

# AVEI NEWSLETTER



Working on the 15 m conical vault at Sharanam

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In the midst of the North-East Monsoon, the Earth Institute has been busy on the Sharanam construction site and involved with lectures and public events in Auroville and beyond.

After the casting of the Poured Earth Concrete (PEC) pier walls of the Sharanam Conference Hall, the team undertook the construction of the roofing system: a conical vault with a maximum span of 15 m. This makes it one of the largest earthen vaults in the world!

Two publications that the Earth Institute participated in, the *Feasibility Report* for Sri Lanka and the english translation of *Architecture de Terre d'Aujourd'hui*, are now available!

We are currently collecting soil samples from around the world to build a rammed earth wall for Auroville's 50th Anniversary in February. Please contribute your local soils!

Please feel free to share this newsletter with your friends and colleagues as we spread the knowledge of earth architecture to the world!

Earthily yours,  
The AVEI Team

**15 Meter Vault Construction at Sharanam**

These last weeks, the Earth Institute team has been working on the construction an impressive structure for the Sri Aurobindo Society at the Sharanam campus in Pondicherry – a conical vault with a 15 meter maximum span. Designed by Lara and Satprem, the conference hall has been executed as a loadbearing structure of Poured Earth Concrete (PEC), with PEC foundations, stepped plinth of CSEB, PEC walls cast with a custom-designed adjustable formwork system to accommodate the

obliquely intersecting walls of the conference hall, and an RCC slab and masonry vault for the roof system.

The exposed vault is a fully loadbearing masonry shell built with CSEB in the ‘freespanning’ technique developed by the Earth Institute. The span of the conical vault ranges from 6.6 to 15 meters, with a 24 cm thickness at the base and a 17.7 cm thickness at the crown. The first arch of the vault had an impressive 15 meter span with a

thickness of only 5 cm! Now, head masons Mani, Venkadesh, Ravi and Sambaseevam are rapidly closing the vault in the middle of the conical span.

Lara led the structural design of the vault, with a complex series of loading cases applied, including: 1) dead load of the vault only; 2) dead load + overloading from waterproofing layers; 3) dead load + overload + live load per code; 4) dead load + overload + ½ live load to simulate severe asymmetrical loading from wind;



*Head masons at work laying the successive courses of CSEB*



*First courses of CSEB at the widest span of the vault*

5) dead load + overload + a point load of 400 kg applied on the quarter point of the vault. Our friend and partner Mahesh Varma of Nandadeep carried out a cross-analysis of stability with the Finite Element Thrustline Analysis (FETLA) method that he has personally developed, as well as the structural analysis of reinforced concrete slab needed to equilibrate the thrust of the vault. Thank you, Mahesh!

When the vault has been completed, it will be one of the largest earthen vaults in the world. ■



*Lara inspecting the vault as it nears completion*

### Main-streaming Sustainable Social Housing

On the 6th November, Satprem traveled to Delhi to take part in a meeting for the “Main-streaming Sustainable Social Housing in India Project”(MaS-SHIP). Initiated through a partnership between Development Alternatives, Oxford Brookes University, The Energy and Resource Institute, and UN Habitat, this project aims to promote the adoption of sustainable building technologies by social housing providers and to create a policy framework conducive to this shift. The meeting brought together professionals from the construction field for a “Stakeholders’ Dialogue” to review the state of the project, data indicators, and benchmarking methods.

Ultimately, this project should result in an online informational tool to help social housing designers and builders select the most appropriate sustainable materials and methods. It should also contribute to empowering policymakers to support the adoption of these technologies.

We hope that this project will engender new interest in sustainable building practices – including building with earth – to address the dire need for adequate social housing in urban India.

<http://lcbgroup.wixsite.com/mas-ship> ■



**Embodied Water in Construction**

In October, Lara gave a presentation entitled “Embodied Water in Building Materials: Embodied Energy & Water Saving Potential in Construction” for the Water Group in Auroville. While this was only a local presentation for a specialized interest group of Auroville, it represents the growing need to address the water embodied in construction in the state of Tamil Nadu. Although this season’s successful monsoon has somewhat alleviated the urgent state of the underground aquifers, Tamil Nadu’s drought continues with some of the lowest aquifer levels recorded in recent history.

