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We are Hasiru Mane, a consulting firm committed to integrating upcycled materials into the housing sector. We link a market of underserved low-income households in Bangalore to unconventional materials in order to provide low-cost sustainable building solutions.

PROBLEM

There is a great need to revitalize homes within underserved communities, specifically within well-established slums. Over 22% of Karnataka lives in slums, which is 40.50 lakh people (Government of Karnataka, 2016). These intergenerational homes are substandard due to material degradation and their inability to withstand harsh weather conditions. Many lack proper ventilation, running water, and enough space for families to sleep and children to study, negatively impacting their daily lives. Despite the reality of unfit living conditions, many families do not wish to relocate as they own their homes and these slums are where they have created their livelihoods. Furthermore, even if underserved communities wished to relocate, there is limited land due to rapid urbanization; Bangalore’s population density grew by 47% from 2001 to 2011 and is continuing to grow at an exponential rate (Census, 2011).

Currently, families are constrained to two renovation options. They can either hire a formal design firm and contractor or find informal laborers to perform the renovations. A formal contractor is often too costly and informal construction requires a home to be built in phases as economic resources become available, typically leaving a family with an unfinished home for years to come. There are also no standards by which informal contractors must abide, so the structure and safety of a home may be compromised with this option. Moreover, both options are completed using conventional materials such as concrete blocks, a resource that perpetuates raw material extraction and waste generation.

There is also a great need to address Bangalore’s growing waste problem that is largely fueled by rapid urbanization. From upscale home renovations to high-rise apartment construction to neighborhood development and metro extension, the city has been generating 3,540 tonnes of construction demolition waste per day, that’s roughly equivalent to 5,030 passenger cars (Vunnam et. al, 2016). This is in addition to the municipal waste produced at a household to business level. While demolition waste markets are attempting to address this problem, they are underutilized, so the city has nonetheless reached its holding capacity for waste.

THE SOLUTION

Our solution is Hasiru Mane, a consulting firm committed to upcycled and unconventional low-cost housing upgrades for low-income communities. Upcycled materials are defined as products that were once discarded but now have value while unconventional materials are products beyond traditional cement blocks, concrete and corrugated cement roofing. Examples of these unconventional materials are Tetra Pak roofing, Modroofs or indigenous mud and clay slabs.
Our customers are nonprofit organizations working in education, public health or other social sectors that are already invested in underserved communities. These organizations have been so successful achieving their current mission that they wish to address other challenges that these communities face. This includes creating better living conditions through housing development, however they face the barrier of limited resources and knowledge on how to develop a housing sector, and a lack of time.

Our beneficiaries are essentially the organization’s beneficiaries: underserved, low-income families living in aged and degrading homes. We target our beneficiaries through the organizations because the organizations are influencers who have already established trusting relationships with the beneficiaries. They can also connect these communities to low interest home loans by backing their ability to repay.

Our solution is filling a gap; while there are existing firms that provide sustainable solutions in design and material use, they do not prioritize low-cost and thus only reach the more affluent. On the contrary, low-cost options do not promote upcycled material use and contribute to raw material extraction and waste generation.

Our for-profit solution instructs organizations on how to create and establish their own housing sector using a three-pronged approach.

I. We provide hands-on design and construction management training to the organization, detailing the process from start to finish. The training emphasizes how to design and build using upcycled materials and teaches the importance of using such materials.
   Along with our training, we design and construct the homes of two beneficiaries selected by the organization. This gives the organization a chance to observe our design methods and processes in action, as well as real examples to reference in the future.

II. We offer to teach the organization how to generate revenue from their new housing sector. We offer this service for two reasons. First, given their lack of experience within the housing sector, organizations are unfamiliar how to generate revenue from housing development. Second, we understand that nonprofit organizations must generate revenue to sustain their work.
   The premise of customer’s revenue model is: our design and building process saves the household a significant amount of money compared to conventional approaches. A small percentage of the household’s savings will be paid to the organization.

III. We offer an annual subscription to our website that outlines our design processes and features an ever-growing network of formal and informal material vendors, material manufacturers, contractors, architects and engineers.

