Laurie Baker's

RURAL HOUSE PLANS

RURAL HOUSES

Rural housing is more complex than urban housing as it usually has to cope not only with human beings but with livestock as well.

There is also usually a need for covered space for all sorts of occupations, weaving, basket making, rope making, nets and fishing, food drying and processing etc.

The open space surrounding the house is as important as the house itself and is very much used for cooking, storing, animal, poultry etc.

Present conditions are not happy for providing all this needs - so these plans aim at minimum basic planning with room to expand as and when possible.

LAURIE BAKER

Rural Housing

1. It should be made very clear that the Principles of good housing for whatever strata of society in whatever geographic or climatic regions, and concerning planning, design, materials and construction techniques are in no way different whether for rural or urban housing.

a) We must plan for the people who will occupy the house their needs, their pattern of living, their religious ideals, their occupations etc.

b) We must as far as possible use locally available inexpensive materials.

c) These materials must be as energy-free or as energy conserving as possible.

d) The striving for structural stability together with an acceptable and pleasing look must be maintained.

e) The structure will be able to cope with all aspects of climate, whether of intense heat or cold, or of heavy rain or driving wind etc.

f) Planning must be not only of a house, but of its services and its land and it must take into full consideration possible occupations including the keeping of livestock

2. It is frequently assumed by planners of all sorts that the rural housing is inferior to, less costly than with fewer needs, requirements than urban housing. This is not so. Usually the needs and the planning arid the implementation of rural housing is more complex and calls for more planning structural administrative skills than urban housing.

3. We should also keep in mind, as planners, the very long traditions and patterns of rural living. In particular the use and planning of the space surrounding a house that is the compound, however small, is of more important and value to the occupants than the few rooms of the house. Many occupations providing preparation of food, utensils and tools, farming, live-stock and so on are done outside, not inside the house.

4. There is no one type of plan, no one set of materials, no one type of construction techniques, no one set of rules that will be applicable to all parts of India, but the above principles do apply everywhere.

As far as Cost reduction is concerned

1. Plan three-dimensionally - that is plan the space in and around a house and not just a 2-D plan

2. Only plan and build what is necessary. Cut out all frills, fancy finishes, gimmicks.

Ask of every component part of a house "Is it necessary"?

If the answer is no - Then DON'T DO IT

If the answer is yes, then query whether we are using the simplest, most efficient way of doing it.

3. As far as possible use plentifully available local inexpensive materials (e.g.: lime instead of cement, improved stabilised mud instead of burned bricks etc. and import as little as possible (import means from other parts of India as well as from outside India)

4. Cut out unnecessary labour: for example - what has an engineer got to do with a simple mud structure? Or once you have a set of plans which can be adopted to different regions and for different materials what do you want an architect for? Pay a lump sum for your plans and details, but do not employ a permanent establishment of unnecessary expensive skills.

5. Especially in rural areas aim at localised or in-situ services to avoid extensive piping, wiring etc.

Incorporate passive energy systems in building and make use as much as possible of alternative energy and waste disposal (or, better, waste conservation) systems.

6. There is rarely any good reason for repeating endlessly one standard type house plan.

There are individuals and families

Families are small and large.

There are families of adults only (grand-parents, unmarried sisters, widows etc.) There are those who go out for work and those who have home occupations. Some occupations call for a small area only while other need space.

7. One simple way of dealing with this is the CORE HOUSE-a simple basic plan including living area (sleeping, sitting, and eating) and service areas (a basic kitchen and a basic latrine and washing place. Then, according to felt and expressed needs and requirements further living, sleeping, work areas etc can be added.

8. No architect is worthy of his professional title if he is willing only to design one prototype plan. Variety and alternatives are necessary and several plans can be adopted, altered, adjusted on the site itself.

Sites

l. Stop these straight lines and long rows of identical boxes.

2. Follow contours. Build along, not across them

3. Do not excavate and level unnecessarily

4. Leave in place natural features such as trees, large rocks ponds or tanks, streams or rivers.

5. Winding paths and roads have been trodden in over years or even centuries. Don't straighten them unless you have a good reason

6. Make use of aspect (N.S.E.W). That is making use of wind direction. Protect from driving rain direction. Align and pitch roofs to deflect and not absorb the sun's heat

7. First attend to drainage and then plan services-whether individual, group or community.

Architectural style

1. Each area has evolved empirically over centuries, ways of building to use local materials so that they remain structurally stable and withstand local climatic hazards. They also have coped with traditional, local, religious and social patterns of living.

2. Obviously you can and should continue the Research & Development -

e.g.: improve thatch to be fire retardant and more durable, or stabilise mud to add strength and prevent termites etc. But don't just substitute with a modern material because it is the in- thing. Consider the energy used in its manufacture, also transport, and its acceptability, (e.g.: you can sleep on mud or tile but not on a cement floor)

3. A common urge of contemporary architects, planners and do-gooders is to put in large glass windows. Remember that in rural areas you often work in the sun and enter a house to be away from heat and glare. You also want to be able to shut out insects, mosquitoes, bats etc.

Also remember that a square metre of window costs about ten times as much as the square metre of plain wall it replaces.

4. Also security is important. A whole rural family may be out in the fields for long parts of the day. The fewer your possessions, the more valuable and essential they are to you!

5. Very often a Jali wall is a better substitute for a glass window. It lets in general subdued light. It also deals with ventilation but prevents driving rain from entering. You can look from the inside to the outside but from the outside you cannot see inside. It is secure and thieves or animals cannot enter.

6. Jalis can be made from brick, tile, laterite, stone, cane or bamboo and so on. Their patterns are endless and pleasing. Unlike windows, simple Jalis cost less than the wall they replace.

Foundations / Basements

1. Don't dig deeper than is necessary. Consistency of soil is more important than solidity.

2. Only dig as wide as your foundation / basement wall is going to be (usually 45cm)

3. Use the dug out soil as infilling. So throw it into the building area, not outside it.

4. If there are intact local traditional houses over 50 years old, there is no need to do any other sort of foundation / basement - unless you can simplify it and lessen its cost without involving energy and transport.

5. Special difficult soils may well benefit from more scientific methods. For example, reclaimed soils and black cotton soils are notoriously bad and difficult and dangerous.

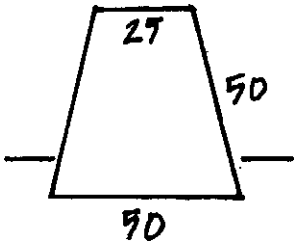
a) The traditional deep excavations and infilling with sand or gravel etc can be replaced with a surface beam.