The presentation covered information on the state of water scarcity on the subcontinent, the historical context of the ‘virtual water’ concept, its role



*Mixing water into a lime stabilized earth plaster*

in lifecycle analysis, definitions, methodologies and limitations of calculation, and ways forward for water savings in construction in the Auroville context.

The Earth Institute applauds the energy which the AV Water Group has invested in this issue and hopes that this may be just

the beginning of a critical local discussion amongst building professionals of the area.

AVEI hopes to incorporate embodied water analysis into its ongoing inventory of carbon and energy, for a broader lifecycle assessment approach to benchmark earthen construction.

**Auroville Expo in Delhi**

At the end of November, Hilary traveled to Delhi to take part in the “Journey of Auroville” exhibition, assisting with the Sustainability & Green Practices Kiosk as a representative of the Earth Institute. This exhibition, organized in honor of the upcoming 50th anniversary of Auroville, aimed to express the philosophy of Auroville and highlight its many fields

of activity. Held at the Indira Gandhi National Centre for the Arts over the course of four days, an additional presentation and panel discussion on the topic of education was held at the UNESCO Delhi Offices. These events offered a dynamic environment to dialogue about the crucial work being done in Auroville on sustainable development and to introduce the uninitiated to the vast potential of earthen architecture.



**Earthen Architecture Today Published**

The English version of the book *Architecture en Terre d’Aujourd’hui* – translated by Lara and Hilary of the Auroville Earth Institute – was published in October and premiered at the ETH Expo at ETH Zurich, Switzerland.

Written by Dominique Gauzin-Müller with illustrations by Pauline Sémon, this book is a collection of the 40 finalists of the Terra Award, featuring contemporary earthen architecture from all continents in the categories of individual and collective housing, educational and cultural facilities, mixed-use buildings, interior and landscape design, and local development.

The Terra Award, including the book and the traveling exhibition ‘Earthen Architecture Today,’ has aimed to identify and distinguish outstanding projects built in earth (adobe, cob, compressed earth blocks, rammed earth, wattle & daub and light clay). In celebrating “the audacity of project owners, the creativity of designers and the skills of craftsmen and builders”, this initiative has aimed to re-discover low-carbon construction in raw earth and to generate the first worldwide database of contemporary earthen architecture.

The translation of this book and exhibition text was a wonderful and very inspiring exchange and collaboration between Dominique and the Earth Institute team! Both French and English versions,



published by Museo in partnership with amàco and CRAterre, are available online through Museo. A German version has been published by Museo and the vdf Hochschulverlag AG at ETH Zurich.

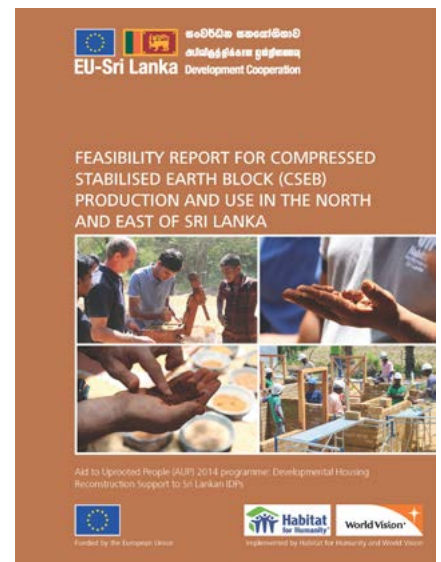
[www.museo-editions.com/product-page/earthen-architecture-today-1/](http://www.museo-editions.com/product-page/earthen-architecture-today-1/)

<http://terra-award.org/travelling-exhibition/>

**Feasibility Report Published for EU**

The Earth Institute’s *Feasibility Report for Compressed Stabilised Earth Block (CSEB) Production and Use in the North and East of Sri Lanka* has now been published in book form by the European Union. The feasibility study, written by Lara and Satprem, was carried out as a first technical feasibility assessment for Habitat for Humanity’s “Homes Not Houses” project in Sri Lanka. The

study critically assessed factors influencing earthen construction in the war-affected zones in the North and Northeast of Sri Lanka, including the physical parameters of climate, geography, soil type and suitability, locally available raw materials; socio-cultural parameters of existing building culture and skills, awareness and cultural acceptance; and socio-economic parameters of cost and contribution to local economy. Certain recommendations have been made for the viability of CSEB and other earth techniques in these regions.



