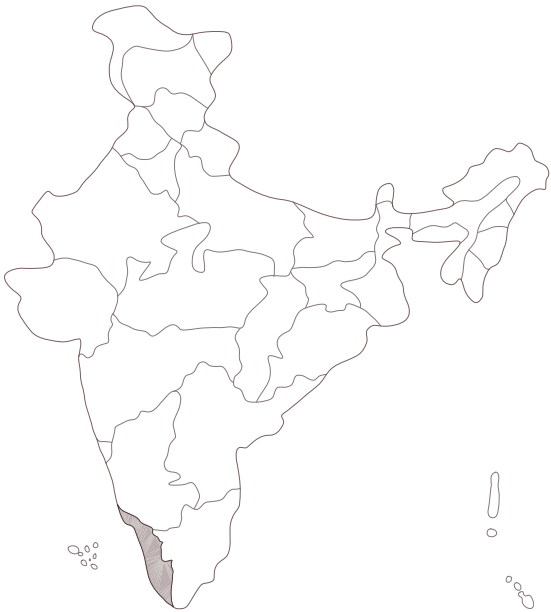
COLUMBIA
GSAPP

TEMPORAL MAPPING OF VALUE

An Analysis of Brick Architecture in Kerala, India from 1970 to Present

MARIAM JACOB

INDEX



PREFACE

LINE OF INQUIRY

The investigation aims to look at the formal and material repositioning that took place within the built realm in the southern state of Kerala, India from 1970 to the present.It hopes to unpack the costs associated with these shifts, and question what value based systems were involved in the decision making process.

Then by comparing two case-studies of flood relief projects built half a century apart, the author aspires to understand the temporal shifts that occured through a 5 value system framework. Overall, the line of inquiry revolves around why there is a need to change the hierarchy of the current value system moving forward.

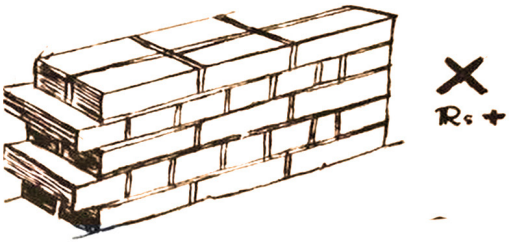
LAURIE BAKER'S IDEOLOGY

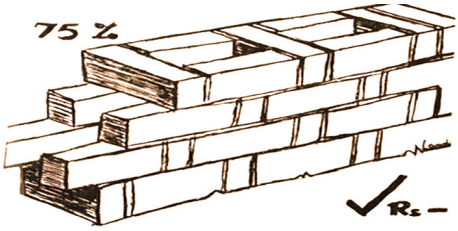
PRACTICE & COSTFORD

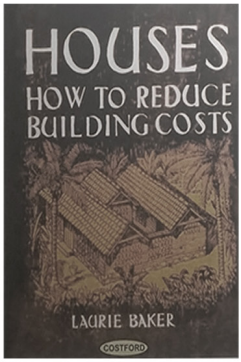
Laurence Wilfred Baker (Laurie Baker), was a renowned British-born Indian architect and humanitarian who primarily worked in Trivandrum, Keralafrom 1969. His architectural principles of cost-effectiveness, respect for nature, avoidance of energy-intensive materials and wastage minimization to create low-cost, beautiful, high quality buildings long pre-empted modern concepts such as eco-friendliness and sustainable architecture.

Baker's body of work is significant both in terms of the volume and sheer diversity as well as in terms of the innovative and practical concepts he introduced within the vernacular realm of Kerala. His manifesto and design philospophy exuded his eagerness to study and utilize local materials, use the expertise of craftsmen and empower local economies, whilst educating and challenging the cultural norms of society.

His pioneering work at Poonthura Fishing Village in 1970 was chosen as one of the case studies as part of the comparative mapping process, which will be discussed later (pg. 12).







BAKER'S MANIFESTO

EMBEDDED VALUES

1 Only accept a REASONABLE BRIEF and one which you think you are capable of carrying through. — Scope + Impact

2 DISCOURAGE EXTRAVAGANCE & SNOBBERY and don't take on a job which is either. — Cultural

3 Always STUDY YOUR SITE re soil, Topography, water climate & neighbours (noisy temples, smelly factories, etc)

4 See POTENTIAL SERVICES – water, drainage, access, power, fuel, phone, etc. If not possible or available, what will you do? — Operational

5 YOU, YOURSELF, GET ACCURATE DETAILS of the site, with in-situ facts such as trees, rocks, a well, wind & rain directions.

6 Every building should be UNIQUE. No two people, or families etc are alike, so why should their homes all be the same?

7 STUDY & KNOW LOCAL MATERIALS – their availability, performance, costs, techniques & workmen who know how to use them. — Knowledge Transference

8 STUDY & KNOW ENERGY used in the manufacture & transport of materials, avoiding using energy intensive materials where possible. — Ecological

9 BUILDING CODES ARE ADVISORY & NOT MANDATORY ! Read the first chapters of our National Building Code!

10 DON'T ROB NATIONAL RESOURCES & do not use them extravagantly or unnecessarily.

11 Be HONEST & TRUTHFUL in design & material usage, construction, costs, & about your own mistakes!

12 AVOID OPULANCE & 'SHOWING-OFF', and don't use currently fashionable gimmicks. — Culture + Perception

13 Get your CONSCIENCE out of deep-freeze & USE it. Let ALL YOU DO be honest & truthful – not only yr buildings. — Objective