BUSINESS MODEL

We have created three revenue streams to sustain Hasiru Mane.
I. We will charge a flat fee to organizations for our training program. This will be our primary source of revenue.

II. Upon completion of the training program, the organization will have the option of a yearly subscription to our website which will provide access to the design process – from getting to know the customer to creating the 3D renovation model - and to our network of contacts, resources and material vendors. We will continually update this website as we identify new contacts, establish new partnerships, and serve more customers.

III. We will charge a fee to entities (e.g. architects and material suppliers) that would like to list their name, company and/or product on our website and benefit from exposure to our ever-growing network.

IMPACT

Hasiru Mane provides a human-centered solution for grand challenges. Our goal is to provide low-cost building solutions so that low-income communities can renovate their homes to be safe and healthy, at an affordable price. By designing homes that can withstand heavy rains, provide proper ventilation, give access to 24/7 drinking water, have a personal toilet, and space for study, we are improving lives.

When a home can withstand harsh rains, families are not displaced during the monsoon season and their belongings are not ruined. When homes are properly ventilated there is greater air circulation and reduced risk of air contaminant related illness (National Center, 2018). When homes are equipped with 24/7 drinking water, the need to spend valuable time collecting water is eliminated. Additionally, the families are likely to drink more water, reducing the risk of dehydration and related illnesses (WHO, Drinking-water). A personal toilet means the families are less likely to suffer from sanitation and hygiene related illnesses (WHO, Sanitation). Lastly, when there is space for children to study, they can perform better on their exams, which increases their chances of succeeding in school and going on to higher education (Tilak, J. B. G., 2007). These improvements to homes increase health, well-being and opportunity.

Furthermore, building with upcycled materials saves beneficiaries money. According to Das, a man known for his Kachra Mane in Bangalore, he experienced over 50% savings when remodeling with upcycled materials compared a conventional approach. On the other hand, we visited a family who had recently performed a home renovation for 13 lakh. They renovated their home to be four floors (from one) using conventional materials. Nalini, our mentor at Hasiru Dala, stated that we could have completed the same renovations using upcycled materials for “well under 10 lakh”. While the percentage of savings will vary from home to home based on families’ wishes and budget, there is confirmation that our solution is largely more affordable than traditional methods. By saving low-income families money, they can set it aside for savings or use it for alternative needs.

We are also combating India’s waste crisis. By using upcycled materials we transition out of the linear material economy that perpetuates unnecessary raw material extraction. Conventional materials such as cement and wood require the extraction of rock, sand and
trees, which are valuable resources. While upcycled materials were once a raw material, we interrupt the current model:

Resource Extraction → Building Material → Home → Demolition Waste → Landfill

Instead, we do the following:

Viable Demolition Waste → Informal Material Vendor → Buy Upcycled Material → Home

PILOT

Our first pilot was with Hasiru Dala, in Bangalore, India, whose mission is to improve the livelihoods of waste pickers through institutionalizing decentralized waste management. Hasiru Dala’s goal for this pilot was to upgrade waste pickers’ homes using upcycled and unconventional materials in an innovative and cost-efficient manner. They provided us with two beneficiaries as case studies. We conducted a needs assessment, researched local material retailers and suppliers, prototyped designs to implement in the construction phase, identified a plethora of resources and created a comprehensive website of our methodologies.

This pilot is where we were first introduced to the challenges that low-income families experience because of inadequate living conditions. First, both families experience difficulties during the monsoon season. For one home, their roof leaks, forcing them to move their belonging to a different space and collect the water in a bucket. For the other, the home floods to knee height, their belongings are damaged, and they are unable to live in their home. They are forced to live with family and neighbors during this time and often go weeks without sleeping.