No excavation is required except the removal of the top few centimetres of top soil.

b) The Beams can be reinforced with bamboo instead of steel. In section, the beam can taper upwards, e.g.: a wide flat base, say 50cm,50 or 60cm height, tapering to a top surface only 20 or 25 cm wide,

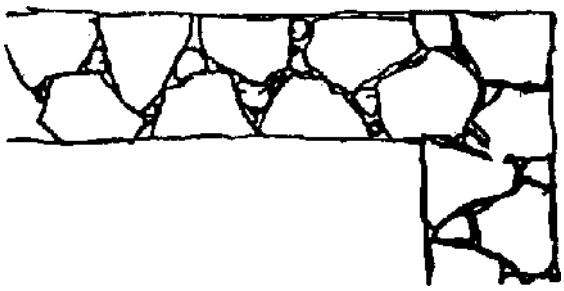
c) The plan is made to fit on to a series of parallel beams.

d) These beams are very much like the pontoons of a military bridge. They rise and fall as the black cotton soil solidifies in the dry weather and expands like a sponge in the wet weather.



e) The aggregate of the concrete can be quite large (60 mm metal)

6. Where stone is available, this is usually the best foundation and basement material, but it should be bonded properly. If so bonded, it can either be a 'dry wall' (if locally used) or it can be built in a mud mortar. If and where necessary, a lime or cement pointing can be used above ground on the outside.



7. An extra thick wall is not necessarily a stronger wall. Bonding is more important than thickness of the wall

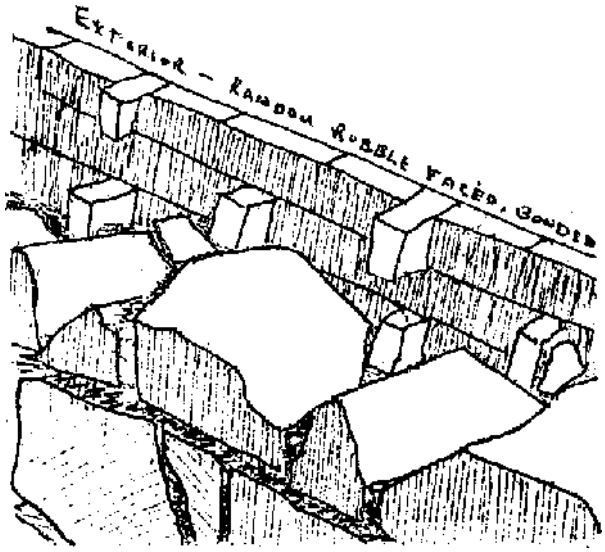
8. Stones should be laid flat-not upright

Superstructure walls

Stone

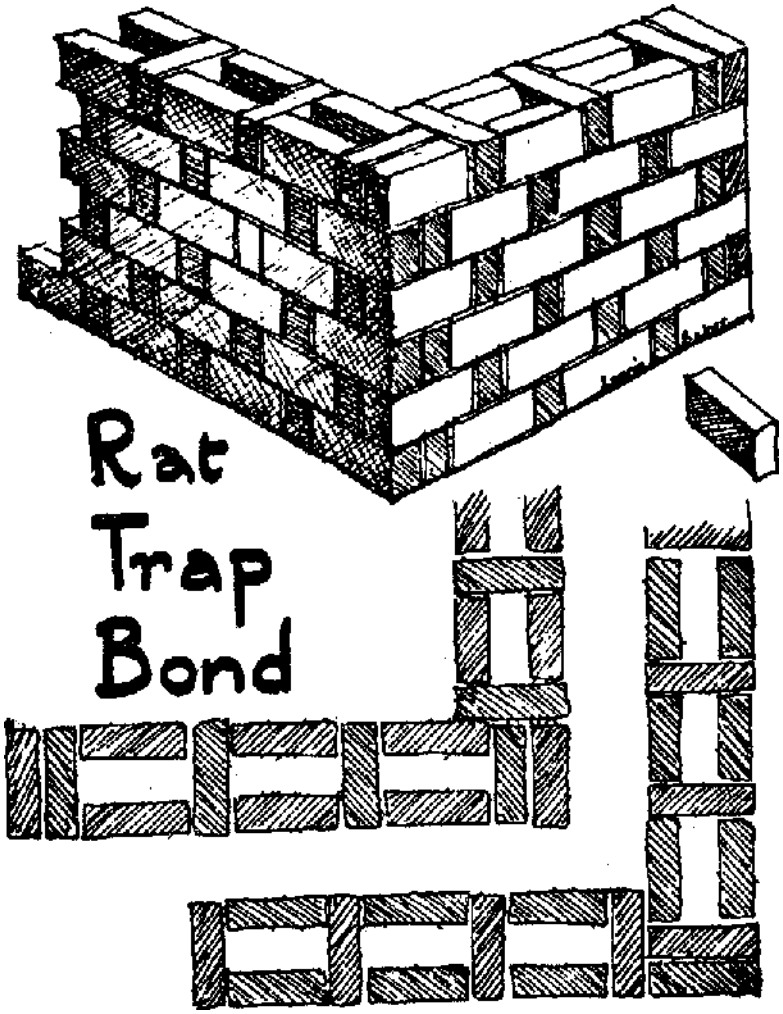
1. In some districts stone is used for external walls. If the interior is not to be plastered, then the stone wall can be lined with 3" brick (or mud brick). Pointed neatly it will not need piaster. If desired it can be colour or white washed. Usually cost rises considerably for an upper storey - so mainly stone walls are for the ground floor.

2. The C.B.R.I (Central Building Research Institute) Brick Block is useful for interior walls to save space. Small stone are laid into a mould and packed in with a weak concrete to form a block. (It can be used for external walls but rarely has a pleasing look)



Brick walls

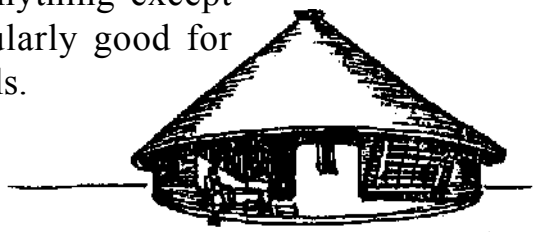
1. Use bricks in districts where it is made and is plentiful
2. 4.5" walls are stable and strong if corrugated or buttressed.
3. 9" walls are usually capable of being load bearing up to three storey height
4. 25% of bricks, mortar, cost etc can be saved by using the Rat trap Bond. This can also usually be safely used up to 3 storeys in height and is equally load bearing.

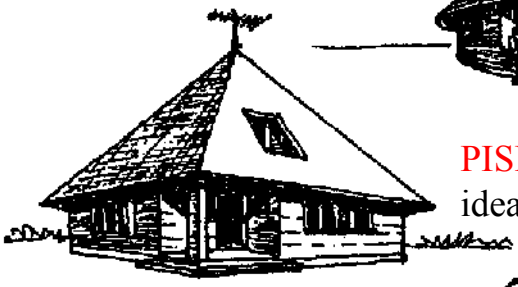


MUD WALL

1. Their main advantage over burnt brick walls is that no energy / fuel are used in their manufacture.
2. There are many varieties of mud wall systems
3. Mud must be protected from water of any sort.
4. Use local methods unless you can prove “advanced methods” are genuinely superior.
5. The easiest type of mud wall is to use the same shape and size brick as the burnt brick, but leave it un-burnt. Masons do not have to relearn-they use it in exactly the same bond and methods as they do the burnt brick.

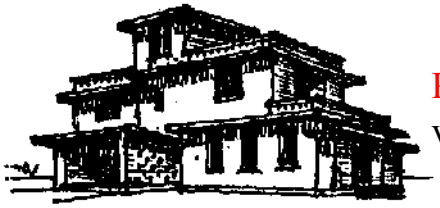
COB is good for anything except height. It is particularly good for curved or round walls.