14 Look closely at YOUR OWN PREJUDICES. Question them and see if they are still justifiable!

15 HAVE FAITH IN YOUR OWN CONVICTIONS & have courage to stick to them — but respect those of other people.

16 Make COST-EFFICIENCY your WAY OF LIFE – not merely "Low Cost for the Poor". Practice what you preach. — Financial ≠ User

17 Keep your INFORMATION & KNOWLEDGE 'UP-TO-DATE', but make sure the latest 'fashions' are better than established ways before changing. — Knowledge Transference

18 DON'T DO THAT WHICH IS NOT NECESSARY. Explain this to your clients when you think their demands etc are NOT necessary. — Objective

19 Above all USE COMMON SENSE (I think you had better not ask me what 'Common sense' is!) & HAVE FUN in designing.

20 TRIM your drawings, staff, equipment, travel & transport, papers, & expenses. — Financial + Ecological

(MY FEELINGS ABOUT BEING AN ARCHITECT !) Laurie Baker

FORMAL CHANGES

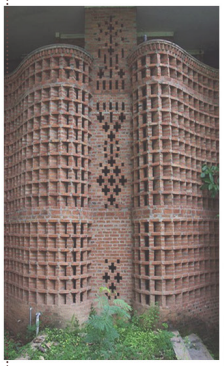
1970 - PRESENT

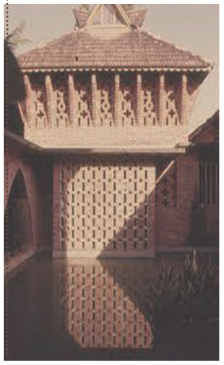
1970 - 1990

SMALLER SYSTEMS BOUNDARY

SMALLER MATERIAL PALETTE

UNRENDERED





INNOVATION IN THE VERNACULAR

LOW TO MIDDLE CLASS HOUSING

TRANSITION FROM LATERITE TO SUN / KILN DRIED BRICK

CHAMPIONED BY LAURIE BAKER

THE SCHISM : A SHIFT IN IDEOLOGY

MIDDLE TO UPPER CLASS HOUSING

LARGER SYSTEMS BOUNDARY

COMPLEX MATERIAL PALETTE

RENDERED FINISH

1990 - PRESENT

LARGE SYSTEMS BOUNDARY

SMALLER MATERIAL PALETTE

UNRENDERED

EXCEPTION : ROMANTICIZING THE VERNACULAR

UPPER CLASS HOUSING & HOSPITALITY SECTOR

2015 - PRESENT

CURRENT WEIGHTAGE

UNPACKING DEFINITIONS AND CURRENT HIERARCHIES

COST

(OED Online)

I. The spending or outlay of **money** ; expenditure; **expense** to attain a particular goal

An amount that must be or has been paid or spent in order to acquire, produce, maintain, or accomplish something.

II. Expenditure of **time, labour**, etc.; (now chiefly) the **effort, loss**, or **inconvenience** involved in doing something.

VALUE

(OED Online)

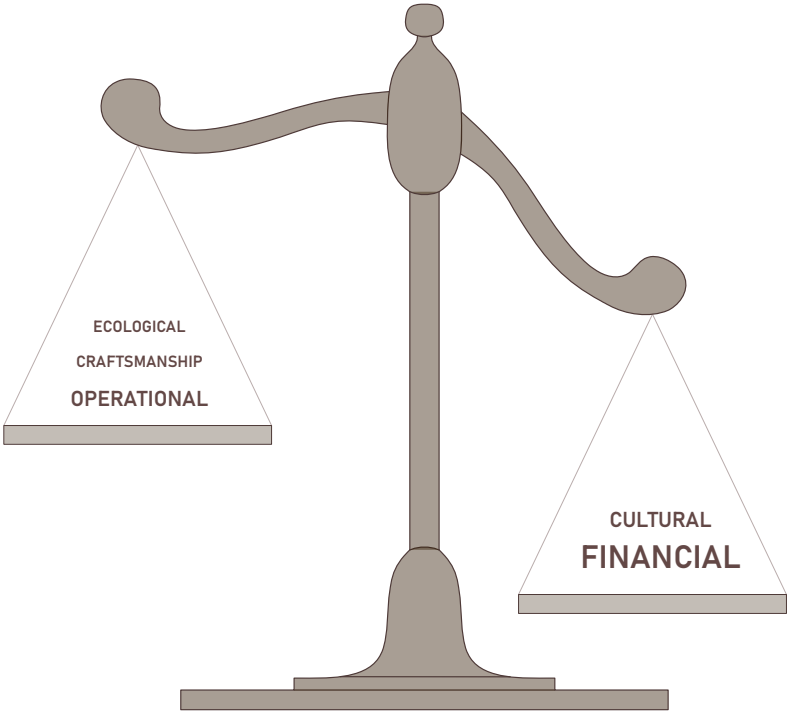
I. Worth or quality as measured by a standard of equivalence.

The **material or monetary worth of something**

The equivalent **monetary worth** of a specified sum or amount : a thing regarded as worth having.

