The course catalogue presented here offers an overview of the programme's typical content and is not intended to be exhaustive. Lecture topics and content may be adjusted between programme cycles to ensure that the curriculum remains relevant and responsive. Such adjustments enable us to address the specific needs and interests of participating fellows while also reflecting the availability and expertise of guest lecturers and faculty members.

GRÓ-FTP Introductory Course Description

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Overview

All fellows take part in GRÓ-FTP's introductory course during the first 5 weeks of the 6-month training programme. Through this part of the programme, Fellows develop a holistic view of fisheries, providing them with insights into various disciplines within fisheries and their connectedness. Fellows receive a comprehensive overview of fisheries in an international context, sharpening their understanding of fisheries in their home countries and what is needed for a fisheries sector to evolve. Through individual assignments and presentations, Fellows also gain insights into the fisheries sectors of their peers' countries, allowing them to compare different contexts, challenges and approaches, and to place their own fisheries systems in a broader perspective.

The Introduction consists of a series of lectures /tutorials /site visits and assignments, touching upon the subject of personal and professional growth, and group dynamics.

Fellows are encouraged to break cultural barriers and develop their capacities as a fisheries professional working in an international environment. Throughout the Introductory course, fellows ought to be active in discussions and to develop arguments to support their views on fisheries. To that end, it is important for fellows to work hard, with dedication, and with a positive attitude on all assignments.

Assignments

During the introductory course of the FTP, fellows complete several assignments. Through these assignments, fellows prepare themselves for working with others, reflect on the fisheries in their home countries in a global context, practice various forms of communication, and prepare for their final projects. Assignments during the introductory course include:

- Social assignment
- Topical assignments (3)
- Professional goals

Topical Assignments

There are three individual assignments in the introductory course. The goal of the individual assignments is to for fellows to reflect on the fisheries in their home country and to share their views and understanding with others. This is also a way to practice giving presentations and the art of communication. Through the individual assignments, fellows compare their home country fisheries with regional and world fisheries. Fellows are asked to develop a complex understanding and analyse aspects of fisheries in their home country with which they may be unfamiliar. Moreover, fellows are encouraged to listen to their colleagues and ask questions of one another. In this way, fellows begin to make use of one another's expertise and the unique and diverse knowledge and experience present in each cohort.

For each of these assignments, fellows prepare presentations and write a comprehensive summary of one-two pages in length. In their written work, fellows are instructed on proper usage of references and citations for academic work. Fellows receive feedback from the GRÓ-FTP staff on both the presentations and on the written submissions.

The topical assignments are:

1) Capture fisheries /aquaculture in home countries (7 min PP and 1-2 page summary)

In this assignment, fellows are asked to describe elements of capture fisheries or aquaculture in their home countries. This may relate to a general description of the fishery, the economic importance, and number of fishermen, types of vessels, total catch, and seasonality, etc.

Given the brief time allotted for the presentation, fellows are challenged to narrow the scope of their talks to cover topics relating to, for example: one region of their country, inland fisheries or marine, coastal fisheries or offshore, pelagic or demersal, or even a specific well-defined fishery, e.g. from a specific lake or on a specific species. If fellows

choose to present on aquaculture, you can discuss a specific species, or a method, e.g. tilapia culture, polyculture, ranching (culture-based fisheries) etc.

When presenting numerical information, fellows are asked to evaluate its accuracy and consistency.

If more than one person is from the same country, fellows are asked to coordinate topics, so they do not cover the same information.

2) Resource governance in home countries (7 min PP and 1–2-page summary).

In this assignment, Fellows are asked to describe and discuss the governance and policy situation around a particular fisheries, aquaculture, fishing gear used, or a species/stock in home country. What is needed for successful resource governance? What are the primary challenges and how are these challenges addressed?

3) Fish value chain OR fishing technology in home countries (7 min PP and 1–2-page summary)

In this assignment, Fellows are asked to present on fish value chains or fishing technology in home country. They may describe and discuss a particular value chain for wild catch or cultured fish at home and assess the value addition potential and how quality in the processing is assured and controlled. If working with Fishing Technology, fellows are asked to focus on the main boat and gear types and analyse them with respect to selectivity, environmental impact and so on.