PISE or RAMMED EARTH is strong and ideal for solid, squat single storey houses.

ADOBE or SUN DRIED BRICKS can easily cope with two storey houses.

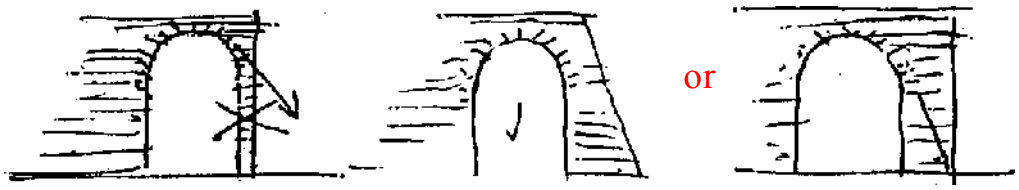


PRESSED BRICKS are smooth and very strong and can build three storeys.

WATTLE & DAUB is elegant and fine for seismic zones and can be done wherever there is cane or bamboo.

Wall Openings

1. Use Arches rather than lintels
2. Many varieties of arches (see booklet) flat, segmental, pointed rounded, corbelled, and so on.
3. All arch methods are equally suitable for mud wall construction
4. Remember to give adequate width of support walls to deal with the arch thrust.



5. Frame work, templates, arch frames must be removed immediately the arch is completed (to allow for compression as the mortar dries and shrinks)

Doors and Windows

1. Wood is getting scarce and costly. Use as little as possible.
2. 1n many instances frameless doors and windows are acceptable and reduce both quantity of timber, labour and costs
3. Board and batten type shutters are less costly, use less labour and less timber than panelled shutters.
4. Glass is often not necessary. Only use when it has a useful purpose and is essential.
5. Glass manufacture is Energy intensive. It is extravagant or unnecessary use is ANTI-NATIONAL.

Floors

1. Use local materials
2. Remember that cement is energy intensive and should not be used if there is a good local alternative.
3. Tile (unglazed) floors are traditional and effective.
4. In many areas there is a local flooring stone available. Where so, use it.

Roofs and intermediate floor slabs

l. In many areas tile roofs are OK but call for a lot of timber support (purloins, rafters, battens etc)

2. On the other hand prefabricated and various R.C slabs use energy-intensive steel and cement.

3. Both systems have advantages and ‘evil’ disadvantages. These including labour and transport cost and other problems have to be studied locally before the better choice is made.

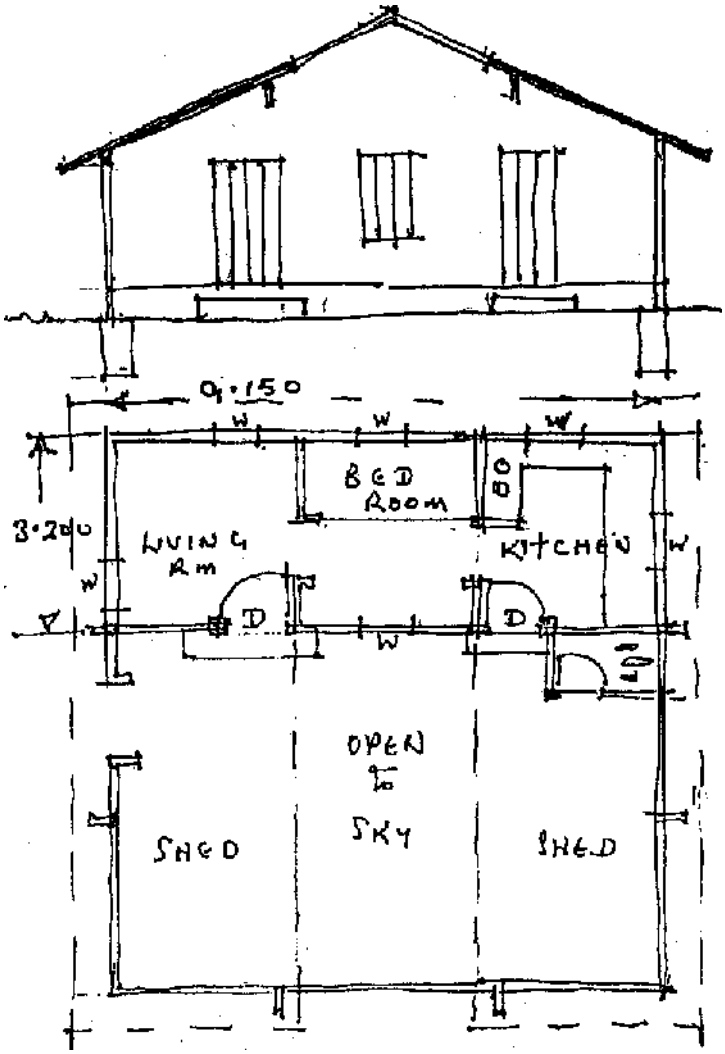
4. Regarding Concrete roofs:

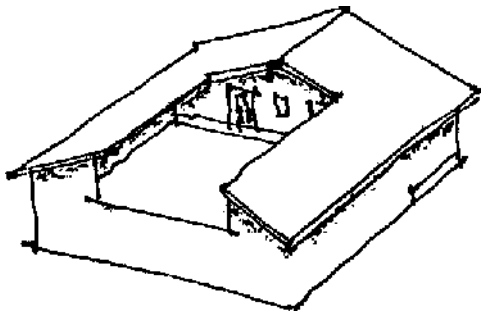
C.B.R.I etc have a variety of systems-L-panels, double funicular shells, etc. In practice the latter often has leak problems.

Both use steel and cement and have to be ‘over designed’ to cope with handling and transport. Alternative slab in-situ systems include filler slabs (void formers) which reduce materials and cost by about 30%, but shuttering is costly. Again, local balancing and comparing of overall costs, transport, labour, and energy used etc, have to be made before a choice is made and it will vary from place to place.

5. Domes and vaults can be done but are mainly not acceptable to live under: In certain drier areas the Hassan Fateh or Egyptian system of frameless domes and vaults is good-but usually “un-Indian”