II. **Relative Worth** based on esteem

quality viewed in terms of importance, usefulness, desirability, etc. **in relation to** an individual or group



CURRENT HIERARCHY FOR VALUE BASED SYSTEMS

FRAMEWORK FOR ANALYSIS

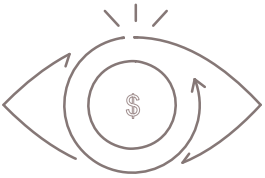
5 VALUE SYSTEM

CRAFTSMANSHIP VALUE

Transference of knowledge from generation to generation through apprenticeship and by including the public through local participation.

CULTURAL VALUE

Perception & Appreciation of the overall built element and the emedded associations with the material palette choice that evolve over time.



ECOLOGICAL VALUE

The environmental impact of the built entity.

For the purpose of this investigation, it is measured using embodied carbon -(carbon emitted pre-building operation).

OPERATIONAL VALUE

The regimes of maintenance and the dependency of occupants on external funding during the building's operation

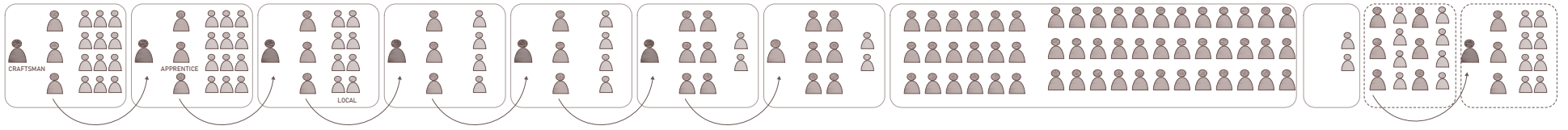
FINANCIAL VALUE

The material, transportational and labor costs associated with the built entity

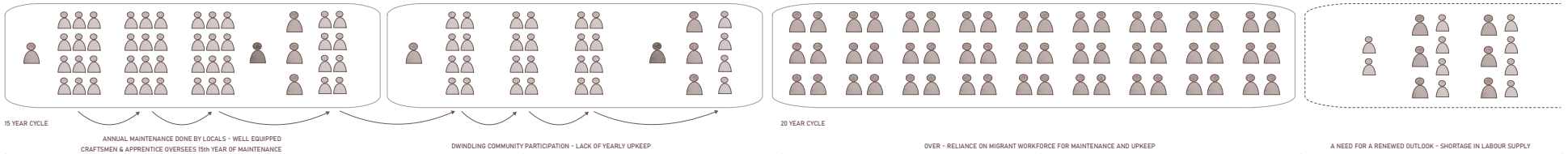
TEMPORAL FLUCTUATION OF VALUES

FACTORS INFLUENCING HIERARCHY

Generational Transference of Knowledge



Regimes of Maintenance



Brick Architecture - 'loincloth' architecture

for the **Poor** unfinished cheap

lack of proper maintenance results in deteriorating perception of the material -brick

cyclical

Decline in Unstabilized Brick construction

Association with **materials and class**

Altering ideals : Tradition vs Modernity

permanence?

finished

Steel - concrete construction preferred

nostalgia

Affluent Romanticizing the Vernacular - Brick

Eco -Toursim / Leisure

SMALLER SYSTEMS BOUNDARY

local extraction of resources

Brick Industry Boom results in kiln dried Brick Factory taking over rice fields

depletion of local resources

LARGER SYSTEMS BOUNDARY

reliance on **imported** resources for building

More stringent environmental and land use policies are introduced

material costs rising

EXTERNALISING

Importance of Craft - labour costs were justified

resources obtained primarily from site , minimal transportation

rising material costs

rising transportation costs

cheap labor due to surplus in migrant workers

supply chain issues

higher material costs

higher labor costs

higher transportation costs

1970 1980 1990 2000 2010 2020 2030

EXTERNAL FACTORS

Communist Party Rise → **Changes in policy** - low cost housing

Laurie Baker's arrival → **Advocacy for brick** , local transference of knowledge

Gulf Boom & Migration

COSTFORD established

Gulf Migrant Income & Remittances - changing ideals

Increase in Construction

Brick Industry Boom → **Restrictions & loss of Subsidies for Brick Industry** → **Migration of Local Craftsmen from Kerala to other states**

Financial Crisis

Gulf dream - class mobility

material & labor shortages in brick industry

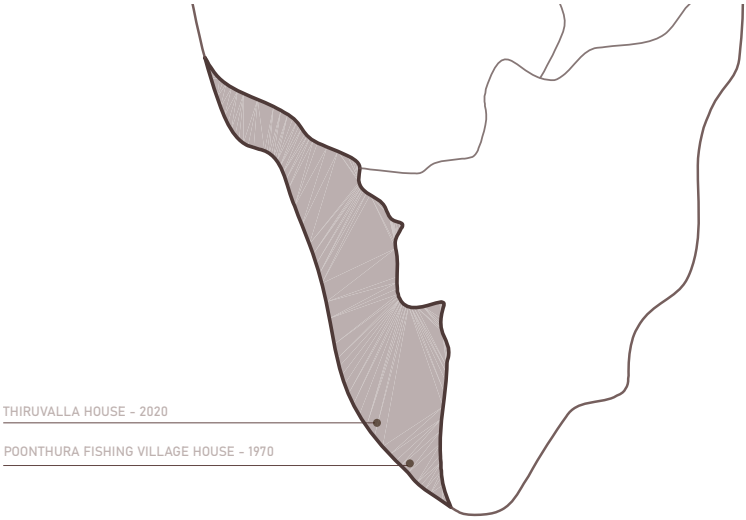
Natural calamities

COVID-19 Pandemic

affluent romanticizing the brick construction for nostalgia

Green-washing

Eco-Tourism



COMPARATIVE MAPPING

LINE OF INQUIRY

The aforementioned mapping of fluctuations in hierarchy over time in Kerala between 1970 to the predicted trends in 2030, reveal the factors that influenced these value systems from a macro lens.