Professional goals

The main goal of this assignment is for fellows to reflect on themselves as professionals and to realize what they want to get out of this training. This work aims to emphasize the responsibility fellows have for their own learning. It is also the first step towards formulation of an individual research project, to be carried out at the end of the 6-month course. This assignment is also a way for fellows to practice writing skills and strengthen the ability to express their thoughts and opinions. This assignment helps us to shape the training according to the needs of the fellows. Fellows receive a lecture from GRÓ-FTP staff on how to formulate and write professional goals during the introductory course. They then meet individually with GRÓ-FTP administrators at the end of the introductory course to discuss their short and medium, term goals, and to begin the process of formulating research ideas for their final project.

Lectures & other activities

Week 1 – Orientation week

The Orientation Week is designed to help Fellows settle into life in Iceland and prepare for the six-month training programme ahead. Through practical orientation activities, Fellows become familiar with Hafnarfjörður, Reykjavík and the facilities of the Marine and Freshwater Research Institute (MFRI), while receiving support with essential administrative requirements, including residence permit procedures, health checks and other practical arrangements. The week also provides an opportunity for Fellows to get to know one another and begin building the supportive and collaborative learning community that will underpin the programme. Through introductory sessions, Fellows are introduced to GRÓ FTP's philosophy and objectives, gain an overview of the programme structure and expectations, and become familiar with the different components of the training programme that they will engage with over the following six months.

Week 2 – The aquatic resource

State of World Fisheries and Aquaculture

This module presents the latest update of the world fisheries and aquaculture and how it has developed. The emphasis is on quantity, fishing nations, dominant species, and the types of fisheries in relation to industrial vs. small scale fisheries. Case studies come from the Pacific with special focus on how climate change may impact world fisheries.

Social Assignment

The Social Assignment is designed to acquaint Fellows with each other and their surroundings. Fellows are asked to work together and gather information on a range of topics, such as Icelandic culture; recreational opportunities; food and shopping services; and entertainment and lifestyle. The assignment encourages them to explore Hafnarfjörður, Reykjavík and its surroundings. Working in small groups, Fellows are given one of the theme or activity areas described below and are tasked with identifying and visiting relevant locations, gathering information, photographs and other material to share with their peers in the form of a presentation on their topic. The assignment promotes active exploration of the local environment, supports the development of relationships among Fellows during their first days in Iceland, and aims to share information about daily life in Iceland. Through the subsequent presentations, Fellows learn about a wide range of cultural, social and practical aspects of living in Iceland that may be useful throughout their six-month stay.

Each team is assigned one of the themes below:

- ✓ **Heritage culture:** the artistic, historical, and cultural legacy of Icelanders. Examples include museums, historical sites, traditional arts, architecture and buildings of note and folklore. *What is interesting to see and know?*
- ✓ **Spending Time Outdoors**, **Nature and Environment:** areas of nature to enjoy and public recreation spaces. *Where can we go to enjoy time spent outside?*
- ✓ **Food and Shopping**: Practical information about "daily life in Iceland" regarding Icelandic cuisine, popular food shops, where to buy international food, butget-friendly shopping, outlets for winter clothing and up-cycled clothes. *What (where) can we buy?*
- ✓ **Icelandic lifestyle, leisure and community life.** Examples include music, sports, films, theatre and entertainment for the public. *What can we do for entertainment and where?*

Fish Biology

This seminar provides an introduction to fish biology and ecology, beginning with the evolution, diversity, and adaptations that have enabled fishes to occupy a remarkable range of aquatic environments. It then examines key life-history traits and population processes, including growth, reproduction, recruitment, mortality, species interactions, and the factors that influence population abundance and productivity. The seminar concludes by exploring how biological and ecological knowledge supports sustainable fisheries and aquaculture through stock assessment, resource management, and aquatic food production. Drawing on examples from both marine and freshwater ecosystems, the seminar provides a foundation for subsequent courses on stock assessment and aquaculture principles.

Field-trip: Sampling at MFRI

A central focus of this field trip is the collection, processing, and management of biological data used in fisheries research and stock assessment. Participants are introduced to sampling programmes conducted by MFRI, including research surveys at sea and biological sampling from commercial catches. Particular attention is given to age determination methods, including the collection and interpretation of otoliths and scales, and to the role of biological data in understanding growth, recruitment, population dynamics, and stock status. Fellows are also introduced to databases, digital tools, and quality-control procedures that support fisheries science and management. Through direct observation of laboratory and sampling activities, participants gain a practical appreciation of how scientific evidence is generated and transformed into the knowledge required for sustainable fisheries management. Beyond its technical objectives, the field trip serves as an introduction to Iceland's fisheries and aquatic food system at the beginning of the programme. By connecting scientific sampling and data collection to management institutions, industry actors, and seafood value chains, the excursion helps participants understand how research supports

decision-making and how effective collaboration between scientists, managers, and industry contributes to the sustainable use of aquatic resources.