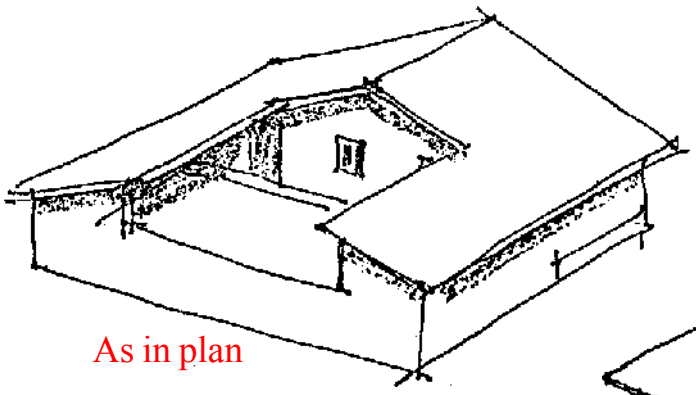
A RURAL HOUSE I



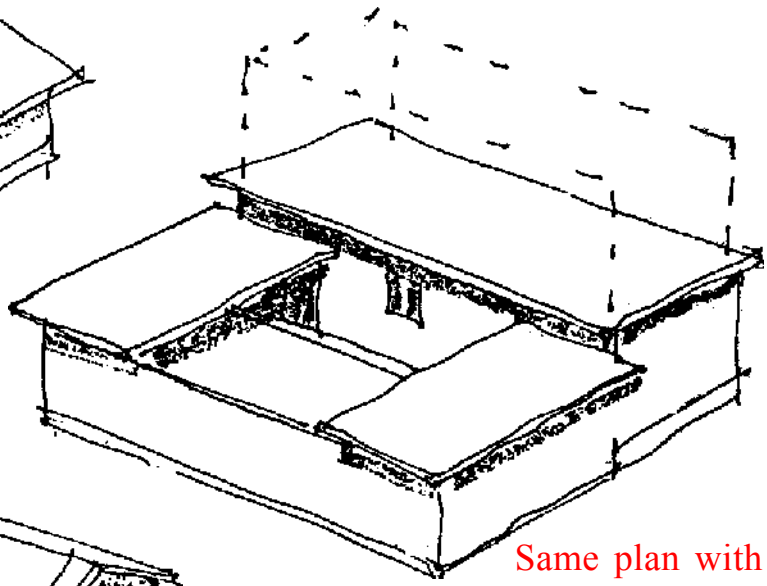


This is a very simple 3 room house with an in the front. The main house roof can project over the courtyard to form sheds for cattle or occupations.

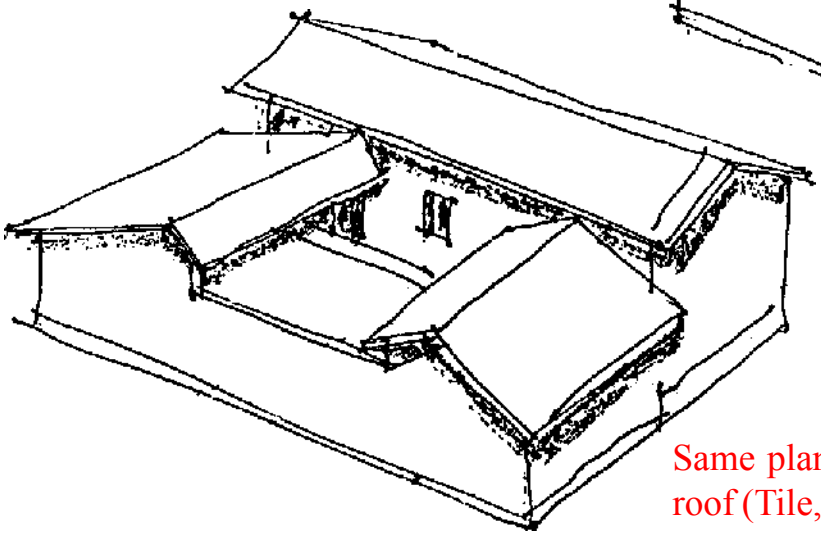
Obviously the sizes can vary according to means, size of plot, family requirement etc.



As in plan

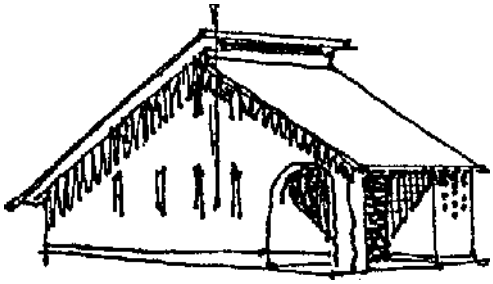


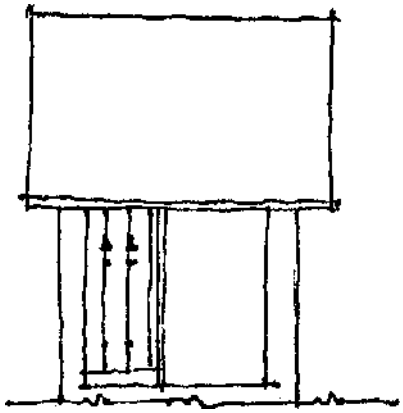
Same plan with flat roof with space for vertical expansion



Same plan using a pitched roof (Tile, Thatch or Sheet)

A RURAL HOUSE II





FRONT ELEVATION

VARIABLES

According to district, availability of various materials locally (stone mud, brick etc.) and cost. Also availability of labour, skilled or unskilled.

FLAT ROOF: at 2.75 m height but no loft.

ROOFING: Thatch, tiles, terracing, R.C.C., RC filler and pan, D.S shells, Sheeting's etc.

WIDTH OF BUILDING: As shown it IS 3.000m, but it can be anything between 2.750m and 4.100m.

SIZE OF SPACES: Sit Out can be anything from 0.90 to 2.300 to 3.000m, KICHEN ditto CATTLE or WORK ditto.

SLEEPING SPACE: As shown it is four spaces Loft /Living / Bed / Kitchen can be more or less as required.

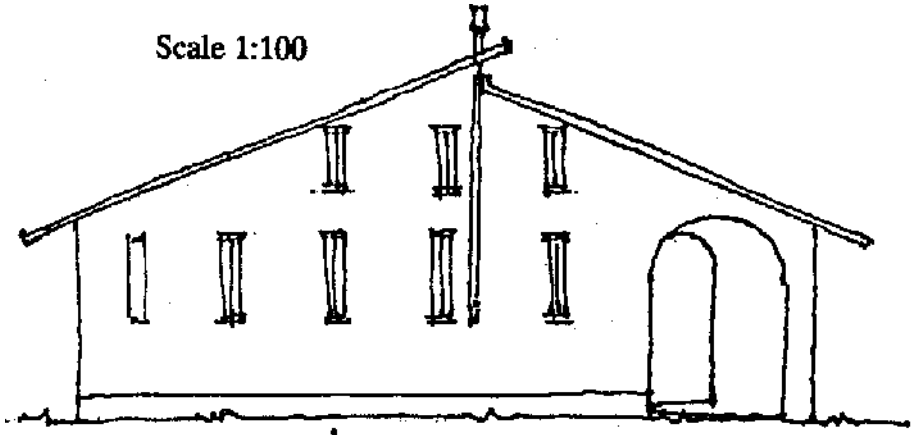
CATTLE: This space can be for catties, goats or poultry, or as a WORK area for occupations such as SERI culture, Food processing, Cane or Basket work, Nets, Fish cutting and drying. The space can be extended on 3 sides.

DOORS AND WINDOWS: Doors can be minimum 3 or more if required. It can be framed or frameless. **WINDOWS** can be of various types.