I hope to unpack this further through the comparative mapping of the House in Poonthura built in 1970 by Laurie Baker and the House in Thiruvala built in 2020 as part of a Government flood relief project. Both clients (end-users) had lost their homes due to natural calamities, and the construction methods utilized were primarily decided from a financial value based system.

Using the five system framework, I aim to discern how value systems cannot be viewed purely from a financial lens or as isolated criterias, but as interconnected entities that have quantifiable impacts upon the society we live in.

POONTHURA HOUSE - LAURIE BAKER

POONTHURA FISHING VILLAGE - 1970

LOWER COURSE

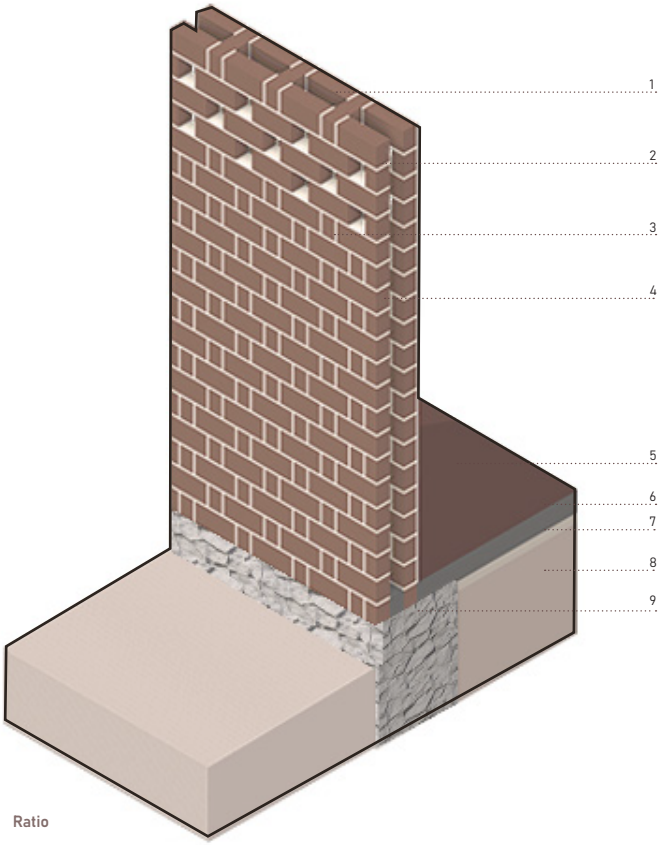
UPPER COURSE

Mortar Ratio 1 (cement): 10 (sand)

No insulation

No exterior render

Exposed rubble foundation



Sun dried brick Construction system

Total Volume (m3): 1.412

Materials	Volume (m3)	Ratio
1 : 9" x 4" x 3 " sun dried brick	0.39	27.6 %
2: 0.25" Interior lime plaster	0.02	1.4 %
3: Jaali work (fenestration)	-	
4: 0.375" mortar	0.05	3.5%
5: 1/16" inch red oxide flooring	0.002	0.1%
6: 4" concrete screed	0.13	9.2%
7: 2" fine sand fill	0.04	2.8%
8: compressed earth (from site)	0.45	31.9%
9: rubble foundation	0.33	23.5%

THIRUVALLA HOUSE

KERALA GOVERNMENT FLOOD RELIEF PROJECT - 2020

LOWER COURSE

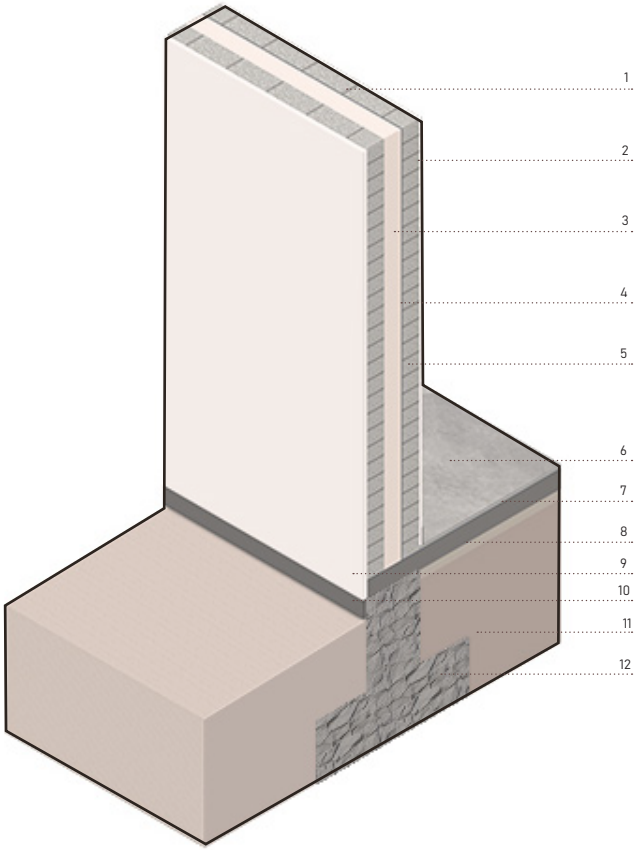
UPPER COURSE

Mortar Ratio 1 (cement): 4 (sand)

