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### Education program at Karigarshala

કારીગર શાળા વર્ષ 2022-23માં. નવા અભ્યાસક્રમ મુજબ ત્રણ સેમેસ્ટર માં અભ્યાસક્રમ કરેલ તે પ્રમાણે 2022-23 ના વર્ષ માં ત્રણ સેમેસ્ટર ચાલુ થઈ ગયા હતા, જેમાં પ્રથમ સેમેસ્ટરમાં 6 વિદ્યાર્થી બીજા સેમેસ્ટરમાં 6 વિદ્યાર્થી અને ત્રીજા સેમેસ્ટર માં 4 વિદ્યાર્થી કુલ 16 વિદ્યાર્થી વર્ષ દરમિયાન હાજર રહ્યા હતા જેમાં નવા અભ્યાસક્રમ મુજબ ગુજરાતી, પદાર્થ વિજ્ઞાન, સ્કેચ , ઈજનેરી ડ્રોઈંગ , લાઈબ્રેરી , હિસાબ માટે નામું, પડતર કિમત કાઢવી, વ્યાપારિક સાહસિકતા અને કાફ્ટ વર્ક વગેરે વિષયોનો સમાવેશ કરેલ.

આ વર્ષ દરમિયાન રાજેશભાઈ વોરા પાસેથી ફોટોગ્રાફ સાવ્યાબેન મહાજન પાસેથી કોલાર્જ કમલેશભાઈ પાસેથી એકાઉન્ટ વગેરે ના વર્ગો નું આયોજન કરેલ હતું

પ્રથમ છ મહિના બેજ કોર્સ

બીજા છ મહિના એડ્વાન્સ કોર્સ

ત્રીજા છ મહિના માસ્ટર્સ કોર્સ

કારીગર શાળા વર્ષ દરમિયાન મંજલ ફાઉન્ડેશન ઓફ લર્નિંગ નું 150 વર્ષ જૂના મકાનમાં શિક્ષણ કાર્ય કોઈપણ ચાર્જ વગર સ્કૂલ શરૂ કરેલ છે તેના રૂફનું કામ કારીગર શાળા ના વિદ્યાર્થીઓ એ કર્યું હતું. જેમાં એક સંસ્થા બીજી સંસ્થા ને મદદરૂપ બનવાના ભાગ રૂપે કરેલ ખુબજ આનંદપૂર્વક એક મહિના માં તે કામ પૂર્ણ કરેલ.

બીજું કામ કચ્છ મહિલા વિકાસ સંઘદ્વન સાથે બન્ની વિસ્તાર ની પ્રાથમિક શાળાઓ માં રીડિંગ ટેબલ બનાવી હતી. જેના ભાગરૂપે 18 ટેબલ બનાવી હતી. જેનો ઉપયોગ અંતરિયાળ શાળાઓમાં વાંચન પ્રત્યે રુચિ થાય તે માટે બનાવેલ.

ખાવડા સોલારિસ કંપની માં બેચ ટોપ નું કામ પણ વિદ્યાર્થીઓ દ્વારા કરવામાં આવેલ આ બધા કામો હાથ પર લેવાનો હેતુ કામ ને સમજવું આયોજન કરવું અને સાઇટ પર તે મુજબ કામ કેમ કરવામાં આવે તે બધુ શીખવવામાટે નાના નાના કામના પ્રોજેક્ટો લીધેલ હતા આ ઉપરાંત શિશુકુંજ ના વૂડ મોડેલ જે 50 બનાવવાના હતા જે વિદ્યાર્થીઓ એ બનવેલ આ વર્ષ દરમિયાન ધોળાવીરા તેમજ ફોશીલ પાર્ક ના શૈક્ષણિક પ્રવાસે ગયા હતા.











## **COMMUNITY EMPOWERMENT DIVISION:**

### **Support to Urban Street Vendors:**

Under this project, street vending is seen as an informal livelihood option supporting a significant poor population. To work with the street vendors of the city, we organized them and assisted them in forming their own federation who can collectively work towards the betterment of the street vending in the city as a whole. We forged collaborations with other social organizations, as well as academic institutes to work for the federation. Along with social mobilization, this set of work also included documentation of the vending business in the city, preparation of spatial designs and project reports, and connecting the local organisation to the national level organisations like National Hawker Federation (NHF), and National Association of Street Vendors of India (NASVI). This also included attempt to implement various schemes and guidelines floated by the government under the Street Vendors' Act, 2014. Once organised, the street vendors' federation was assisted to demand for constitution of the legally mandated Town Vending Committee (TVC) for Bhuj city. Bhuj became the second city in the country to have an elected body in the TVC. Our organisation's representative became one of the members of the TVC.

After constitution of the TVC, a pilot vending zone – designed through participatory processes with street vendors being the major stakeholders – was proposed to the municipality, who approved it and asked us to implement it. This pilot vending was designed and constructed by our organization.



### **Heritage Mapping**

The project is based in Bela village in Rapar taluka. The village has notable local heritage value. It is being carried out with the partnership of CEPT University, Ahmedabad, and Nottingham Trent University (NTU), UK. We have entered the third phase of the program. The main objective of the project is to prepare earthquake resilient construction guidelines of heritage/vernacular structure with the help of 3D laser scanning technologies – for the use of relevant government authorities, and to disseminate it to the local community with the aim to improve the local building practices.

The project is currently in the third phase which entails working on a prototype in the village to introduce earthquake resistant features in the traditional building technologies of the village.