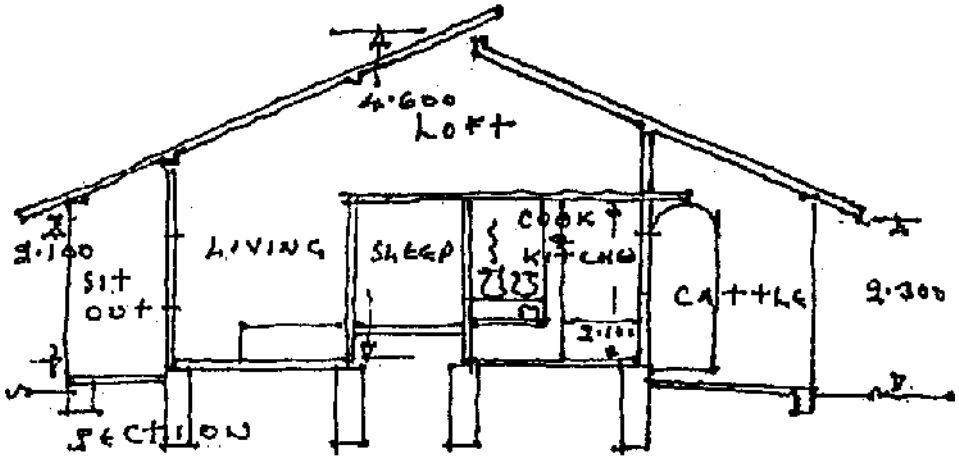
WALLS: can be of mud, Brick, Stone etc. according to availability and cost.

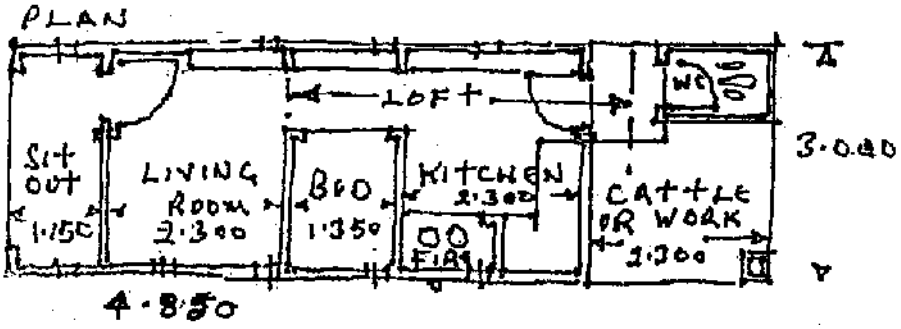
SMOKELESS CHULHA: Main objective is energy saving.

Scale 1:100

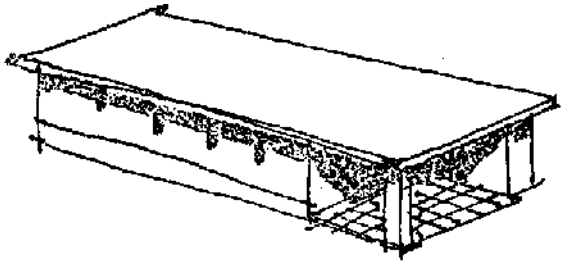


SIDE ELEVATION

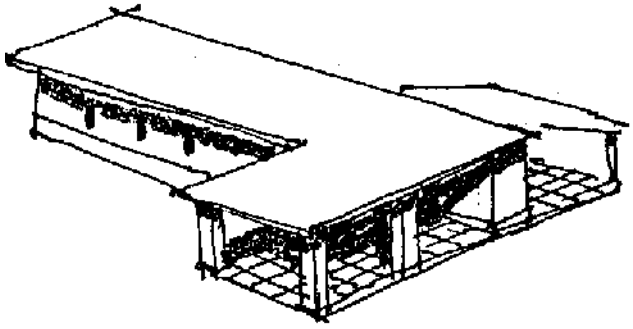




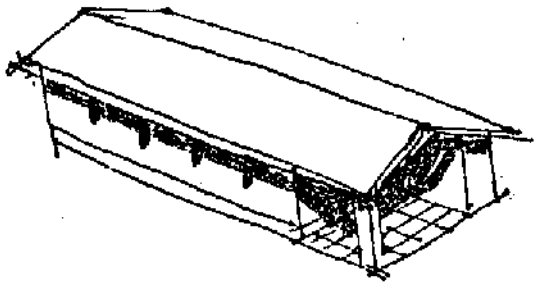
FROM ONE BASIC PLAN



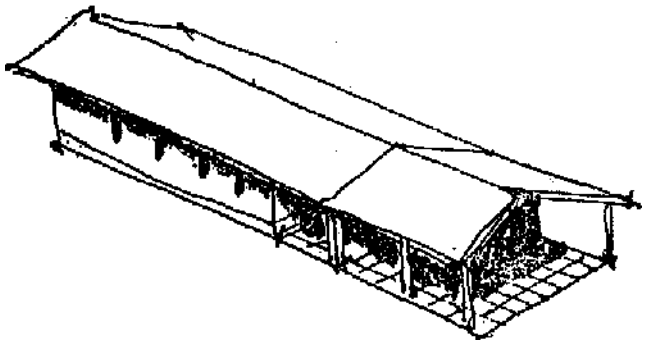
FLAT ROOF with Extensions for Cattle, Poultry or other occupations, or more living room.



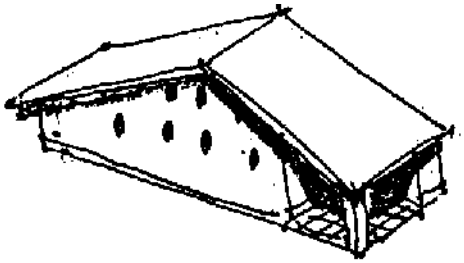
Same plan but with a longitudinal pitched roof of thatch, Tile, L pan, etc.



Same plan as above but EXTENDED longitudinally (It can of course be extended in other ways.)



PITCHED ROOF as in the drawings. This gives plenty of space inside for a loft for sleeping or storing drawings. This gives plenty of space inside for a loft for sleeping or storing.



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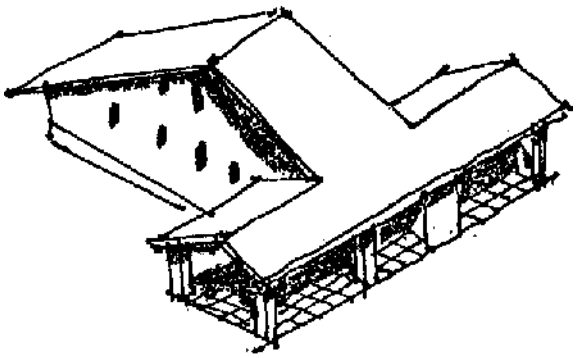
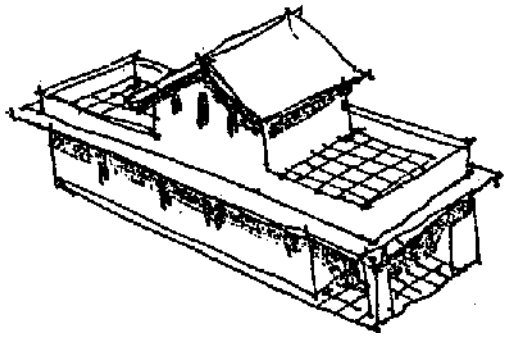


PITCHED ROOF as above but extended laterally for cattle or work area.



FLAT ROOF with an EXTRA STOREY. This can of course be on one part, and other part used as a terrace for drying etc. or other parts also, or over the entire ground floor plan.