## 2nd Bioclimatic Earth Design Workshop

In October, the second incarnation of the 'Bioclimatic Earth' Design Workshop was held at the Earth Institute. Led by Omar Rabie and co-taught with Lara, this course is an intensive, two-week design workshop which reinvestigates earthen architecture through environmental reasoning. The course aims to provide designers – including professional architects, students of architecture and structural/ environmental engineers – with the knowledge needed to evoke their sensibility to simultaneously design with earth and with climate.

The course begins with a week of lectures covering the principles of bioclimatic design, characteristics of different climatic zones and



*Students listening to lectures on bioclimatic design principles*

basics of earthen construction. Students study examples of vernacular earth architecture acclimated for environmental comfort and practice methods/ use simulation tools of weather analysis, establishing initial

design guidelines for different environmental conditions.

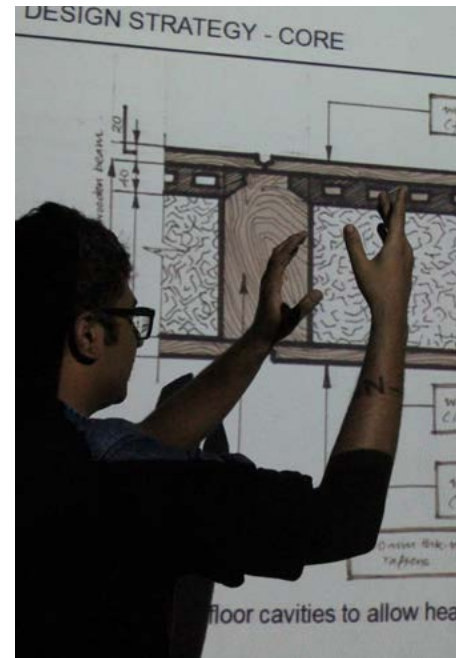
In the second week, students apply the gained theoretical knowledge and practical skills in a design project, designing examples of innovative earth architecture adapted to the environmental conditions of different regions. This synthetic design process reflects the multi-parameter intelligence of vernacular earth building and demonstrates the versatility of earth construction techniques.



*Lara lecturing on earthen construction techniques during a sudden downpour*

As a new course which is still in development, the significant modifications to the course in October included the addition of a hands-on component in earthen construction, the development of the modelling methodologies for bioclimatic design and the further integration of constructive logics in the second week of the design studio. Omar altered the 'problem





*Students presenting their projects during the final design studio*

statement' for the design studio so that each group working in a different climate had a specific challenge in the siting of their building. During the hands-on workshop, students built walls with different types of earthen techniques (cob, adobe, rammed earth and compressed earth block), as Lara lectured to them in the pouring rain. :)

The final design studio was attended by critic Shailaja Bhati, principal architect of 'Planning and Architecture Towards Holistic development' (PATH). Shailaja is a respected local practitioner who has previously taught climatology at a school of architecture in Bangalore. The final design projects developed to a surprising level of sophistication after just one week of the design studio.

[www.earth-auroville.com/bioclimatic\\_earth\\_en.php](http://www.earth-auroville.com/bioclimatic_earth_en.php) ■

### New Team Member

The Earth Institute has welcomed a new team member!

#### *Muthiah*

Muthiah Kasi is an artist and graphic designer who is now exploring principles of permaculture, natural building and spiritual sciences. He is participating in Auroville community living and has taken the role of graphic designer and photographer at the Auroville Earth Institute.

After his graduation in communication design from DJ Academy of Design, Coimbatore, he went on to take on the roles of illustrator, graphic designer and user experience designer at a design firm, advertising firm and wearable technology firm from 2010 to 2015.

During 2015-17, he learned organic farming through practical farm work at Solitude Farm and Evergreen Forest Community in Auroville and went on to practice organic farming as a freelance permaculture designer. To support the community at Sristi Village Foundation in Konamangalam Village in its attempt to secure sufficient food production to feed the roughly 40 resident members including 18 mentally challenged individuals, he designed and created a network of swales, ponds and wells that evenly harvests rainwater and distributes it over 8.5 acres of land, and aided in the plantation of trees and seasonal crops.