### Urban Housing and Collective Housing National Process

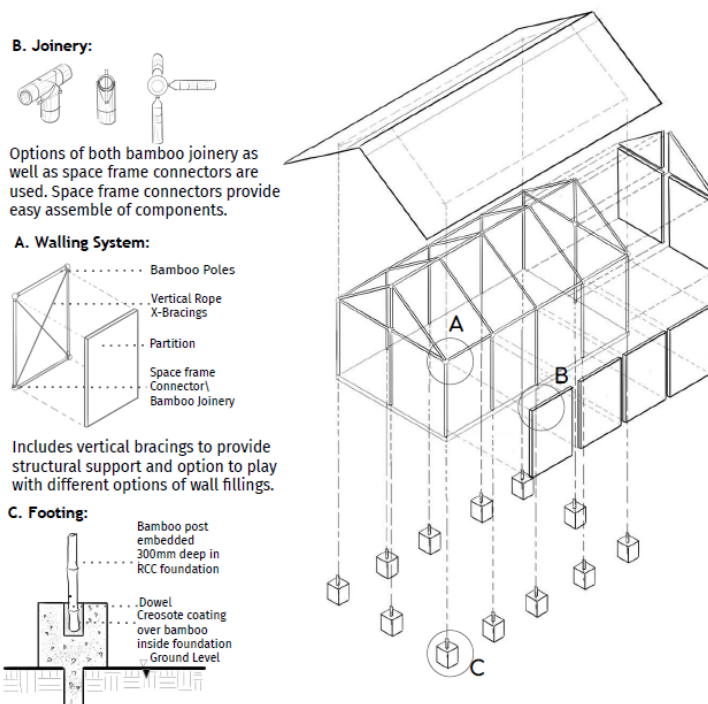
Hunnarshala has been working closely with *Zameen ane Awaas Adhikar Manch* (Platform for Land and Housing Rights), Sakhi Sangini and KMVS to assist communities in informal settlements of Bhuj to access their housing rights. Accordingly, Hunnarshala has technically assisted the Platform in putting forward demand for land rights to the government for more than 4,000 houses. To further support the process, Hunnarshala has also prepared design options for more than 1,000 houses distributed over 5 settlements across the city – designed using participatory design tools. The proposals have been submitted to the authorities for further processing.



### Bamboo Fellowship – HIC

Hunnarshala has been working with migrant workers in Bhuj city for the last many years. Under this project, a low-cost prototype house using bamboo as the main structural material was designed. The objective was to develop design and details which can be easily executed by the migrant workers without much engineering and using readily available tools. Actual implementation of the structure is proposed at one of the migrant settlements in the city. During the implantation the developed details and guidelines are expected to be shared with the target community. Once the construction of this prototype structure is over, it is proposed to be used as a community space. The design, however, is developed to replicate a residential unit.





## Madhya Pradesh Rural Tourism

Government of Madhya Pradesh, through Madhya Pradesh Tourism Board (MPTB), has envisioned a program for responsible rural tourism across the state through mobilising and empowering families staying in several villages with tourism potential, within themselves and/or regions around. The tourism will be promoted through development of homestays in selected villages. Currently 100 such villages have been selected around the state. To select the appropriate families in these villages for whom these homestays will be developed, local organisations have also been appointed to assist with the ground work and to handhold the families with the process. Each village will be expected to have 6-8 curated homestays, providing experience of traditional living and accordingly incorporate traditional architectural styles.

Hunnarshala has been currently appointed for 30 villages out of the above-mentioned 100 villages for design of the required homestays. The agreement was made between Hunnarshala and Madhya Pradesh Tourism Board in August, 2020. The board is also planning to expand the number of villages and have approached us to extend our services to new villages as well. The board is preparing the RFP and will release it shortly to invite the organisations.

Since most of the villages allocated to us are in tribal areas, people are building their homestays based on the seasons of farming. Farming is their primary source of income, and they get engaged in this activity during the entire year. The construction of homestay is only done when they are free from the farming activity. Also, the financial is one of the critical points. People generate the financials slowly and are building their homestays based on available finance. The MPTB has a policy to release the installment in 2 stages. 1<sup>st</sup> on the plinth level and 2<sup>nd</sup> on completion. The homeowner has to complete



their plinth work to get the 1<sup>st</sup> installment. Following table shows the current progress of the construction:

| Zone  | No. of Villages | No. of Homestays | Construction Stages |            |              |                    |           |
|---|-----------------|------------------|---------------------|------------|--------------|--------------------|-----------|
|   |                 |                  | Not Started         | Foundation | Plinth level | Lintel/ Roof level | Finishing |
| Zone - I<br>(Dhar, Jhabua, Agar)                              | 08              | 49               | 34                  | 04         | 02           | 09                 | 00        |
| Zone - II<br>(Raisen, Sehore Hoshangabad, Raigarh)            | 14              | 46               | 17                  | 10         | 05           | 09                 | 05        |
| Zone - III<br>(Chhindwara, Bhopal, Anuppur, Umariya, Dindori) | 09              | 37               | 09                  | 16         | 03           | 05                 | 04        |
| Total   | 31              | 132              | 60                  | 30         | 10           | 23                 | 09        |

**Pictures of the on-going work:**





Hunnarshala is also involved in providing trainings to the local masons and artisans to build their capacity by improving the details in building construction. Hunnarshala is associated with Bharat Rural Livelihoods Foundation (BRLF) and Madhya Pradesh Tourism Board for these training programmes under Madhya Pradesh Rural Tourism Project.

In the month of April – July 2022, we have conducted 3 different trainings for the Cob walls, Stone walls and Brick walls under BRLF. These trainings were conducted on the homestays of selected homeowners. Few glimpses of the activities during the trainings:





Along with these, 3 different training programmes were also conducted for Sabarvani, Chhedka and Ranchha villages of Chhindwara, Hoshangabad and Umari district under MPTB. These trainings were conducted for Brick walls and Adobe walls. Few glimpses of the activities during the trainings:







In all these trainings, about 125 masons, artisans and carpenters got trained for the different technologies and its technical details. It is expected that these trainings will help them provides more livelihood options nearby and surrounding villages.



## **ARTISAN EMPOWERMENT DIVISION:**

The Artisan Entrepreneur Unit of Hunnarshala's initiative aims to promote the use of natural building materials, such as soil, wood and thatch in modern construction practices. By encouraging architects to explore a fusion between modern and traditional building techniques, they are likely creating spaces that embrace sustainability, cultural heritage and craftsmanship.

By focusing on the transfer of technologies and innovations, the artisan entrepreneur unit plays a vital role in keeping traditional building practices alive. Through training artisan guilds, they ensure that knowledge and skills are passed down to the next generation, preserving valuable craftsmanship techniques that might otherwise be lost over time.

This approach not only helps in the conservation of traditional knowledge but also contributes to the promotion of eco-friendly construction practices, which often have a smaller environmental footprint compared to conventional building methods.