A RURAL CORE HOUSE

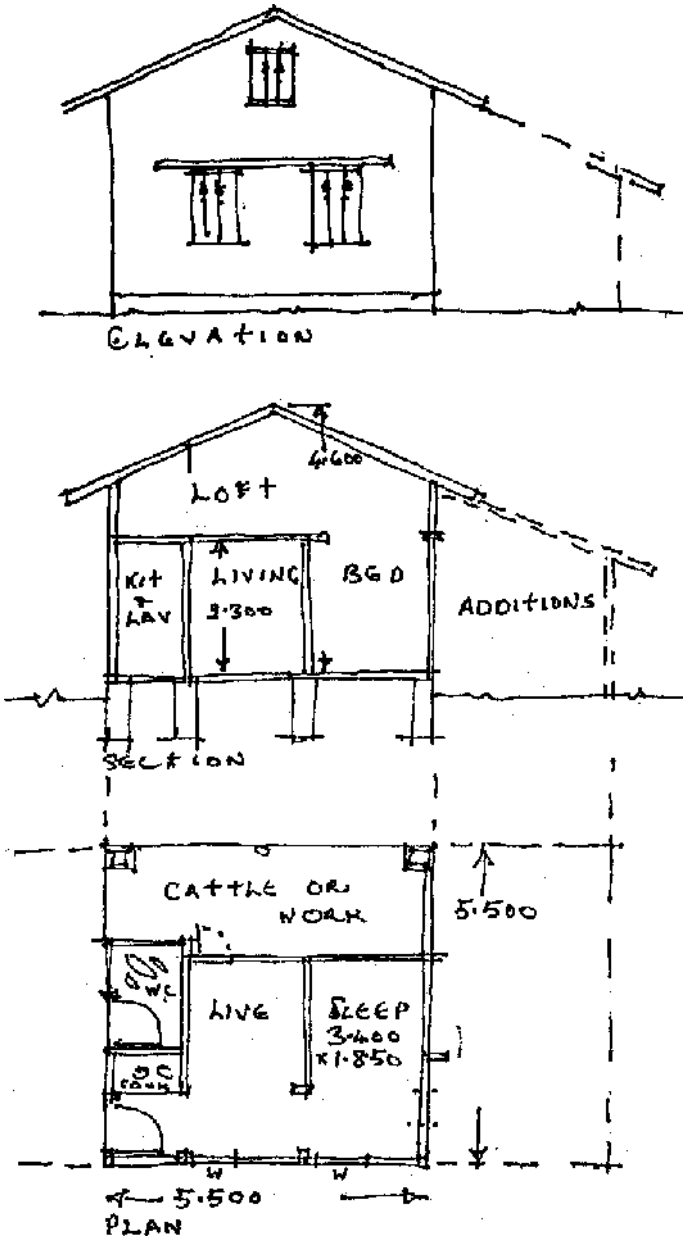
The main idea of the CORE HOUSE is to provide a minimum essential living space. In this plan the living room, the bed room and the loft provide three sleeping areas

Obviously extra rooms or sheds maybe added at any time when required, on all or any of the four sides of the core house.

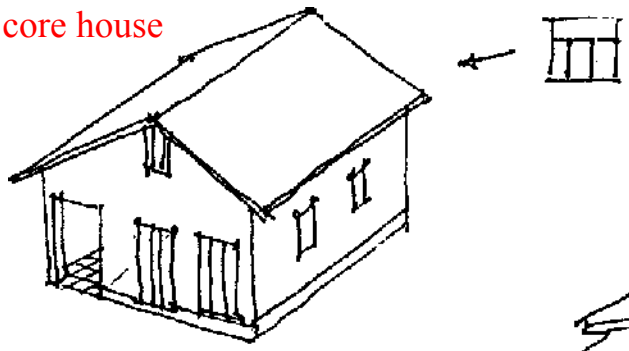
The extra height of the loft gives an overhang which will protect extra lean to roofing which may added later. There is enough room for a smokeless *chula* (wooden stove) and a latrine/ bathing room

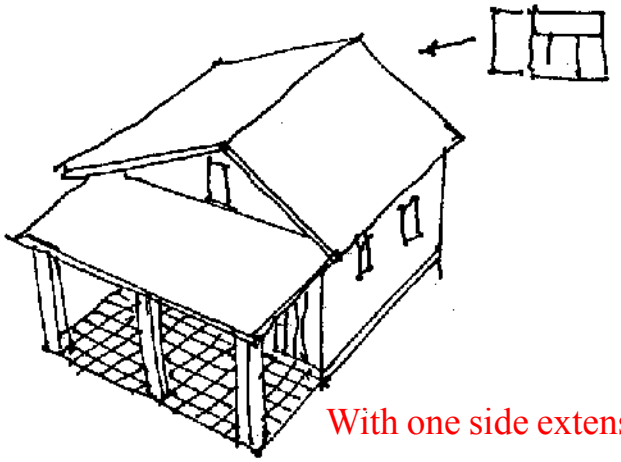
Obviously extra rooms or sheds may be added at any time when required, on all or any of the four sides of the core house.

The usual variations can be made in Walls, Roofs, Spaces, etc. These will depend on available local materials, customs etc.

