# Farm Facilities

agriculture

**farm facilities are farm buildings** any of the structures used in farming operations, which may include buildings to house families and workers, as well as livestock, machinery, and crops.

The basic unit of commercial agricultural operation, throughout history and worldwide, is the farm. Because farming systems differ widely, there are important variations in the nature and arrangements of farm facilities. The buildings on a farm generally consist of the farm family's house, the dwellings of any resident hired workers, and the various structures and facilities for farming operations. This article deals with farmhouses and service buildings that can be classified as follows: livestock barns and shelters; machinery- and supply-storage buildings; buildings and facilities for crop storage, including fodder; and special-purpose structures.

## General layout

The location of the farmstead and the relative position of its different buildings are influenced by several factors, external and internal. Among the external factors, mainly natural, are soil conditions, climatic conditions, and access facilities to the main road and to the fields.

Internal factors depend on the type of business enterprise suitable to the farm. Among general principles that must be taken into account are the necessity of some partition between the farmhouse and service buildings, minimizing of transportation between buildings, the possibility of enlarging buildings, and security against fire. Four general layouts may be defined: large crop farms, large stock farms, farms in underdeveloped areas, and small to medium mixed farms.

## Large crop farms

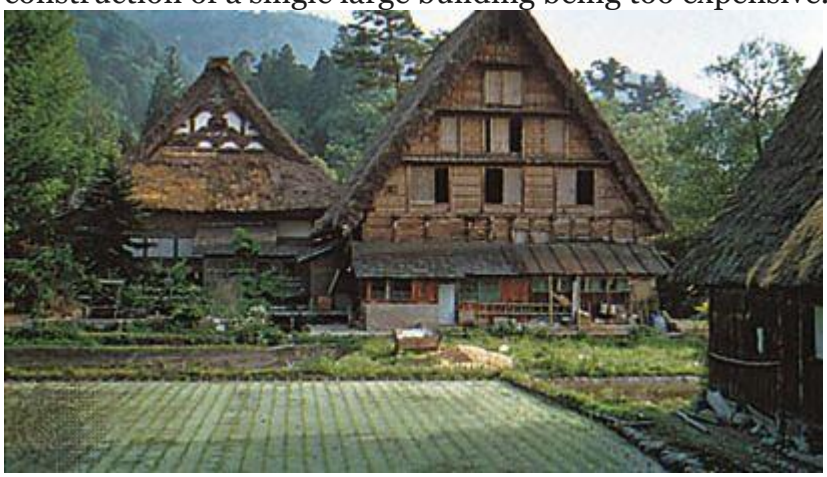
Independently owned farms of this type, mainly cash-grain farms, are numerous in North America. The layout is simple: there are generally two types of service buildings, one for storage and the other for machinery. Large farms specializing in fruit production have a shed for the conditioning and storing of products, the other main building being a machinery and supply shelter. Some large farms specializing in viticulture include buildings that are equipped with wine cellars.

## Large stock farms

Two types of large stock farms, extensive and intensive, may be distinguished. The extensive type is exemplified by the cattle ranchers of the United States. At the extreme, there are no buildings, only equipment. In Australia and New Zealand, dairy cows are kept without housing. The only building houses the milking parlour and the milk room, in the centre of the pasture. In the western United States, the most important beef ranches have several thousand head, entirely free on the range. The only building is the elevator with the milling and mixing machinery. For the animals there are only troughs and fences. Among intensive stock farms are the big dairy units—with several hundred cows—in the United States, in western Europe (France, northern Italy), and in eastern Europe and the former Soviet republics. There are three major layouts: parallel buildings; monobloc buildings (in Hungary, for example); and circular layout, with the milking parlour in the centre (United States, northern Italy). The covered feedlots for fattening beef, in the U.S. Midwest and elsewhere, feed from several hundred to several thousand head of cattle and are generally built with a shelter for the animals and with tower or bunker silos. Large units for hog production frequently have many buildings, partly to reduce disease risks and partly to separate the various animals—for example, the suckling sows, in-pig sows, fattening pigs, and boars. Some systems, however, use only one or two types of buildings. Large poultry units, specialized either for egg or for broiler production, use large identical buildings, the number depending on the unit size.