Fisheries (and Aquaculture) Technology: Selectivity and Fish Behaviour

Participants are introduced to the major categories of fishing gear used worldwide and examine how gear design influences species and size selectivity, bycatch rates, catch quality, fishing efficiency, and the reliability of scientific sampling programmes. Particular attention is given to the sensory capabilities and behavioural responses of fish, including vision, hearing, smell, taste, and mechanoreception, and how these responses can be used to improve fishing operations and fisheries management. The seminar also considers parallels with aquaculture, where knowledge of fish behaviour is similarly used to optimise feeding, growth, welfare, stock monitoring, and environmental performance. By linking aquatic animal biology with technological design, the seminar provides participants with a foundation for understanding how technology can support responsible resource use, improved data collection, and sustainable aquatic food production.

Oceanography and Fisheries

The seminar examines how (freshwater) and marine ecosystems generate food through primary production by phytoplankton and other aquatic plants, and how this production supports the food webs that ultimately sustain fisheries and aquaculture. Participants explore the role of oceanographic processes such as mixing, stratification, currents, wind-driven circulation, and upwelling in regulating the availability of nutrients and the distribution of biological productivity across the world's oceans and inland waters. The course follows the flow of energy and matter from primary producers through plankton communities and food webs to commercially important fish populations, highlighting why some regions support highly productive fisheries while others remain relatively unproductive. Through examples from major fishing regions around the world, the seminar demonstrates how physical and biological processes are fundamentally linked to fisheries production and food security. By establishing this ecological and oceanographic foundation, the course prepares participants for later discussions on climate variability and change, environmental stressors, biodiversity, and their implications for fisheries, aquaculture, and aquatic food systems.

Week 3 – Resource management

Climate and Fisheries

The seminar examines how climate variability and climate change influence marine ecosystems, fish stocks, and fisheries, and how these effects interact with fishing pressure and resource management. Through global case studies, including examples from the Pacific, Africa, Asia, the Caribbean, and the North Atlantic, participants explore the impacts of ocean warming, large-scale climate phenomena such as ENSO,

shifting species distributions, and emerging challenges for food security and livelihoods. The seminar highlights the importance of ecosystem-based management, climate adaptation, and long-term monitoring in supporting sustainable fisheries and resilient coastal communities.

Fisheries (and Aquaculture) Technology: Fishing Gear Impact

Participants assess the strengths and limitations of different fishing gears and operational practices and are introduced to methods used to evaluate impacts on seabed habitats, non-target species, marine mammals, sensitive ecosystems, and fish stocks. The course also considers broader challenges such as illegal, unreported and unregulated fishing, abandoned and lost fishing gear, plastic pollution, and the emerging role of circular-economy approaches in reducing environmental footprints. By highlighting both fisheries and aquaculture interactions with the environment, the seminar emphasizes the importance of understanding technological impacts as a prerequisite for responsible management, effective regulation, and the achievement of sustainability objectives such as SDG 14 and ecosystem-based resource management.

Governance -- International Law of the Sea

The seminar examines the international legal and institutional framework governing fisheries within Exclusive Economic Zones (EEZs) and on the high seas, with particular emphasis on the United Nations Convention on the Law of the Sea (UNCLOS), the UN Fish Stocks Agreement, and regional fisheries management organizations. Through practical case studies, participants explore the management of shared and migratory fish stocks, the challenges of international cooperation, and global efforts to combat illegal, unreported and unregulated (IUU) fishing through flag state, port state, and market state measures. The seminar highlights the importance of effective governance, compliance, and regional collaboration in ensuring the sustainable use of marine resources and protecting the economic and food security interests of coastal nations.