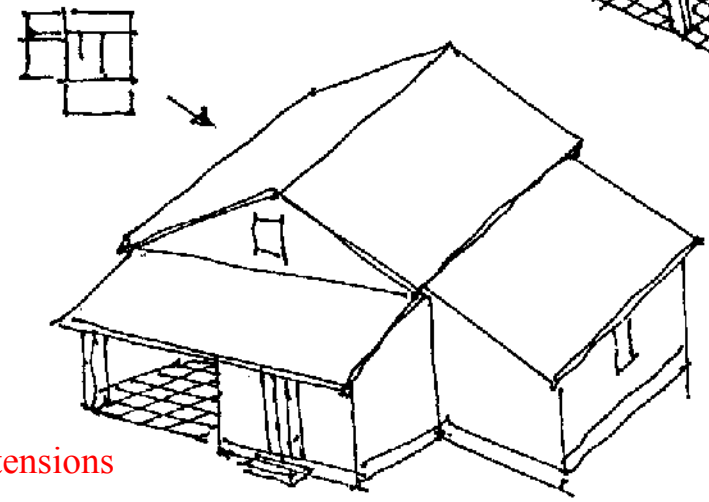


The rural core house

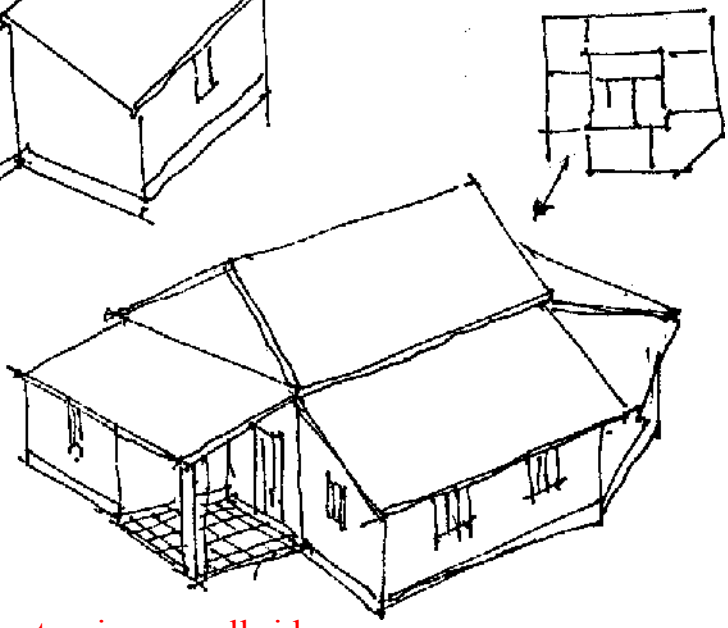




With one side extension

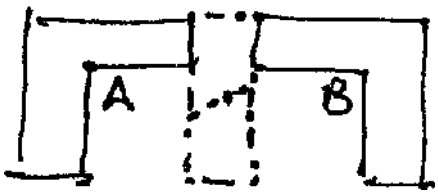


With two extensions



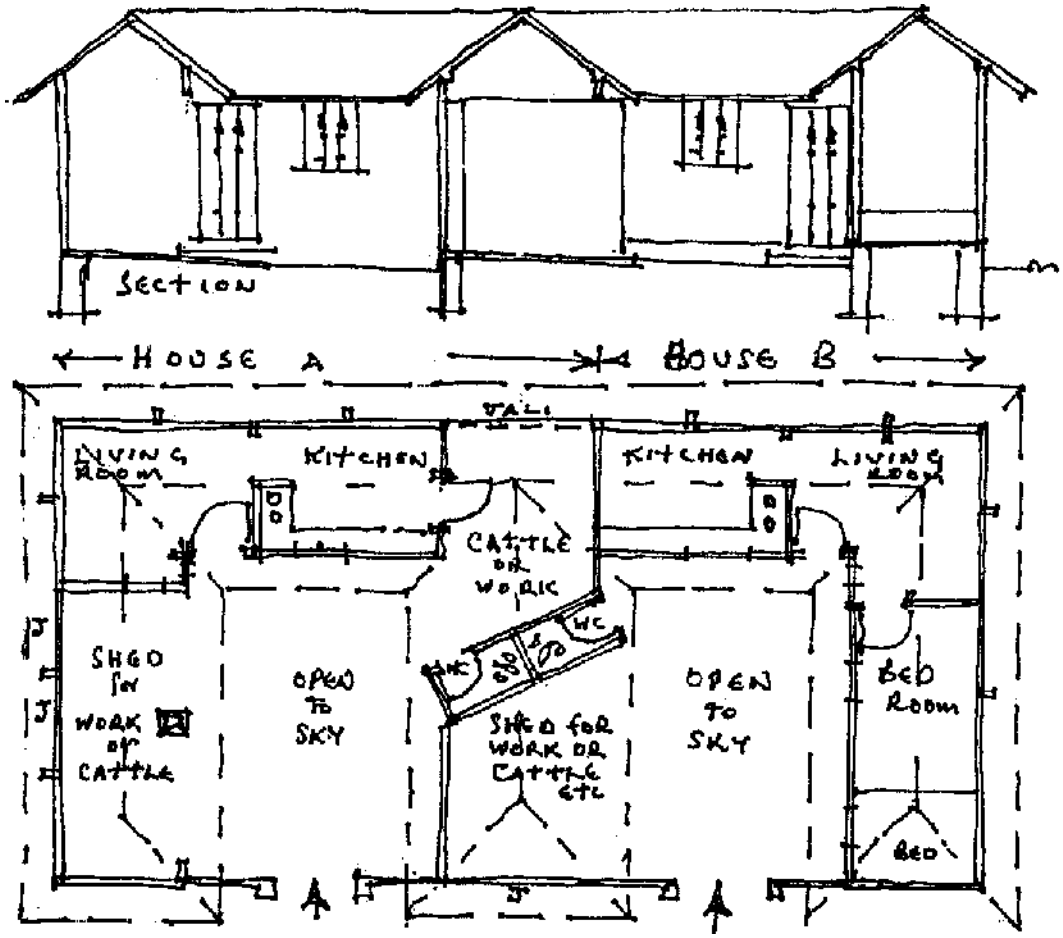
Or with extensions on all sides

TWO RURAL HOUSES

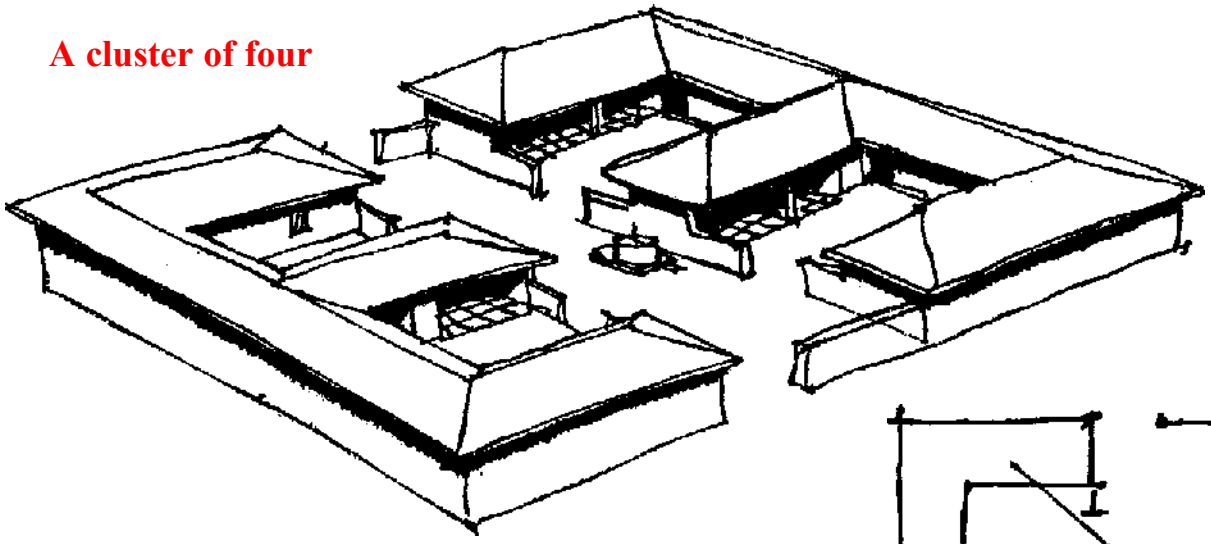


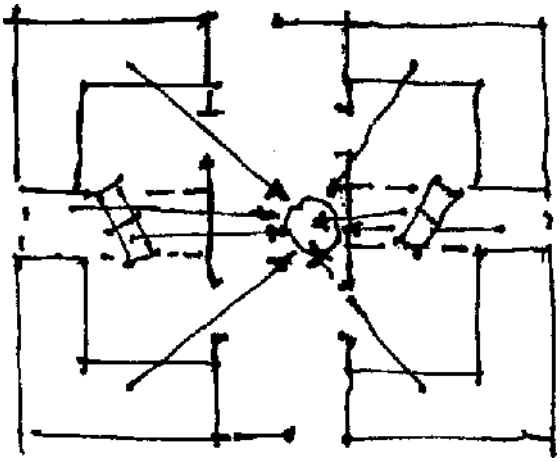
These are two houses with courtyards. The main provision is for roofs and sanitation and Kitchens.