Both homes also experience poor ventilation, making their homes unbearably warm in the summer months. For one family the heat becomes so unbearable that they sleep outdoors. It is also common that drinking water will only be available once or twice a week for a few hours at a time, so families must pot and store this water when it is available. One family does not have a toilet and must pay to use the community facility, which costs money each use. There is also poor lighting which means families must rely more on electricity which is a reoccurring cost. Lastly, there is a lack of study space and lack of space in general. The families must pack themselves into the home in order for everyone to sleep. This tight space is also not conducive to studying, which is a priority for the children of both families.

To address these needs, we designed home renovations for both families. The designs were spatial and focused on providing families ventilation and lighting through windows, adding toilets and washrooms, and creating more space. We designed and reiterated multiple times based on the families’ feedback, until we finally created designs that elicited smiles and “we like this”.

Since our final designs were primarily spatial, water access will be addressed by an engineer and contractor closer to the start of construction, and flooding will be addressed
by well selected materials and an engineer. Given time, we did not have the opportunity to share our designs with architects or engineers or assign specific materials to the homes, but we interviewed professionals and researched material markets. We placed a high emphasis on professionals committed to sustainable building and focused on informal material vendors. Our goal was for Hasiru Dala to be able to take our spatial designs and show them to an architect, structural engineer and contractor from our developed network. From there, small changes could be made to the design and upcycled materials could be selected.

Our website highlighted this entire process, from interviewing, to AutoCAD work, to design reiteration. It also included a detailed map of informal material markets across Bangalore, as well as a list of architects, designers, engineers and innovative material suppliers. This website served as our minimum viable product and was reiterated based on feedback. The website and two detailed 3D designs of the beneficiaries’ homes were our final deliverables to Hasiru Dala, which we presented to the organization at the close of our internship. They were so pleased with our work that we were asked to write the job description for the individual that would be hired to continue what we have started.

Turning toward the future, research and feedback in Bangalore reflects an immense opportunity for our service. With the rapid urbanization of India, cities are experiencing an increased need for affordable and sustainable housing. Many non-governmental organizations focus on supporting and enhancing the livelihoods of low-income communities, specifically slum communities. While our pilot project has been through Hasiru Dala, we have identified several other organizations who are tackling low-income housing issues in India.

The SELCO Foundation believes that urban development and the environment cannot be decoupled. SELCO has many branches of work, one being a built environment team working on modular housing for migrant communities. We met at their organization to learn about the various materials they are prototyping. While they are seeking to utilize the materials for their modular homes, we believe we could establish a partnership surrounding these materials. We envision a working relationship, where quality and functionality of upcycled and innovative materials is exchanged. This could lay the ground work for the future; if SELCO were successful in modular housing and interested in pursuing work in permeant housing, they could come to us for resources and training.

Another nonprofit, KKPKP, based in Pune, India, is also exploring affordable and sustainable housing. Similar to Hasiru Dala, KKPKP is a waste picking trade union. They have already completed several housing projects using upcycled materials. Speaking with them validated our research that affordable and sustainable housing is in high demand for low-income communities. We see multiple synergies between Hasiru Mane’s and KKPKP’s approach and believe continued collaborative efforts through sharing lessons learned can help create the greatest impact.

Additionally, we connected with a local man known for his Kachra Mane, or ‘waste home’, built using 90% upcycled materials for less than half the cost of a conventional build.
During our tour of his home he explained his process and shared insight; building a safe and stable home for less. He also connected us to Maya Praxis, his architect, who expressed strong excitement, support and even interest in being part of our network.

We also identified many innovative materials being developed in India. These include Tetra Pak, Modroofs, and manufactured sand. Tetra Pak is corrugated roofing made from recycled Tetra Pak and aluminum. Modroofs is flat panel roofing made from recycled agriculture waste and packing waste. Manufactured sand is made from cement waste that is turned back into sand and used to make cement again. While we aim to stray from the conventional uses of cement, we understand not all builds can be cement free.

To our benefit, companies have been focused on product creation and production, but largely ignored marketing. We see our network as an open opportunity for them to enter the market. ReMaterials, who produces ModRoofs, shared great enthusiasm for their product and expressed interest in joining our network to bring their product to Bangalore, and train local carpenters how to install and maintain it.