Week 4 – Blue food for future

Fish for Food I: Overview of fish composition, properties, spoilage, handling and processing

This seminar shifts attention from the production of fish biomass to the delivery of safe, nutritious, and high-quality fish foods. The course examines the physical, and chemical properties of fish as a raw material and explores how species characteristics, environment, season, harvesting methods, and post-harvest practices influence product quality and value. Participants are introduced to the post-mortem changes that occur after capture or harvest, including rigor mortis, enzymatic breakdown, microbial activity, and lipid oxidation, and how these processes affect freshness, shelf life, texture, flavour, and nutritional quality. Particular emphasis is placed on good handling practices throughout the value chain, including bleeding, gutting, washing, chilling,

icing, storage, transportation, and cold-chain management. The seminar introduces methods used to assess fish freshness and quality, including sensory, microbiological, biochemical, and physical indicators. Participants also gain an overview of major preservation and processing methods such as freezing, drying, salting, and smoking, with a focus on the scientific principles that underpin their effectiveness.

Fish for Food II: Fish value chain, post-harvest losses and food safety and security

The course explores the nutritional importance of fish and other aquatic foods as sources of high-quality protein, essential fatty acids, vitamins, and minerals, and considers their contribution to food security, public health, and sustainable development. Participants examine the four dimensions of food security, namely availability, access, utilization, and stability, and discuss how aquatic foods can contribute to improved dietary outcomes and livelihoods, particularly in developing countries. A major focus of the seminar is the causes and consequences of post-harvest losses along aquatic food value chains. Participants explore how physical damage, quality deterioration, inadequate infrastructure, poor handling practices, weak cold chains, and market-related factors contribute to losses in both quantity and quality, and examine strategies for reducing losses and increasing value creation. The seminar also introduces key concepts in food safety and quality assurance, including biological, chemical, and physical food hazards, risk and hazard analysis, hygienic practices, and preventive food control systems.

World Seafood Trade

The seminar examines how international seafood markets coordinate the movement of fish and fish products from producers to consumers across the globe. Participants explore the structure and dynamics of world seafood trade, major importing and exporting regions, evolving consumption patterns, and the growing role of aquaculture in meeting global demand. The seminar introduces concepts of competitiveness at the national, industry, and firm levels, drawing attention to value creation throughout the seafood value chain, from harvesting and processing to distribution, marketing, and retail. It also examines changing consumer preferences, sustainability requirements, product differentiation, and the strategic factors that shape market access and trade performance. The seminar highlights both the opportunities and limitations of market-based systems in promoting efficiency, innovation, and international exchange, while providing a foundation for subsequent discussions on market failures, sustainability challenges, and equity concerns within global seafood value chains.

Global Warming and Other Challenges

Complementing earlier lectures on climate impacts on fish stocks and fisheries, the seminar focuses on the broader ecological consequences of environmental change in marine ecosystems. Participants examine ocean warming, acidification, harmful algal blooms, oxygen depletion, pollution, eutrophication, and other interacting stressors

that affect marine food webs, biodiversity, seafood safety, and aquatic food production. Through international case studies and examples from Icelandic waters, the course highlights how changes at the base of marine ecosystems can propagate through food webs and influence fisheries, aquaculture, and coastal livelihoods. Particular emphasis is placed on understanding ecosystem resilience and identifying adaptation strategies, including monitoring systems, ecosystem-based management, climate-resilient aquaculture practices, and actions that reduce local environmental pressures, thereby strengthening the capacity of marine sectors to respond to a changing ocean.

Fisheries (and Aquaculture) Technology: Innovative Fishing Gear Solutions

Through international case studies, participants are introduced to innovative solutions including modified trawls, sorting grids, bycatch-reduction devices, ropeless fishing systems, advanced materials, optical monitoring systems, artificial intelligence applications, real-time decision-support tools, and technologies that improve fisheries certification and sustainability performance. While the primary examples come from capture fisheries, the seminar also draws attention to common innovation challenges shared with aquaculture, including environmental stewardship, technological adoption, investment needs, and performance monitoring. Emphasis is placed not only on individual technologies but also on the processes through which innovation occurs, how new solutions are evaluated, and how countries can identify technologies that are appropriate to their own ecological, institutional, and economic circumstances. The seminar encourages participants to view technology as an important component of broader strategies for sustainable aquatic resource management and food-system transformation.

