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Role	Name	Organisation	Date	File suffix
Authors/ Task Leaders	Mary Frances Davidson	GROFTP	22/11/2021	MFD
WP leader	Mary Frances Davidson	GROFTP	22/11/2021	MFD
Coordinator	Jónas R. Viðarsson	MATIS	22/11/2021	JRV
Administrative Coordinator	Oddur M. Gunnarsson	MATIS	22/11/2021	OMG

## **Deliverable D7.10**

# **Report on the advanced post-graduate training programme**

22/11/2021



## Executive Summary

Training, education and capacity building are key objectives of FarFish. The project has addressed these objectives in variable approaches, depending on the needs of the different target groups. One of these approaches is outlined in Task 7.5 of the FarFish project description, as “advanced post-graduate programme for key personnel working in relevant supply chains”. The programme was successfully delivered by the GRÓ Fisheries Training programme (GRÓ-FTP), as reported in this document. This six-month programme was adapted for FarFish partners in the Case Study SFPAs countries and targeted participants in influential positions, to provide and create in-depth knowledge on fisheries management and related issues.

The GRÓ-FTP is an established training programme, based in Iceland and funded through the Ministry for Foreign Affairs as part of Iceland’s Official Development Assistance. The mission of GRÓ-FTP is to enhance capacity of individuals and institutions in developing countries to sustainably use living aquatic resources. The programme began operation in 1998. The core activity of the GRÓ-FTP is an annual six-month post graduate fellowship programme, targeting mid-career fisheries professionals from developing countries. Fellowships are awarded based upon an established set of selection criteria, candidates are selected to participate in cooperation with their institutions.

A total of five (5) fellowships were awarded through the duration of the FarFish project to scientists and experts working in FarFish Case Study partner organisations. These fellowships were awarded based upon the FarFish Training Needs Assessments and subsequent visits to the Case Study countries, in which capacity gaps and priorities were established.

The post-graduate training was impacted by the COVID-19 pandemic. Due to international travel restrictions, fellows who had been selected for training in the 2020-2021 cohort were required to delay their participation by one year. As such, even with the extension of the FarFish project, the five fellows were not able to complete the programme within the life of the FarFish project. Nevertheless, three (3) FarFish fellows fully completed their studies, with research reports produced and published on the [groftp.is](http://groftp.is) website, and two (2) FarFish fellows are currently enrolled in the GRÓ-FTP six month programme, and are expected to graduate in March 2022.

This document outlines the selection of fellows for training, the structure of the six-month training, and summarises the outputs of the fellows’ research projects.

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# 1 Introduction

Training, education and capacity building are key objectives of FarFish. The project has addressed these objectives in variable approaches, depending on the needs of the different target groups. One of these approaches is outlined in Task 7.5 of the FarFish project description, as “advanced post-graduate programme for key personnel working in relevant supply chains”. The programme was successfully delivered by the GRÓ Fisheries Training programme (GRÓ-FTP), as reported in this document. This six-month programme was adapted for FarFish partners in the Case Study SFPAs countries and targeted participants in influential positions, to provide and create in-depth knowledge on fisheries management and related issues.

The GRÓ-FTP is an established training programme, based in Iceland and funded through the Ministry for Foreign Affairs as part of Iceland’s Official Development Assistance. The mission of GRÓ-FTP is to enhance capacity of individuals and institutions in developing countries to sustainably use living aquatic resources. The programme began operation in 1998. The core activity of the GRÓ-FTP is an annual six-month post graduate fellowship programme, targeting mid-career fisheries professionals from developing countries. Fellowships are awarded based upon an established set of selection criteria, candidates are selected to participate in cooperation with their institutions.

A total of five (5) fellowships were awarded through the duration of the FarFish project to scientists and experts working in FarFish Case Study partner organisations. These fellowships were awarded based upon the FarFish Training Needs Assessments (D7.4) and subsequent visits to the Case Study countries, in which capacity gaps and priorities were established.

This document outlines the selection of fellows for training, the structure of the six-month training, and summarises the outputs of the fellows’ research projects.

## 2 Structure of the GRÓ-Fisheries Training Programme

### 2.1 Overall description of the six-month course

#### 2.1.1 Introduction to GRÓ-FTP

The Fisheries Training Programme (FTP) was established in 1998 through a trilateral agreement between the Icelandic Ministry for Foreign Affairs, the Marine Research Institute of Iceland, and the United Nations University as part of Iceland's development cooperation efforts. The Programme ran as the United Nations University Fisheries Training Programme (UNU-FTP) from 1998 through 2019, before becoming part of the GRÓ Centre under the auspices of UNESCO in January 2020.

The mission of the GRÓ Fisheries Training Programme is to strengthen institutional capacity to support the sustainable use of living aquatic resources in developing countries through international educational and research cooperation.

Ultimately, the FTP's aim is to assist partner countries in achieving their own development goals related to fisheries. To achieve this, partnerships are formed with institutions, agencies, and organizations in partner countries which are important in developing, supporting, and implementing fisheries policies. Based on the capacity gaps identified in close consultation with our partners, the FTP creates content and training programmes to address the needs in each country and organisation.

While considering the importance of cultural diversity and gender equality, the activities of the programme have a special focus on Africa and Small Island Development States (SIDS) where fisheries play an important role in local economies and culture. The FTP primarily partners with countries which qualify for ODA assistance in accordance with the OECD DAC classification.

The FTP applies an approach based on the principles of Education for Sustainable Development. FTP builds on the knowledge and expertise of different experts by liaising with a wide range of Icelandic and international institutions and organisations.

