaster Relief Dwellings personnel for assistance with design, supervision and execution of this project. The MIT Disaster Relief Dwellings personnel can assist with municipal lay out, design of the individual dwellings and public buildings, determining the cost of construction with local materials, and training and supervision of the local population.

Upon the successful completion of this project, ASP will consider future projects with the Disaster Relief Dwellings personnel if both parties deem the alliance to be agreeable.

Marie Besançon, PhD
CEO, American Sudanese Partnerships for Peace and Development

Figure 21. Letter of Intent by potential client.

We will also target philanthropic Foundations that issue grants to humanitarian and foreign aid projects. The philanthropy industr and published. Extensive databases of donors, grant contributions, and areas of interest are available either at Giving USA publication or at The Foundation Center.

Preliminary sales

In the course of the last few weeks, as we have started to talk to prospective clients for feedback on our product, we have successfully engaged in the following expressions of interest:

- MOU from The American Sudanese Partnerships for Peace and Development to build a 500 dwelling-unit village and a few community buildings at $2,000 each *(box)*
- Letter of Interest from Green Mountain Coffee to build 100 dwelling units for their coffee farmers
- Letter of Intent from Gawad Khalinga (Philippines) to build a community center as a proof of concept

These results are remarkable given that the intent of our contacts was merely informative, achieved without any proper marketing materials.

Other ongoing contacts with potential customers

DRD has been actively pursuing preliminary contacts with potential customers and partners. Our focus has been first to contact NGOs with field experience, who might be willing to partner with us in housing projects. Their responsibility would be sourcing of land tracts, and screening for the most needed recipients of aid. The response has been overwhelmingly positive, to the point that some have expressed interest in potentially becoming buyers themselves. However, their main reservation is our lack of track record and the risk that a potential failure could hurt their reputation. Such barrier to entry might force us to take small projects during the first year as we build our own brand.

Summary of responses from potential clients

Building shelter is a painful duty for organizations in the field – it is not their focus, they lack the technical staff, it is hard to find construction materials, and land is an issue. Shelter ranks last in ratings of satisfaction of relief aid received by victims.

- Post Tsunami relief efforts, NGOs are revisiting the assumption that local construction companies or local NGOs should be hired to do the job – quality issues and corruption are cited. There is a niche space for an expert agent.
- But reputation and track record is essential to protect brand names of client and agents.

- Our technology solves many logistics barriers, but still our ability to streamline operations seams to be of concern for clients.
- Concept will work in other applications: Slum upgrade, ultra low cost housing for specialty groups, rural schools, storage, community centers, penitentiaries.

Direct sales team

The DRD sales team will be focused on targeting CSR executives of companies in the US or in the regions where we operate. We have planned a cost of sales and marketing of 20% declining to 5%, in line with the 9% – 30% of other players. The sales team is forecasted to grow in number to keep up with our expansion strategy:

Fixed cost structure	2007	2008	2009	2010	2011
Sales and marketing	**780,000**	**1,310,000**	**2,135,000**	**2,985,000**	**3,860,000**
Wages and salaries	**180,000**	**460,000**	**935,000**	**1,435,000**	**1,960,000**
# People	**2**	**5**	**10**	**15**	**20**
Average salary	**90,000**	**92,000**	**93,500**	**95,667**	**98,000**
Representation costs	**100,000**	**250,000**	**500,000**	**750,000**	**1,000,000**
Marketing costs	**500,000**	**600,000**	**700,000**	**800,000**	**900,000**

Direct marketing and PR: Established forums and conferences where CSR strategies are debated will be our source for business development and interaction with potential clients.

Harvard Business School: Corporate Social Responsibility: Strategies to Create Business and Social Value	Oct-18
CSR Conference at the Center for Responsible Business at the Haas School of Business	April
London Business School Corporate Responsibility and Global Businesses Conference	July
International Conference on Business Performance & CSR	June
Annual Conference Business For Social Responsibility, NYC	Nov-06
Golden Peacock Awards on Corporate Social Responsibility	November
IV InterAmerican Conference on CSR hosted by the IADB	Dec-06
Business Civic Leadership Center, Washington DC	May-18
Business – NGO Partnerships Conference, NYC	May-9
Business in the Community BITC. Annual Conference, London	May-9
The Institute on Corporate Community Involvement, Boston College Center For Corp. Citizenship, Boston	May-10
Europe CSR Summit The Ethical Corporation, London	May-31
Cause Marketing Forum, NYC	June-12
Business in the Community Awards of Excellence. Gala Dinner	July-12

Industry Publications: CSR Wire, Business Ethics Magazine, Interfaith Center on Corporate Responsibility Newsletter (ICCR), Chronicle of Philanthropy.

The sales process for Corporations

CSR revenues will come from several categories depending on the needs of the client.

- Operational enhancement of Corporations' Supply Chains: Green Mountain, Starbucks, Cargill, other agricultural crops, oil companies, hotel chains in Cancun, garment industry in Central America.
- Expansion of sales through construction materials and machinery partners
- Polypropylene manufacturer – Bassell, Innovene, etc.
- Curbing extruder manufacturer – United Rentals or Edgemaster or other
- Brand/ethical risk management and mitigation for PR purposes: Oil companies, petrochemicals, child labor, sweat shops

The sales process will involve the following phases:

Phase 1: Develop list of potential customers, and contact persons within the organizations, classifying them by Problem Category: (1) Operational effectiveness, (2) Expansion of markets, or (3) Brand Risk Management

Phase 2: Strong sales force to leverage our affiliated technology with MIT and strong backgrounds of team members with significant experience in the sale of emergency housing.

Phase 3: Engage with senior international managers to understand their aspirations, current initiatives and challenges. Benchmark their company approaches to corporate social responsibility and its integration into governance and business systems against other companies' publicly available information.

Phase 4: Analyze how our value proposition can match their needs

Phase 5: Formulate project proposal that addresses the key dimensions of the client's CSR policy.

