

Lecture-1 (PFE-302)

Planning of Farmstead



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MEANING OF FARMSTEAD

- The buildings and adjacent grounds of a farm.
- A farm together with its buildings.

WHAT IS FARMSTEAD

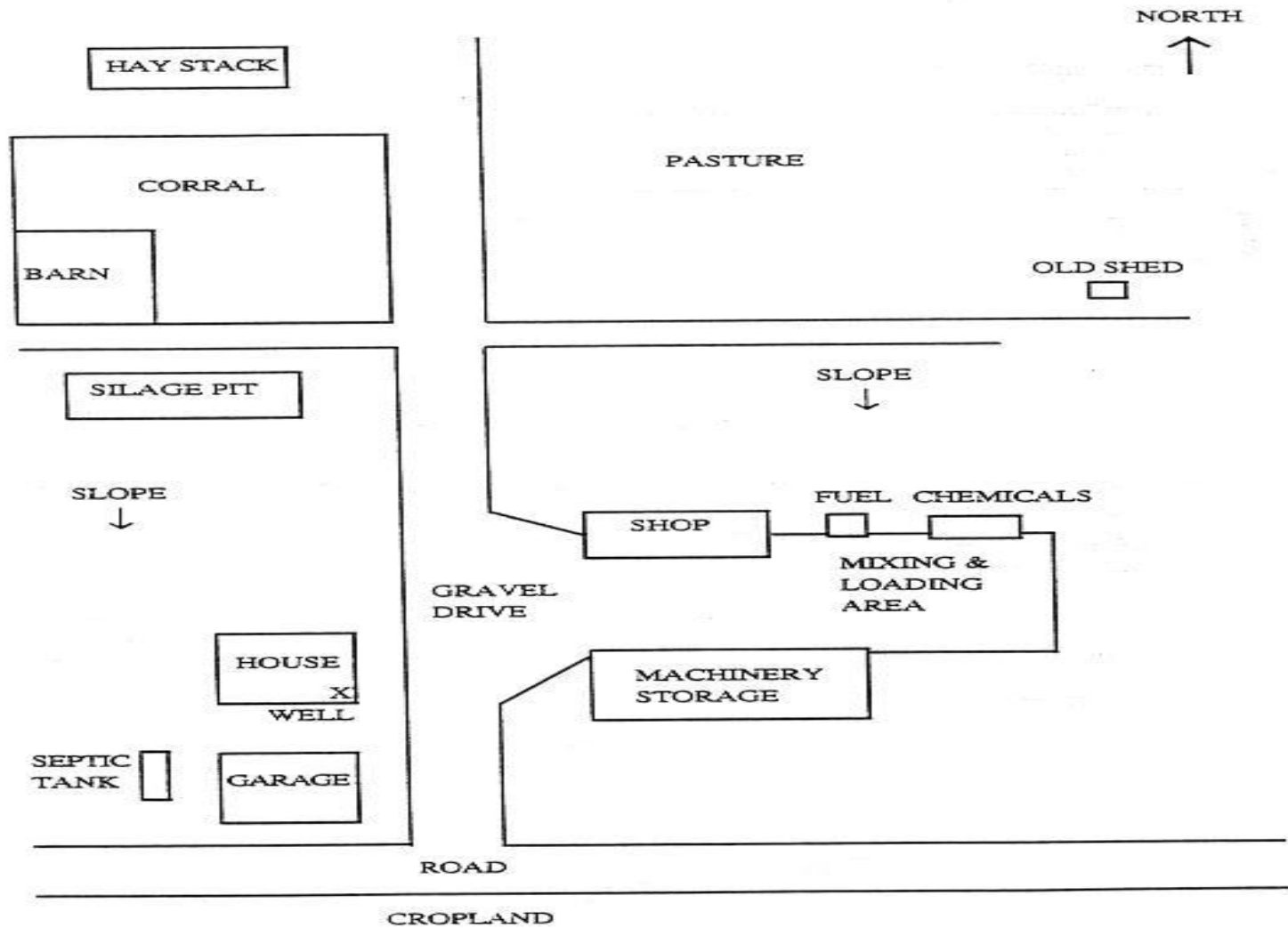
A farm or the part of a farm comprising its main building together with adjacent ground is called farmstead.