Overall, the efforts of the Artisan Entrepreneur Unit of Hunnarshala fosters a positive impact by interweaving the modern architectural needs with traditional building wisdom, thus creating sustainable and culturally rich built spaces.

### **1. Abohar Villa and Resort**

Abohar Villa and Resort is a project based in Abohar, Punjab. Project Architect DCA group Delhi, designed a sample Villa in which the walls are made of Stabilized Rammed Earth (SRE). The team of Artisan Entrepreneur Unit was involved in the following activities:

- a) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- b) Providing technical guidance and support to the artisan team and client.
- c) Helping the project architect, DCA group Delhi, to incorporate Stabilized Rammed Earth walls in the architectural drawings.

The SRE walls were constructed by the artisan guild. The quantity of SRE work was approx... 17000 cubic feet.





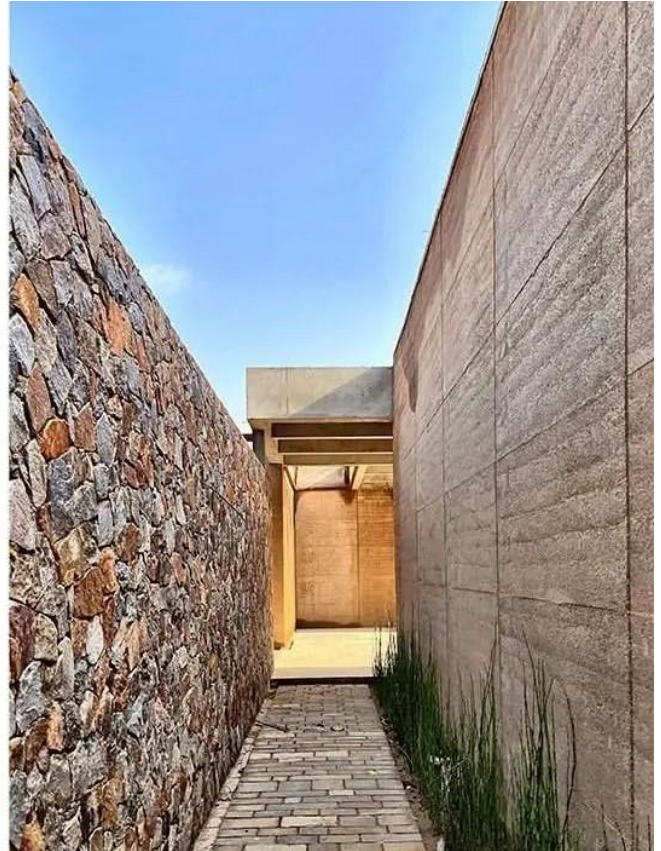
## 2. Elemental House

Elemental House is a residence of Mr. Vikas Gutgutia a business person from Delhi. Project Architect Dada Partners, Delhi, designed a residence in which the walls are made of Stabilized Rammed Earth (SRE). The team of Artisan Entrepreneur Unit was involved in the following activities:

- a) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- b) Providing technical guidance and support to the artisan team and client.
- c) Helping the project architect, to incorporate Stabilized Rammed Earth walls in the architectural drawings.

The artisans implemented the SRE project measuring 9250 cubic feet.





**d) Mango Tree House**

Work on the farmhouse of Mr. Jatin Parekh's, designed by Architect Rhea Shah, which started last year is under progress in this financial year as well.

Stabilized Rammed Earth walls, filler slabs, mud roll ceiling on wooden roof under structure with tiled roof are being constructed by artisans having the required skills.

The work is in progress and various artisan teams are providing their services as and when required.







e) **Residence of Mr. Amit Seokhand**

The lime plaster work at the residence of Mr. Amit Seokhand, photographer by profession residing in Goa, was in progress in this financial year. The IPS and terrazzo flooring work was completed. The artisan team of "Lustre" implemented the project.

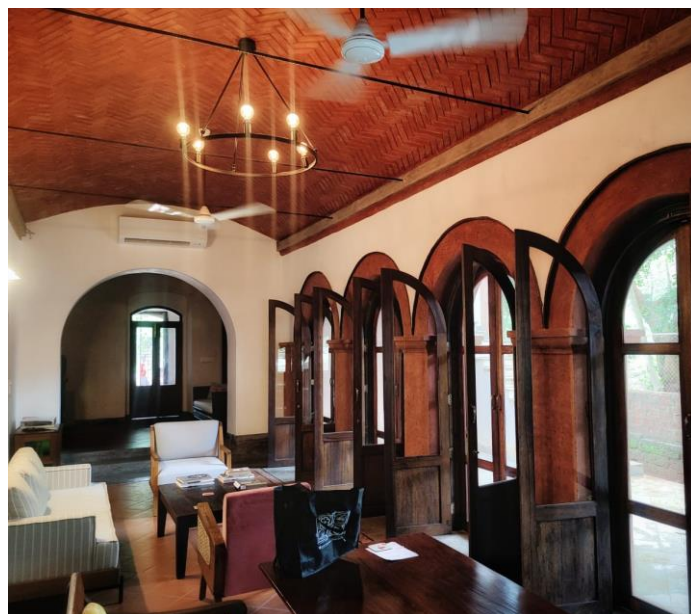




**f) Residence of Ms. Natasha Parekh and Mr. Philippe Shah**

Ms. Natasha Parekh and Mr. Philippe Shah contacted the artisan empowerment unit of Hunnarshala through their architect Mr. Buland Shukla to restore their traditional house, situated in Goa, using fresh lime plaster coats, strengthening the building, adding new structures, renovating the old structure by incorporating arches and domes using tiling work.

They wanted new structures to be constructed near the old house that could be utilized as an out-house and a wash area near the swimming pool. These new facilities were constructed using Stabilized Rammed Earth of approx..1200 cubic feet. Masonry work for the living room also started in the current year and the entire scope of work was completed.



g) **Max Infra, Hyderabad**

Hyderabad based Architecture firm, Kannan Modi and Associates contacted Sankalan-the artisan empowerment unit of Hunnarshala as they were interested in incorporating eco-sensitive materials in their design of a farmhouse of Ms. Sunitha Lingareddy at Hyderabad.