Uses rigid insulation

Exterior render

Siding covers rubble foundation



CMU Construction system

Total Volume (m3): 2.451

Materials	Volume (m3)	Ratio
1 : 9" x 4" x 3 " CMU	0.46	18.8%
2: 0.5" gypsum plaster	0.03	1.2 %
3: 4" rigid insulation	0.27	11.0%
4: 0.2" vapor barrier	0.2	8.2%
5: 0.375" mortar	0.08	3.3%
6: 1" cement screed	0.02	0.8%
7: 4" concrete grade beam	0.14	5.7%
8: 2" fine sand fill	0.05	2.0%
9: 1" cement plaster	0.07	2.9%
10: 0.5" ceramic skirting tile	0.001	0.04%
11: compressed earth	0.63	25.7%
12: rubble foundation	0.50	20.4%

COMPARATIVE MAPPING

POONTHURA HOUSE VS THIRUVALA HOUSE

Total Embodied Carbon

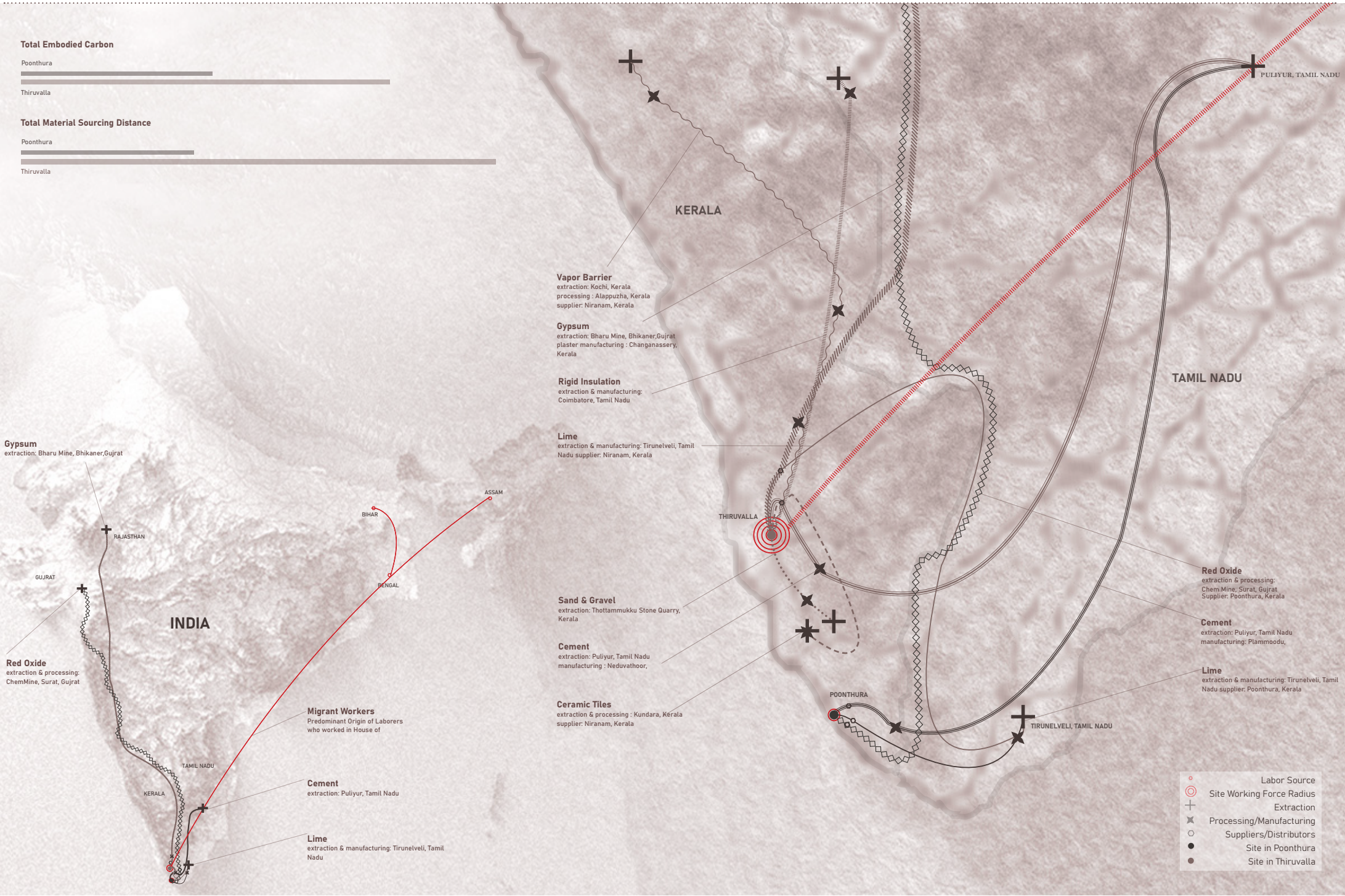
Poonthura

Thiruvalla

Total Material Sourcing Distance

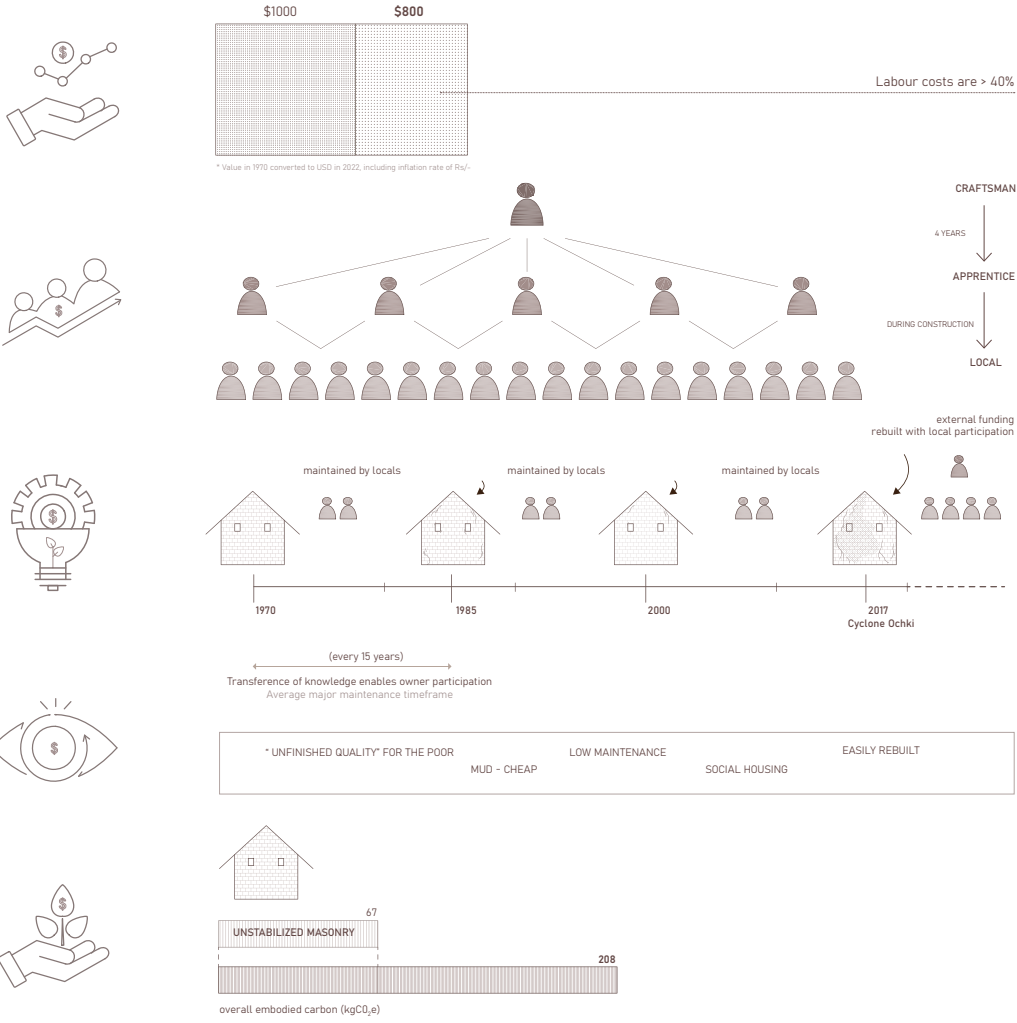
Poonthura