#### 2.1.2 6-Month Course Description

The core activity of the FTP is an annual postgraduate level six-month training programme in Iceland which aims to strengthen the professional capacity and competency of FTP Fellows to actively contribute to work done in their organisations and to recognise development potential in their home countries. Each year, the course runs from September to March and comprises three modules; an introductory part, a specialisation part, and an individual research project. Successful graduates receive a UNESCO GRÓ certificate of completion.

### ***2.1.3 Introductory course***

The introductory part occupies the first five weeks of the programme and gives Fellows a holistic view of fisheries, providing them with insights into various disciplines within fisheries and their connectedness. In this course, 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. The introduction consists of a series of lectures, site visits and assignments, touching upon the subject of personal and professional growth, and group dynamics. The FTP places emphasis on environmental conservation and gender equality which are integral to sustainable fisheries and the development of the fisheries sector.

### ***2.1.4 Specialist course***

On completion of the introductory part, each Fellow joins a specialist line according to their area of expertise and responsibilities at home. The lines focus on one specific area of fisheries and aims to hone each Fellow's knowledge and experience throughout a six-week programme of lectures, assignments, and site visits. During this time, Fellows develop ideas for a final project in collaboration with their supervisors communicated through a project proposal submitted orally and in writing.

The FTP offers training in four areas of specialisation:

- Fisheries Policy and Management
- Stock Assessment and Gear Technology
- Quality Management of Fish Handling and Processing
- Sustainable Aquaculture

### ***2.1.5 Project work***

The programme culminates in a twelve-week individual project in which fellows work closely with a supervisor to conduct research on a pressing issue related to their work at home. The project work combines the Fellow's experience and practical skills gained in the introductory and specialist training, along with their personal goals on an individual research topic. Project design skills are applied to develop and present a research proposal, and then research is conducted individually through close collaboration with an expert supervisor. Final projects most often involve data directly from Fellows' home countries. On completion, a research paper is submitted and published on the GRÓ-FTP website. In addition, Fellows are required to design an information poster summarising their research and present their results in an open dissemination meeting.

### ***2.1.6 Assessment***

As an individualised training programme, the FTP does not employ standard examinations as part of its assessment regime for the fellows. Fellows are working, mid-career professionals, and not traditional students. We anticipate that fellows attend the 6-month course 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. Through our assessment strategies we aim to support the progress of each individual fellow.

With the aim of personalised and individual growth, there are several methods for assessment of fellows throughout the 6-month course. In the introductory course, fellows receive feedback from FTP staff on written work and presentations delivered with 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 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.

Assessment in the specialist course is coordinated and conducted by the leaders of each line of the specialisation. Each line includes a series of lectures, site visits, assignments, and practical exercises.

During the specialist course, fellows receive a workshop on project management and proposal writing, delivered by GRÓ-FTP staff, as they begin the process of formulating their own project proposals. At the end of the specialisation course, fellows submit a project proposal and present their ideas to the rest of the group. These proposals are assessed based on several criteria, and should demonstrate the fellow's ability to:

- Adequately describe the situational context for the issue to be addressed.
- Formulate specific goals and objectives for the research
- Describe the methodology the fellow will employ in the project
- Create a budget for any expenses associated with the execution of the project
- Develop a realistic timeline for collecting and analysing data, and for writing the report itself

Over the course of the individual project period, GRÓ-FTP staff hold meetings with both the supervisor and fellow at least two times, and more frequently if extra support is required. The purpose of these meetings is to monitor the progress of the research and provide additional support to both the fellows and the supervisors when required.

The assessment of the research projects is based on several criteria. In general, these projects should demonstrate the fellow's ability to:

- Set the context for the problem the research aims to address
- Synthesise existing knowledge of the topic through a literature review
- Apply selected research methodology
- Critically analyse data and information collected



- Describe results in the context of existing knowledge,
- Interpret what the results mean for the issue in a wider context,
- Clearly communicate how the results from the project can be meaningfully applied to address the issue being researched.

### **2.1.7 Monitoring**

For each module of the 6-month course evaluations are performed which gather important feedback crucial for improving the operation of the training programme. These are described in the module descriptions. At the end of the six-month course, a written evaluation is conducted which is online and anonymous. These written evaluations are followed up with focus groups, held with each line of specialisation.

### **2.1.8 Selection of Countries, institutional partners, and fellows**

#### *2.1.8.1 Country Selection*

The selection of FTP partner countries builds upon an identified and mutually agreed upon need in the country for the type of capacity building offered by the FTP. In addition:

- The country has a policy to develop sustainable, science-based management of fisheries
- The country lacks capacity to sustainably manage its aquatic resources
- It is a country that qualifies for Official Development Assistance, as defined by the OECD DAC
- The country is stable, with institutions receptive and able to apply capacity developed through the FTP

#### *2.1.8.2 Institution Selection*

Depending on a partner country, targeted partners of the FTP in developing countries are governmental agencies, universities, and other organisations that have the mandate to deal with fisheries development issues. These partners include relevant ministries responsible for designing and implementing policies and regulations fisheries; universities, and research institutions. FTP works with the partners to identify training and research needs and to design and run custom made short courses. The partner organizations also nominate candidates for the six-month training, who are then selected by FTP through a thorough selection process.

#### *2.1.8.3 Fellow Selection*

FTP aims to train key people within partner organisations, who are well-positioned to apply and disseminate their new knowledge and skills after they return home. FTP does not accept applications from individuals. Instead, they apply a selection process which is intended to secure appropriate candidates:

- Candidates must have at least one university degree,
- Candidates must have at least one year's working experience in the field they intend to study

- Candidates must hold a position within their organisation that allows them to apply and disseminate the knowledge and skills gained through the training
- Candidates must demonstrate ability to communicate effectively in English
- Candidates are interviewed by FTP staff members or their representatives.
  - Usually, the interviews take place in the partner country, which in itself is a strategy for strengthening the connections between FTP and the partners and also offers opportunities for informal progress monitoring
  - Candidates are interviewed virtually when physical meeting are not possible

The FTP makes the final selection and selected candidates are invited to attend the training, in cooperation with their organisations. The training is free of charge for the fellows. All expenses directly connected to the training are paid by GRÓ, or in some cases by sponsors. The partner organisations are expected to release them from their day-to-day responsibilities during the training period.

