

Seafood CRC Future Harvest Master Class in Fisheries Economics - Revision & Extension

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Project No. 2013/748



**AUSTRALIAN
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Non-Technical Summary

2013/748 Seafood CRC Future Harvest Master Class in Fisheries Economics - Revision & Extension

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PROJECT OBJECTIVES:

- a) To revise/extend the existing face-to-face Fisheries Economics Masterclass materials/resources
- b) To develop an online version of the Fisheries Economics Masterclass
- c) To develop a strategy for marketing, delivery and funding of the Fisheries Economics Masterclass

ABSTRACT

Following an initial successful round of delivery of the Fisheries Economic Masterclass developed in 2010/714 – Future Harvest Masterclass, there was strong support for continued delivery based on a revised course, in terms of both material and mode of delivery. This project has addressed these revisions by extending the existing face-to-face course and developing the resources required to underpin an online version of the Masterclass. The result is a suite of resources that can be used flexibly to tailor content and delivery mode to the needs of different groups of participants. A strategy and business case for ongoing delivery of the Masterclass was also developed based on an initial model of cost recovery for face-to-face delivery and free, online self-study.

OUTCOMES ACHIEVED

The outcome of this project is a suite of Fishery Economics Masterclass learning and teaching resources that can be used flexibly to tailor course content and delivery mode to the needs of different groups of participants. This will provide the basis for further improvements in the economic understanding and skills of seafood sector participants, and more broadly marine stakeholders. These resources are to be hosted by the FRDC and responsibility for promotion and delivery now lies with the FRDC's Social Science and Economics Research Co-ordination Program 2015-2018. This roll-out phase will be guided initially by the strategy and business case developed as part of this project

LIST OF OUTPUTS PRODUCED

The project has resulted in a large number of learning and teaching resources designed to support the delivery of the face-to-face and online versions of the Masterclass. These include lecture presentations (powerpoint and video); question

sets and solutions; practical worksheets and exercises (spreadsheets and simulations); and a variety of ancillary resources to support both a class instructor and participants.

A document titled *Strategy and Business Case for Delivery of CRC Future Harvest Economic Masterclass* was also developed.

ACKNOWLEDGEMENTS

We would like to thank the Seafood CRC and the FRDC for their commitment to promoting the development of economic understanding and skills among seafood sector stakeholders. Many thanks also to Tim Emery (IMAS, University of Tasmania) for his contribution to the online version of the Masterclass and to Ian Cartwright for his support and patience in championing the project.

1. Introduction and Background

1.1 Need

There is an increasing demand for capacity building in fisheries economics. This is becoming evident as fisheries management becomes more sophisticated and harvest strategies and control rules in management plans become widely used. In addition, the increasing competition for resource access also heightens the demand for understanding of economic principles of allocation and project/program evaluation.

Recognition of this ongoing need resulted in project 2010/714 – Future Harvest Masterclass, and underpinned a subsequent recommendation (see Appendix 1) that the Masterclass continue, following revisions to both material and mode of delivery. This recommendation helped shape the nature and scope of the current project.

1.2 Objectives

The project had three distinct Objectives:

- a) To revise/extend the existing face-to-face Masterclass materials/resources
- b) To develop an online version of the Masterclass
- c) To develop a strategy for marketing, delivery and funding of the Masterclass

The manner in which Objectives a) and b) have been achieved through this project are described in Sections 2 and 3 of this report. Objective c) was addressed in the document *Strategy and Business Case for Delivery of CRC Future Harvest Economic Masterclass* which is included as Section 4 of this report.

2. Revisions/extensions to face-to-face Masterclass materials/resources

Two major structural changes have been made to the Masterclass. These are:

1. A new module was developed on the use of **benefit-cost analysis (BCA) in fisheries management** (Module 2). While there are a wide range of decision-support tools available to managers, BCA remains economist's preferred tool to determine the best (efficient) allocation of scarce resources. The module was developed based on substantial materials and advice provided by Professor Harry Campbell (University of Queensland). Professor Campbell has been involved in a number of real-world benefit-cost analyses intended to inform natural resource decision-makers, and is the author of the successful book *Campbell, H.F. and Brown, R.P.C. (2015) Benefit-Cost Analysis: Financial and Economic Appraisal using Spreadsheets, Cambridge University Press.*

The new module is pitched at the introductory level and provides an overview of the basic principles of BCA. It is also strongly applied in its focus, and enables participants to learn by working through examples using

a powerful spreadsheet approach. This approach is particularly useful to decision-makers as it lets them examine the effect of a decision on different groups of individuals, as well as its overall effect. Hence the method's value in providing information to decision-makers about both efficiency and distribution is emphasised.