## Farms in underdeveloped areas

In the underdeveloped areas, two types of buildings are found: those of the latifundia, or large plantation-type farms, and those of the small-owner or tenant farms. In these, buildings are generally small and scattered, the construction of a single large building being too expensive.



Traditional *gassho-zukuri* farmhouses, Gifu Prefecture, Japan

*W.H. Hodge*

## Mixed farms

The small and medium farms which characterize European agriculture and which exist in many other parts of the world are managed on the traditional mixed farming and animal husbandry system. Consequently, this type of farm normally has several service buildings: one for machinery, one for hay and cattle, another for hogs, and still another for sheep. In mountain areas, however, there frequently is a single building, including the house. With the increase of the average size of farms in these areas, there is relative specialization, and the number of buildings in the newly built farms is decreasing.

# Building types

These include homes (farmhouses), livestock barns and shelters, buildings for machinery and supplies, and crop storage and special-purpose structures.

## Farmhouses

The basic requirements for the farmer's family are about the same as those of the urban family, but certain features of the farmhouse depend on the farm life pattern. Because the farmer generally comes directly from the fields or the service buildings, with soiled clothes and boots, it is necessary to provide a rear entrance with a washroom or lavatory and clothes-storage space. For the same reason, many farmers prefer a dining place close to the kitchen or included in it. The house must include an office and a large food-storage place with ample refrigeration, including a freezer or cellar in many countries, as most farm families are large. There are usually three or four bedrooms.

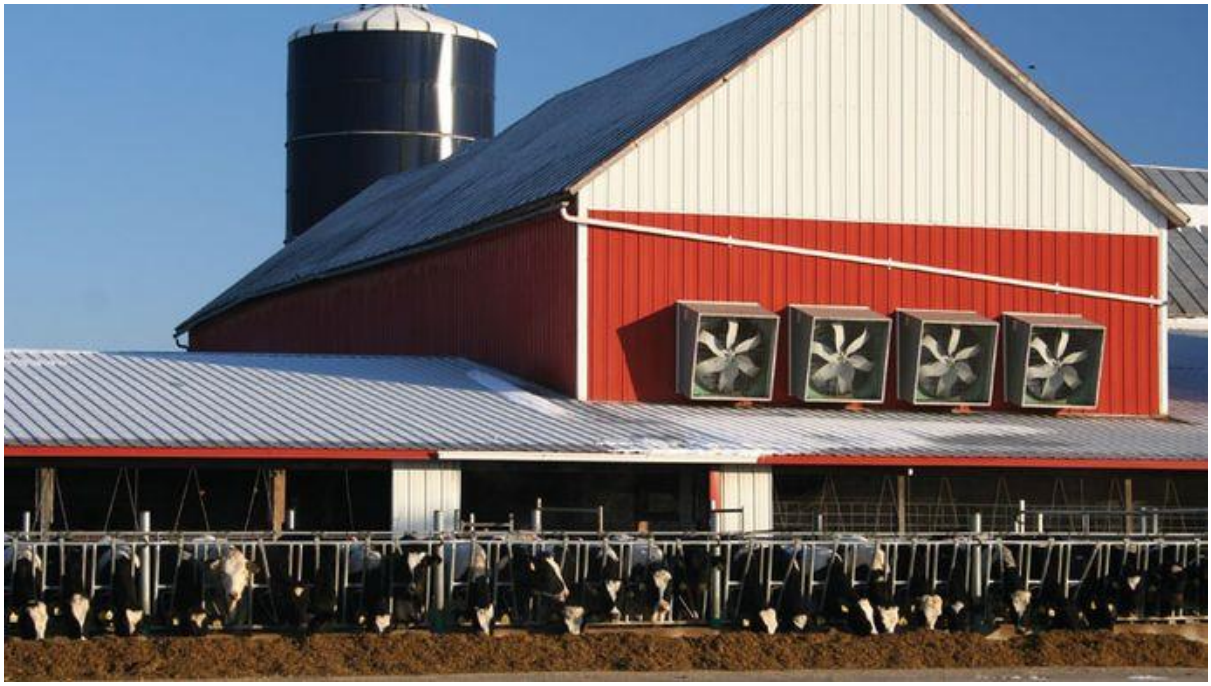
Satisfactory modernization of old farmhouses is difficult in some cases, but if the available floor space is sufficient and the main walls strong, renovation can give good results. The cost of a new house must be proportionate to the farmer's income; for this reason, farmhouses in underdeveloped regions have less floor space with a main room (kitchen and dining room), two or three bedrooms, a large washroom, and a storage place.