### ***2.1.9 Long term change and impact***

Some of the general assumptions behind the work of GRÓ-FTP are:

- In each partner country, there are key local institutions and organisations that have the potential and ambition to contribute to necessary changes in the fisheries. FTP identifies those institutions and chooses to work with them.
- Selected institutions/organisations have a mandate to work on fisheries development issues; to work towards better fisheries science, fisheries policies, improve the fisheries value chains, or improve aquaculture practices.
- To maximize impact, FTP needs to be flexible and adapt over time in selection of partner countries and collaborating partners.

### ***2.1.10 Icelandic partners***

GRÓ-FTP is funded by the Ministry of Foreign Affairs and hosted within the Icelandic Marine and Freshwater Research Institute. Other partner institutes within Iceland include the University of Iceland, Matís Ltd. - Icelandic Food and Biotech R&D, the University of Akureyri, and Hólar University College. These effective partnerships offer a broad-based learning and training environment for our fellows by providing access to experts in diverse specialist fields. One of the reasons Iceland was chosen to host the FTP was because of easy accessibility to knowledge from so many expert areas within a highly developed fishing industry due to the unusually close connections between industry, academia, governmental and research institutions within the country.

Additionally, the GRÓ International Centre for Capacity Development, Sustainable Use of Natural Resources and Societal Change, as well as the other GRÓ programmes on land restoration, geothermal and gender equality, are key partners in Iceland.

### **2.1.11 UN partners**

The primary UNESCO partner for the GRÓ-FTP is the Intergovernmental Oceanographic Commission. Within the wider UN system, the work of FTP is closely related to the mandates of the UN FAO, the UNDP, and UNEP.

## **2.2 Introduction module**

### **2.2.1 Course description**

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. The Introduction consists of a series of lectures, 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 work hard, with dedication, and with a positive attitude on all assignments.

### **2.2.2 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
- Individual assignments (3)
- Professional goals

### **2.2.3 Social assignment**

The main goal of this assignment is to acquaint newly arrived fellows with another and their surroundings. This serves as an ice breaker and as a way for the fellows to begin practicing working together with people from a variety of cultural and linguistic backgrounds in a new environment. This is done through working in groups, solving problems, and exploring public transportation routes in Reykjavik. Fellows work in groups to investigate social opportunities in the area, which can be useful over the next six months.

The groups share their results and experiences with the others and are expected to use pictures and maps. The topics for each group are listed below.

- Sport and recreation in Reykjavik and surrounding towns. Find at least four things that fellows can do (within their budget). Assess the accessibility, cost, opening hours, try it out, and evaluate how good/popular these options may be for the fellows.
- Cinemas, plays, theatres, and concerts in Reykjavik and nearby towns. Where are they? What will be shown this winter? How much are the tickets? Describe the location of these activities and how to get there by bus.
- Museums and Art Galleries in Reykjavik and nearby towns. What types of exhibitions are there nearby? Describe the opening hours, accessibility, and cost.
- Swimming pools: Choose three different swimming pools. Try them out, location, cost and how to get there.

Fellows are asked to be creative in approaching these assignments, and to share their personal views and opinions.

#### ***2.2.4 Individual 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 individual assignments are:

### **1) Capture fisheries OR 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.

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

### **2) Fish processing OR fishing technology in home countries (7 min PP and 1–2-page summary)**

Fellows are asked to present on processing methods or fishing technology at home. They may select to highlight the main processing methods, size of industry, importance of fisheries to the national economy, traditional methods, export, or how quality in the processing is assured and controlled. Fellows from the same country coordinate to cover different types of processing.

If working with Fishing Technology, fellows are asked to focus on the main boat and gear types. Fellows can describe the size, number, and classification of fishing vessels, how these categories are determined, and how fishing operations are carried out. Fellows can explore the main advantages and disadvantages with fishing methods used (for example, fuel consumption, effect on environment, effect on the quality of the fish caught. etc), or the design, selective properties and use of different types of gear, and how they affect the resource.

### **3) Fisheries management in home countries (7 min PP and 1–2-page summary).**

Fellows are asked to discuss the status of management at home and what is needed for successful management of fisheries. What are the main objectives of the management system and how is it implemented? How are the fisheries monitored, how is the information used in management? What are the primary challenges in implementing effective fisheries management and how are these challenges addressed?

## ***2.2.5 Professional goals for the six months in the GRÓ-FTP (1-2 p)***

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.

### ***2.2.6 Further guidelines regarding the individual assignments***

Presentation of individual assignments is modelled on the style of short and concise presentations required at academic conferences. Fellows are encouraged to make presentations that tell a story – with a beginning, middle and an end. Through the presentation, fellows are asked to consider the main message they would like to communicate for an audience to reflect upon. As the presentations are brief, fellows are coached to decide on one or two main points they would like to make and structure their presentations accordingly. This is good practice for presentation at academic conferences, which often limit presentations to under ten minutes for most presenters.

Furthermore, fellows are given the following guidelines on creation of visual presentations:

Try not to clutter the slides. It is a bad idea to write long text on slides and then just read them out as the presentation moves forward. Rather, aim to create simple illustrations or point which to communicate the main messages of the talk. Do not have lots of animation – the slides must not be too busy.