Thiruvalla



POONTHURA HOUSE - 1970

POONTHURA FISHING VILLAGE



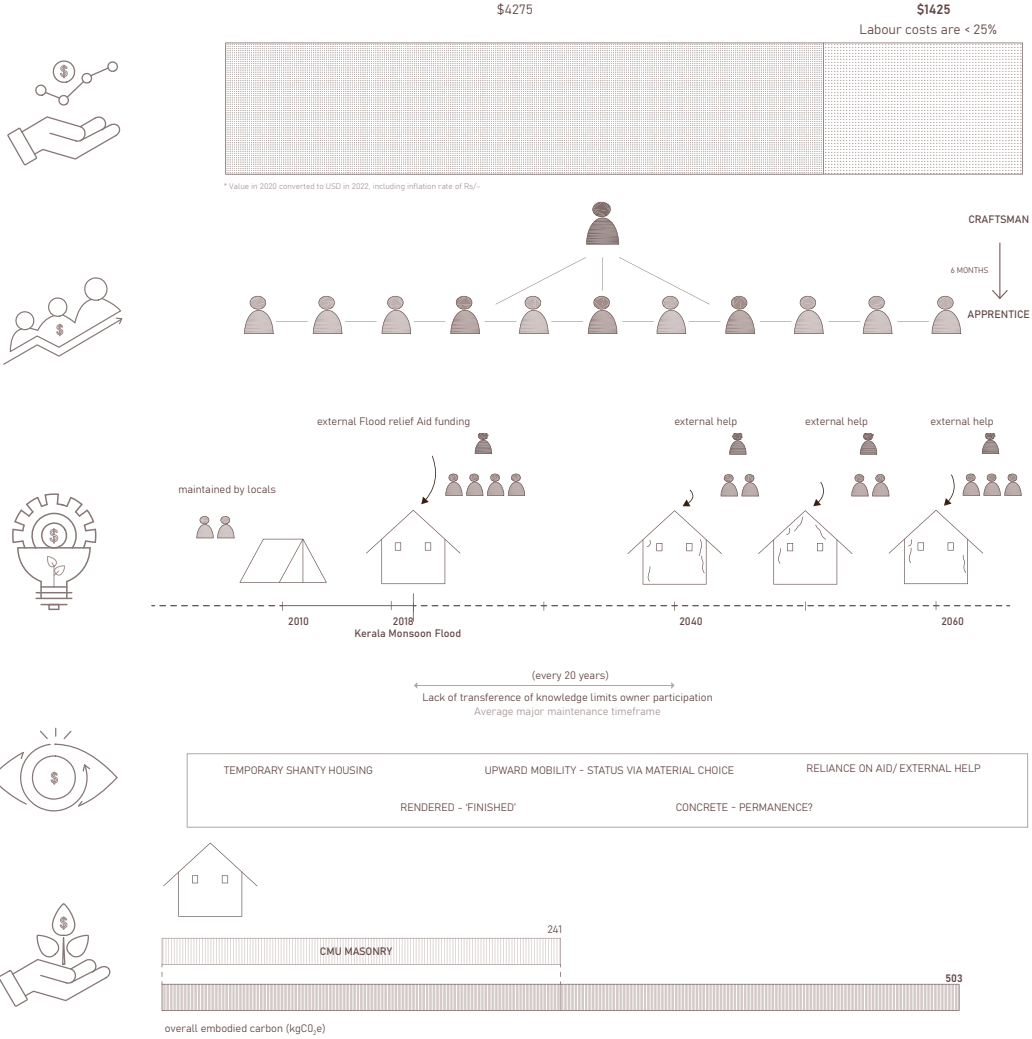
POONTHURA FISHING VILLAGE UNIT -1970

Material	% Embodied Carbon	% Material Mass	Distance from source to site (km)	Type of Labour* (on site)
Unstabilized soil	32.2	40.2	on site	Skilled crafstmen training unskilled
Cement for mortar*'	3.3	5	447	Semi-skilled
Cement for Rubble Foundation*'	40.3	39.9	same source as above (447)	Semi-skilled
Cement for Concrete Screed*'	18.1	13.1	same source as above (447)	Semi-skilled
Lime Plaster	3.2	1	167	Skilled crafstmen
Red Oxide	2.9	1	1983	Skilled crafstmen

* all laborers were locally sourced from 5 km radius and additional voluntary communal participation was involved
*' sand & gravel were obtained from site

THIRUVALA HOUSE - 2020