2. The material on the use of bio-economic models to inform optimal fisheries management has been reorganised into three modules (Modules 3-5). This will allow greater flexibility in delivery, with Module 3 being suited to providing a high-level overview of issues related to the management of common-pool resources, maximum economic yield (MEY) and the economics of re-building. Module 4 now focuses on a more formal treatment of the static-bioeconomic model and acts as a lead-in to the hand-on simulations that form the basis of learning in Module 6.

In addition to these structural changes, and following feedback from previous participants and instructors, all materials have been reviewed and revised. This includes the simplification of some topics and the development of question sets and solutions to support more effective learning. All powerpoint slides have been revised and glossaries expanded.

A summary of the learning and teaching resources developed as part of this project and available to support face-to-face delivery is shown in Table 1a (Instructor resources) and Table 1b (Participant resources).

Table 1b: Resources distributed to Participants in Fisheries Economics Masterclass (Face-to-Face)

	General	Module 1	Module 2	Tutorial 1	Module 3	Module 4	Module 5
Program							
Powerpoint presentation							
Video presentations							
Checkpoint Questions							
Checkpoint Answers							
Worksheets							
Exercises							
Resources summary							
Glossary							
Reading list							
Feedback form							

3. Develop online version of the Masterclass

A key recommendation following the Masterclass's delivery under project 2010/714 – Future Harvest Masterclass was to expand the range of delivery modes to include an online option (see Appendix 1). This would increase accessibility and allow for enhanced self-paced learning. Combining resources from both face-to-face and online modes would also allow flexible, blended options for course delivery to be offered based on the needs of individual groups.

The online version of the Masterclass was developed in conjunction with the University of Tasmania's Tom Fink Studio and a consultant video producer, resulting in a series of professional quality recorded presentations that align with the modular structure of the face-to-face course. A series of video lectures embed checkpoint questions to reinforce learning, and interface with both the spreadsheet-based applied BCA exercises (Module 2) and the specialised FisheriesExplorer harvest optimisation simulation software (Module 5). A short online tutorial on the mechanics of discounting was also produced. Users of the online resources are encouraged to work through modules in sequence; however they can also be accessed in an ad hoc manner allowing users to focus on particular topics.

Table 2 summaries the learning and teaching resources that comprise the newly developed self-study online version of the Fisheries Economics Masterclass.

4. Strategy and Business Case for Delivery of CRC Future Harvest Economic Masterclass

(Note that this strategy and business case document was submitted and approved as part of a previous project milestone.)

Background

The previous Future Harvest Economic Masterclass (FHEMC) was available in the form of a 1-day, face-to-face class and, after being trialled, was delivered eight times (in Hobart, Adelaide, Melbourne, Brisbane (2); Sydney; and, Perth (2)) in 2010. Overall 121 participants completed the class. In two cases, classes were delivered to teams consisting solely of fisheries managers. In all other cases the classes comprised participants from industry, management and research backgrounds. Project team members, as well as other fisheries economists, delivered the classes. These classes were supported through the initial CRC grant, with an in-kind contribution from FRDC through the Economic Capability Building Project. Seafood CRC participants were charged a fee of \$50 per person while non-Seafood CRC participants paid \$150 per person. The CRC provided substantial administrative support. Participants were supplied with morning and afternoon tea, lunch, class materials, plus access to a netbook for the purpose of engaging in the bioeconomic modelling activity. Travel and accommodation costs were paid for instructors, and where an instructor was used who was external to the project, they were remunerated. In most cases, more than one instructor was present for the module in which the bioeconomic model was used.

The current project has reviewed and redeveloped components of the 1-day face-to-face FHEMC, and has developed a suite of resources that will allow the class to be accessed online; it does not however provide for the ongoing marketing, delivery and/or maintenance of these resources. This short document outlines a strategy for these ongoing activities and suggests a budget model for delivery, accounting for the need for periodic revision and updating of materials to retain currency and relevance. It is based on the assumption that the developed materials will be housed within FRDC, and that activities related to coordination of these ongoing activities will be undertaken as part of the new FRDC 2015-300: Social Science and Economics Research Coordination Program (SSERCP) (PI Dr Emily Ogier), which will encompass legacy activities of the Economic Capability Building project and employ the services of an economist. This document therefore pertains to the period covered by the new SSERCP project (end 28 February 2018), noting that that project will again consider models for continued delivery as part of its final reporting.