5300 cubic feet of in-situ stabilized rammed earth was constructed by the artisan team based on the design.

The team of Artisan Entrepreneur Unit was involved in the following activities:

- a) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- b) Providing technical guidance and support to the artisan team and client during construction.
- c) Helping the project architect, to incorporate Stabilized Rammed Earth walls in the architectural drawings.





#### **h) Monte Carlo Ltd.**

Monte Carlo Ltd. an Ahmedabad based company, are developing an oxygen park in Ahmedabad. They wanted to use natural material to construct the boundary wall for the park. They contacted the Artisan Entrepreneur Unit of Hunnarshala to construct a SRE boundary wall measuring approx. 9400 cubic feet. The work shall be completed by the artisan guild in two phases. The work is in progress.

The team of Artisan Entrepreneur Unit was involved in the following activities:

- a) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- b) Providing technical guidance and support to the artisan team and client.
- c) Helping the project architect, to incorporate Stabilized Rammed Earth walls in the architectural drawings.



#### **i) Taril Infrastructure Ltd.**

The owner of Taril Infrastructure Ltd. an Ahmedabad based company, was constructing his residence in Ahmedabad. He was interested in constructing a boundary wall from eco-sensitive construction material. Stabilized Rammed Earth (SRE) was selected. A SRE boundary wall of approx. 10300 cubic feet is being constructed. The work is in progress.

The team of Artisan Entrepreneur Unit was involved in the following activities:

- d) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- e) Providing technical guidance and support to the artisan team and client.
- f) Helping the project architect, to incorporate Stabilized Rammed Earth walls in the architectural drawings.



#### **j) Residence of Mr. Sujit Sumitaran**

Mr. Sujit's residence is a unique and environmentally friendly project designed by Architect Buland Shukla. The use of Stabilized Rammed Earth (SRE) for the walls indicates a commitment to utilizing natural materials in the construction process, which can be more sustainable and eco-friendlier.

Additionally, Mr. Sujit's decision to involve the artisans from Lustre in the entire construction work has expanded the scope of the project. The artisans from Lustre are actively working on



various building components, including excavation, foundation and plinth masonry, banks and other allied concrete works.

The specialized artisan guild that focuses on SRE works has been actively involved in constructing the SRE walls, measuring approx.. 5000 cubic feet. The project is progressing well, with the construction of other building components also underway.

The team of Artisan Entrepreneur Unit was involved in the following activities:

- g) Conducting Laboratory Soil Testing for deriving the design mix for SRE.
- h) Providing technical guidance and support to the artisan team and client.
- i) Helping the project architect, to incorporate eco-sensitive construction techniques in the architectural drawings.





### **Artisans Training Programs**

The Artisan Empowerment unit conducts Training Programs to transfer skill sets of traditional construction practices, in the modern context, to the building artisans. The innovations and development that are being carried out in Artisans Empowerment unit are tested and passed on to the artisans in a training mode.

In this financial year, at regular intervals 4 training programs were conducted for CSEB production and Arch Masonry.

The training covered the following aspects of CSEB production.

- Preparing the soil mix for making CSEB.
- Demonstration on using the manual block making machine.
- Making CSEB using the manual block making machine.
- Initial stacking of the freshly moulded CES Blocks.
- Curing the CSE Blocks.
- Final stacking.
- Arch Masonry of the CSEB.

Follow-up training programs are conducted immediately after the main training program so that the gaps during the main training is addressed.









## **Research Program:**

### **Evaporative cooling system (Research Programme with MIT Boston -USA)**

Hunnarshala Foundation is working with farmers in rural communities in Gujarat, India. Hunnarshala Foundation is collaborating with the Massachusetts Institute of Technology (MIT) to implement a project to evaluate the performance of a new fruit and vegetable storage chamber and understand the impact of this low-cost cooling and storage solutions in helping to reduce post-harvest losses for fruits and vegetables at various stages along the relevant value chains. The results from this project will be published externally and shared with other practitioners in the field of technology for development.

The lack of affordable and effective post-harvest vegetable cooling and storage poses a significant challenge for smallholder farmers that can lead to vegetable spoilage, reduced income, and lost time. Most techniques for cooling and storing vegetables rely on electricity, which is either unaffordable or not available for many smallholder farmers, especially those living in remote areas.

Evaporative cooling technologies — the focus of the proposed project — holds great promise to address this challenge. Utilizing the natural cooling effect generated by the evaporation of water, these technologies can provide a cool and humid environment to prevent rot and dehydration. Evaporative cooling devices are best suited for use in regions with 1) a hot and dry climate, 2) some access to water, 3) a need for improved vegetable storage, 4) limited or unaffordable access to electricity, and 5) local access to the materials needed to construct evaporative cooling chambers (ECCs). These conditions are present in many low-income rural communities in Kenya and Gujarat in India, where this project will take place.

The primary goal of the project is to construct mobile evaporative cooling rooms for vegetable preservation that are based on retrofitting a used 20' shipping container and use forced-air evaporative cooling as the mechanism for cooling the produce stored in the chamber. In addition to constructing and testing the chamber with fresh produce, interviews with farmers using the chamber will be conducted to gain an understanding of what value the chamber provides to users and what factors encourage or hinder adoption of the technology.

**Progress:** Container based system is ready and first trial with vegetables has been done and results are encouraging. Vegetables can remain fresh for longer time from 3 to 5 days. System has very low energy consumption. At present, Hunnarshala team is working on the automation of the system with the support of MIT. Next round of vegetable trial will be done in October 2022. Visits to APMC market, wholesalers' vegetable vendor group will be called for exposure of system in October 2022.

Testing – second testing of cooling chamber with vegetables conducted in December 2022 and for one week system has been monitored and found very encouraging results, vegetable kept inside were quite fresh even after fifth day...

At present, the system has been kept at Shri Ram Krishna Trust, who promote organic farming. The system is kept for testing its performance by storing different vegetables produced in the farm. The idea is to create a usage guideline for different farmer groups and help them build such systems and mainstream the innovation and experiment did so far.