Operational Effectiveness of Supply Chain	Rebuild villages and dwelling units of our Client's suppliers *Case: Fast deployment of DRD in coffee growing areas affected by hurricanes, mudslides and earthquakes in Central America for Green Mountain Inc.*
Expansion of Markets	Build brand name in new geographic markets or social segments by contributing to local development of most vulnerable areas *Case: X % of this sale donated to house the victims of xxxx*
Brand Risk Management	Upgrade living conditions of employees or suppliers to decrease risk of organized media campaigns or product boycott *Case: FairTrade, No Child Labor, Sweat Shops*

Figure 21. Segmentation of Corp Social Responsibility clients by value proposition

Dimensions of CSR		**What the client cares about**
Ethics, Values and Principles		Shareholders Value
Accountability & Transparency		Revenue
Triple Bottom Line Commitment		**Operational Efficiency**
Environmental Process Focus		Access to Capital
Environmental Product Focus		**Customer Attraction**
Socio-Economic Development		**Brand Value & Reputation**
Human Rights		Human & Intellectual Capital
Workplace Conditions		**Risk Profile**
Engaging Business and Non-Business Partners		Innovation

Sales on the ground

Partners and contacts who interviewed by DRD emphasized the need for someone to manage projects on the ground in a post-disaster situation. Our project managers placed in the field will have an incentive to source new deals with local corporations which need to rebuild their stakeholders' assets, or even with NGOs in need of an affordable way to support their re-building initiatives. Our team members with field experience have confirmed the "sales on the field" as a real and fast way of landing new clients. The size and complexity of jobs will increase as DRD establishes its reputation. We have also confirmed such extent with interviews to experienced members of Habitat for Humanity or Save the Children.

Geographic expansion

We have contacted the Fritz Institute, experts in Operations for emergency relief. Ms Anisya Thomas, Director of the Institute agrees with our plan to focus our first efforts in the Latin American region, and gradually expand geographically to other regions with high foreign direct investment (FDI) and disaster-prone regions, such as India and China.

- Latin America is a natural disaster prone region, specifically hurricanes in the Caribbean, earthquakes in Central America and most of the western countries, and mudslides in Andean region and along all urban slums
- The Spanish common language will play an important roll in expanding our operations and deploying experienced teams along the region
- We can leverage personal contacts of some team members in Chile, Mexico, Peru, and Colombia

  However, the unpredictable essence of disasters, especially those of very large magnitude, might force us to change such strategy. According to the Chairman of Habitat for Humanity International, Habitat for Humanity has been forced by social pressure to act in the aftermath of main disasters, even if their plan was to stay away from them[1].

Phases in going to market:

- *Complete pilot & get proof of technology.* Objective: Build reputation and trust. Time: 1 month
  a. Pilot being tested in MIT Laboratory at the Department of Architecture (building N51). Earthquake resistance tests to be completed by 1st week of May
  b. Memorandum of Understanding signed with CalEarth Institute to provide help and know how on sustainable earth building technologies. Architect Nader Khalili has over 30 years of experience in the field.
- *Market to NGOs to gain small contracts as showcases.* Objective: Build portfolio of projects executed. Time: 3 months.

[1] Interview with Nicolas Retsinas, Chairman Habitat for Humanity. April 21st 2006

a. Target NGOs as fast track to rapidly sign a few projects. NGOs have the need (not core competency) and the financial means.

b. Personal contacts, calls leveraging MIT/Harvard student affiliation

c. Hire staff responsible for sales & business development.

- *Market to Corporations for Corporate Social Responsibility programs and to Foundations.* Objective: Build scalable operations during the next 3-4 years. This would be the main focus of our operations.

  a. Build portfolio of regional Funds where clients can invest

  b. Client specific projects

- *Product expansion to Slum Upgrades with Microfinance and Remittances.* Objective: Grow market by selling to pools of final users.

  a. We are already talking to people interested in the idea of applying our technology to Slum Upgrades. International institutions such as the InterAmerican Development Bank have expressed their interest in facilitating a Joint Venture between DRD and regional Microfinance Institutions to offer an attractive bundling to over one billion slum dwellers – providing them with a high quality and ultra-low-cost house financed through microcredits, and leveraging remittances which equal $53B annually to Latin America, 30% of which is used for housing according to the President of InterAmerican Bank.

  b. Our Marketing focus will shift at that point to microfinance institutions, to help them expand their business to higher profitable product:

     i. Add mortgages to their lending portfolio

     ii. The loan market for house building in Latin America is bigger than the microcredit market ($960 per mortgage versus only $620 per loan for working capital credit)[2]

     iii. Loans for house building have a longer term of payment

[2] Remittances and Housing in Latin America, Gregory Watson, Multilateral Investment Fund IADB

Seasonality

Natural disasters occur on a continuous basis, although only very large ones are covered by the international media. Thus, many people have built the perception that disasters are quite an unexpected event. The reality is that 450 disasters populate the annual calendar, creating a continuous demand for ultra-low-cost housing for the 5.7M new homeless each year. Adding to that demand, more than 1Bn people live in shantytowns and could benefit from cheap technology to producing safe yet affordable houses if financial means are provided. We anticipate peaks of demand related with large catastrophes rather than with seasonality. Tsunami or 2005 hurricanes are a good example of such events. Our technology and scalable model is specially designed to minimize such peaks of demand: (1) by using non-skilled local labor, and (2) by minimizing the need for external building materials.

Pricing Strategy

The price of housing is extremely variable, even in the low-cost segment in which we operate. That makes price an evasive factor and seldom the focal point of negotiations. Normally organizations are more interested in quality (to protect their brand name or sensitivity of their donors) and ability to fulfill the contract.

Our pricing and product strategy focus on the Semi-permanent and ultra-low-cost Permanent segments ($800 to $1800) in which there is an underserved market. The price covers our variable cost, and allows for a gross margin of 27.7% in year 5. This margin will allow us to cover fixed costs after having sold 17,000 units[3].

Price of our units is on average 31.4% below competition due to our cost structure:

- Soil is the cheapest construction material than any other modern product commonly used
- Soil is sourced on site, with no costly transportation of bulky materials
- Use of unskilled labor is cheaper than having to contract specialized masons or carpenters

[3] see chart "Variable and Fix cost Analysis" in Financials

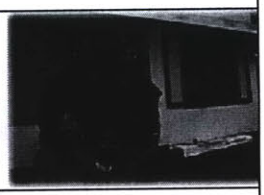
Habitat for Humanity price of dwellings				
				
Congo $2,545	Papua N. Guinea $2,304	Sri Lanka $2,436	Guatemala $2,100	India $1,793

Figure 22. Price comparison of products
Source: public information in web page Habitat

Our product not only can compete in price, but also has superior technical qualities:

- Fast to build, with only 1 week of production time, which is 2 to 15 weeks faster than our competition.
- Resistant to earthquakes, floods, hurricanes, and fire, thanks to its 18' thick walls of solid earth packaged into fire resistant woven polypropylene.
- Fosters community labor and long term capacity building, as praised by advocates of economic development.
- Uses mainly local materials, minimizing the need for transportation and shortcutting complex logistics that tend to derail emergency relief aid.
- Adaptable and flexible to local designs and styles; its simplicity is ideal for progressive construction typically found in slums upgrades.