Marketing/Promotion

The availability of the FHEMC will be promoted through the following mechanisms:

1. Email sent to management agencies, industry associations/members, relevant NGOs, recreational fishing groups, including A4 flier that they can circulate and/or print and display. (face-to-face and online)
2. FRDC website (note that it is anticipated that a downsized version of the current Fishecon website will be migrated to be part of the FRDC website and combined with a general SSERCP web presence) (face-to-face and online)

3. Regular SSERCP/Fishecon newsletter and Linkdin page. (face-to-face and online)
4. Targeting, through direct approach of key individuals/groups/organisations to determine particular needs with a view to 'tailoring' the face-to-face class. For example, some groups may prefer more emphasis on either the benefit-cost module or the bioeconomic modules.

Budget model

The following proposed budget model is based on full cost recovery, including the cost of co-ordination and promotion activities undertaken by the SSERCP and ongoing maintenance of materials/resources. It is based on the following assumption:

- Full cross-subsidisation of online access by face-to-face delivery. In other words access to the online resources will be free, initially with a small amount of instructor support provided. The level of instructor support and opportunity for interaction will be increased based upon the level of uptake of the face-to-face class or the availability of other funds.

• *Face-to face delivery (based on one day course)*

Cost item	Amount	Explanation
Instructor i)	\$1500 - \$2000	1 ½ - 2 days @\$1000/day (based on actual prep/travel/delivery)
Assistance with interactive components	\$300	6 hours @\$50/hour
Travel	\$0 - \$1000	Based on actuals
Accommodation for instructor	\$0 - \$300	Based on actuals.
Incidentals for instructor	\$0 - \$100	Based on actuals. (meals/ground transport)
Administration ii)	\$500 - \$1500	½ - 1 ½ day @\$1000/day dependent on level of administrative support provided by 'host' organisation
Provision of class materials and use of netbooks	\$240	Max. 12 participant @ \$20/participant
Contribution to cover maintenance/marketing/online engagement	\$1000	
Total	\$3,540 - \$6,440	

Notes:

- i) The course includes hands-on exercises using Excel and specialised bioeconomic simulation software. Depending on the background and experience of the participant group, a second instructor may need to be involved to provide appropriate support. In this case no assistance with interactive activities would be needed. Depending on the circumstances this would increase the total cost of delivery by about \$3,000.
- ii) Where possible hosting organisations will be required to provide some administrative support, including organising room hire, and to cover costs

of venue and food/beverage. Where this is not possible, these costs will be added to the cost of delivery accordingly.

Fees

Based on the cost assumptions above the, total cost for delivery (max. 12 participant) will range between \$3,540 and \$6,440, depending on travel and accommodation cost of the instructor, and the ability of the host organisation to share in the class administration.

For a class of 12 participants (max.) this corresponds to a fee per participant of \$295 - \$536.

5. Adoption and Further Development

Responsibility for promotion and delivery of the Masterclass now sits with the FRDC's Social Science and Economics Research Co-ordination Program (SSERCP) 2015 – 2018. This activity aligns with Objective 5 of this Program which is to *“Build further capability in fisheries social sciences and economics research to meet the needs of industry and managing agencies in addressing emerging issues in wild harvest, aquaculture, post harvest, recreational and indigenous fishery sectors.”*

The Masterclass was promoted via a flier at the 2016 Seafood Directions Conference (Appendix 2). Discussion has subsequently taken place between the SSERCP Program co-ordinators and the Western Australian Department of Fisheries, with a view to the new course being offered first in that jurisdiction. Alternative blended formats for the course are currently being prepared for the Department's consideration.

While no budget allocation has been made for the purpose of further developing the Masterclass at this stage, the potential does exist for additional modules to be developed in the areas of economics (e.g. non-market valuation), social science methodologies relevant to the management of fisheries, and interdisciplinary research and management approaches.