- Make a short PowerPoint presentation, 6-10 slides.
- Provide relevant information on each slide and stick with graphs/pictures and short sentences rather than a long text.
- Introduce yourself and the theme of the talk
- Think of the audience! Put information into a context that the others to understand
- Set boundaries, scope of subject. There is not have much time, so it is important to be selective with where your presentation is focused
- Mention the main sources of information
- Present main findings
- Relate to regional/world situation – you are encouraged to use information from lectures
- Assess the situation in your country. If things are going well, explain why you think so. If things are not going well, explain why you think so. In both cases, how could the situation improve/be better?
- What do you see as the best opportunities or most likely development in the short and medium term?
- Make a 1-2 page summary which you hand in to UNU staff at the presentation.
- Include references in the written summary.

## 2.2.7 Teaching modules and lecture topics

### Week 1 – Orientation week

- Introduction to FTP and the Marine and Freshwater Research Institute
- Residence administration
- Practical information
- Guided tour around the Greater Reykjavík area
- IT processing
- Introduction to Introductory Course Assignments and expectations
- Presentation of Social Assignment

### Week 2 – World Fisheries

- Trends in World Fisheries
- Ecosystem Approach to Fisheries Management
- The UN SDGs and Fisheries
- Oceanography and Fisheries
- Climate change and Fisheries
- Ocean Pollution
- Group dynamics and setting working goals
- Assignment 1 delivery session and Introduction to Assignment 2: Capture fisheries/aquaculture in home countries

### Week 3 – Practical Fisheries

- Fish Biology
- Introduction to Fishing Gear followed by field trips
- Environmental Impact of Fishing Gear
- Shellfish Fisheries
- Pelagic Fisheries
- Data needs, Modelling and Sampling
- Presentation Skills
- Personal and Professional Goals
- Assignment 2 delivery session and introduction to Assignment 3: Fish processing OR fishing technology in home countries

### Week 3 – Fisheries, Quality, Management, Law and Economics

- Quality Management in Fisheries
- Introduction and tour of Matís Food Science Research Institute
- Introduction to Fish Safety
- Quality Changes and Shelf life of Fishery Products
- Overview of Fish Handling and Processing
- The Legal Framework of Fisheries
- EEZ Fisheries
- High Seas Fisheries
- IUU Fishing
- Role of Ministry of Fisheries in Iceland
- Fish Processing Technologies followed by site visits
- Fisheries Management and Economics and Value Chains
- FAO Small Scale Fisheries Guidelines

- Icelandic Coast Guard – site visit
- Assignment 3 delivery session and introduction to assignment 4 Fisheries management in home countries.

#### **Week 4 –Academic Skills, Aquaculture and statistics**

- World Aquaculture
- Eco-labelling in Fisheries
- Introduction to Statistics
- Academic Writing Skills
- APA Referencing System
- An Introduction to Academic Poster Design
- Professional Communication and Leadership Skills
- Assignment 4 delivery session

#### **Week 5 & week 6 –Fisheries Field Trip Around Iceland**

10-day trip to the north of Iceland, Akureyri and surroundings, including lecture programme at the University of Akureyri highlighted with extensive site visits.

- Blue Economy
- Value Chain Culture
- Marketing of Seafood
- Traceability in Seafood Industry
- International Shipping and Logistics – site visit
- Seafood Export Systems
- Historical Development of Icelandic Fisheries – site visit
- Aquaculture, Fish Farming and Importance of Feed – site visit
- Online Auctioning of Fish – site visit
- Salt Fish and Dried Fish – site visit
- Whaling – site visit
- Fishing Technology and Innovation – site visit
- Fish Processing Technology – site visit

#### **2.2.8 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.

### **2.2.9 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 be 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.

## **2.3 Specialist lines**

### **2.3.1 Aquatic Resource Assessment and Monitoring**

The Aquatic Resources Assessment and Monitoring course uses statistics and modelling in connection with fishing gear and technology to assess status of aquatic resources and harvested stocks. The aim of the course is to provide fellows with a good understanding of fish catching methods and how they interact with fish behaviour, along with an in-depth knowledge on common stock assessment methods and their application. Depending on the fellows' backgrounds and future project the course splits up after three weeks into stock assessment or fishing technology module.

In the stock assessment module, the fellows gain practical experience working with data, designing research, sampling design, collection and management of data, and applying various stock assessment methodologies.

In the fishing technology module, the fellows will gain both theoretical and practical skills in gear design and construction, the ability to understand blueprints and standards within the field, and basic understanding of fishing vessels and gear design and use. On completion fellows should be better able to communicate and work with researchers within their field such as fisheries managers, gear manufacturers, gear scientists.

The course is delivered through a series of formal lectures and case studies, building practical experience not only working with data, programming and the use of R statistical software, but also in the field and in net making, depending on modules. Fellows are encouraged to contribute their personal expertise and work with their own data when appropriate.

The specialist course is the second module in the six-month Fisheries Training Programme, following the 5-week introductory course and concluding with the initiation of the 14-week research module. It takes 6 weeks, and includes

- Joint Stock Assessment and Fishing Technology teaching module (approx. 3 weeks)
- Fellows specialize in the Stock Assessment module or Fishing Technology module (approx. 3 weeks)

The aims of the FPM specialist line are to provide the fellows with:

- good understanding of fish catching methods and how they interact with fish behaviour
- in-depth knowledge of common stock assessment methods and their application

This course contributes to FTP's 6-month programme by helping the fellows achieve the following Learning Outcomes:

#### Stock Assessment Learning Outcomes

- acquire practical experience of working with data and designing research
- design sampling programmes
- experience in management of data and working with databases
- design and plan research
- apply various stock assessment methodologies
- gain familiarity with statistical software

#### Fishing Technology Learning Outcomes

- gain both practical and theoretical skills in netmaking and gear construction
- ability to understand blueprints and standards within the field
- basic understanding of fishing vessels and gear use
- ability to both communicate and work with gear manufacturers, gear scientists and researchers

#### Recommended Resources:

Course material is mostly based on lectures and recommended research papers, but fellows are encouraged to read and general fisheries textbooks.

