Education and Culture
Lifelong learning Programme
LEONARDO DA VINCI

Aquaculture & Sports Fisheries

EQF Level 5

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http://pesfa.eu/

Fish Farming techniques

EQF Level 5:

Credit Value:10

Unit abstract

In this unit the learners will develop theoretical and practical understanding of fish production management of intensive and extensive systems. Learners will develop an understanding of the relationship between good husbandry, disease prevention, growth, and health.

Learners will develop an understanding of how a fish nutrition is managed to promote performance, health and welfare, examining how nutritional problems can arise and how they can be solved.

Learners will consider the key concepts of planning and managing breeding programmes, as well as understanding the various factors that can influence and affect fish breeding.

Learning outcomes

On successful completion of this unit a learner will:

1 Understand the management of fish production.

2 Understand the principles of fish nutrition.

3 Plan and manage fish breeding.

4 Understand the environmental impact of fish farm effluent.

Unit content

1 Understand the management of fish production.

Intensive and extensive production: types of systems and definitions; reasons for choice (eg locality, subsidies, personal philosophy, quality of life, business driven, long-term sustainability); targets for production; environmental impact; physical and financial performance.

Fish handling: consideration of animal behaviour; physiological state; approach methods; correct capture and restrain methods in a range of situations.

Fish husbandry: assessment of physical condition; characteristics of breed, preventative healthcare; routine healthcare and stock tasks; consideration of species' feeding behaviour.

Data management: importance of fish management record keeping; identification of required data; information storage and retrieval; interpretation and utilisation of current and past data; information networks; legislative requirements for record keeping.

Commercial pressures affecting the production of fish; supply and demand; choice of stock; consumers pressures (welfare, slaughter management, health) Asc (aangeven wat de afkorting is) certification; laws regulating transport, and handling of fish.

2 Understand the principles of fish nutrition.

Chemical composition and role of macro and micronutrients: sources and functions of carbohydrates; sources and functions of proteins; essential amino acids; structures sources and functions of lipids; essential fatty acids; functions of water; structures, sources and functions of vitamins; sources and functions of minerals; influence on fish quality.

Nutritional requirements of fish: condition; age; health; species; water temperature; feed intake; palatability; requirements for energy, amino acids, minerals, vitamins, dry matter and proteins; fish feed quality criteria.

Plan the nutrition of fish: routine and prescriptive feeding plan components such as feeding frequency, type and content of feed; ration calculation; cost effectiveness; staff training; purpose of types of feed; competition for food; evaluation of nutrition plans eg indicators for good health, improved performance, suggested changes if diet does not meet target; gradually introducing changes to diet; relation of feeding and water quality.

Fish health and diet-related diseases: metabolic processes; metabolic disorders; identification an rectification of nutrient excesses and deficiencies; indicators of malnutrition; changes in behaviour; unsatisfactory performance; quality of food during storage; effects of different types of food degradation.

3 Plan and manage fish breeding.

Genetics: laws of inheritance; sex determination; inbreeding; line breeding; crossbreeding; hybrids; family selection; pedigree selection; genotype and phenotype selection.

Breeding programmes for fish: objectives of breeding e.g. purpose for which fish are to be bred; cost effectiveness; procedural planning for sale or transfer of fingerlings; planning of breeding; risk assessment and quality control e.g. hygiene; ethical considerations.

Reproduction of fish: reproduction strategies of different species of fish; hatchery demands; quality and demands on broodstock, anaesthesia; hormone treatment; hand spawning; fertilization; treatment of the eggs; incubation; maintenance hatchery system, legislation.

Production of fingerlings: production of artemias and zooplankton; transferring to dry commercial foods; manage the feeding of the larva/fingerling e.g. amount of food; sequence of different types of fish food; maintenance of equipment; water quality; growth rates; record keeping.

4 Understand the environmental impact of fish farm effluent.

Water sources: lakes; rivers; wells; springs; water abstraction; water quality criteria; monitoring and measuring; water treatment; temperature; availability; seasonality.

Discharge from fish farming systems: monitoring water quality; water treatment; pollution; environmental impact; pond management; sediment removal, recycling and disposal.

Legislation: licences and permissions; water directives; national and international legislation, directives and protocols; national and international authorities .

Learning outcomes and assessment criteria

Learning outcomes **On successful completion of this unit a learner will:**	**Assessment criteria for pass** **The learner can:**
LO1 Understand the management of fish production.	1.1 Compare two production systems from a sustainability perspective. 1.2 Carry out appropriately selected fish handling and restraint techniques 1.3 Correctly assess the physical condition of fish. 1.4 Monitor performance using appropriate resources. 1.5 Analyse information in the routine management of fish 1.6 Explain the importance of record keeping 1.7 Outline the legislative requirements relevant to record keeping. 1.8 Explain supply and demand relationships affecting choice of commercial breed.
LO2 Understand the principles of fish nutrition.	2.1 Evaluate the composition of fish food. 2.2 Explain the functions of macro and micronutrients. 2.3 Discuss the nutritional requirements for different species. 2.4 Formulate fish nutrition plans for a variety of circumstances. 2.5 Examine nutritional problems relating to performance or diseases
LO3 Plan and manage fish breeding.	3.1 Implement a breeding protocol for a fish species. 3.2 Select brood stock for a specific purpose. 3.3 Carry out fertilization techniques 3.4 Explain the hatching process 3.5 Explain water quality during hatching
LO4 Understand the environmental impact of fish farm effluent	4.1 Compare and contrast water from a range of sources. 4.2 Assess the quality of the water source. 4.3 Explain the environmental impact of a fish farm 4.4 Determine the licences and permissions required in a national context.

Guidance for tutors:

Delivery

Lectures, discussions, seminar presentations, site visits, supervised laboratory and fish management practicals, research using the internet and library resources, and the use of personal and/or industrial experience would all be suitable for the delivery of this unit. Delivery will also involve practical assessments, written assessment and visits to suitable collections and will link to work experience placements.

During delivery of this unit, it is essential that tutors stress the importance of hygiene measures. Health and safety issues relating to working in a laboratory and using chemicals must be stressed and reinforced regularly, and risk assessments must be undertaken before any practical activities. Adequate personal protective equipment (PPE) must be provided and used following the production of suitable risk assessments.

Visiting experts will add to the relevance of the subject for learners. For example, fish farmers could talk about their work, the particular situations they face and the methods they use.

Essential requirements

To support the learners in achieving this unit., they must be given the opportunity to manage fish on a regular basis. A wide range of husbandry tasks, at a supervisory level must be provided for learners to develop competence and confidence.

Learners require access to both intensive and extensive fish farming systems. Where this is not possible, a suitable visit programme must be part of the course to give the learners the opportunity to experience different production systems. Learners must have sufficient time to carry out first – hand observation, research and analysis of a production system.
Learners must be involved in planning and managing the breeding of fish.
Animal welfare requirements must be paramount at all times. Fish must not be subjected to stress or inappropriate handling during the delivery on this unit.

Employer engagement and vocational contexts

A team of professionals should support the different units during the qualification by developing the programme of learning, providing guest speakers or in designing assessment activities.

Links with and access to fish production facilities is desirable including markets, processing plants and breeding facilities and food producers.