KERALA GOVERNMENT FLOOD RELIEF PROJECT



THIRUVALA UNIT -2020

Material	% Embodied Carbon	% Material Mass	Distance Travelled to site (km)	Type of Labour (on site)
Cement, Sand & aggegate for CMU	48.2	40.2	900	Semi-skilled
Cement, lime & sand for mortar	3.3	5	738	Semi-skilled
Cement, Sand & gravel for Foundation	25.0	39.9	450	Semi-skilled
Cement, Sand & gravel for Concrete Screed	16.1	13.1	same source as above (450)	Semi-skilled
Gypsum Plaster	3.2	1	2600	Skilled
Ceramic Tiles	0.8	1	51	Skilled
Rigid Insulation	0.6	2.8	274	Semi-skilled
Polypropylene & Doric Acid forVapor Barrier	2.8	2.8	200	Semi-skilled

* all laborers were migrant workers from NE India, sourced from 20 km radius of the site

RENEWED OUTLOOK

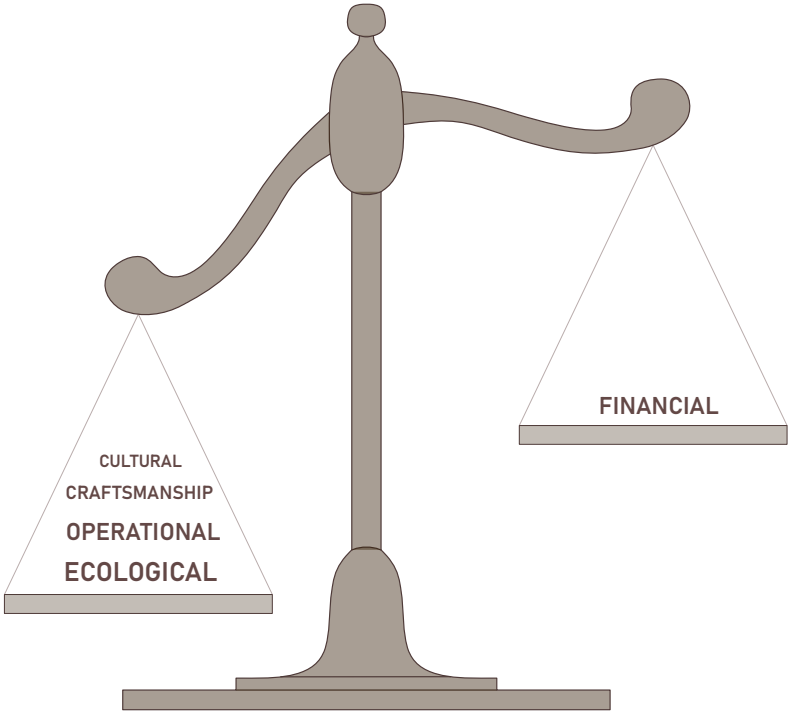
WHY DOES IT MATTER?

