

Week 3. The farm: technical components in a system

In a farm the various technical components included in a system can be roughly separated as follows:

- **Production units**
- **Water transfer and treatment**
- **Additional equipment** (feeding, handling and monitoring equipment)

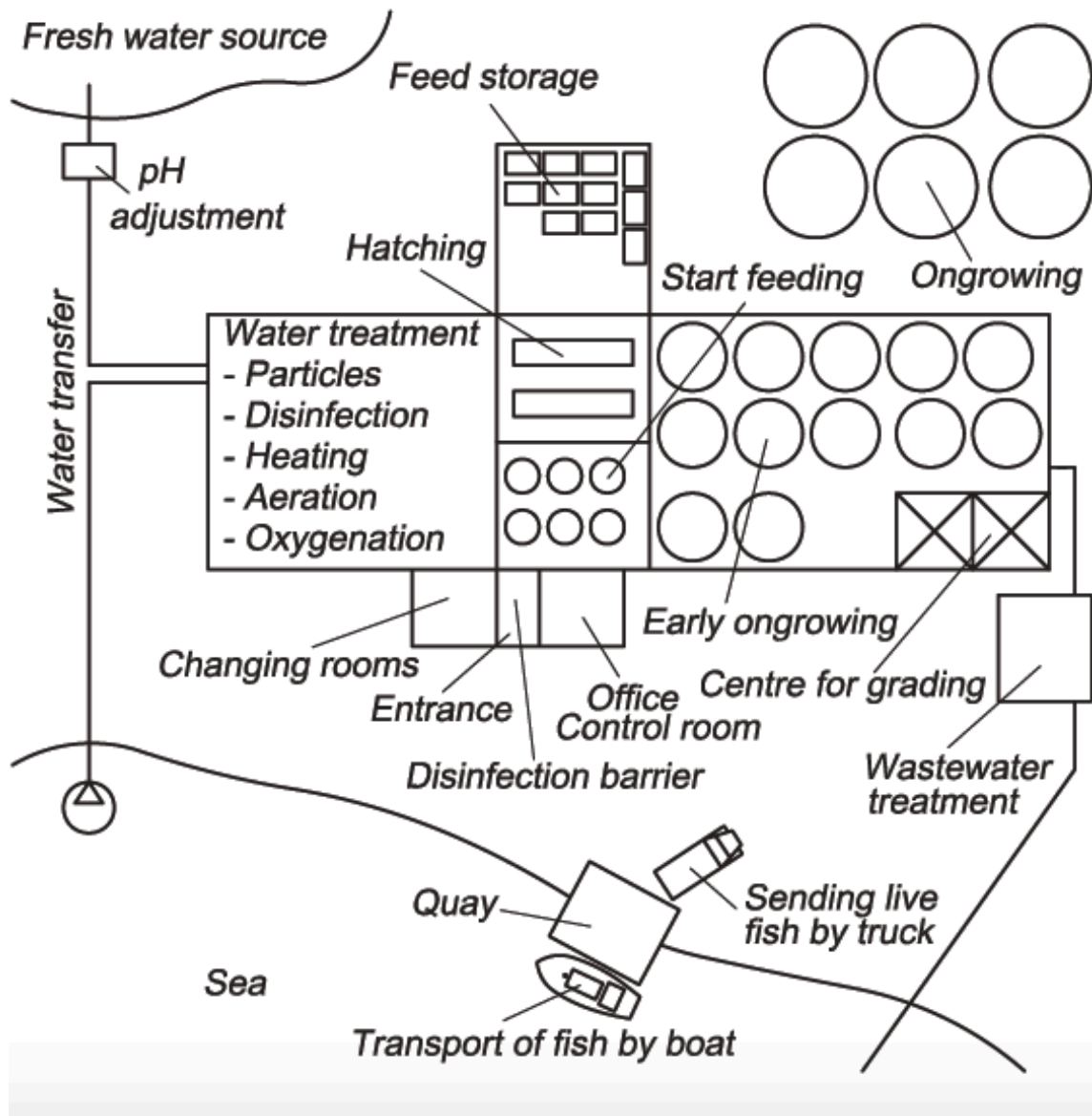
To illustrate this, two examples are given:

a land based hatchery and a juvenile farm, and an on-growing sea cage farm.

–Land-based hatchery and juvenile production farm

Land-based farms normally utilize much more technical equipment than sea cage farms, especially intensive production farms with a number of tanks. The major components are as follows (Fig. 1.1):

- Water inlet and transfer
- Water treatment facilities
- Production units
- Feeding equipment
- Equipment for internal fish transport and size grading
- Equipment for transport of fish from the farm
- Equipment for waste and wastewater treatment
- Instrumentation and monitoring systems



Water inlet and transfer

The design of the inlet depends on the water source: is it seawater or freshwater (lakes, rivers), or is it surface water or groundwater? It is also quite common to have several water sources in use on the same farm. Further, it depends whether the water is fed by gravity or whether it has to be pumped, in which case a pumping station is required. Water is normally transferred in pipes, but open channels may also be used.

Water treatment facilities

Usually water is treated before it is sent in to the fish. Equipment for removal of particles prevents excessively high concentrations reaching the fish; additionally large micro-organisms may be removed by the filter. Water may also be disinfected to reduce the burden of micro-

organisms, especially that used on eggs and small fry. Aeration may be necessary to increase the concentration of oxygen and to remove possible supersaturation of the gases nitrogen and carbon dioxide.

Production units

The production units necessary and their size and design will depend on the species being grown. In the hatchery there will either be tanks with upwelling water (fluidized eggs) or units where the eggs lie on the bottom or on a substrate. After hatching the fish are moved to some type of production tank. Usually there are smaller tanks for weening and larger tanks for further on-growing until sale. Weening start feeding tanks are normally under a roof, while on-growing tanks can also be outside.

Feeding equipment

Some type of feeding equipment is commonly used, especially for dry feed. Use of automatic feeders will reduce the manual work on the farm. Feeding at intervals throughout the day and night may also be possible; the fish will then always have access to food, which is important at the fry and juvenile stages.

Internal transport and size grading

Because of fish growth it is necessary to divide the group to avoid fish densities becoming too high.

It is also common to size grade to avoid large size variations in one production unit; for some species this will also reduce the possibilities for cannibalism.

Transport of fish

When juvenile fish are to be transferred to an on-growing farm, there is a need for transport. Either a truck with water tanks or a boat with a well is normally used. The systems for loading may be an integral part of the farm construction.