#### Hardware and Software:

R programming language within R-studio environment.  
Excel or similar spreadsheets.

During this course, fellows are likely to experience the following activities:

- Lectures and demonstrations
- Hybrid learning activities (exercises, self-study, presentation of case studies)
- Class discussions
- Presentations
- Site visits
- Assignments
- Reading lists

The course is based upon assessment of the fellow's performance and work during the formal teaching module and evaluation of the proposal describing their final project work.

Formal teaching (6 weeks)

Evaluation during the teaching module is based on (a) attendance (b) performance and participation in classes, and (c) quality of completed assignments.

*On occasion an additional week is added at the discretion of the FTP for further site visits, case studies or practical training activities. In this case, the final research phase is shortened by one week.*

**Weeks 1 - 2: Fish catching methods, fish behaviour, gear design and rigging (30 hrs)**

- Fish-catching methods
- Fishing gear design
- Fishing gear rigging
- Gear selectivity
- Standardised sampling gear

**Weeks 1 - 3: Methodologies for data collection, management, and analysis (30 hrs)**

- Life history
- Datamining and data sampling
- Ageing fish
- Introduction to statistics
- Monitoring and estimating biomass trends
- Freshwater surveys/Trawl surveys
- Acoustics/Pelagic survey/other methods

**Weeks 4 - 6: Stock Assessment module (30 hours per week)**

- Storing and handling data
- Spatial data and mapping in R
- Fish biology and population dynamics
- Stock production models
- Age structured models
- ELEFAN and other FAO models
- Length-based models – Gadget
- Ecosystem modeling
- Ecosystem approach to fisheries management

**Weeks 4 – 6 Fishing Technology module (30 hours per week)**

- Gear calculations and designing theory
- Use of computer programmes for calculation and presentation of gear designs
- Practical training in net-making and maintenance, gear constructions and gear evaluations
- Fishing vessels and on-board gear handling
- Fishing methods and fish quality relations
- Presentations on present state of fishing gear research and development

**Additional week 7:** Site visits, case studies and practical training activities (e.g. Ísafjörður week)

Total in-class hours: 180 over six weeks. Approximately 30 hours per week.

### ***2.3.2 Fisheries Policy and Management***

This course offers basic training in the theory and practice of fisheries management. Different management tools are explored, along with natural and institutional requirements. Appropriate management choices for different management problems are discussed. Fellows are provided with a solid understanding of the basic principles of a socially beneficial fisheries policy and practical training in the design and implementation of such a policy.

Further, fellows gain an overview of the main issues in the operation and management of fishing companies. Topics include value chain management, the importance of aquaculture, processing and markets, overview of primary products and processing methods, along with the most important markets for seafood, the working environment, and environmental issues. The importance of innovation and knowledge management in fisheries is discussed.

The specialist course is the second module in the six-month Fisheries Training Programme, following the 5-week introductory course and concluding with the initiation of the 14-week research module. It takes 6-7 weeks, and includes a series of lectures, assignments, and site visits to organisations working in the fishing industry and various fisheries governance institutions.

The aims of the Fisheries Policy and Management specialist course are to provide the fellows with:

- solid understanding of the basic principles of a socially beneficial fisheries policy
- basic training on the development and analysis of fisheries policy
- basic training in the theory of natural resource and fisheries economics
- training to assess the impact of fisheries policy
- the ability to apply the basic principles and practical training to real world situations

This course contributes to FTP's 6-month programme by helping the fellows achieve the following Learning Outcomes. At the end of this programme, the fellows should be able to:

- understand and explain the basic economic problems associated with the utilisation of natural resources
- work out socially optimal utilisation of these resources under a variety of conditions
- understand management methods to ensure socially optimal utilisation of these resources and apply this knowledge to real-life situations
- identify and explain the main issues in the operation of fishing companies and the importance of fisheries in the economy
- compare and critically discuss different methods used to manage fisheries
- discuss the importance of aquaculture
- discuss the importance of innovation, technology and knowledge management in the fishing industry
- understand the role of fisheries value chains
- identify primary products and processing methods
- discuss the most important markets for seafood
- acquire fisheries data, solve it and report on it in the form of a research assignment

- apply techniques to understand fisheries dynamics in fellows' home countries and be able to assess the effects and impacts of fisheries policy

### **Recommended Resources:**

Course material is mostly based on lectures and recommended research papers, but fellows are encouraged to read and general fisheries textbooks.

During this course, students are likely to experience the following activities:

- Lectures and demonstrations
- Hybrid learning activities (exercises, self-study, presentation of case studies)
- Class discussions
- Presentations
- Site visits
- Assignments
- Reading lists
- Tests

The course is based upon assessment of the fellow's performance and work during the formal teaching module and evaluation of the thesis describing their final project work.

Formal teaching (6 weeks)

Evaluation during the teaching module is based on (a) attendance (b) performance and participation in classes, and (c) quality of completed assignments.

*On occasion an additional week is added at the discretion of the FTP for further site visits, case studies or practical training activities. In this case, the final research phase is shortened by one week.*

### **Week 1: Managing quality and value chains (30 hours)**

- Theories of value chains, strategic positioning, and vertical integration. Internal and external forces affecting value chains.
- Value chain analysis methodology.
- Case studies and exercises
- Prices of heterogeneous goods. Economic theory of price formation for heterogeneous goods and attribute demand and supply.
- The role of markets and market failure in fish markets.
- Elements of social welfare analysis, cost-benefit analysis, and the role of fisheries in development.