His belief in natural materials and earth as a building material for healthy living has brought him back to Auroville Earth Institute after his first visit here as a curious CSEB Masonry workshop student in 2015. ■





50<sup>th</sup> Auroville anniversary

**HELP US  
CONSTRUCT  
UNITY  
THROUGH  
DIVERSITY**



Auroville  
Earth Institute  
UNESCO CHAIR EARTHEN ARCHITECTURE



THOUSANDS OF SOILS. ONE EARTH.  
**BRING US YOURS!**  
 FROM YOUR CORNER OF THE WORLD

On the occasion of Auroville's 50th anniversary in **FEBRUARY 2018** Auroville Earth Institute and Unity Pavilion will celebrate this special event with the construction of a **RAMMED EARTH WALL** composed of **SOILS** coming from all over the **WORLD**. Can you contribute ?

**1) COLLECT 1 LITER OF SOIL**

Dig below the organic topsoil with a tool to take your sample from the mineral-rich subsoil. The more you can provide, the better!

**2) PREPARE YOUR SAMPLE**

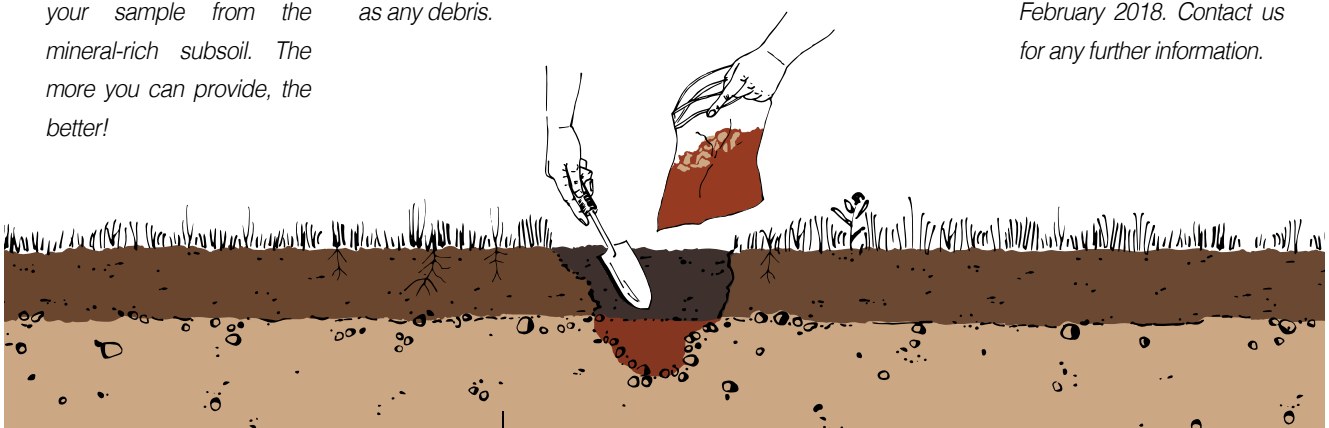
Remove any stones larger than 3 cm in diameter, as well as any debris.

**3) STORE IT IN A ZIPLOC**

Put it in a ziploc bag, labelled with the town/country of origin.

**4) BRING IT OR SEND IT TO US**

Hand-deliver or ship it to us anytime up until 20th February 2018. Contact us for any further information.



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Auroville  
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**AVEI Training Course  
Schedule for 2017-18**

**2017**

**December**

4th to 9th: CSEB Intensive  
11th to 16th: AVD Intensive

**2018**

**January**

22nd to 5/02: Bioclimatic Earth

**March**

12th to 17th: CSEB Design  
19th to 24th: CSEB Production  
26th to 31st: CSEB Masonry

**April**

2nd to 7th: AVD Intensive  
16th to 30th: Bioclimatic Earth

**June**

4th to 9th: Ferrocement  
11th to 16th: AVD Theory  
18th to 23rd: AVD Masonry

**July**

2nd to 7th: CSEB Design  
9th to 14th: CSEB Production  
16th to 21st: CSEB Masonry  
23rd to 6/08: Bioclimatic Earth

**Setember**

3rd to 8th: CSEB Production  
10th to 15th: CSEB Masonry  
17th to 22nd: AVD Theory  
24th to 29th: AVD Masonry

**October - November**

8th to 13th: Ferrocement  
22nd to 5/11: Bioclimatic Earth  
12th to 17th: Wind Generator

**December**

3rd to 8th: CSEB Intensive  
10th to 15th: AVD Intensive

**AVEI Newsletter**

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© Auroville Earth Institute

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