7. Appendices

Appendix 1:

Legacy from Future Harvest

1. Focus Area: Capacity building

2. Project: 2010/714 – Future Harvest Master Class

3. Project status:

The Project now effectively complete, with the final report held back while await result of request for extension. The project developed and delivered a one-day Master Class training programme consisting of four modules

Key economic concepts including: cost benefit, types of cost, role of markets and the role of government.

- **Bioeconomic modelling** including: dealing with common property/tragedy of the commons; key concepts of static bioeconomic models including MSY and MEY, and stock effects.
- **Optimising future catch** demonstrated using: bioeconomic model teaching software including: fleet dynamics; input vs. output controls; demand; stock dynamic considerations; and catch optimisation
- **Competing uses and allocation between sectors** including optimal allocation, valuing non-market uses and the role of impact analysis

The Master Class was rolled out between September and December 2010 in capitals and other cities in all coastal states (not Northern Territory), with a total of nine courses being delivered to 121 participants. Attendees comprised: fisheries managers (52%); industry (18%); researchers (23%); and NGOs (5%).

Response to the training was generally positive, with 84% of the participants considering that the Master Class had substantively improved their understanding of the role of fisheries economics in future harvest decisions.

In early 2011, the PI and project team worked with the CRC Communication and Extension team to develop a project variation (extension) at a cost of around \$48,000, comprising of two major components:

1. Revision/refinement of the existing Master Class materials/resources to support further 'on demand' face-to-face delivery,
2. Development of the revised/refined Master Class as an online short course.

The revision/refinement of existing Master Class resources included new modules on i) fisheries policy and the role of economics and ii) cost-benefit analysis, and further development of the teaching software, including a manual.

The online short course would include the development of podcasts and audio files, supplementary reading material, web-based discussions and online assessment. After completing the online course a certificate of participation would be provided.

Assessment of this project by the CRC was held, pending the FH Legacy Review.

4. Proposed pathways to adoption (completed project)

By developing the capacity of fisheries managers, biologists and industry the project seeks to increase understanding and appreciation of the value of:

- incorporating economic targets into fisheries objectives;
- identifying (lost) opportunities associated with inefficient management strategies; and
- comparing different management measures/scenarios and trade-offs to determine how best to address lost opportunities

The project was also designed to make participants aware that current management arrangements are rarely optimal and to motivate efforts to improve them.

The increased capacity and understanding will provide a platform to support the uptake of outcomes of CRC projects, including decision support tools, fishing to market opportunities and the utilisation of capital in prawn and other fisheries.

The Master Class would be available on demand and on an ongoing basis.

5. Discussion

It is clear from feedback from Master Class participants and discussions with managers, researchers and industry that the course has been generally successful. The outcomes of the successful bioeconomics projects either completed or underway will provide a plethora of material suitable for incorporation into teaching materials. This, in turn will provide a very useful platform for extending the project outcomes to other fisheries, or increasing understanding by those in whose fisheries the projects were based. A strong network of fisheries economists has been built under FRDC project 2008/306 (Building economic capability to improve the management of marine resources in Australia) who are capable of delivering courses. Many of these fisheries economists are working on FH bioeconomics projects. The one day Master Class will be available on an on-demand, cost recovery basis.

The teaching materials, while generally meeting the needs of participants, are in need of further development both in terms of material and means of delivery.

Key feedback suggests that:

- 'tailoring' courses to jurisdictions and the economics of specific and relevant fisheries would make the courses considerably more attractive;
- in some select cases, having participants from more than one jurisdiction, particularly with common species/fisheries (e.g. rock lobster, abalone) would be very beneficial for knowledge transfer;
- attending a one-day course and expecting a high rate of retention beyond a general awareness of concepts is unrealistic. Similarly, to expect an audience of fishers and higher degree qualified fisheries managers/researchers to find a single level of course delivery sufficiently

informative and challenging while not being overly complex is somewhat optimistic.

The online, self-paced course would address any tendency to achieve retention deficit caused by the intensity of face to face one day session.

There is an increasing demand for capacity building in fisheries economics. This is becoming evident as fisheries management becomes more sophisticated and harvest strategies and control rules in management plans become widely used. In addition, the increasing competition for resource access also heightens the demand for understanding of economic valuation and principles of allocation.