### **Week2: Fisheries Economics and Modelling (cont.) (30 hours)**

- Optimal Sustainable Fisheries. Modelling and Simulations
- Optimal Dynamic Fisheries. Modelling and Simulations
- Advanced fisheries modelling

### **Week 3: Fisheries, economy and society (30 hours)**

- Elements of social welfare analysis: Definitions and measures of social welfare and economic progress. Dynamics of economic growth. The price system. True vs. false prices.
- Basic cost-benefit analysis: Price corrections. Present values. Internal rates of return. Risk. Distribution of cost and benefits.
- Fisheries and economic development: The role of fisheries in national and regional economic development, forward and backward linkages, source of investment capital, source of taxation revenue, foreign exchange earnings. Education, knowhow, training of labour, generation of entrepreneurship etc.
- Society and fisheries. Social impacts of the fishing industry and fisheries policy
- Law of the sea, EEZ fisheries, High Seas fisheries regime, IUU fishing

### **Week 4: Project Analysis and Management (30 hours-FTP staff)**

Writing a project. How to prepare and write a convincing project proposal.

- Essential structure of projects
- The translation of policies into projects
- Iteration between projects and policies: The optimal project
- Project management (software)
- Uncertainty and risk
- Exercises

### **Week 5: Fisheries Management (30 hours)**

- The basic fisheries problem. The common property problem
- The fisheries management regime
- Fisheries management systems: Main categories. Pros and cons
- Property rights-based fisheries management systems
- ITQ systems.
- TURFs
- Community fishing rights
- Monitoring, control, and surveillance. Requirements of the fisheries management systems. On land monitoring, at sea monitoring. Remote monitoring. Indirect monitoring. Enforcement of rules. Extent and costs of monitoring. Links with fisheries judicial system.
- Fisheries judicial system. Processes and sanctions. The appropriate
- balance between sanctions and monitoring.
- Optimal enforcement theory

### **Week 6: The formulation design and assessment of a fisheries projects (30 hours)**

- Fisheries development as a project
- Economic potential of given fish resources:
- The ability of the private sector.
- Assessment of existing administrative and monitoring capacity.
- The design of an appropriate fisheries management regime.
- Fisheries management system. What fisheries management system to employ.
- Monitoring, control, and surveillance. What is the appropriate system and technology?
- Fisheries judicial system. Processes and sanctions. The appropriate system.
- The required administrative and advisory capacity. Design and costs.
- Assessment of net benefits: A feasibility study

**Additional week 7:** Site visits, case studies and practical training activities (e.g. Vestmanneyjar week).

Total in-class hours: 180 over six weeks. Approximately 30 hours per week.

## 2.4 Final research project

### 2.4.1 Introduction

The 6-month course of GRÓ-FTP culminates in a fourteen-week individual project in which fellows work closely with a supervisor to conduct research on a pressing issue related to their work at home. In the projects, fellows combine the experience and practical skills gained in the introductory and specialist training, along with their personal goals on an individual research topic. Project design skills are applied to develop and present a research proposal, and then research is conducted individually through close collaboration with an expert supervisor. Final projects most often involve data directly from Fellows' home countries. On completion, a research paper is submitted and published on the FTP website. The final project is presented and defended by the fellow at the end of the project period. In addition, Fellows are required to design an information poster summarising their research and present their results in an open dissemination meeting.

### 2.4.2 Description

The first step towards the final individual research project is the development of a research proposal. Based upon the personal goal interviews and conversations with the fellows, instructors and GRÓ-FTP staff, fellows are paired with a project supervisor near the end of the specialist course. Fellows develop a proposal for their research projects, and present their ideas at the end of the specialist course, at which time they are either approved to commence their research or asked to modify their proposals when it is deemed necessary to do so by GRÓ-FTP staff.

The style of proposals and subsequent research project varies greatly based upon the field of study, the background, professional responsibilities, and personal interest of the fellow. To be approved, proposals must:

- Provide a contextual exploration of the problem being addressed
- Include a basic literature review, demonstrating correct use of citations and references
- Illuminate the research approach to be used, including the objectives and goals of the project, and methodology to be employed
- Include a realistic timeline for the work ahead
- When needed, include a detailed budget of any costs associated with the project

When the proposal is approved, fellows commence their individual research work, supported by their supervisor and GRÓ-FTP staff.

### **Role of the supervisors**

Supervisors provide expert guidance to the fellows in their area of study. Supervisors are responsible for monitoring the progress of the research work on a regular basis and offering support when needed. The supervisor is also charged with the responsibility of ensuring that the project work is of a sufficiently high standard. If the fellow is falling short of expectations, it is the supervisor's responsibility to inform GRÓ-FTP. In addition to the supervisor, the fellow may be provided with additional advisors as needed. We expect that over the course of the individual project, supervisors dedicate at least 80 hours to support of the fellow.

### **Role of the GRÓ-FTP staff**

Over the course of the individual project period, GRÓ-FTP staff hold meetings with both the supervisor and fellow at least two times, and more frequently if extra support is required. The purpose of these meetings is to monitor the progress of the research and provide additional support to both the fellows and the supervisors when required.

### **Role of the GRÓ-FTP fellow**

Ultimately, fellows are responsible for the work they produce. In this regard, they have the final authority work with comments and direction from their supervisors and the GRÓ-FTP staff to produce relevant and impactful work.

## **2.4.3 Assessment**

Evaluation of the fellow's project work is based on (a) quality of final thesis and (b) quality of final presentation of research work.

Criteria used for evaluation of the individual project include analysis of:

- How well does the fellow describe the context for the problem being addressed by the research?
- Does the review of literature/state of the art provide a comprehensive background?
- Is the methodology applied adequately explained?
- Are citations and references used appropriately?
- Does the fellow adequately interpret the results of the research?
- Does the fellow provide conclusions and/or recommendations based upon the review of literature and new results from the study?
- Logical structure of the report: does the fellow successfully tell a story about the problem, the objective of the work at hand, the methodology used, the results from the work, and an analysis of what the results mean in context?