FARMSTEAD PLANNING

When planning a new building or adding to an existing farmstead, you must consider such things as:

- ✓ Site drainage
- ✓ Services (power, water supply, waste disposal)
- ✓ Security
- ✓ Space allowance for future expansion
- ✓ Separation distances for snow and wind control, ventilation and disease control
- ✓ Distance separation from residences for control of noise and odours
- ✓ Municipal regulations
- ✓ Distance to wells, surface water, catch basins

LAYOUT OF FARMSTEAD



LOCATION OF FARMSTEAD

A farmstead is satisfactory, if its on a suitable site, if the individual buildings are properly designed for the functions they serve, and if their grouping is properly planned.

The Primary objective of good planning are;

- 1) Sanitation and well being of human and animals
- 2) Economy in labour management
- 3) Economy in initial cost
- 4) Low cost of maintenance.

The most convenient location from the management, sanitation and other convenience point of view may be decided as indicated below;

LOCATION OF FARMSTEAD

- 1) From the management point of view, the farmstead should be located near the **centre of the farm** or **in the middle of the long side**.
- 2) Location at **one side** or even at **corner near a roads** is always helpful in **procuring farm supplies and disposing of farm produce**. This will facilitate better social life and protection, common water supplies management and other convenience.
- 3) A Site having *high elevation & good natural drainage* should be selected.

LOCATION OF FARMSTEAD

- 4) It should be *located near a permanent water supply*. Advantage of an existing well can be taken while deciding the farmstead location.
- 5) Site have trees around will provide *protection against high wind velocities and dust storm* , will also provide shade for human being and animal.

SIZE AND ARRANGMENT OF FARMSTEAD

- 1) Farmstead should area is occupied by residential buildings, storage buildings, dairy barn, bullock shed, poultry house, other service buildings, threshing yard, roads, etc. and this area usually varies from **3 to 5% of farm area**.
- 2) Residential building should be located **away from the cattle shed and other buildings**. This will ensure privacy and reduce the nuisance of flies and smell coming from the dairy barn.
- 3) Residential and animals houses should be so located that the **prevailing wind will not blow from the animal houses to residences**.

SIZE AND ARRANGMENT OF FARMSTEAD

- 4) Various building are such arranged to provide the **minimum of walking from one place to another** in doing the required work.
- 5) The silo pits and feed storages should be located **near the animal shelters**. The mill room or milk house is placed about **6m away from the barn**.
- 6) The layout of farmstead should allow for possible **future expansion** of buildings.

Planning of Farm Residence

The **residential building** on a farm is the **heart of the farmstead**. It should be so designed and constructed that the owner has the **satisfaction of staying in a most comfortable** and attractive place.

A residence is not merely a shelter alone, but is the *centre of a social life, a place of health, comfort and happiness of the entire family* in all stages and walks of life. It must provide conveniences for all the life activities.

There must be *places for cooking, dining, sleeping, study, guests*, and other special requirements, to take maximum advantage of the sun light, the **residence should face south or north**. Facing the residence onto the main road and rivers or streams in another desirable feature.

However, the traditional designs of village houses have the following defects:

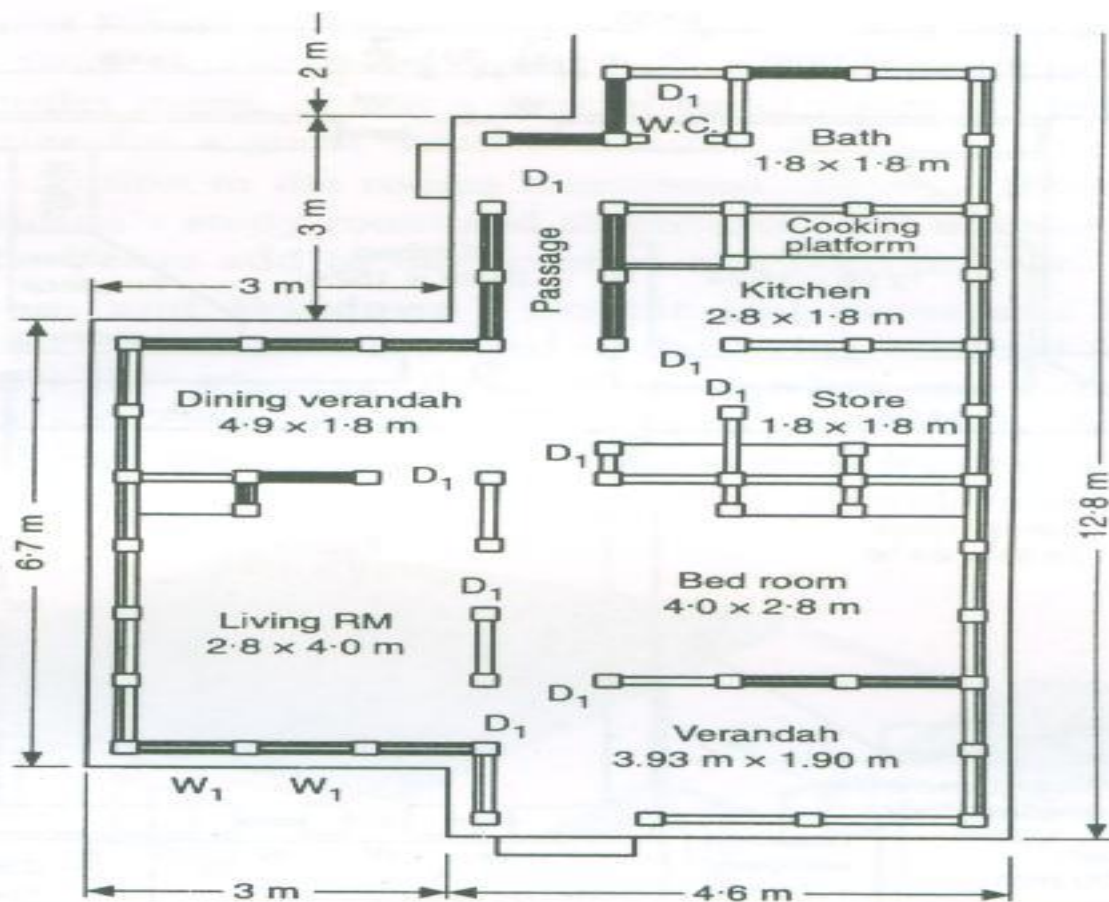
1. Construction is unsatisfactory and not water proof.
2. Windows are too small
3. Rooms are too small
4. Kitchen are not properly constructed to remove the smoke
5. Animals are also kept in or around the house
6. Surroundings are often used as a waste disposal place.

Hence, a good house should have the following facilities:

- 1) Bedrooms-the number depends on the size of the family.
- 2) Verandahs both for sitting out and house work.
- 3) A Kitchen with good ventilation
- 4) Food grain store
- 5) Fuel wood store
- 6) Animal shelter
- 7) Animal fodder store
- 8) Latrine cum urinal and a bathing place
- 9) Sitting room cum DALAN
- 10) Open space inside or outside the house well enclosed for social gatherings.
- 11) Space for biogas plant and slurry dump
- 12) Space for kitchen garden
- 13) Space for washing purposes
- 14) Space for farm tools and machinery storage

Improved Farm House Design

- ✓ A farm house should be designed to provide maximum utility and comfort.
- ✓ The various rooms should be so located as to provide adequate comfort and minimum time and energy wastage in going from one to the other.
- ✓ The two floor plans presented in these figures are meant for small family sizes living in the villages. These houses are sufficient to provide necessary facilities to a modern farmer.