5. The technology and product

DRD is a proprietary building process that provides high-quality, low-cost and rapidly constructed housing units, which uses a smart combination of community trained labor, stabilized earth, polypropylene sleeves, and metal interlocking pieces. The building technology is known as earthbag construction and in the US it is protected by patent number 5,934,027 filled on 1997 by architect Nader Khalili, director of the CalEarth Institute. Earthbag technology relies on:

- *Community labor*: Each dwelling unit can be built by a team of 6 to 10 unskilled people. Thanks to our simple technology, one experienced manager is enough to coordinate and ensure quality. Productivity can be easily boosted 10-fold with the use of an inexpensive ($3,000) off-the-shelf curbing extruder machine slightly modified to allow for variable heights.

Figure 23. Curving machine is normally used for landscaping or for building curves at side walks

- *Stabilized earth*: DRD uses local soil as the primary construction material, an unlimited and affordable resource which does not require transport or warehousing. Our technology allows the use of almost any kind of soil. Depending on its texture, we stabilize it with small quantities of cement. The use of on-site earth positions us as the lowest cost product in the segment.
- *Woven polypropylene (PP) sleeves*: Earthbag technology is based on the use of a plastic sleeve as formwork so the final construction can be performed *in situ.* The PP acts also as a protective skin to ensure extended protection against moisture. Such protection is not present in other low-cost technologies such as rammed earth, adobe, or earth blocks.
- *Metal interlocking pieces*: Because earthbag technology is committed to satisfying the most demanding construction codes, it uses metal interlocking pieces to fasten each layer of *earth sausage* and creates resistance to shear-strength (generated in earthquakes or hurricanes) to guarantee the dwelling's durability.

The process

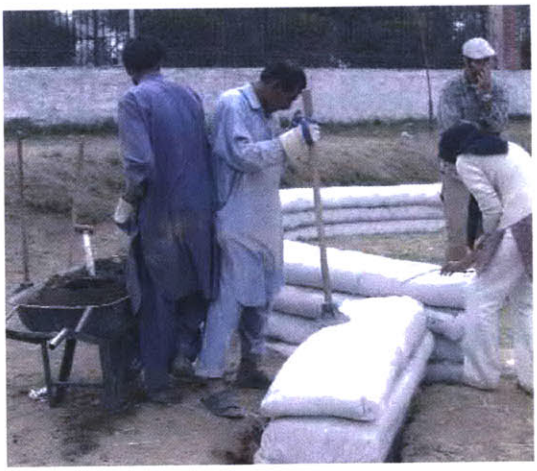


Figure 24. Tampering the earthbags once filled with earth
Source: CalEarth

Earthbag construction technology patented by Khalili consists of three main phases – foundation, walls and construction of roof.

- *Phase 1 (The Foundation):* Requires digging 2 feet in the ground and filling it with 2-3 layers of PP sleeves filled with stones or rocks to create a rigid platform and a barrier to moisture.
- *Phase 2 (The Walls):* Are formed by constantly packing the stabilized earth into the polypropylene sleeves so that we are creating long *earth sausages* that act in the form of a continuous brick. These sleeves, full of stabilized earth, are piled on top of each other until reaching the desired height. Vertical interlocking pieces between each layer of sleeves ensure horizontal shear resistance.
- *Phase 3 (The Roof):* Is considered the part that better characterizes the design of the dwelling. Thus, it should be built out of local materials, and follow the traditions and vernacular architecture of the place. Community participation in the design process will be promoted to ensure that the final product is in alignment with local taste and requirements.

Meeting technical requirements

The Khalili earthbag building process applies the UBC (Uniform Building Code) of the U.S. UBC takes into account the standards accepted by California's seismic zone 4, the most

Figure 25.stacks of the continuous brick
Source: CalEarth Pakistan

stringent seismic code in the U.S. and the world. Because this code is very detailed and constantly improved, most of the countries around the world adopt this code and either keep all its rules or disregard the most stringent ones. Our product meets world-wide safety requirements.

Although Khalili´s earthbag constructions meets technical requirements, there are certain technical risks that we are working to alleviate, such as guaranteeing that standardization of our technology is complete to minimize operating mistakes that could affect the dwelling's structure. Furthermore, UBC uses several probabilistic factors to set its rules, for it also agrees that there could be isolated earthquakes that could damage the structure regardless of the building process we use.

DRD's advantages/disadvantages:

	Advantage	Disadvantage
Labor	Community commitment Steep learning curve Unskilled Motivation	Inexperienced labor, not too much beauty
Materials	Available Affordable Environmentally sustainable Resistant	Lack of acceptance or reluctance to build using regular soil
Technology	Patent pending Simple and easy to learn Scalable Meets safety requirement	Customization to local needs and tastes

Figure 26. Pros and Cons of earthbag constructions

Earthbags' uniqueness is based not only on its advantages described above, but also on its:

- *Production time:* Earthbag technology can deliver a finished basic dwelling in less than one week, employing only 5-10 people.
- *Scalability:* The DRD operating process is designed so that unskilled people can constantly learn and coach during the construction time. This interaction and friendly technology lets them build as many dwellings as is required in a short period of time.
- *Native:* DRD architecture is environmentally friendly because it can be customized by the recipient. It uses less energy per square feet than any other technology, and its flexible design

lets the community decide their preferred style. DRD homes do not carry the stigma of "foreign look" houses, typical of prefab.

- *Durability & resilience to repeated disasters:* Hurricanes, earthquakes, floods, and fires are all typical events. Earthbag technology has the structural capacity to successfully overcome these major events by assuring its weight, stiffness, and water-proof materials.
- *Proven technology through test pilot at the MIT lab of Architecture*: Similarly emergency relief shelters are being built in Pakistan by our partner not-for-profit the CalEarth Institute.

Construction of ½ scale Pilot at the MIT Laboratory of the Department of Architecture:

Availability of raw materials

No specialized labor required

Short production time and standardization

Figure 27. Construction of test pilot at MIT

Time to market: Earthbag building technology will be ready for full deployment in the next 1.5 months as we resume our lab test. We will need another 3 months to perfect the use of the extruder machine to boost productivity. The DRD timeline is as follows:

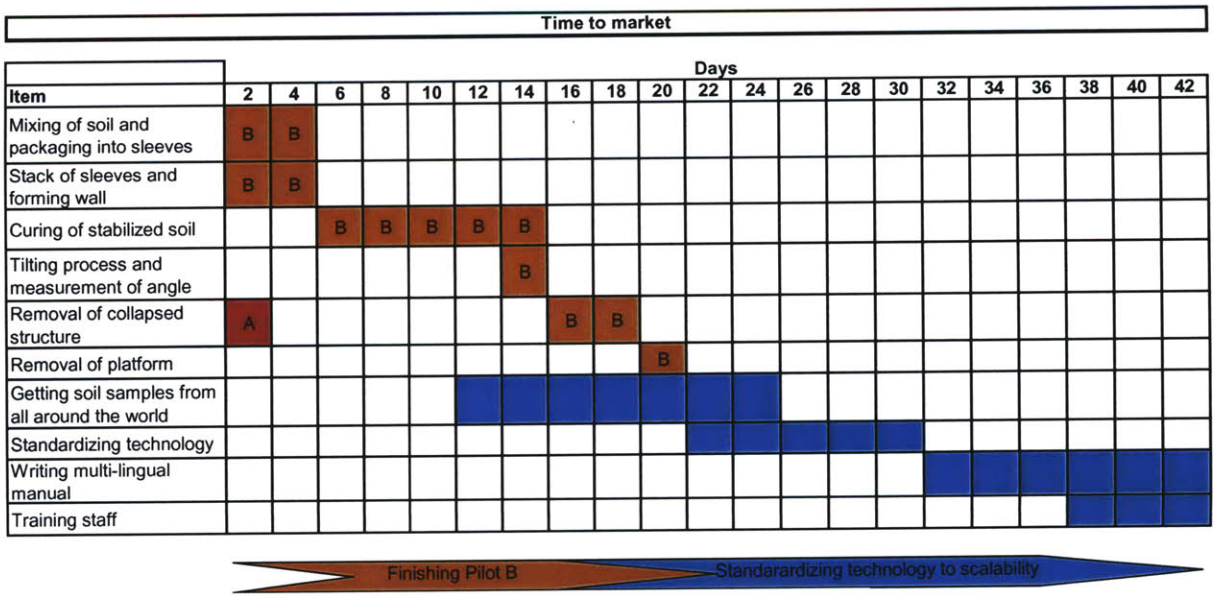


Figure 28. Timetable

6. Logistics and Operations

Geographic Scope

In this industry it is very important to operate regionally due to two reasons: local customs determine the design of the shelters, and relationships with local suppliers are vital to attain

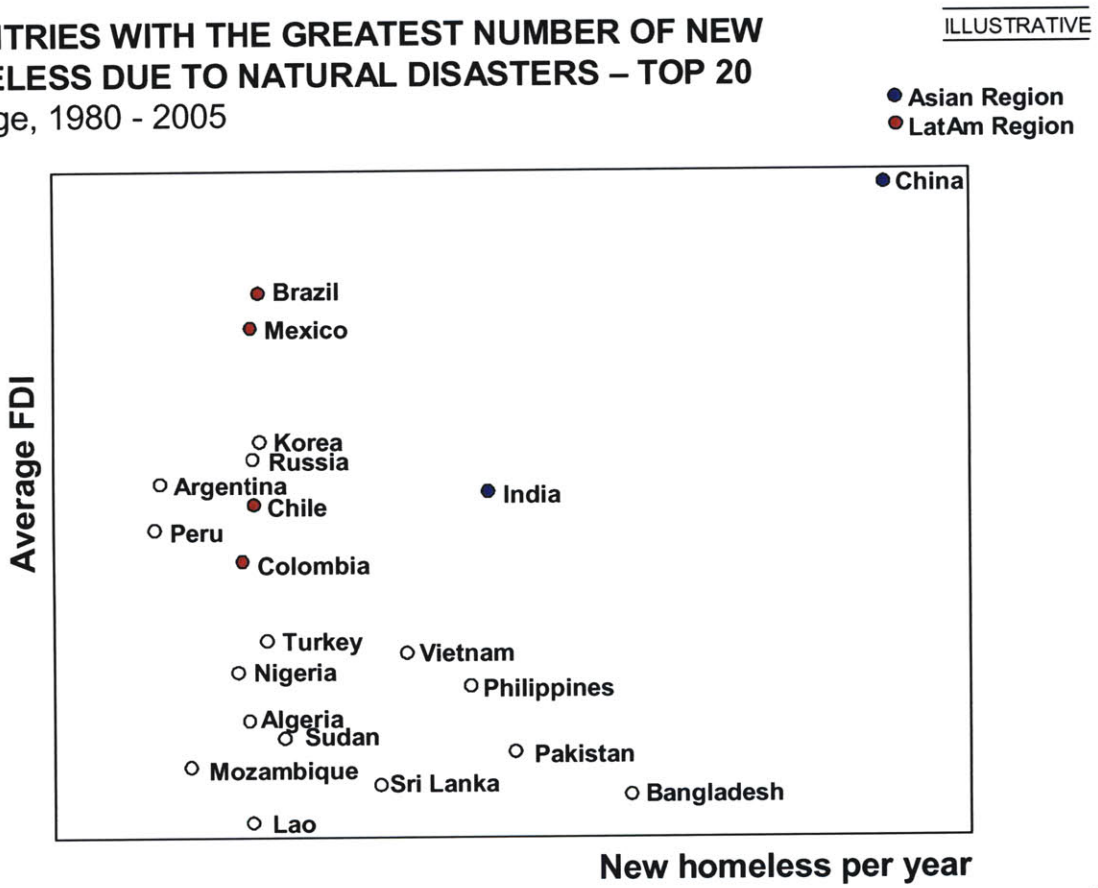


Figure 29. Geographic focus based on new homeless and Foreign Direct Investment
Source: Emergency Disaster Database EM-DAT

efficiency. We acknowledge that house designs vary across different cultures, capturing peoples' customs and beliefs. This condition also applies in disaster situations. People affected by disasters will not accept living in a shelter that does not respect their culture. Thus, we have to thoroughly understand what type of designs they are used to and tailor our shelters to the local customs in order for our product to be accepted.

Regional operations also facilitate the relationship with local suppliers. For our operations to be scalable, we have to identify suppliers with the capacity to deliver in a disaster situation, and train them to do it efficiently. We strongly believe that working closely with our suppliers on a long term basis will give us a competitive edge. Given that operating regionally is so important, and knowing that we will have limited resources during the start-up phase, our company plans to focus its efforts on two regions during this stage:

a) Latin America: Including Mexico, Brazil, Chile and Colombia

b) Asia: Including China and India

To make a first screening of the countries we wanted to focus on, we analyzed historic data on the number of homeless as a consequence of natural disasters. Then we looked at the amount of foreign direct investments that each country receives. We used FDI as an indicator of the probability to get funding from multinational companies to build shelters in any given country:

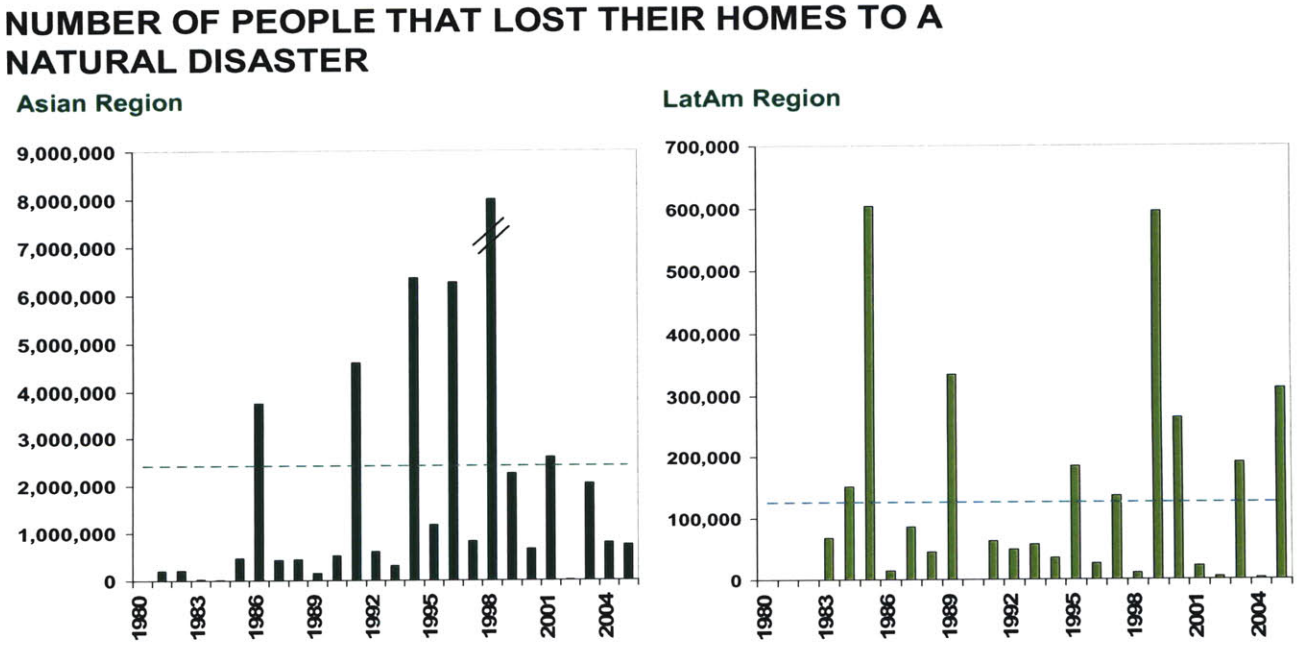


Figure 30. Homeless by natural disasters, break down by region
Source: Emergency Disaster Database EM-DAT

Companies with operations in the affected area will be more interested in alleviating issues for employees in the zone. Our last criterion was geographic proximity. We believe that we can

capture important synergies (through the use of common language, word of mouth, media coverage, distribution networks of suppliers, etc.) from operating in neighboring countries.

Both regions have had an average of 2,600,000 homeless every year from 1980 to 2005. Furthermore, by focusing our efforts in several countries, we ensure that there will be enough people in need of our product every year, due to the hedging effect between the two regions.

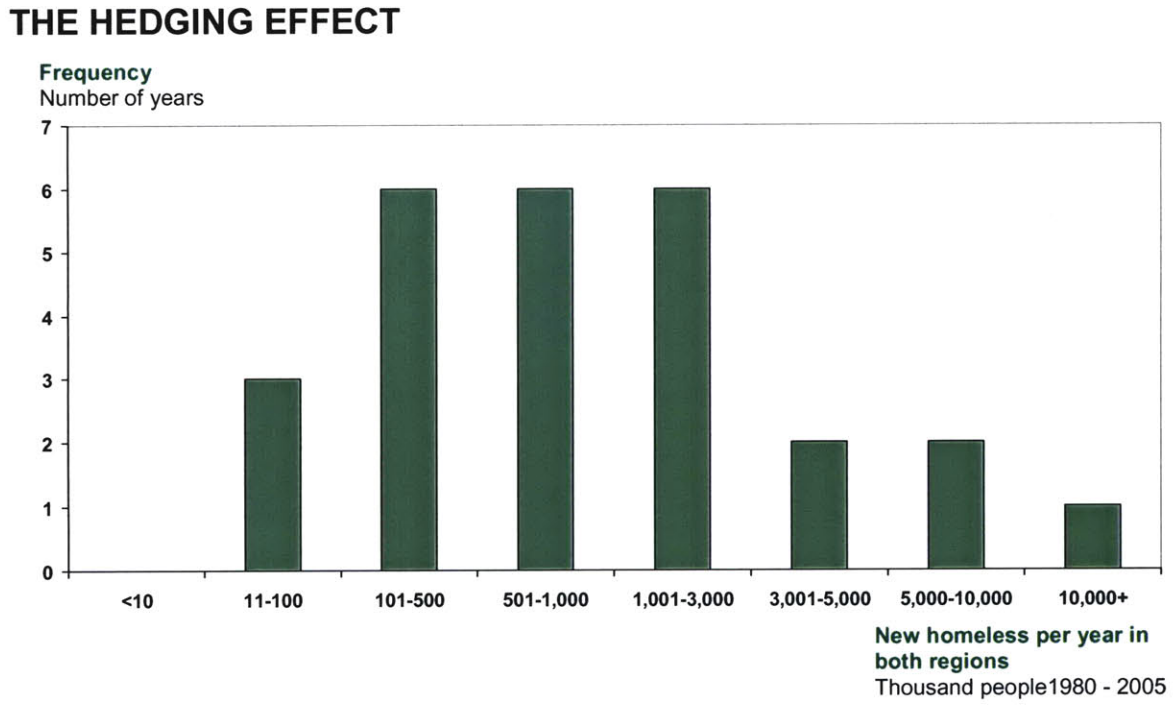


Figure 31. Frequency of natural disasters and their effect
Source: Emergency Disaster Database EM-DAT

Once we have developed the know-how in these regions and our company has increased its resources, we plan to further expand into Asia, entering in China and India and looking for clients with interests in Bangladesh and Pakistan.

Supply chain and operations

The ability to serve an important number of homeless is directly related to the supply chain planning and operations management. Companies wanting to be successful in this industry must be able to procure the required inputs in the affected area on time and at the minimum cost. Our company has an edge on these matters due to a coherently designed business that addresses the

importance of logistics: a company that is geographically focused with a product that requires very few materials. Moreover, we have developed a series of strategies to make our operations more efficient. Regarding procurement, our overall strategy is to buy the raw materials in the affected country. We believe this will result in a win-win situation. Our company will leverage the location of its suppliers to minimize transportation costs, and to reduce inventory costs by implementing Just in Time. On the other hand, the local community will benefit from the money injected into the economy.