The system now kept on simple devices rather than used early for research mode to make its operation easy and user friendly

### **Research on low carbon footprint wall and finishes**

As cement is responsible for 8 to 10% of carbon emission and its self-building industries is responsible for 35-40% of carbon emission and impacting climate. It's important to work on technologies which is environment friendly and having low carbon footprints. Hunnarshala has explored possibilities to develop wall and floor finishes, which are traditional but developed for contemporary application in architecture without using cement. It also provides opportunity to bring back value of work by local artisans. The results encourage us to go in direction to build house with no or minimum cement.

#### **1. Wall finishes:**

- **Traditional Kodi marble** lime plaster is done with base coat of GGBS + lime which gives strong base like cement and traditional lime plaster. Kodi finish has been developed by artisans of Rajasthan. (GGBS is Ground Granulated Blast-furnace Slag come as pozzolanic material, which reacts with lime to give good strength)
- **Mud lime plaster:** A very fine finish mud lime plaster is developed with very little use of lime and specific graded soil. It gives a very natural earthy finish and helps to improve the inner climatic condition as the material used are breathable in nature.
- **Mud plaster:** Fine mud plaster developed by using graded soil with very fine silky and textured finish for interior and exterior plaster with application of natural oils to make it water resistance.

#### **2. Floor finishes**

- **Lime GGBS terrazzo floor:** Terrazzo floors are very ancient techniques to make floors. It requires to add small aggregates from 2mm to 20 mm size of different colored stone like green marble, Jaisalmer and other type of colored stones. Hunnarshala tried it for the first time with GGBS and Lime as binder and able to produce very durable and aesthetically beautiful floor finishes.
- **Lime GGBS oxide floor:** Typically, it is known as oxide floor and in southern states of India it's still widely used and many of the old buildings have good conditions. At Hunnarshala we have used Lime oxide as well Lime GGBS oxide floors with different combination of oxide colors. This is also used in wall of toilets to avoid use of ceramic tiles which is a material that consumes a lot of energy while production.

#### **3. Stabilized Rammed Earth and Compressed earth Block**

- To avoid and reduce cement component for stabilized rammed earth wall and Compressed earth block, experiment was conducted using Lime and GGBS. Encouraging results were obtained when Lime with GGBS was used to produce walling material having strength around 5 mpa. Also, significant work has been done to reduce cement with around 35% of GGBS without compromising the quality of SRE walls.



## **Studying and Prototyping use of Indian Wool for Thermal Insulation in Architectural Solutions**

### **Introduction**

Hunnarshala regularly experiments and tries to push the boundaries of traditional skills and local materials. Hunnarshala with support from CFP, decided to start experimenting with the suitability of using indigenous wool (Desi Oon) as insulating material in architectural solutions.

### **Why Desi Oon (Indigenous Wool)?**

Hunnarshala's decision of working with wool was driven by two major factors:

- Additionally, India's 74 million strong sheep produce close to 40 million kilos of wool each year. While indigenous wool was once procured by government agencies and local traders, the demand is close negligible as we speak today. This has led to despair amongst the herders as well as a shift towards exotic breeds, introducing newer risks into the pastoral systems. Given the large volumes of local wool which are currently being discarded, ending a commercial application of the wool will contribute to not just greener buildings but also a greener ecologies and economies.

### **Our Philosophy**

We have set for ourselves some guiding principles at the beginning of the project which have helped shape the paths we have chosen. Fundamental elements of this have been noted below

- *High percentage of wool*
- *Decentralized processes and production:*
- *Cost solutions:*

A brief of various activities undertaken

#### **1. Study of wool and its properties**

The project started with a feasibility study on Using Sheep Wool as Insulation material in Buildings, in July 2019. Sheep wool, being a new material for us, we conducted literature review of studies carried out over the subject in the past, visits to major areas where cleaning, processing, and manufacturing of raw wool or finished products was undertaken.

#### **2. Testing for degradation.**

The set of experiments was conducted with a 10 % boric acid + borax solution. The wool was soaked for 75 minutes and then air-dried at 40 degrees for 2 days. A sample of the treated wool was sent to

WRA, Thane where they tested this for anti-moth properties by introducing moth larvae *Anthrenus flavipes* (*Le Conte*) to the sample and its activity was observed in controlled setting. The results have been promising with the feeding damage restricted to 7.45 mg in the treated wool as opposed to 50.35 mg in untreated wool. WRA subsequently informed us that the treatment had passed the standard testing criteria.

### **3. Testing for thermal resistance/secondary research - out ideal parameters of the product**

We tested the wool for thermal resistance with help from MIT and WRA. MIT tested the Patanwadi wool in breed form and woven form at the very beginning, and that helped us to form an understanding of insulation properties of Patanwadi wool.

After that the following approaches and tests were conducted:

A 30 cm x 30 cm x 6.5 cm sample was tested at Hunnarshala housed within an insulated box apparatus with temperature loggers. The sample delivered a R value of around 8.

#### **1. Using mattress**

We used a cotton opener for opening/ using the wool. This machine is usually used to open cotton to make mattresses. After opening the wool, it was loosely packed in 43" (wide) x 60" (long) x 3.5" (thick) mattress type insulation panels with an average density of 55-65 kg/cmt.

#### **2. Using air blowers**

Air blown loose- insulation is an alternative to insulation panels, especially for sandwich or double roofs and cavity walls. This method was explored by adapting an air-blower and installing a hopper to it. There was some success with filling a 4 x 2.5 feet double ceiling with loose sheep wool insulation achieving a density of 60 kg/cmt. However, there is still some re-tuning required in the power and axis of the motor as well as the setup for it to become an economically viable alternative.

#### **3. Mixing with synthetic fiber and casting in oven**

We also worked with Bharatbhai of "Thaker felt" and with his help led to a promising breakthrough in product formation. He was quite supportive in guiding us about the process and has given us a sample of a low-density product which was sheep wool heat bonded with low melt fiber. This is the most promising solution to developing woolen insulation panels for now, and we are hoping that the percentage of wool can be increased from the current 65% to 85% with experimentation. Bharatbhai is also willing to transfer the knowhow and help us establish decentralized panel production centers in rural areas, which can be a source of rural livelihoods.