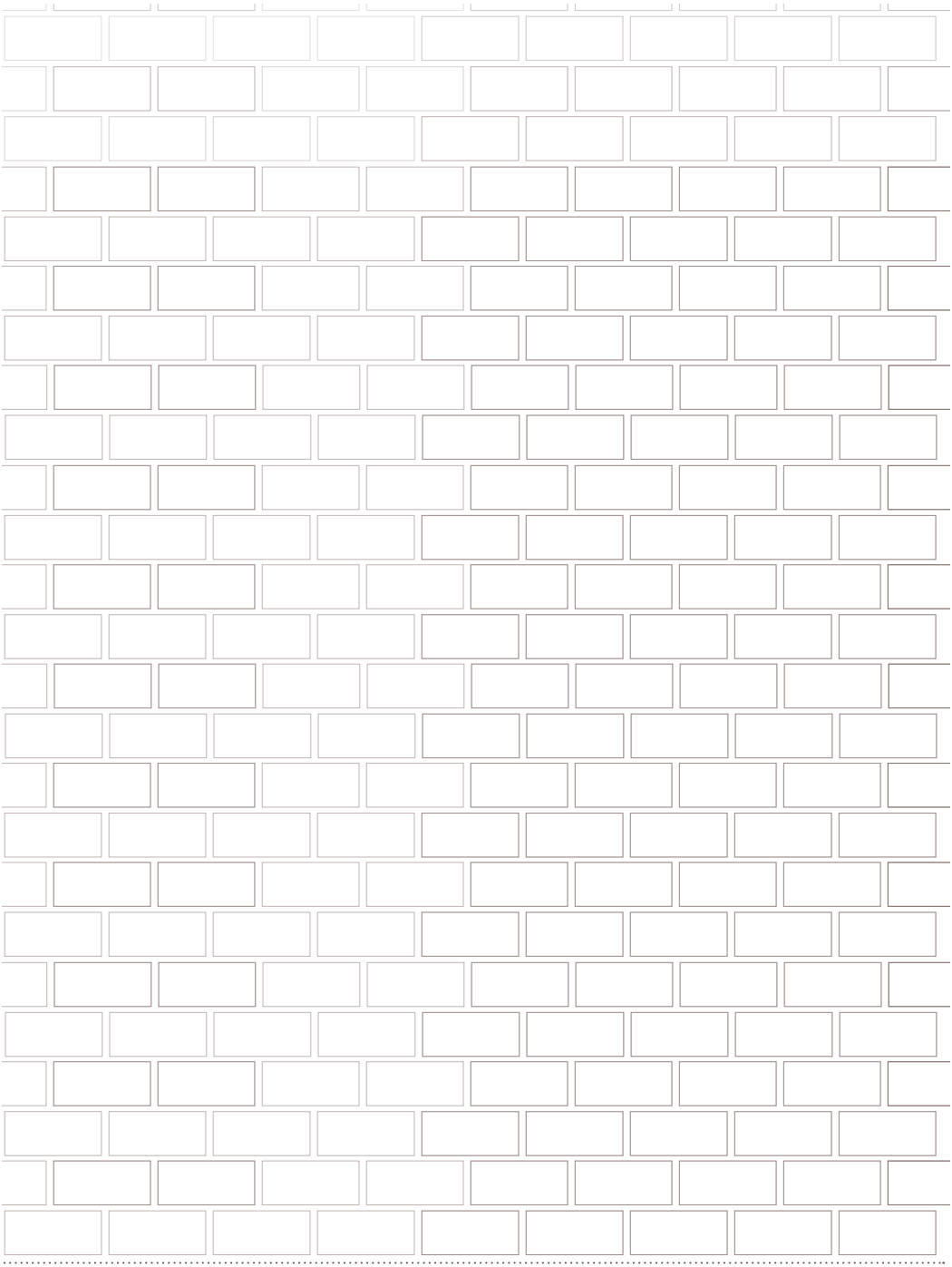
Why should there be a need to change the hierarchy of the current value system moving forward?

The comparative mapping between the Poonthura House built in 1970, and the Thriuvalla House built in 2020, helped reveal a series of costs that extended beyond the financial realm. I was able to identify how the socio-economic and political factors within Kerala over the decades, affected policies and subsidies that preferred one material over the other, and eventually fueled the debate over the altering ideals of tradition and modernity percieved in the built realm.

The analysis helped me acknowledge the importance of local craftsmanship and the impact this generational transference of knowledge between craftsmen, apprentice and the local public has on the operational regimes of maintenance, sense of ownership and subsequently the associative value for the material (brick) being used. The lack of appreciation for the craft ,the influx of a cheaper migrant labour force from NE India and the lack of subsidies for the brick industry after stringent land laws resulted in the highly skilled local craftsmen to leave the state to look for opportunities elsewhere. This resulted in a further decline in brick construction due to lack of skilled labour, that once again pushed the scale in favour of alternative 'modern' forms of relatively 'cheaper' construction. Therefore, from a temporal stand point when these value systems (craftsmanship, cultural and operational) are evaluated one can easily deduce the subsequent financial implications of the prior decisions that seemed trivial. Morever, the impact is even more pronounced when viewed in tandem with the ecological costs associated with these shifts, i.e. over-reliance on imported materials that have higher embodied carbon, depletion of natural resources, higher CO_2 emissions due to transportation and manufacturing off-site.

The financial value based decison process is essential but a renewed outlook is necessary moving forward. It is imperative that Institutions that are capable of implementing policies and designers that are accountable for future built projects, re-evaluate the weightage placed on value systems for a changing planet.





ARCH A4874
Construction Ecologies in the Anthropocene
Spring 2022