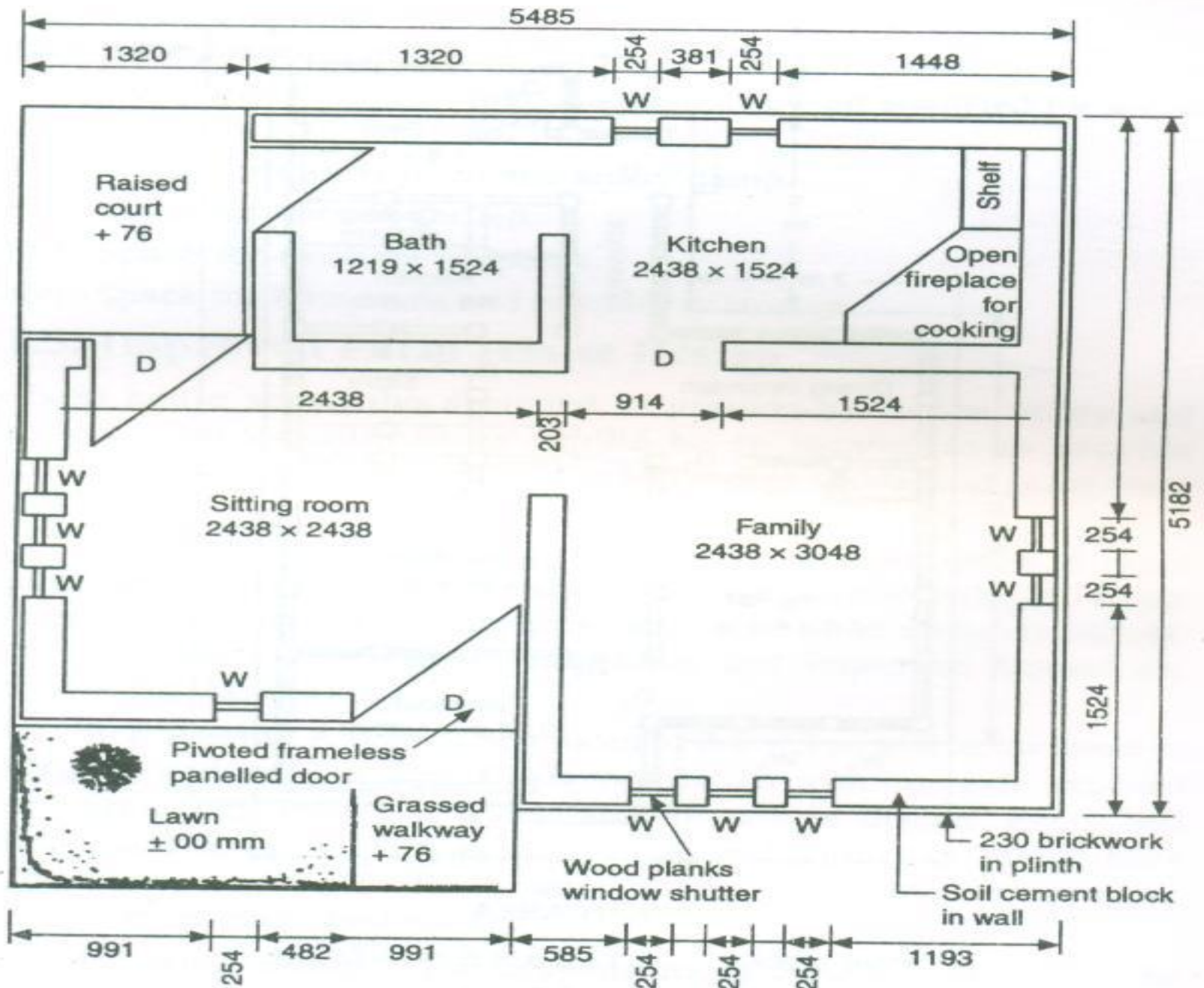


PLINTH AREA

Main block	:	12.8 × 4.6 m =	59 sq. m
Side	:	6.7 × 3 m =	20 sq. m
Total	:		79 sq. m
Deduct	:	1 × 2.1 m =	2 sq. m
Total	:		77 sq. m

Fig.11.1. Floor plan of a farm house

light Availabilities of LPG in rural areas have made considerable



(All Dimensions in mm)

Fig. 11.2. Floor plan of a house.