#### **4. Testing Prototypes**

As both the development of preserving wool and of product formation were quite promising, we started work on the prototype. Our plan was to conduct pilot studies at two extreme weather conditions, one in Bhuj for hot desert climate and one in Ladakh in cold, Himalayan climate. As per the plan, we started



construction of one room with help of a local resident of Ramdev Nagar in Bhuj and collaborated with a construction specialist, Mr. Rigzin from Leh for the prototype. Installation of insulation panels at both the places have been completed and temperatures have been logged. These initial tests have been more than just encouraging. We have noted below a brief of the approach, results and learnings from both the places.

### **At Bhuj**

Based on the temperature data of the month of June in peak summer. The CGI sheet temperature, which reaches 45 to 55 centigrade in day time but same time room temperature avg 34/35 centigrade while the temperature measured underneath the insulation mattress remains around 37 degrees. But at night, and because of the heat from the south wall, inside temperatures remain higher than outside temperature and though CGI sheet temperature in roof was around 28 degrees but wool did not allow to escape heat (and hence indoor temperatures hover at around 32 degrees).

In month of December heat trapped in day time keep house warmer by about 5 degrees at night. In the day time house remains 5 degree cold than outside temperatures.

### **At Ladakh**

Our partner Rigzin in Ladakh installed the wool panels in cavity walls. We have noted salient points of the process followed by Rigzin and his team:

In Ladakh temperature logger has started functioning after 15th of December 2022. It was noticed that there was a huge difference in temperature from outdoors and indoors. There is a significant difference of average more than 30 degrees was recorded. Outside temperature was collected from the web for Leh town. We have recently installed outdoor temp loggers on site. It was noticed that the temperature difference of outside and inside of mattress in the cavity wall was around 10 degrees.

### Things to focus on in the next phase

#### **Market research and marketing**

We have conducted preliminary market research of insulation alternatives. A brief of the various commercial solutions available in the market and their rates have been produced below. We will have to carry on further market research and testing so that we can identify a niche in which the wool insulation panels may be placed.

#### **Key learnings and concluding remarks**

On the brighter side of things, working with wool presents us an opportunity to develop production processes on our own, develop local livelihoods, and plan for decentralized methods of production. Since wool is a new material and has very low embodied energy, our project has also got many people interested, a significant percentage of people who have expressed interest in helping us as well as sharing their knowledge freely with us.





## Financial Report 2022-2023

| Hunnarshaala Foundation for Building Technology & Innovations  |          |                  |                    |                  |                    |
|--|----------|------------------|--------------------|------------------|--------------------|
| CIN : U45201GJ2003NPL042739   Licenced under section 8 (1) of the Companies Act, 2013   Section 8 Licence Number : 7/ (25/N) 4/03 / 4359 |          |                  |                    |                  |                    |
| Hunnar Shaala, Plot No. 8 to 15, Mahadev Nagar-1, Bhuj Mandvi Road, Bhuj Gujarat 370001 India  |          |                  |                    |                  |                    |
| BALANCE SHEET AS AT  |          |                  |                    |                  |                    |
| 31st March 2023  |          |                  |                    |                  |                    |
| PARTICULARS  | Note No. | As at 31-03-2023 |                    | As at 31-03-2022 |                    |
|  |          | Rs.              | Rs.                | Rs.              | Rs.                |
| <b>I. EQUITY AND LIABILITIES</b>   |          |                  |                    |                  |                    |
| <b>1. Shareholders' Funds</b>  |          |                  |                    |                  |                    |
| (a) Share Capital  | 2        | 101,000          |                    | 101,000          |                    |
| (b) Reserves and Surplus   | 3        | 124,726,987      |                    | 137,456,745      |                    |
|  |          |                  | <b>124,827,987</b> |                  | <b>137,557,745</b> |
| <b>2. Current Liabilities</b>  |          |                  |                    |                  |                    |
| (a) Trade Payables   | 4        | 592,644          |                    | 193,189          |                    |
| (b) Other Current Liabilities  | 5        | 1,856,865        |                    | 1,325,467        |                    |
| (c) Short Term Provisions  | 6        | -                |                    | 645              |                    |
|  |          |                  | <b>2,449,509</b>   |                  | <b>1,519,301</b>   |
| <b>TOTAL</b>   |          |                  | <b>127,277,496</b> |                  | <b>139,077,046</b> |
| <b>II ASSETS</b>   |          |                  |                    |                  |                    |
| <b>1. Non-current Assets</b>   |          |                  |                    |                  |                    |
| (a) Fixed Assets   |          |                  |                    |                  |                    |
| (i) Tangible Assets  | 7        | 17,875,428       |                    | 18,542,880       |                    |
| (b) Non-current Investments  | 8        | -                |                    | 70,000,000       |                    |
|  |          |                  | <b>17,875,428</b>  |                  | <b>88,542,880</b>  |
| <b>2. Current Assets</b>   |          |                  |                    |                  |                    |
| <b>Current Investment</b>  |          |                  |                    |                  |                    |
| (a) Current Investments  | 9        | 94,634,908       |                    | 38,646,895       |                    |
| (b) Inventories  | 10       | 76,599           |                    | 145,673          |                    |
| (c) Trade Receivables  | 11       | 3,685,376        |                    | 2,479,478        |                    |
| (d) Cash and Cash equivalents  | 12       | 4,244,772        |                    | 3,033,533        |                    |
| (e) Short - term Loans and Advances  | 13       | 4,089,409        |                    | 4,162,738        |                    |
| (f) Other Current Assets   | 14       | 2,671,003        | <b>109,402,067</b> | 2,065,849        | <b>50,534,166</b>  |
| <b>3. Miscellaneous Expenditure to the extent not written off or adjusted</b>  |          |                  |                    |                  |                    |
|  |          |                  |                    |                  |                    |
|  |          |                  |                    |                  |                    |
| <b>TOTAL</b>   |          |                  | <b>127,277,496</b> |                  | <b>139,077,046</b> |
| <b>Significant Accounting Policies and Notes to Accounts</b>   | 1        |                  |                    |                  |                    |

Hunnarshaala Foundation for Building Technology & Innovations

CIN : U45201GJ2003NPL042739 | Licenced under section 8 (1) of the Companies Act, 2013 | Section 8 Licence Number : 7/ (25/N) 4/03 / 4359