### 3 GRÓ-FTP FarFish Fellows

Five (5) fellowships (two women and three men) were awarded as part of the FarFish project to experts from FarFish Case Study partner organisations, including INDP/IMAR, SFA, IMROP, and CRODT. These fellows were selected on the basis of onsite interviews conducted both during the original training needs assessments, and interviews during follow-up visits taken by the FTP team in 2019 (to Senegal and Mauritania) and in 2020 (to Seychelles). The first two fellows who participated in the GRÓ-FTP six month programme did so in 2018-19, and hailed from Cabo Verde. Notable here is that the GRÓ-FTP has a long-standing cooperation with INDP/IMAR and was already well-established and known to the Cabo Verdian partners. This may be why sourcing candidates for training in Cabo Verde was comparatively simple when compared to the other FarFish partner organisations.

Fellows were also invited for the same 2018-19 group from CRODT and SFA. Unfortunately, these candidates were withdrawn from consideration at a date too late to accommodate the invitation of any of their colleagues. This is one of the reasons for the FTP's follow up partnership-building visits to these organisations, to clarify expectations and possibilities for capacity building initiatives within the project. Subsequently, CRODT nominated one fellow, but could not release that person for a full six-months due to his obligations to the organisation. As such, he was invited to attend the programme in phases, first participating in the final project research, and then returning to Iceland later to complete the introduction and specialist parts of the training. This return was delayed due to the pandemic, but ultimately meant that he was able to assist with the development and delivery of other FarFish training initiatives, namely the Data Limited Methods course. Two more FarFish fellows were invited to participate in the six-month training in 2021-22, after a delay of one year due to the pandemic. Though they have not completed the programme at the time the FarFish project is ending, they are well on their way to creating research relevant to their organisations (IMROP and SFA) and will certainly add to the capacity of those organisations upon their return home in March 2022.

#### 3.1 Alciany Nascimento da Luz, Cabo Verde

Alciany is a scientist working at the IMAR in Cabo Verde. She attended the GRÓ-FTP in 2018-19. The abstract of her final research project is below:

Title: TESTING METHODS TO ESTIMATE THE AGE OF BLACKSPOT PICAREL (*SPICARA MELANURUS*) USING OTOLITHS, FROM THE WATERS OF CAPE VERDE ISLANDS.

Blackspot picarel (*Spicara melanurus*) is a fish species from the Sparidae family and is an important species for the artisanal fishery in Cape Verde. Despite being commercially important, stock assessment is not performed for this species due to limited knowledge of life story traits and a lack of methodology to investigate the age of the species. In this study, methodology to estimate age of blackspot picarel from Cape Verde waters, was investigated by counting otolith increments and by

measuring otolith size. Otoliths from 134 specimens ranging in fork length from 4.5 cm to 29 cm were analysed. Increments became visible once the otolith was sectioned, polished, image taken, and the image enhanced. An age-length key was produced. The precision of the ageing method was estimated by replicating increment count for 23% of otoliths. For replicas, the mean coefficient of variation was 8.76% which is acceptable. The maximum age estimated was 17 years and the von Bertalanffy growth parameters were  $L_{\infty} = 36.17 \text{ cm}$ ,  $k = 0.09 \text{ year}^{-1}$ ,  $t_0 = 0.89 \text{ year}$ . This suggests that blackspot picarel is a slow-growing and a long-lived species. Maturity-at-age was 7.1 years. The relationship between specimen length and otolith dimension, and between specimen age and otolith dimensions was strong and explained 89% or more of variance in otolith dimensions. The age-length key, maturity-at-age, and growth rate provide vital information for stock assessment.

### 3.2 Nuno Roberto Vieira, Cabo Verde

Nuno is a scientist working at the IMAR in Cabo Verde. He attended the GRÓ-FTP in 2018-19. The abstract of his final research project is below:

Title: STOCK ASSESSMENT AND THE INFLUENCE OF ENVIRONMENTAL PARAMETERS ON THE DISTRIBUTION OF MACKEREL SCAD (*DECAPTERUS MACARELLUS*) IN CABO VERDE WATERS.

Mackerel scad is one of the most important small pelagic fisheries in Cape Verdean waters, having enormous social and economic importance, and is used as bait and food and in the canning industry. INDP official landing data recorded between 1989 to 2015 indicate that mackerel scad made up almost 40 % of Cape Verdean total catches at the peak of its fishery in 1997 and 1998. After this peak the catch decreased significantly, especially in the last six years, representing only 6.6 % of landings in 2015 or 642 tonnes. The main goal of this study was to assess if the fluctuations and recent decline in mackerel scad catch in Cape Verdean waters are caused by harvesting or by changes in environmental parameters. The data analysed was provided by reconstructed catch data during the time frame 1950 to 2014 from the research initiative Sea Around Us, official landing and effort data from INDP in the period from 1989 to 2015, biological data from INDP in the period 1989 to 2018, and sea surface temperature and chlorophyll-a from satellite observation. The growth parameters  $K$  and  $L_{\infty}$ , the recruitment pattern and the total mortality were computed in the software FISAT II, the biomass was estimated by the Shaefer model using the Sea Around Us reconstructed catch data and CPUE data from INDP for both fleet, and simple linear regression was applied to see the correlation between the catch data and environmental parameters. The growth parameters computed from FISAT II indicate  $L_{\infty} = 40.6 \text{ cm}$ ,  $K = 0.450 \text{ year}^{-1}$ ,  $Z = 3.23 \text{ year}^{-1}$ ,  $F = 2.31 \text{ year}^{-1}$ ,  $M = 0.92 \text{ year}^{-1}$ . The biomass estimated by the Shaefer model indicate an MSY of 5,619 tonnes using the Sea Around Us catch and artisanal CPUE from INDP, and 5,686 tonnes using the Sea Around Us catch and industrial CPUE from INDP. The correlation between catch and environmental parameters, showed an  $R^2 = 0.043$  when catch is correlated with sea surface temperature, and  $R^2 = 0.21$  when catch is correlated with chlorophyll-a.