The second strategy is to find suppliers with whom we can have economies of scale. To this effect, we make the distinction between two different types of suppliers: multinational and domestic companies. We plan to purchase the cement from local branches of CEMEX and Holcim; both companies have presence in the countries where we will operate, and they both have the production capacity and distribution network required to respond in a disaster situation. The consolidation of the purchase of cement will result in lower prices and better terms. Domestic companies will provide us with the rest of the inputs - shovels, picks, gloves and rebar. We expect that some of these suppliers will have an interest in growing their businesses, and we plan to help them achieve it by sharing our experiences from other countries through training and advisory.

Following our overall procurement strategy, labor will be sourced from the affected country. Shelters will be built by the beneficiaries, taking advantage of the fact that our product does not require specialized labor. Thanks to this strategy, we will attract the people with the highest motivation to get the work done, and they will have the means to jump start their individual economies at the same time. We will also have one supervisor for every fifty families, sourced from the local labor market. Having supervisors from the local community will make the process more efficient, as they know the local culture and language.

Although our product relies on an easy-to-build process, we still believe that training may play an important role in making the operation more efficient. Our approach to train the people is to put a "viral training" in place. Supervisors will receive a hands-on workshop days before the project's kick-off. Each supervisor in turn will train the fifty families that he will coach.

Beneficiaries will be trained in a specific task so that they can move along the learning curve. There are three main tasks in our construction process: Mixing sand and cement, filling the sandbags, and piling them. It usually takes 20 hours to build a 79 square foot *temporary* shelter with four people, (a week with 10-15 people for a semi-permanent version) and we expect to reduce this number at least by 10%, by implementing these trainings. We acknowledge that the number of people with the ability to work (age, health, etc.) varies from family to family. However, based on past experiences and interviews with experts, there is always a feeling of community and solidarity in a post disaster situation (e.g. civilians spending days rescuing people in 1985 after an earthquake hit Mexico City). Our company will bring order to this willingness to help, making a small census before the operation starts, and allocating people from different families to help their neighbors. The objective is for all the families to have the same number of "workers", in an effort to have all the shelters in the same construction stage everyday, so that the learning may be easily transferred from one family to another and the supervision process becomes easier. Supervisors will also receive a manual in the local language, describing the construction process and solutions to the typical problems that they might face. We realize that accumulating the learning may result in important savings, so we plan to update these workshops and manuals to capture any improvements in the process. Finally, our company will also keep record of the supervisors hired in each project to hire them again in case there is another disaster in the country, which will result in less training and more experienced people on the field.

7. Financial Plan

Revenue assumptions

- The number of houses built per year increases steadily from 2,000 in 2007 to 50,000 in 2011. The increase is due both to an increase in the number of projects carried out per year and an increase in the size of each project. See the table below for further detail.

	2007	2008	2009	2010	2011
Number of houses built	2,000	10,000	20,000	35,000	50,000
Average houses built per week	67	192	385	673	962
Average houses per operation	500	1,000	1,500	1,750	2,000
# Operations	4	10	13	20	25

- In 2011 we would be relieving 250,000 people, assuming an average of 5 people per house. This would mean solving the housing need for 5.5% of the people left homeless by natural disasters annually.

Variable costs assumptions

- We have computed the variable cost for an upgraded house, including basic materials, upgrading materials, labor and tools.
- Our costs for basic and upgrading materials have been estimated according to local sources in affected countries (Peru, India), and taking into account the real cost of our technology (thanks to the pilot developed at MIT).
- The labor cost includes local basic labor and specialized labor for plumbing and electricity, according to local sources.
- We estimated that our variable cost per house will decrease each year due to alliances with strategic partners (material providers).

Costs per house built ($)	**2007**	**2008**	**2009**	**2010**	**2011**
Unit cost	1,807	1,717	1,626	1,536	1,446
Savings due to alliances	0%	5%	10%	15%	20%

Cash Flows assumptions

- The initial investment required to start the company will be entirely applied to working capital. There will be no purchase of long term assets, since we will use lease contracts for the facilities, the computers and other long term assets.
- We will not buy materials on demand, so that we do not have to manage warehouses / inventories. Our cost flow will be pretty similar to our payment flow, since most of our costs will be those materials, as well as wages and salaries and monthly leases.
- Regarding our revenues, we planned to charge our clients according to the percentage of complexion of the project, so that our cash inflows and revenue inflows are concurrent in time.

The following graphs describe the projected revenues, margins, variable and fixed cost structure for DRD from 2007 to 2011:

- DRD revenues are projected to be $100 million by 2011…

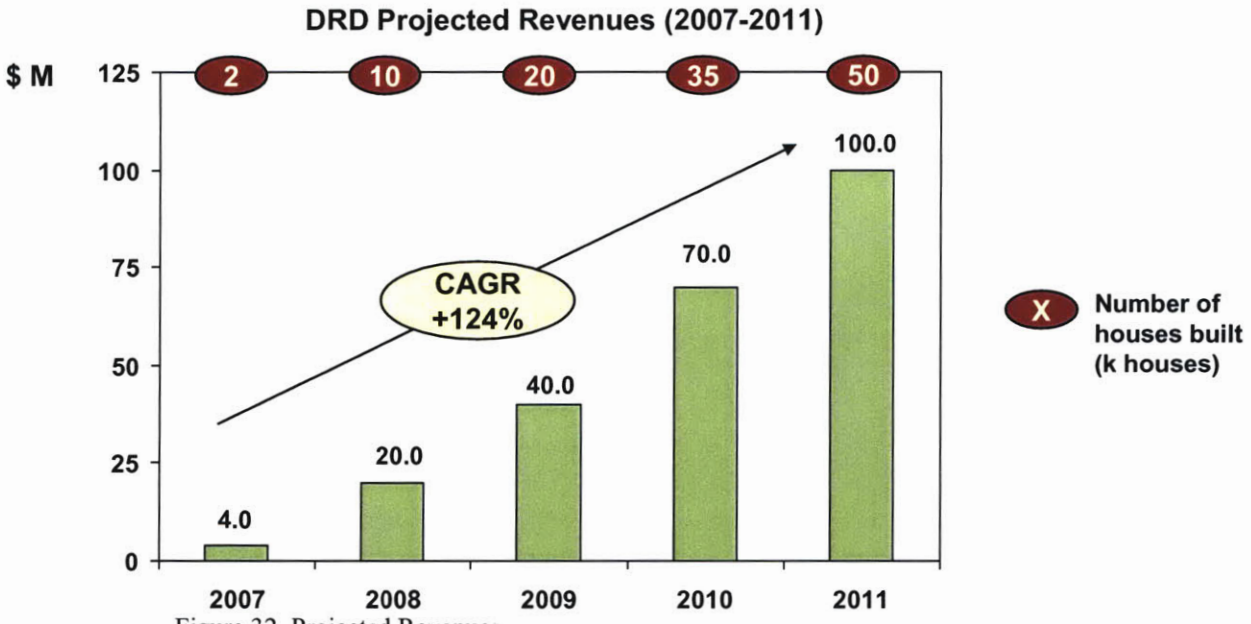


Figure 32. Projected Revenues

- … Resulting in gross margin of $28 million, pre-tax margin of $18 million, and net income of $12.4 million by 2011.