# Livestock barns and shelters

Barns and shelters tend to be the most important elements of the livestock farm. Two general types of animal shelters may be distinguished: the multipurpose type, a single-story building with clear-span roof construction, useful for feed storage and machinery, as well as for livestock; and the specific type, designed for a particular type of animal.

There are two major cattle-housing methods, the stall barn (or stanchion barn) and the loose-housing system. In the stall barn each animal is tied up in a stall for resting, feeding, milking, and watering. The typical plan has two rows of stalls. In older buildings hay and straw are stored in an overhead loft, but in modern layouts adjacent buildings are generally used.

In cold and moderate climates the barns need insulated walls and ceilings, as well as ventilation systems, either natural or power-operated. In mild and hot areas the barns are open on one or two sides. The loose-housing system, developed in the United States after World War II, is now employed throughout the world. Basically, this system includes a wood- or metal-framed shelter, arranged in such a way that the animals can move freely inside and sometimes also between the shelter and an outside yard. Depending on the bedded areas, four types can be distinguished: loose housing on permanent litter—for example, straw, corncob, sawdust; loose housing in free stalls or cubicles; loose housing on slatted floors; and loose housing on sloped concrete.



## dairy farm

In some countries, in old as well as new dairy farms, cows are housed in stall barns that include milk rooms. Milking takes place in stalls, and the milk is carried either in cans or directly by pipeline to a refrigerated tank in the milk room.
Modern layouts with loose housing always include a milking parlour, either stationary or rotary. Two types of loose housing are used: loose housing on permanent litter and loose housing in free stalls, either under a clear-span roof or under a narrow lean-to roof.

## dairy farm

Routine cleaning of a dairy farm barn.

Beef-breeding cows often live on pastures, with only open-front sheds, during the calving period. In France and Scotland, however, they are kept in barns all winter. For fattening steers there are two major housing systems. The first of these is the American system, with very large groups of animals and a wide surface per animal. In the western United States the open feedlots include only fences, troughs, and alleys for feed distribution. In the Midwest Corn Belt a shelter is often included. The second, the European system, is characterized by very small groups (10 to 20 animals each) and a very small surface, generally covered. Any of the four loose-housing systems can be used.

For horses and ponies it is customary to use individual stalls, where the animal can move freely, even though this requires more space. Mules may be kept together in large pens. In mild climates sheep and goats live on pastures without any shelter. The facilities include fences, waterers, corrals, dipping vats, and lambing and shearing sheds. In moderate and cold climates the flock is wintered in sheds. The trend is toward clear-span buildings, with large alleys so that trailers can distribute feed into racks and troughs. Ewes are housed by groups (50 to 100 each), and special pens are kept for lambs. Feed racks and fence partitions are generally movable. For the dairy

ewes there are special milking parlours. Goats are housed either in tie stalls, for small flocks under 50 head, with milking on the spot, or in pens, for larger flocks housed by groups, with milking in a special milking parlour.