1.1 Bed Room :

A typical bed room of **3.6 x 3m** will accommodate **two single beds of 1 x 2 m**. Cross ventilation with one side exposed to the prevailing breeze is a desirable feature in design. Every bed room should **be provided with attached toilet facilities** or should have an independent access to the common toilet room. Some **storage space is essential** in every bed room.

1.2 Drawing Room :

The drawing room generally serves as the **room for recreation and social gathering**. The minimum size of the drawing room is **4.5 x 3.6 m** but some people prefer to have **one large room of about 6 x 4.5 m** to serve as a **drawing room cum dining room**.

The drawing room is best suited to be on one side of the house, and should generally open into the front porch, kitchen, and bed room. Wall space in the **drawing room should have plenty of provision for natural light and ventilation**.

1.3 Kitchen :

The kitchen is preferably place near the living room but away from the bed rooms. It should be equipped with a sink and many built-in-racks for storage of utensils and supplies.

Floor space of kitchens usually varies from 9.3 to 14 sq. m. Store rooms and fuel storage space should be attached to the kitchen. Besides a large size chimney to carry out the smoke from the built-in-cook stove, the kitchen should have cross ventilation.

One of the windows and a door must directly open to the kitchen garden. The kitchen must have an eastern location if possible, so that the rays of morning sun can provide adequate light.

Availabilities of LPG in rural areas have made considerable difference in the design and layout of kitchen in villages. Where gas stoves are not being used, improved fire wood CHULHAS are being introduced.

1.4 Toilet Rooms :

For Indian families, bath room and lavatory should usually be separated. In the bath room, provision should be made for both a shower and a direct tap bath.

If the water supply is not maintained throughout the day and night, a small water reservoir may be a part of the bath room. A hanger for towels and a rack for soap, etc. are very useful. For the lavatory, a flush arrangement is essential.

SOURCE OF FARMSTEAD WATER SUPPLY

Water is used for household requirements livestock, processing of milk and milk products and irrigation of lawns and kitchen gardens.

Water needs meet by wells, ponds, streams and rivers, but wells are the main source of water supply. Shallow dug well and drilled well with hand pumps are used for small water requirement.

- ✓ If water requirement $>20,000$ lits/hour then high yielding open wells, tube wells, ponds or rivers are required to meet the need.
- ✓ If water requirement $<20,000$ lits/hour then shallow dug well, drilled hand pump are required
- ✓ Source of water supply must be capable of supplying total quantity of water needed.
- ✓ If rate of water required exceeds the yield by less than 25% a large capacity overhead storage tank may be used to store extra water for use at the peak demand period.

TABLE:- WATER REQUIREMENT OF FARMSTEAD.

Place of use	Litre/Capital/Day	
	Range	Average
1) Residence	100-250	200
2) Dairy barn for Cows	150-200	200
Dairy barn for Calf	30-50	40
3) Cattle shed for Bullock	100-200	150
Cattle shed for Buffalo	250-350	300
4) Sheep	10-15	15
5) 100 chickens	10-30	20
6) Kitchen garden (per tap) (if tap run for 3 hr\day.)	600-1200	1000

NUMERICAL BASED ON FARMSTEAD

Determine the size of an overhead water tank for a farmstead demanding a maximum of 50,000 lts/hr, for 2 hrs during noon and only about 25,000 lts/hr, during rest of the periods the tube well is capable of supplying at a rate of 35,000 lit\hr.

Total quantity of water demanded during Peak period
= $50,000 \times 2$
= 1,00,000 lits,

Total quantity of water supplied during peak period
= $35,000 \times 2$
= 70,000 lits

Storage capacity of the overhead water tank
= $1,00,000 - 70,000$
= 30,000 lits