There is a FRDC-funded project to develop a national approach to harvest strategies, which will incorporate the use of economic target reference points. This will boost the need for a wider appreciation of the value and use of economic analysis. Currently, many within industry and government are either unfamiliar with the underpinning economic theory (if any) behind these new forms of management, or have an incomplete awareness of the range of solutions available. The first round of Master Classes generated considerable interest and, in the absence of similar educational offerings, the ongoing need is clear.

The issue of on-going funding and continuation of capacity building once the CRC is complete is an issue. Most fisheries departments and industry leaders have the resources and a high degree of 'willingness to pay' for staff development, particularly in the absence of other training options. The marginal cost of updating the proposed online short course and Master class material should not be significant, particularly if the former becomes part of a unit in an accredited course.

The FRDC Capacity Building Programme has indicated that it would like to be engaged, mostly to be in the loop, and would be willing to be on a steering committee is thought useful. Further, FRDC have indicated that it is unlikely it will have capacity to promote and organise courses into the future.

6. SWOT analysis and review of current adoption strategies

Strengths	Opportunities
<ul style="list-style-type: none"> • Capacity to deliver • First round Master Class course developed and established, including software training resource • Effective courses – evidenced by positive feedback from course participants and indication of future demand • Availability of Future Harvest project 	<ul style="list-style-type: none"> • Increased use of bioeconomics and economic decision support tools creating need/demand for master classes to address knowledge gaps • Momentum generated from first round of courses • Absence of other similar educational offerings • Use of flexible delivery methods utilising online delivery • Fisheries management/research institutions willing to support staff to undertake economics training and likely to maintain

outcomes	continuity <ul style="list-style-type: none"> • FRDC Human Development Programme • Overseas interest, indicating the possibility of leveraging off this material to increase international collaboration.
Weaknesses <ul style="list-style-type: none"> • Courses not tailored for individual fisheries/jurisdictions • Single-jurisdiction courses do not allow for adequate transfer of knowledge • Lack of retention of course content among participants • Catering for the different needs of fishers and managers/biologists in a single workshop 	Threats <ul style="list-style-type: none"> • Lack of interest from key stakeholders, and especially industry/post harvest • On-going source of funding post CRC • Time pressures on potential participants, including managers and industry • Lack of individuals/entities to initiate and drive 'on demand' courses

6. Conclusions and recommendations (to enhance uptake and contribute to FH legacy)

A variation to project 2010/714 should address the following:

- A two-pronged approach via:
 - The retention, with refinement and update of material/resources, of the current Master Class course, to be delivered on an 'as needs' basis, with particular consideration to those jurisdictions where FH outcomes are to be implemented. This course would continue to focus on introductory material and would be suitable for advisory (MAC) committee members.
 - An online short course aimed at fisheries professionals engaged directly in fisheries management or allied fields including fisheries research. The course would enable self paced learning, noting that if web-based seminars are to be used, start and end times of units will need to be coordinated. This course may be suitable for use as credit towards an accredited unit within a graduate diploma/certificate course. It is not clear if the effort required to accredit the course would be justified.

- Using input from state-based economists in both the online course and on demand, self-funding Master Classes and other face-to-face courses, will reduce costs, ensure relevance and increase participation.
- Refinement of the existing Master Class materials/resources to include: refinement of the bioeconomics teaching tool to enable easier 'tailoring' to case study fisheries of interest; expansion of the module to expand treatment of the role of economics in fisheries policy; review by economists that were part of the Master Class delivery team; and the addition of a new module on cost-benefit analysis.
- The use of case histories and examples of particular application to jurisdictions, with an emphasis on FH projects, will also provide relevance and increase the awareness and adoption of FH outcomes.
- Short courses based on Master Class and online course material could be usefully coordinated with major meetings where the field of bioeconomics is applicable e. sg. at Seafood Directions.
- A focus of the online course on fisheries managers/researchers/ senior industry stakeholders so as to help bridge the gap between bioeconomic research and uptake by decision makers and key advisers.
- A user group comprising course attendees and those undertaking the distance-learning module could be developed, which would form a network of practicing fisheries managers and other users of bioeconomic analysis
- A legacy strategy be developed for the longevity of the materials and associated websites beyond the life of the current project. Options include hosting on the FRDC site, the University of Tasmania or the CRC.

<p>Recommendation: Extend the current Master Class in Fisheries Economics Programme, based on the document previously developed and incorporating the above comments.</p>
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Appendix 2:

The *Future Harvest Masterclass in Fisheries Economics*...