**horse stable**

Horses housed in individual stalls in a stable in France.



Pig housing varies for sows and fattening pigs. The sow lives with its litter for four to eight weeks according to the weaning age chosen. During this period there are two types of housing: movable, individual houses (generally of wood) located on or close to pastures and fixed in place, and central farrowing houses. A sow may farrow and live with its piglets in a single pen or farrow in a special stall, to avoid possibly crushing the piglets, or may farrow tied up by a chain or a harness. The pregnant sows live either free in groups of six to 12 or tied up or blocked up inside individual stalls. In cold climates the house is heated; in all modern practice infrared lamps or tubes are used to keep the piglets warm. Fattening pigs, like fattening beef cattle, may be kept either in a simple feedlot, in large groups with a wide surface per head and a simple open shelter, a system widely used in the United States Corn Belt, or penned in a closed building, isolated and ventilated, each pen holding seven to 15 pigs. This is the most common system in Europe. Size of the pig units varies all the way from five sows or 20 pigs to large farms of up to 100,000 pigs.

Poultry farming is the most-industrialized type of animal production. Some of the breeding phases no longer take place in farms but in specialized plants; the farmer buys either chicks for broiler production or young layers for egg production. The typical modern broiler house holds from 10 to 100,000 birds, with automated feeding. Two types of facilities can be used. The broilers can be put on the ground on a deep litter of wood shavings, on wire mesh above a pit, or on a combination of these two floors. Alternatively, the broilers can be housed in metal cages, on three stories,

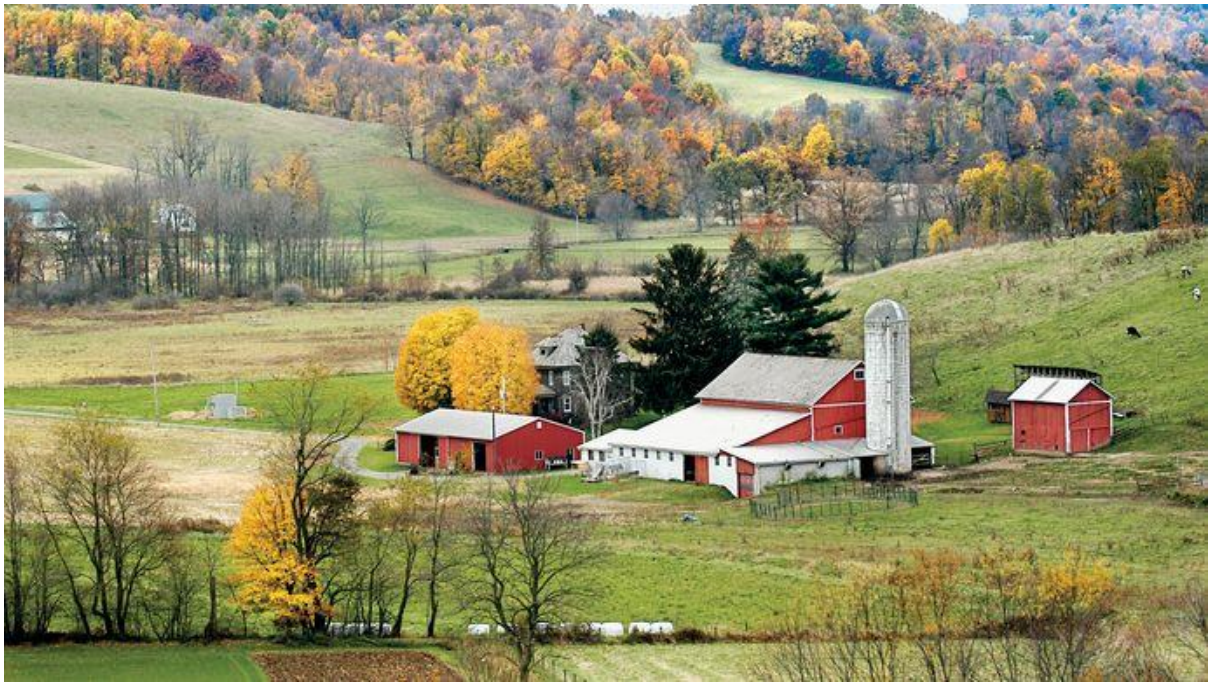
each cage holding three to 10 animals. In this case, feeding and cleaning are mechanized and the density is higher. The typical laying house holds several thousand hens. The same facilities as for broilers are used, but use of the cage is more common for layers. There are several types of cages, some of which are mechanized to facilitate feeding, cleaning, and egg collecting. Each cage can hold one to five hens. The density can reach about two hens per square foot (23 hens per square metre). The main types are cages in two- or three-story batteries (California cages), which are not superposed but rise in tiers; and flat-deck cages, which allow maximum mechanization. The buildings are generally one story, fully enclosed; they have insulated structures with sophisticated ventilation systems. Turkeys and other fowl are housed like poultry but generally on the ground. Rabbit production involves housing by groups in cages, on one, two, or three stories.