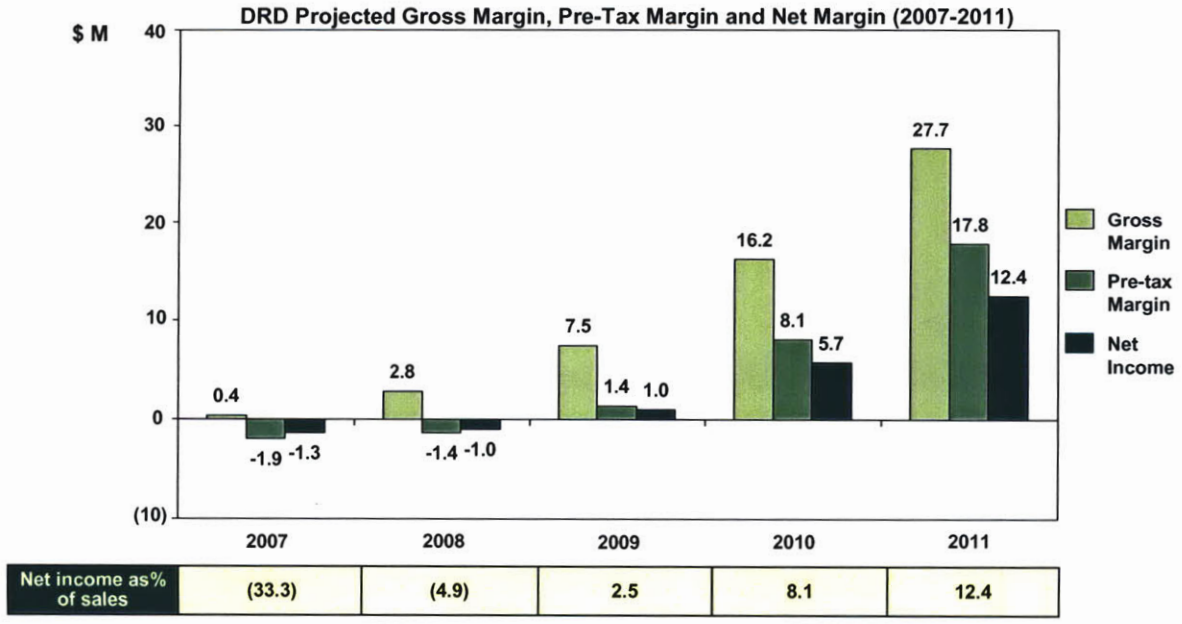


Figure 33. Projected Gross Margin, for price of $2,000 per house sold

- In accordance with the aggressive growth forecasted, fixed costs will increase from $2.3 million in 2007 to $10 million in 2011…
- … But fixed cost as a % of revenue will decline from 57% to 10% over the same period

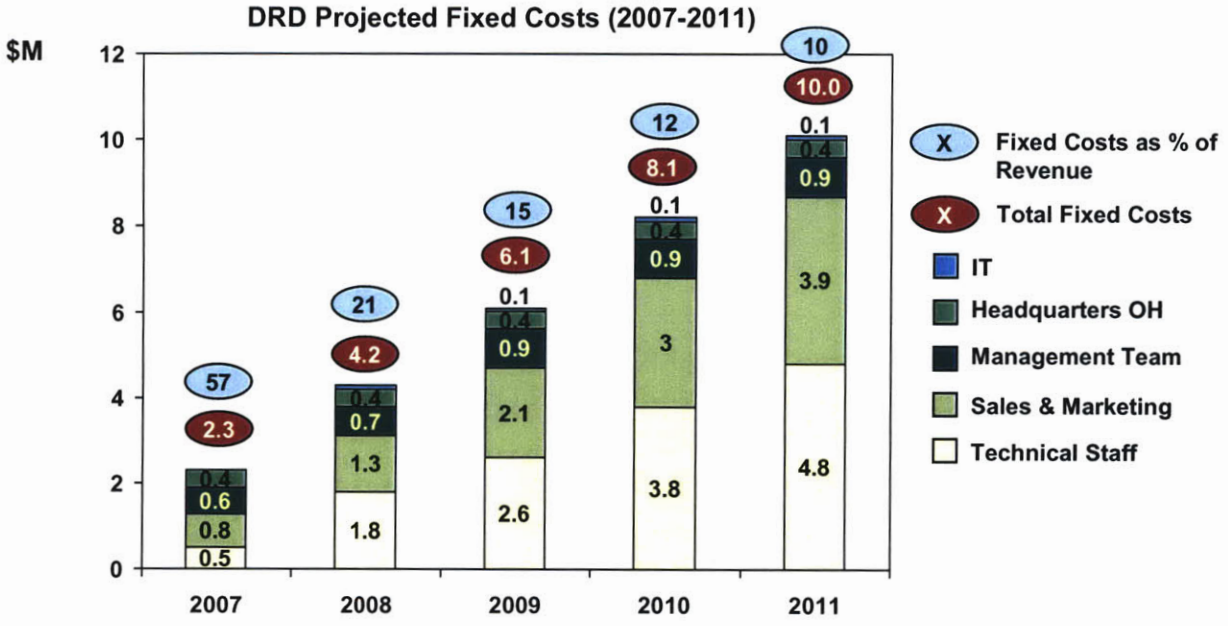


Figure 34. Projected fixed costs

DRD DETAILED FIXED COST STRUCTURE

Fixed cost structure	2007	2008	2009	2010	2011
Technical department	510,000	1,800,000	2,605,000	3,800,000	4,750,000
Wages architects and engineers	120,000	600,000	810,000	1,200,000	1,500,000
# People	2	10	14	20	25
Average salary	60,000	60,000	60,000	60,000	60,000
Wages plumbers and electrician	120,000	600,000	795,000	1,200,000	1,500,000
# People	4	20	27	40	50
Average salary	30,000	30,000	30,000	30,000	30,000
R&D	150,000	300,000	600,000	800,000	1,000,000
Transport & other costs	120,000	300,000	400,000	600,000	750,000
Sales and marketing	780,000	1,310,000	2,135,000	2,985,000	3,860,000
Wages and salaries	180,000	460,000	935,000	1,435,000	1,960,000
# People	2	5	10	15	20
Average salary	90,000	92,000	93,500	95,667	98,000
Representation costs	100,000	250,000	500,000	750,000	1,000,000
Marketing costs	500,000	600,000	700,000	800,000	900,000
Management team	600,000	720,000	900,000	900,000	900,000
# People	6	6	6	6	6
Average salary	100,000	120,000	150,000	150,000	150,000
Headquarters overheads	360,000	360,000	360,000	360,000	360,000
Rent	240,000	240,000	240,000	240,000	240,000
Other overheads	120,000	120,000	120,000	120,000	120,000
Computer leasing and other IT expenses	40,000	51,000	59,500	71,000	81,000
Computer leasing	10,000	21,000	29,500	41,000	51,000
Other IT Costs	30,000	30,000	30,000	30,000	30,000
Total fixed costs	2,290,000	4,241,000	6,059,500	8,116,000	9,951,000

