

Aquaculture & Sports Fisheries

Module Water Management



**EQF
Level
5**

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Water Management

EQF level: 5

Credit value: 10

- **Aim**

This unit aims to develop learners' knowledge and skills of water management. How do we use water in a sustainable way in our aqua cultural systems and how can we keep it clean and available for our sports fisheries. Protecting the land against flooding or drought is another task of the water manager that gets attention in this unit.

- **Unit abstract**

Water management is identified as basic scientific field which investigates hydro economic activities and above all is stimulated by actual or potential disproportion between the resources and water need for given purpose. This disproportion must be understood very widely. It is presented not only by insufficient permanent or seasonal coverage of water requirements for satisfying of that are used utility properties of water in certain territory, but also that water resources exceed this requirement permanently or temporarily in undesirable measure and when man does not gain control of them, they cause large damages.

The definition of water management was formulated according to type of hydro economic activities. Based on large-scale analysis of international viewpoints has formulated the definition of water management generally as: "Summary of manufacture activities that are realized in working processes which result in water as the product." It is understanding of water only as raw material or production tool not as the nature component. Dominant element is still water for national economy and its utilization, but it is already based on knowledge of the nature and society relations.

Moreover it defines water management as science of interdisciplinary nature developing theoretical elements of complex management of water resources affecting interaction of natural, technical and social and economic processes.

Request for complex and rational utilization of water resources results above all from their limitation.

Learning outcomes

On successful completion of this unit a learner will:

- 1 Understand basic principles and definitions
- 2 Understand the fundamentals of sustainable water management
- 3 Understand task and aims of water management
- 4 Understand the classification of water courses
- 5 Get acquainted with the main objects of water management; flood protection
- 6 Understand the main characteristics of wetlands

Unit content

1 Understand basic principles and definitions

Water cycle in nature

The water cycle in nature is driven by the Sun. Solar radiation causes evaporation of water, primarily from oceans. Water vapors are transformed into clouds, and water falls back as rain or snow. A portion of water flows underneath the ground surface, and another portion evaporates from ground, water or snow surfaces, or transpires through plants. The rest infiltrates into the ground and can reach even the groundwater table. Groundwater flows from higher elevations towards valleys and penetrates the surface in a form of springs, riverbeds or seas, or is drained by means of artificial interventions.

Water balance:

The water cycle can be quantitatively expressed by the water balance equation. The Earth's water cycle is closed, without any gains or losses. A long-term water regime balance of continents is expressed by the following equation: Precipitation, Snow, Evaporation, Infiltration, Groundwater and Runoff.

2 Understand the fundamentals of sustainable water management

Our relation to water has not changed very much for last 250 years. We appreciate water value only when it is unavailable out of reason of dryness, bad quality or high price. With increasing water consumption also amounts of produced sewage water have risen. Man increasingly develops pressure on the nature. He needs more and more pure superior water for drinking and for other purposes. On the other hand he discharges into all waters - into surface or ground ones - more and more waste waters.

Waste materials are discharged into the waters that were utilized during millenniums only as drinking water or water for crop irrigation or water was simply the resource of mechanism drive and material transport; water becomes the place of disposal of liquid and some gentle solid wastes trapped for example from gaseous emissions. Change of water quality in our territory and also worldwide is very serious during last hundred years. People have polluted not only water but also the atmosphere and the soil. Natural resources are increasingly influenced by human activity. The more resources are polluted the more people need these resources.

Water protection as ground of life is first-rate aim of environmental policy of each state. Water is influenced by various activities. Economic growth must be focused on water management covering in accordance with the environment to meet its important functions in the nature circulation as well as in the landscape economy in the future.

3 Understand task and aims of water management

Tasks and aims of water management are changing and developing with human society development.

Formerly it was mainly provision of water sufficiency for people for drinking and personal consumption and for farm crop irrigations. Gradually it was utilization for ship transportation, source of mechanical and later of electric energy, etc.

With mankind development the aims and tasks gradually expanded, changed and their importance was reevaluated.

4 Understand the classification of water courses

Classification of watercourses

Watercourse beds may be created by a natural process or artificially (channel). From this perspective, watercourses are classified into natural and artificial. Thus, a majority of river sections within developed areas of towns and municipalities is regulated by alteration of the riverbed's shape and flow capacity in order to facilitate conveyance of the maximum projected flow rate.

5 Get acquainted with the main objects of water management; flood protection

Protective constructions such as dikes, dams, sluices, pumping engine stations are originally built to protect the land from flooding. Getting the water out in the wet season or getting it in in the dry season is the main task of these management systems these days.

It works on a big scale in the Netherlands, but also on a smaller scale in aquaculture, it can manage the water needed for growing fish.

6 Understand the main characteristics of wetlands

Wetlands are defined as areas where water saturation is a determining factor of soil properties as well as plant and animal types. The common features of wetlands are constant or periodic water oversaturation of the ground, the occurrence of hygrophilous plants (hydrophytes) and the specific soil. Wetland ecosystems are intermediate forms between typical land and water ecosystems. Plant and animal systems in wetland form one of the most biologically diverse ecosystems. Wetlands are habitat for rare plant and animal species. Sometimes only there the conditions are favorable enough for the endangered species to live and reproduce. Water and marsh areas retain and purify water, counteract floods and prevent fires. They also play a significant role in the regulation of the Earth's climate, possessing supplies of organic carbon comparable to forests.

Wetlands are ecosystems waterlogged both structurally and functionally and are intermediate forms between typical land and water ecosystems, normally bordering with them. The common features of wetlands are constant or periodic water super saturation of the ground, the occurrence of hydrophanous plants (hydrophytes) and the specific soil. Generally speaking, wetlands are defined as areas where water saturation is a determining factor of soil properties as well as plant and animal types. The notion of wetlands is tantamount to such terms as marshes, bogs, swamps, deep waters, quagmires, morasses, fens.

Wetlands change in time and space. Some wetlands are permanently flooded, others are only flooded for a short time. Water may be visible on the surface or only saturate deeper layers of soil. The borders of the same wetland shift as the water level changes. Therefore it is difficult at a given moment to consider an area as a wetland only because water is visible or not.

Learning outcomes and assessment criteria

Learning outcomes On successful completion of this unit a learner will:	Assessment criteria The learner can:
LO1 Understand basic principles and definitions	Produce a paper in which is explained the basic principles and definitions of water cycle and water balance.
LO2 Understand the fundamentals of sustainable water management	Discuss the necessity of sustainable water management for sports fishing and aquaculture.
LO3 Understand task and aims of water management	Explain the tasks of a water manager to a level 4(EQF) group of students in aquaculture, sports fisheries or countryside management.
LO4 Understand the classification of water courses	Explain the different types of water courses and the functions these courses have economically or in nature.
LO5 Get acquainted with the main objects of water management; flood and drought protection.	Choose an area where water management is important (egg. Polder, Fish lake, Fish plant) and produce a paper in which is explained how the system is equipped to prevent flooding or drought.
LO6 Understand the main characteristics of wetlands	Undertake an excursion to a self-chosen wetland area and explain how the habitat functions.

Guidance

Links