FUTURE DIRECTIONS

In order to become an established and functional consulting business we have identified what must come next. First, we would need to maintain our unpaid internship with Hasiru Dala to see our pilot project to completion. Since Hasiru Dala intends to transition our work to a paid employee, we would provide training to that individual. During this time, we would continue to document and update our process and network. The website would be updated again once the pilot homes were completed, to showcase our work and be continually updated as we gain more customers and further develop our material and professional network. Hasiru Dala would be provided a free yearly subscription to our website for allowing us to pilot our business.

Simultaneous to completing our internship and website, we would need to focus our efforts on marketing our business and securing more clientele. This would require us to visit and connect with social sector nonprofits throughout Bangalore. We would target SELCO, who has already expressed an interest and other nonprofits we encountered during our internship.

We would also need to establish more partnerships. This includes a working relationship with a structural engineer and architect whom we would consult for the two case studies provided to each client. While we identified many local professionals, we would need to determine which companies align closest to our mission and personal needs. Additionally, we would also need to secure a quality assurance specialist to ensure that our material partners consistently provide the highest standard materials and service.

Success for us would come in many forms. In the early stages it would be seeing Hasiru Dala hire a housing director and renovate the homes of the next twenty families on their waiting list. Next, it would be securing our first paying client and successfully establishing a housing sector for their organization. Our hope would be to achieve this for at least ten
organizations within Bangalore. Even greater and more distant success would be expanding Hasiru Mane to other cities in India, which would require us to build a new network of professional partners and material suppliers relevant to each city.

Simultaneously, we would measure success by the number of home renovations completed by each former client, with the vision of generating a collective rise in well-being for hundreds and then thousands of low-income families.

REFERENCE


Story in Seven Sentences

Once upon a time, Hasiru Dala advanced the livelihoods of Bangalore waste pickers through training, government ID cards and secure jobs. Hasiru Dala had such success improving working conditions that they began to dream of also securing better living conditions for waste pickers, except they lacked the time and expertise to create a housing sector. Until one day they hired Hasiru Mane, a design and construction consulting firm, that developed their housing sector. And because of this, two slum families had their homes designed and renovated and Hasiru Dala gained knowledge and access to the design process and an extensive network of contractors, architects, and material suppliers. Because of this, Hasiru Dala was able to hire a director to lead their new housing sector. As a result, the living conditions and livelihoods of two families, and then dozens more, were improved. And ever since, Hasiru Dala has promoted upward mobility by raising the living standards of Bangalore waste pickers.
Prototype: https://sites.google.com/hasirudala.in/hasirumane/home
Hasiru Mane

Our Process

- Initial Interview
- Measurements
- 2D Designs
- 3D Designs
- Ask an Expert
- Present for Construction

Hasiru Mane Materials

Mistry Architects

- +91.9908567189 / info@mistry.com
- #444, 12th Cross, 5th Main, 6th Stage
- Indiranagar, Bangalore, 560038

Mistry Architects have won many awards, including India’s Top 10 Architects for multiple years in a row and Best Architect for Innovative Building Design. We were unable to schedule a meeting but Deepak comes highly recommended.

Structural Engineer(s)

Randhirajash D.K.

R.K. Interior Designer & Decorators
Randomized Control Trial (RCT)

Hasiru Mane’s randomized control trial involves a pool of households living in the same or proximate slum communities. Half the households will be assigned to traditional construction methods for renovation while the other half will have open access to our Hasiru Mane website for guidance and resources. Each household renovation with conventional methods (control) will be unknowingly paired with a household who has access to our website (dependent). On our website they will find designs of previous homes, a network of architects, engineers, contractors and material vendors to help them through the process, as well as a map of Bangalore’s second-hand material markets. Within the pairings both homes will make the same or very similar renovations e.g. add another floor, add the same amount of windows, add a toilet/washroom located on the first floor etc. so that results can be easily compared.

The basic unit of analysis will be the total cost each household spends on identical renovations. Metrics of measurement include the cost of the contractor, the cost differences of material used, and in the long run, how well the material performs.