Figure 35. Fixed costs structure

- Variable cost for our most expensive slum upgrade product will decrease from $1,807 per unit in 2007, to $1,446 in 2011, due to economies of scale and negotiating for better pricing based upon our brand strength. Cheaper units can be also produced for semi-permanent relief.

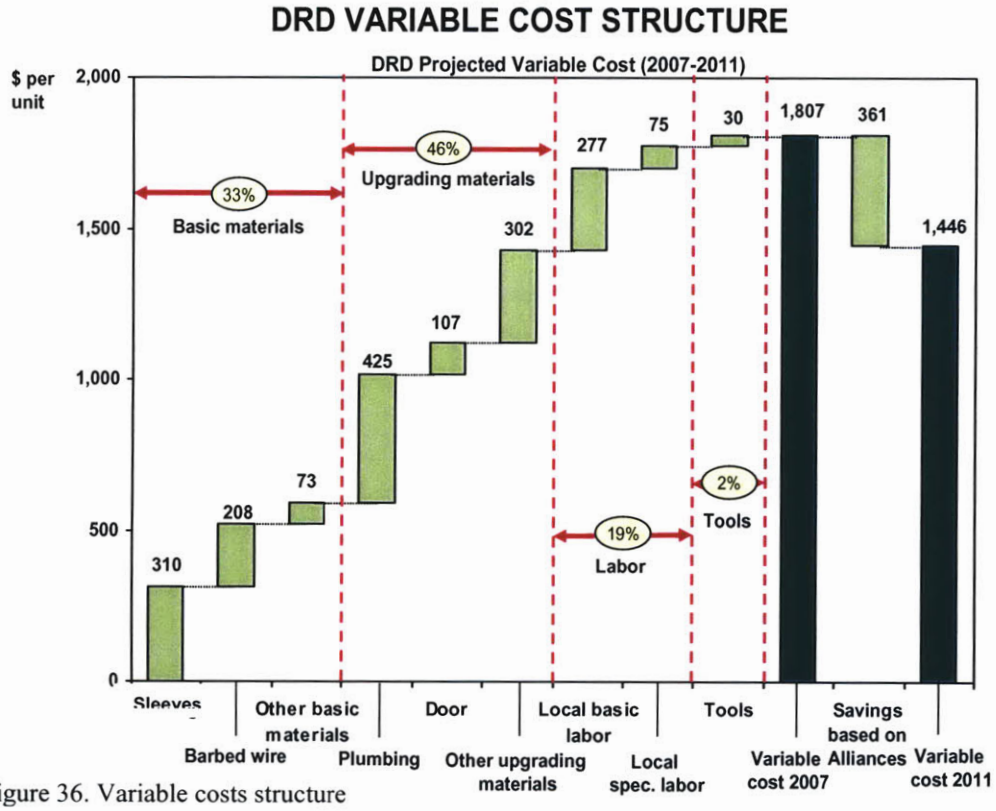


Figure 36. Variable costs structure

- We plan to reach break-even in the 27th month…

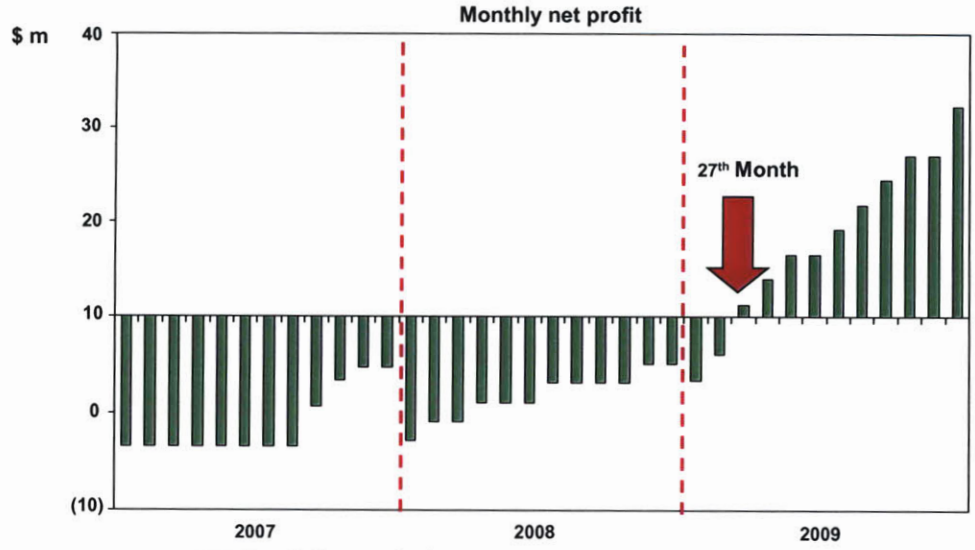


Figure 37. Break Even schedule

- ... And accordingly net income becomes positive in 2009.

INCOME STATEMENT

Concept	2007	2008	2009	2010	2011
Total Revenues	4,000	20,000	40,000	70,000	100,000
Direct costs	3,614	17,167	32,526	53,758	72,280
Gross Margin	386	2,834	7,474	16,242	27,720
Fixed costs	2,290	4,241	6,060	8,116	9,951
Total pretax margin	-1,904	-1,408	1,415	8,126	17,769
Taxes	-571	-422	424	2,438	5,331
Net income	-1,333	-985	990	5,688	12,438

Figure 38. Projection of Net Income

Investment required

We estimate that DRD requires approximately $2.5M$ investment, to cover first two years of fixed costs and cash requirements, and to start up with a solid cash position.

Exit strategy

DRD could be sold to for-profit companies with a relation to the housing market that wishes to expand their current business:

- Building Material Providers, such as cement manufacturer Cemex/Patrimonio Hoy, or polypropylene producers such as Basell or Innovene
- Multinational Construction companies willing to expand to bottom of the pyramid market: Turner, Ferrovial Group
- Financial Services and Mortgages providers, specially Microfinance Institutions willing to have a differentiated product.

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