# Buildings for machinery and supplies

This type of building is designed solely to afford protection from the weather, mainly rain. Machinery storage should have as much surface as possible between the interior posts, without being too deep, so that each machine can be taken out easily. The best solution is a clear-span shed, wood or metal-framed, 25 to 35 feet (eight to 10 metres wide), open on one side and 15 feet (4.5 metres) high under the gutter. At the end of the shed, one bay is reserved for repair and maintenance and another for tools. This part is equipped with sliding or overhead doors. The same shed, or another, can be used for storing the fertilizers, seeds, and pesticides.

## Crop storage

Wheat, barley, shelled corn (maize), and other cereals can be stored in farm bins if the moisture is below a certain limit (from 10 to 15 percent). In some cases artificial drying is necessary before storage, though it is possible to store wet grain, especially shelled corn, in airtight silos for animal fodder. The most common methods of storage of dry grain are (1) in piles of five to 10 feet (1.5 to three metres) on a waterproof floor in a building with reinforced walls; (2) in square or round bins erected within a building, usually of timber, plywood, corrugated steel, or wire mesh lined with waterproof paper; and (3) in watertight bins, often of corrugated metal, with their own roofs, for outside erection. Ear corn is dried by natural ventilation through a crib of limited width, located in a building or outside. Loose or baled hay is stored and sometimes dried by ventilation with fresh or heated air, either under sheds or in special installations called hay towers. Silage is made to conserve moist fodders, such as corn, sorghum, and grass. There are two types of silos. The horizontal silo is parallel-piped, either cut into the ground (trench silo) or built aboveground (bunker silo). The floor is natural earth or concrete. The walls can be concrete, timber or plywood, or sheet steel. The capacity varies but can be large. The tower silo is an above ground cylinder, with 20- to 30-foot (six- to nine-metre) diameter and a 50- to 65-foot (15- to 20-metre) height.



Amish farmhouse, Ohio.

*age fotostock/SuperStock*

Ordinary silos, which are only watertight, are of wood, concrete, masonry staves or blocks, or steel. Special airtight silos with steel walls and a fused-glass surface are used for storage of high dry-matter silage, called "haylage." Fruit and vegetable storage for family consumption is usually in caves or cellars. For crops to be marketed, conditioning and storage generally are handled by commercial enterprises, but some large specialized farms have their own storage. The buildings are insulated, and temperature control is assured either by ventilation with outside air (i.e., for potatoes and onions) or by refrigeration (i.e., for apples).

## Special-purpose structures

Many secondary farm structures, such as smokehouses and well houses, are a leftover of the past, but some are necessary in specialized farms. A typical example is the tobacco barn, built for static air circulation.