There are indicators that the stock is declining, but not conclusive, hence the fishing effort should be reduced until more information is known. The stock did not show strong links to environmental factors, further studies and improved sampling procedures are recommended to get more information on the stock.

### 3.3 Kamarel Ba, Senegal

Kamarel is a scientist working with ISRA/CRODT in Senegal. He attended part of the training in 2020, and is finishing now in 2021. The abstract of his final project is below:

Title: ASSESSING THE NORTH-WEST AFRICAN STOCK OF BLACK HAKES (MERLUCCIUS POLI AND MERLUCCIUS SENEGALENSIS) USING CATCH-MSY AND LENGTH-BASED SPAWNING POTENTIAL RATION MODELS

Shared by three countries (Morocco, Mauritania and Senegal), the black hakes (*Merluccius polli* and *M. senegalensis*) stocks are some of the most important resource exploited in northwest African waters. Since they resemble each other and are caught together in high proportions, the fisheries statistics record them as one species. The catches were high in the 1970s before sharply declining since 1980 as a result of an intense exploitation by the domestic and foreign vessels using bottom-trawls and longlines. Each of these countries has its own records about catch, efforts, CPUE and catch composition which generally led to pooled stock assessments during CECAF Working Groups. This study attempts to perform stock assessments using regional data (catches in metrics and in length composition) from FAO reports and data-limited methods such as Catch-MSY and Length-Based Spawning Potential Ratio (LBSPR) model as a preliminary work in order to compare reference points with existing literature and consolidate them for the fisheries management purpose. The objectives of this study were to (1) obtain information about life history parameters of both species from literature review, (2) estimate natural mortality rate  $M$  and  $M/k$  using data-limited methods, (3) provide recommendations based on assessments of black hakes using Catch-MSY and LBSPR models. Sensitivity analyses were also performed to test the reliability of the results according to some changes in the input parameters. The results from Catch-MSY assessments showed that the MSY ranged between 19,400 and 29,150 tonnes, according to the scenarios. The BMSY values were very high (137,000- 352,000 tonnes), resulting in a high carrying capacity  $K$ . However, the intrinsic growth rates were very low (0.12 to 0.30). For the LBSPR assessments, the spawning potential ratio appeared too low ( $SPR < 0.2$ ) for most cases suggesting recruitment overfishing. Finally, this study recommends to update life history parameters ( $L_{50}$ ,  $L_{95}$ ,  $k$ ,  $L_{\infty}$ ,  $t_0$  and  $M$ ) regarding both species for stock assessment purpose and separate the two species in the fisheries departments statistics (catches, effort, CPUE and length frequencies) which could help scientists to assess them individually and give management advices based on accurate data.

### 3.4 Margret Ally, Seychelles

Margret Ally is a policy analyst at the SFA. She is currently enrolled in the GRÓ-FTP six month course, and her research will focus on bycatch and value chain analysis for value addition.

### 3.5 Sidi Ahmed, Mauritania

Sidi Ahmed is a scientist at IMROP. He is currently enrolled in the GRÓ-FTP six month course, and his research will focus on utilisation and interpretation of acoustic data, particularly important for the small pelagic fisheries of Mauritania.

## 4 Ongoing Impact

Part of the theory of change of the GRÓ-FTP is that the impact of capacity building interventions will extend beyond the individuals trained to increase the overall capacity of their organisations. In this way, the knowledge created is shared with colleagues, and the whole organisation draws upon the benefits created. These benefits can be like a “slow-release pill,” and the longer term impacts and organisational benefits of training investments may not be realised in a short time horizon. That being said, there are indications that the increased capacity and new knowledge made possible by this capacity building intervention as part of the FarFish project is already having an impact, as evidenced in part, by the seminar held in 2019 in Cabo Verde relating to the outcomes of the work of the fellows who attended the training from there.

On Thursday, May 30<sup>th</sup>, a special seminar was held at [INDP \(Instituto Nacional de Desenvolvimento das Pescas\) in Mindelo, Cabo Verde](#) introducing the work of the FarFish project, and the research produced through the post-graduate training offered through the project.

One of FarFish’s specific objectives is “To provide education, training and dissemination to stakeholders within the value chains of EU fisheries in SFPAs waters and international waters and to improve their professional skills and regional networks.” This has clearly been done with great success through strong cooperation in Cabo Verde with the INDP.

The event, entitled *Seminar of presentation of the final research projects done in the ambit of the United Nations University - Fisheries Training Program (UNU-FTP) and the FarFish project* is part of ongoing dissemination efforts within the FarFish project.

Two scientists employed by INDP participated in the FarFish post-graduate six-month training offered by the United Nations University Fisheries Training Programme last year. They both presented their work at the INDP seminar, which was attended by administration officials, scientists, and their colleagues.

Through the post-graduate training at the FTP, fellows are given the opportunity to work with data from home to develop research outcomes that are useful to their home institutions. The aim is to provide a space and expert guidance to create meaningful outcomes for partner organisations and in doing so, build professional and scientific competencies that will bolster the institutional capacity to create impactful fisheries science in the future.

The seminar was opened by the President of INDP, a representative from the Cabo Verdian Ministry of Maritime Economy, and the Work Package 7 (Capacity Building and Dissemination) leader from the FarFish project. The Case study leader for Cabo Verde then gave a presentation of the project to the seminar attendees.