Walls can divide up the covered spaces for rooms or sheds according to the individual needs.



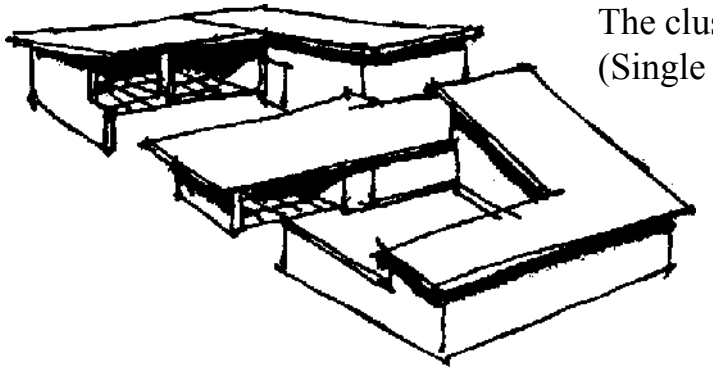
A cluster of four



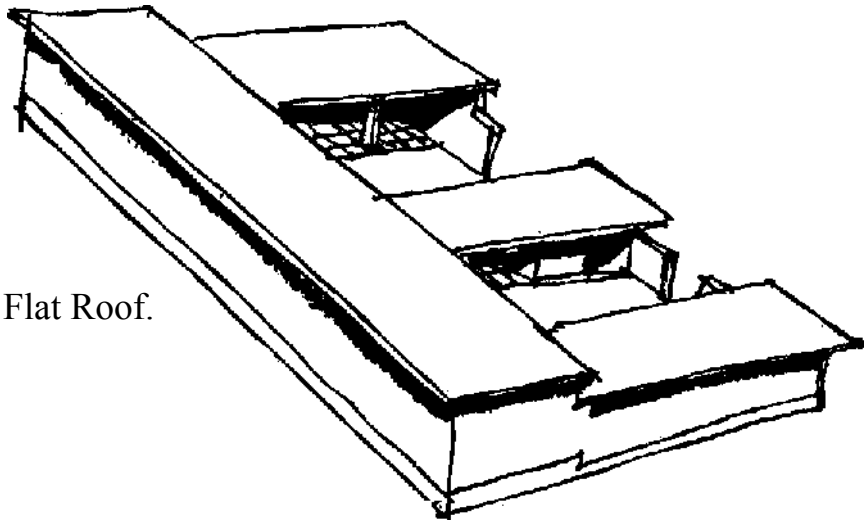


Houses and courtyards can be arranged in clusters. Manure or waste feed a bio gas plant.

Walls and gates at end of lane between buildings can provide security, cattle space and fuel storage etc.



The cluster of two with part pitched (Single pitch roof and part flat).



Cluster of two with Flat Roof.

There is the usual wide range of variation in plan, Cluster plan materials and use of Ouster of two with Flat Roof.

COST AND ENERGY EFFECTIVE TECHNIQUES FOR HOUSE CONSTRUCTION

(Points to be considered)

1. Use your training and professional/technical knowledge but also use an equal amount of common sense.

2. Is the building really necessary? If not don't build it (e.g. many unsuitable existing buildings could be altered, added to, improved)

3. Is the building larger than necessary? If so, study & alter the sizes of rooms and "spaces", also remove unnecessary duplications. (Typical item-dining rooms)

4. Is the circulation space economical & functional & not wasteful? (i.e. passages, corridors, stairs, access verandas & so on).

5. Study local climate & make use of wind directions (to reduce power consumption) & aspect (To prevent unnecessary heat absorption)

6. Make proper use of land gradients contours, natural existing features.

7. Don't waste building space .Think & plan 3-dimensionally.

8. Avoid facadism (a fancy front / facade) & "showing off". Facades are usually a lie and are costly.

9. Concerning EVERY component part of the building (shape, contents, functions, materials, construction techniques etc) ask "IS IT NECESSARY?"

If it is NOT necessary, DON'T DO IT.

10. If it is necessary see whether it is being planned & executed in the best functional & economic way. (Do not accept the frequent explanation "we do it this way")

11. Avoid currently fashionable gimmicks. They are almost always an addition that may be eye-catching but are invariably an extra expense and unjustifiable.

12. Design foundations & basements according to location & soil / land conditions & composition. Text book designs are 'average'. Your plot may not be.

13. Use local plentifully available inexpensive (comparatively) materials .Avoid importing (from other districts) much as possible

14. Use materials openly and honestly/truthfully (in other words, a brick wall should look like a brick wall, a stone wall like a stone wall etc.)

15. Don't do foolish things like building a brick wall covering it with plaster, & then painting it to look like a brick wall.

16. Avoid applied surfacing unless really necessary (e.g. facades covered with assortments of tile, marble, imitation bricks & so on).

17. Remember that plaster is not a structural material *&* that when applied to the inside & outside walls it accounts for about 10% of the total cost of the building, further more it requires painting and not infrequent maintenance. Don't use it if it is not really necessary (Remember it is not the only way of keeping water out of a wall).

18. As much as possible use energy free, or energy-less materials, that is, material, for which very little energy is used in their manufacture (e.g. cement *&* lime are made from the same basic materials but cement uses 100 times more energy) .The result for mortars & plasters is equal.

19. If you have to use energy intensive materials, use them sparingly & carefully. (e.g. glass, windows in corridors & stairs could often be Jali). All plasters & mortars could be of lime or combination mortars & avoid cement.

20. When you have to use reinforced concrete, remember the steel& the cement are energy-intensive - so use economical & alternative forms of Reinforced concrete systems.

21. Use load bearing wall systems up to four storeys *&* avoid unnecessary RCC frame work. Walk can carry beams & slabs without RC columns.

22. Avoid unnecessary fins & louvers & use RCC sparingly when you must have them.

23. Insist on accurate mixes & mixing of plasters, mortars, concretes. Don't use over rich mixtures.

24. Remember that ROOFS have various functions besides only providing the lid to the box Design them to deal with rain and heat insulation etc.

25. If you claim, or want to be "Scientific", then demonstrate your faith in your scientific formulae. If your formula is "scientific" why do you need an extra "factor of safety". Training your craftsmen to be conscientious & honest is a far better way of achieving structural stability.

26 Are all your DOORS necessary? If some are not necessary don't put them in. Do the necessary doors actually need frames? If not, use a frameless type of door.

27. The same for Windows. Are all of them necessary? What are their separate functions? Design economically to satisfy the function required. Remember a Jali wall letting in light & air costs only 1/10 of an 'orthodox' window of the same area.

28. Modern synthetic paints are costly need redoing from tune to time, very few stand up to the Indian Sun. There are other ways of preserving *&* finishing wood. Use them when possible.

29. Remember that what is ‘good’ for Kerala is not necessarily good for Kashmir. What works well in Bihar may be disastrous in Rajasthan etc. Study local indigenous architecture & use its principles even when using modern materials indigenous architecture represents thousands of years of R&D.

30. Don’t forget to apply common sense to all you design & do.

end