Hunnar Shaala, Plot No. 8 to 15, Mahadev Nagar-1, Bhuj Mandvi Road, Bhuj Gujarat 370001 India

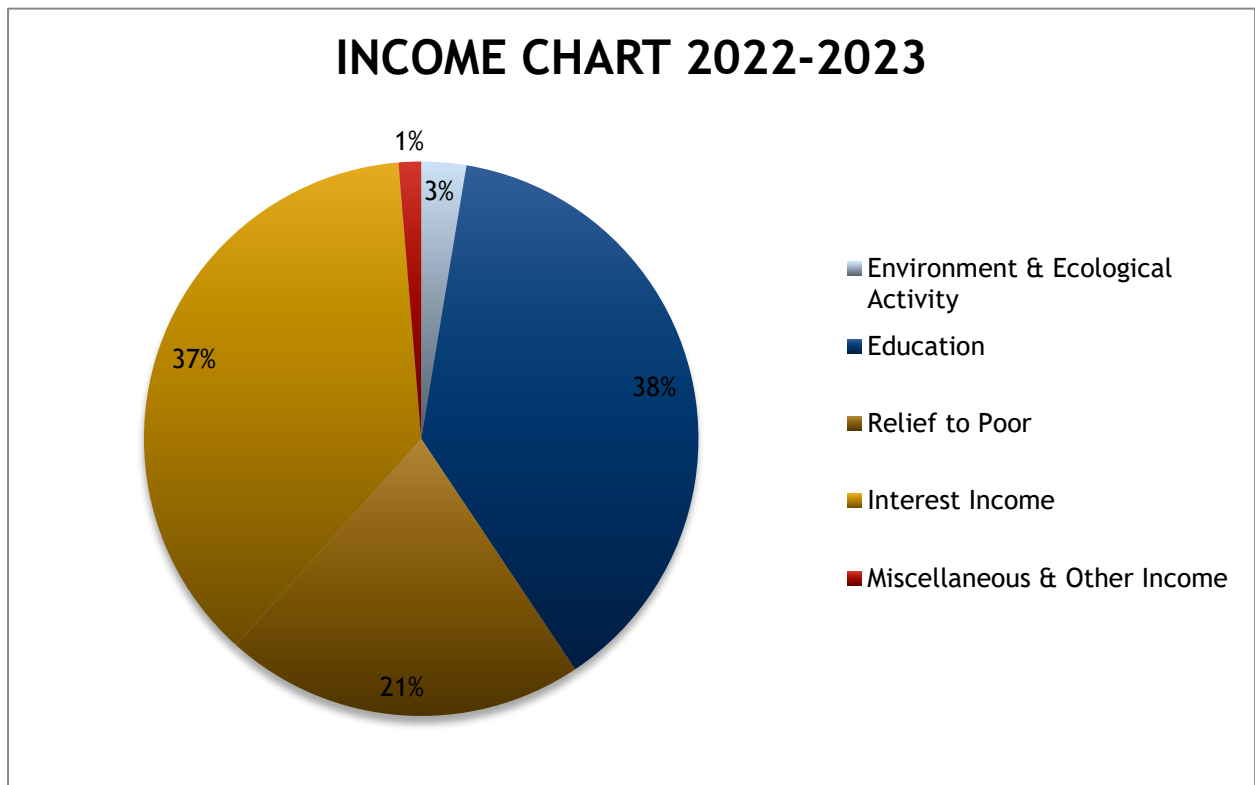
INCOME & EXPENDITURE STATEMENT FOR THE YEAR ENDED 31st March, 2023

|      | PARTICULARS   | Note No. | For the year ended 31st March, 2023 |              | For the year ended 31st March, 2022 |             |
|------|---|----------|-------------------------------------|--------------|-------------------------------------|-------------|
|      |   |          | Rs.                                 | Rs.          | Rs.                                 | Rs.         |
| I    | Revenue from operations   | 15       | 11,407,741                          |              | 14,440,935                          |             |
| II   | Other Income  | 16       | 7,101,782                           | 18,509,523   | 8,221,719                           | 22,662,654  |
| III  | <b>Total Revenue (I + II)</b>   |          |                                     |              |                                     |             |
| IV   | Expenses  |          |                                     |              |                                     |             |
|      | Cost of Materials Consumed  | 17       | 651,388                             |              | 365,766                             |             |
|      | Administrative Employee Benefit Expenses                                      | 18       | 2,131,254                           |              | 2,156,263                           |             |
|      | Expenditure on the Objects of the Organisation                                | 19       | 25,347,776                          |              | 20,283,349                          |             |
|      | Depreciation Expenses   | 7        | 1,537,021                           |              | 1,509,159                           |             |
|      | Other Expenses  | 20       | 1,571,842                           |              | 1,487,513                           |             |
|      | <b>Total Expenses</b>   |          |                                     | 31,239,281   |                                     | 25,802,050  |
| V    | Surplus/(Deficit) before exceptional and extraordinary items and tax (III-IV) |          |                                     | (12,729,758) |                                     | (3,139,396) |
| VI   | Exceptional Items   |          |                                     | -            |                                     | -           |
| VII  | Surplus/(Deficit) before extraordinary items and tax (V-VI)                   |          |                                     | (12,729,758) |                                     | (3,139,396) |
| VIII | Extraordinary items   |          |                                     |              |                                     |             |
| IX   | Surplus/(Deficit) before tax (VII+VIII)                                       |          |                                     | (12,729,758) |                                     | (3,139,396) |
| X    | <b>Tax expense:</b>   |          |                                     | -            |                                     | -           |
| XI   | Surplus/(Deficit) for the period from continuing operations (IX - X )         |          |                                     | (12,729,758) |                                     | (3,139,396) |
| XII  | Surplus/(Deficit) for the period from discontinuing operations                |          |                                     | -            |                                     | -           |
| XIII | Tax expense of discontinuing operations                                       |          |                                     | -            |                                     | -           |
| XIV  | Surplus/(Deficit) from discontinuing operations (after tax) (XII-XIII)        |          |                                     | -            |                                     | -           |
| XV   | Prior Period Expenses   |          |                                     |              |                                     | -           |
| XVI  | Surplus/(Deficit) for the period (XI + XV)                                    |          |                                     | (12,729,758) |                                     | (3,139,396) |
| XVII | <b>Earnings per equity share:</b>   |          |                                     |              |                                     |             |
|      | (1) Basic   |          |                                     | -            |                                     | -           |
|      | (2) Diluted   |          |                                     | -            |                                     | -           |
|      | Significant Accounting Policies and Notes to Accounts                         | 1        |                                     |              |                                     |             |