Now offered under the banner of the new FRDC Social Science and Economics Research Co-ordination Program the *Future Harvest Masterclass in Fisheries Economics* features:

➤ *Face-to-face and online delivery*

Following a successful debut season of face-to-face classes the Masterclass is now also available as a short self-directed, on-line course supported by video lectures, tutorials and workshops. Or talk to us about designing a tailor-made course that combines both delivery modes.

➤ *New and revised content*

A brand new module on the use of Benefit-Cost Analysis (BCA) in fisheries management, as well as extended learning resources including checkpoint questions and answers, worksheet and spreadsheet exercises and simulations.

➤ *Flexible structure*

A modular structure lets us put together a course that meets your needs, catering for the varied background and interests of participants. and for the time and budget

...has had a makeover and is back

Ever wondered how economists think about problems involving the allocation and use of resources?

Ever wondered how economic thinking can contribute to decision-making to achieve profitable and sustainable fisheries?

Do you want to gain hands-on experience in conducting a Benefit Cost Analysis of a simple fisheries project?

Do you want to work with a bioeconomic model to explore how to achieve optimal future harvests?

Then the *Masterclass in Fisheries Economics* is for you

The Masterclass...

- Has been developed and is delivered by an experienced team of marine economists from the University of Tasmania, the Queensland University of Technology, the CSIRO, the University of Adelaide and the University of Queensland
- Caters for people who haven't studied economics before, developing the foundation concepts needed to make sense of more technical topics
- Won't turn you into an economic expert but it will improve your economic literacy and skills, making you a more informed and effective participant in the seafood

sector. It will also be of value to those with a broader interest in marine resource management.

For more information including how to access the online course or to discuss face-to-face delivery options email Sarah Jennings at sarahjennings306@gmail.com



The Masterclass Modules

Thinking Economically (Module 1)

In economics, a small number of core principles do much of the work. In this module we introduce some of these principles using illustrations from fisheries. This will provide the basis for understanding the way in which economists both ask and answer questions about the use of resources. The module also sets the stage for understanding why governments become involved in regulating access to and use of fishery resources, rather than leaving this job to individuals.

Benefit-Cost Analysis in Fisheries (Module 2)

The idea that most people, much of the time, make decisions based on their evaluation of the benefits and costs of alternatives is central to economic thinking. This thinking is equally relevant when we think more broadly about how society's limited resources should be allocated. Benefit-Cost Analysis (BCA) provides a structured framework for comparing the economic effects of different allocations of resources, and can provide useful input to the decision-making process. In this module we introduce the basics of a simple BCA, using fisheries examples. Much of the learning in this module is by doing, and you will have the opportunity to work with a structured BCA Excel spreadsheet tool.

Putting Economics into Fishery Management Decision-making (Module 3)

Fishery management decisions are often driven by biological information, yet the reason for management is to provide economic and social benefits from the fishery, as well as to maintain biological productivity. In this module we show how economics can be included in decisions on the sustainable management of the fishery through the use of bioeconomic modelling. Using such models helps fishery managers focus on fishing for value, not just catch. We will also draw on the concept of time preference to balance short term vs long term goals for the fishery and the implications for stock rebuilding. The module also deals with some of the hurdles to fishing for value, including common pool competition.

The Static Bioeconomic Model (Module 4)

Here we extend our discussion of the bioeconomic model in two ways – firstly, we provide more detail of the underlying biological and economic relationships. Secondly, it presents our analysis of the maximum economic yield in a static, or single period, framework. By the end of this discussion you will be able to; explain the key features of a static bioeconomic model and illustrate it graphically; use the static model to explain the relationship between

MEY and MSY management targets, and the open access outcome in the fishery; and explore what happens to MEY when the value of key biological and economic variables change.

Optimising Future Harvest (Module 5)

This module involves you in some hands-on fishery management using the economic principles developed during earlier modules. You will get to control a simulated fishery using bioeconomic software developed for this Masterclass to explore what 'optimal harvest' really means and to identify some of the trade-offs involved in setting harvest levels. You will be able to explore questions such as: What will the fishery look like if we strive to maximise catch, employment or profits? How do different management tools compare in achieving these goals? What are the consequences of changes in our world, such as higher fuel prices and biological impacts from climate change, and how should fisheries management respond?



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