Political Economy of Food Systems

The seminar examines why food systems often struggle to deliver outcomes that are environmentally sustainable, economically efficient, and socially equitable. Drawing on concepts from political economy, the seminar explores how market failures, externalities, unequal power relations, institutional weaknesses, and policy choices influence the production, distribution, and consumption of food, often leaving significant environmental and social costs unaccounted for. Against this backdrop, participants consider the role that fisheries, aquaculture, and other aquatic foods can play in advancing sustainable development, improving nutrition, and strengthening food-system resilience, particularly in regions facing rapid population growth, persistent poverty, and major development challenges. The seminar combines practical insights from international development and fisheries policy with a discussion of the governance and policy choices needed to build more sustainable, inclusive, and resilient food systems.

Research and Emerging Solutions

Drawing together themes from earlier seminars on aquatic ecosystems, resource governance, seafood value chains, and food systems, the seminar explores how research, innovation, and collaboration can help address some of the most pressing challenges facing the aquatic food sector. Participants examine the role of science and technology in improving the sustainability, productivity, and resilience of fisheries and aquaculture, while also considering how effective solutions emerge through cooperation among governments, research institutions, universities, development agencies, and industry partners. Through international case studies and practical examples, the seminar highlights how advances in fisheries technology, ecosystem-based management, digital tools, biotechnology, and circular economy approaches are contributing to more sustainable use of aquatic resources. Particular attention is given to innovation that reduces waste, improves resource efficiency, creates higher-value products from underutilized biomass, and strengthens the contribution of aquatic foods to food security and economic development.

Crosscutting lectures

Research Methods

Session 1: Research Questions and Research Design

This session introduces students to the logic of scientific inquiry in fisheries science and examines how research questions shape methodological choices. Drawing on examples from fisheries biology, ecology, economics, governance, and social science, students will learn how to formulate clear and actionable research questions and how different research designs can be used to investigate complex fisheries issues. The session will also introduce qualitative, quantitative, and mixed-method approaches, emphasizing their suitability for different types of research questions and the importance of aligning methods with study objectives.

Session 2: Data Collection, Sampling, and Introduction to Qualitative Analysis

This session focuses on the collection of high-quality data and the factors that influence the validity and reliability of research findings. Students will explore sampling strategies, survey design, interview techniques, observational methods, and common sources of bias in fisheries research. The session will also introduce the basic principles of qualitative data analysis, including coding, categorization, and thematic analysis, using practical fisheries examples to demonstrate how interview and textual data can be systematically transformed into scientific evidence.

Session 3: Data Exploration and Descriptive Analysis in R

This session introduces students to practical data analysis workflows using R and focuses on the transition from raw data to summarized information. Students will learn

how to import, manage, visualize, and explore fisheries datasets using simple and reproducible R scripts. The session will cover descriptive statistics, graphical exploration of data, measures of central tendency and variability, and the identification of patterns, trends, and potential data quality issues. Emphasis is placed on understanding data before undertaking formal statistical analyses.

Session 4: Inferential Statistics and Applied R Workflows

This session introduces the fundamentals of statistical inference and their application to fisheries research problems using R. Building on the exploratory techniques introduced previously, students will learn how to formulate and test hypotheses, estimate relationships among variables, and quantify uncertainty in scientific conclusions. Practical examples will include t-tests, correlation analysis, linear regression, confidence intervals, and the interpretation of statistical outputs generated in R. The session emphasizes hands-on application rather than mathematical derivation, providing students with basic analytical tools that can be immediately applied to fisheries datasets.

Assessment

As an individualised training programme, the GRÓ-FTP does not employ standard examinations as part of its assessment regime for the fellows. We anticipate that fellows come to us from a variety of academic and professional backgrounds, and as such, assessment methods focus on individual growth of each fellow, rather than a common metric of evaluation.

With the aim of personalised and individual growth, there are several methods for assessment of fellows throughout the introductory course. Fellows receive feedback on written work and presentations delivered through the assignments. This feedback is provided in several areas, including the technical content of the assignment and presentation, as well as the fellow's presentation style and academic writing.

In addition to the technical assignments, fellows draft professional goals intended to guide their growth over the course of the training programme. Personal interviews between fellows and GRÓ-FTP staff are taken at the end of the introductory part of the course. During these interviews, fellows discuss their professional goals and begin to articulate potential areas of interest for their final individual research projects.

Monitoring

For each module of the 6-month training programme evaluations are performed which gather important feedback crucial for improving the operation of the training programme. For the introductory course, this typically takes the form of a written

questionnaire administered online. The questionnaire aims to determine which elements of the introductory could are relevant and useful for the fellows, and if there is content that is included which should not be, or if there is anything important which is not adequately covered.