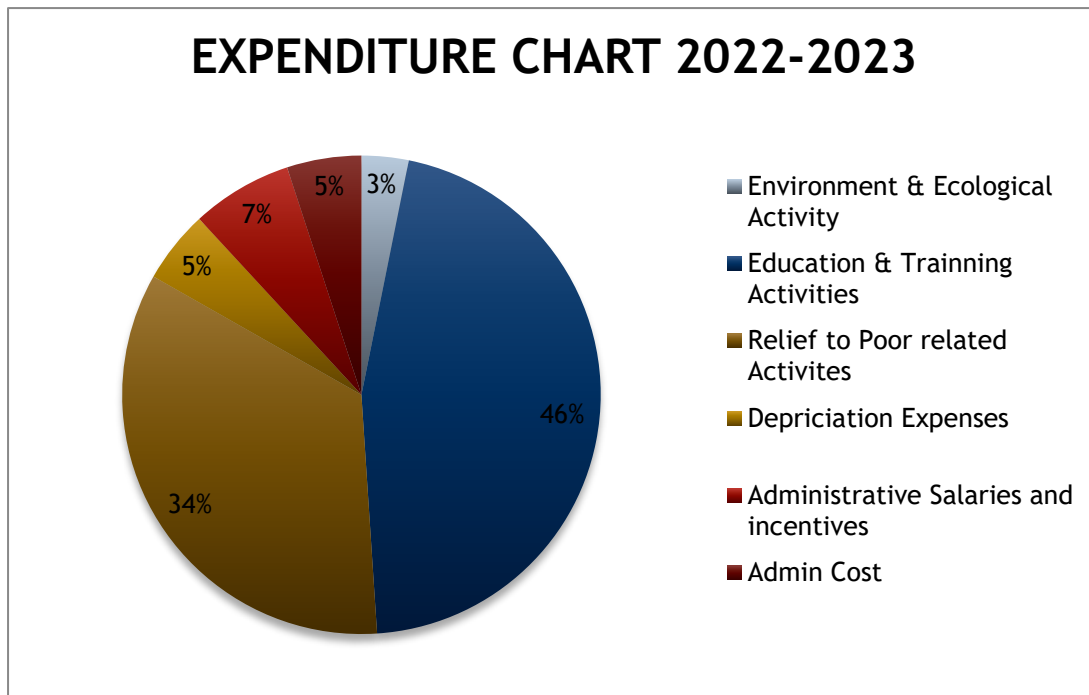
**INCOME CHART 2022-2023**

| Particulars                       | Amount            |
|-----------------------------------|-------------------|
| Environment & Ecological Activity | 484,840           |
| Education                         | 7,035,514         |
| Relief to Poor                    | 3,887,387         |
| Interest Income                   | 6,859,960         |
| Miscellaneous & Other Income      | 241,822           |
| <b>Total</b>                      | <b>18,509,523</b> |



**EXPENDITURE CHART 2022-2023**

| Particulars                            | Amount            |
|--|-------------------|
| Environment & Ecological Activity      | 991,839           |
| Education & Training Activities        | 14,301,860        |
| Relief to Poor related Activity        | 10,705,465        |
| Depreciation Expenses                  | 1,537,021         |
| Administrative Salaries and incentives | 2,131,254         |
| Admin Cost                             | 1,571,842         |
| <b>Total</b>                           | <b>31,239,281</b> |





## **Hunnarshala Family:**

### **BOARD OF DIRECTORS**

Neelkanth Chhaya, Chairman  
Sandeep Virmani, Non-Executive Vice Chairman  
Kiran Vaghela, Director  
Tushar Dayal, Director

### **Staff Members:**

#### **Community Empowerment unit:**

Mahavir Acharya : Programme Co Ordinator  
Rupesh Hurmade, Programme Co Ordinator  
Aditya Kumar, Programme co ordinator  
Karamshi Rangani, Project in charge  
Dinesh Charan ,Project In charge  
Gaurav , Project Architect  
Jignesh Bhatt,Project Incharge  
Hiren Gohil,Project-Assistant  
Rajesh Gor, Project Admin Assistant  
Arvind Anthu,Project Assistant  
Tanvi Chodhari,Architect  
Shreya Khothawale ,Architect

#### **Artisans Empowerment Unit :**

Tejas Kotak : Programme Co Ordinator  
Jignesh Gor, Project in charge  
Hemant Dudhiya, Project in charge  
Milap Gor,Project Assistant  
Bharat Chauhan, Project Assistant  
Poonam Chavda,Project Assistant  
Pradip Rangani , Project-Assistant  
Raj Chauhan ,Accountant  
Mukesh Tank,Project in charge  
Prajesh Jethwa,Business Manager  
Pankaj Bhagat, Project Ass.  
Ajay Ganatra, Architect  
Shreya Kohawale, Architect

### **Karigarshala:**

Atul Vyas, Coordinator  
Ravi Devariya, Instructor  
Sunil Dhadhar, Instructor

**Administration:**

Nilam Sompura , Adm Manager  
Chetna Vau, Finance controller  
Jamnaben Rathod, care taker  
Meghji Buchiya, watchman  
Sita Buchiya , care taker  
Urvashi Anjaria , Adm Ass.  
Alimamad Sama ,Driver

**Interns:**

Ayush Saraf  
Mithali Garg  
Tanishq Gusain  
Ankita Sudhakar  
Misha Pastagia  
Dhiraj Jadhav  
Bhakti Munvar  
Komal Pawaskar  
Misal Varma  
Suvoshri Ghosh  
Mithali Varma  
Twinkle Rajgor  
Ketki Hurmade