The contested ocean

A research and education vision on the economics of coastal and marine ecosystems

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My focus in research and education

- Central theme: economics of coastal and marine ecosystems
- Research: Develop applied bioeconomic models
  - What objectives should policy makers strive for?
  - What policy instruments should they use?
- Teaching: train future resource managers
  - Marine resource economics
  - Institutional economics of marine resources
  - Non-market valuation

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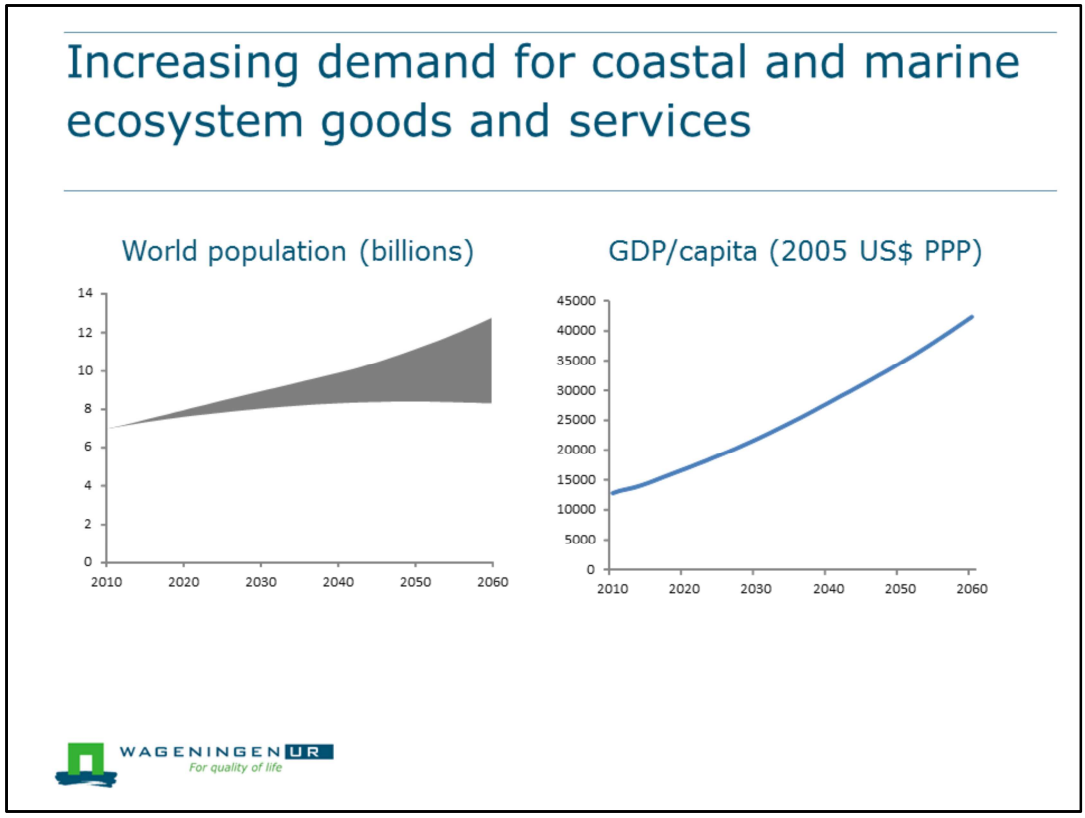
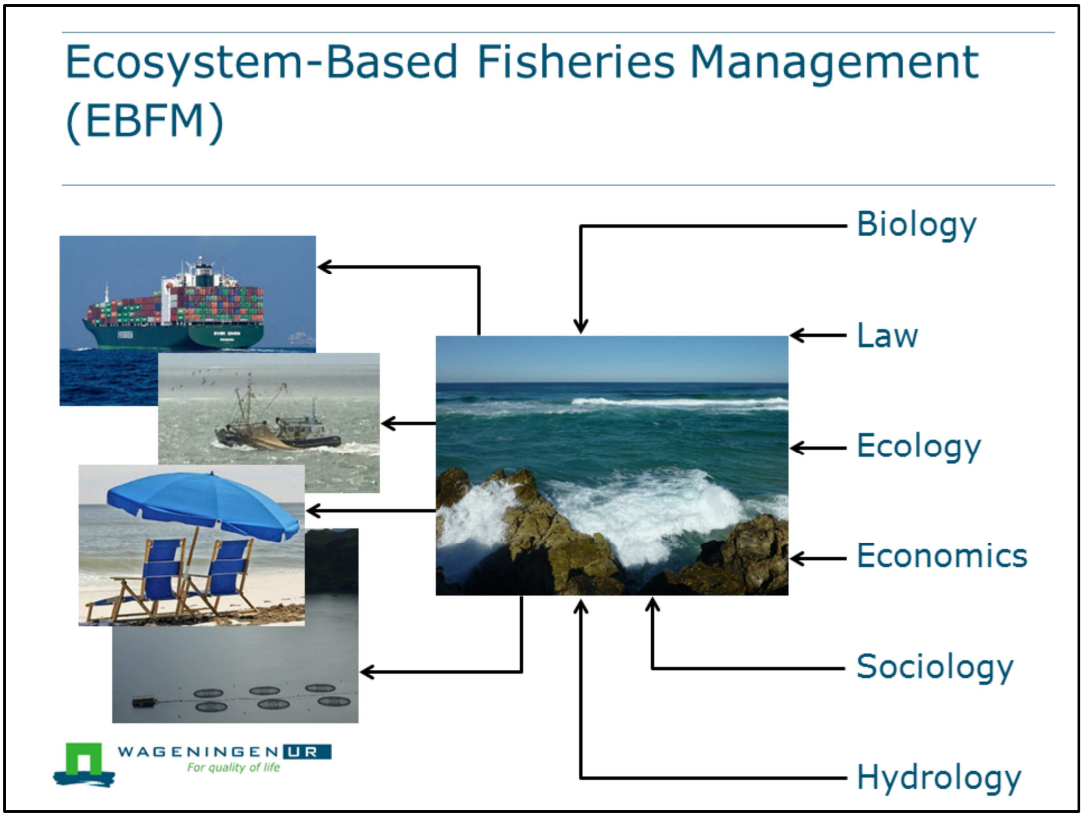
My research and teaching focuses on the economics of coastal and marine ecosystems. This entails, for a large part, fisheries economics, but also coastal ecosystems such as mangrove forests and coral reefs.

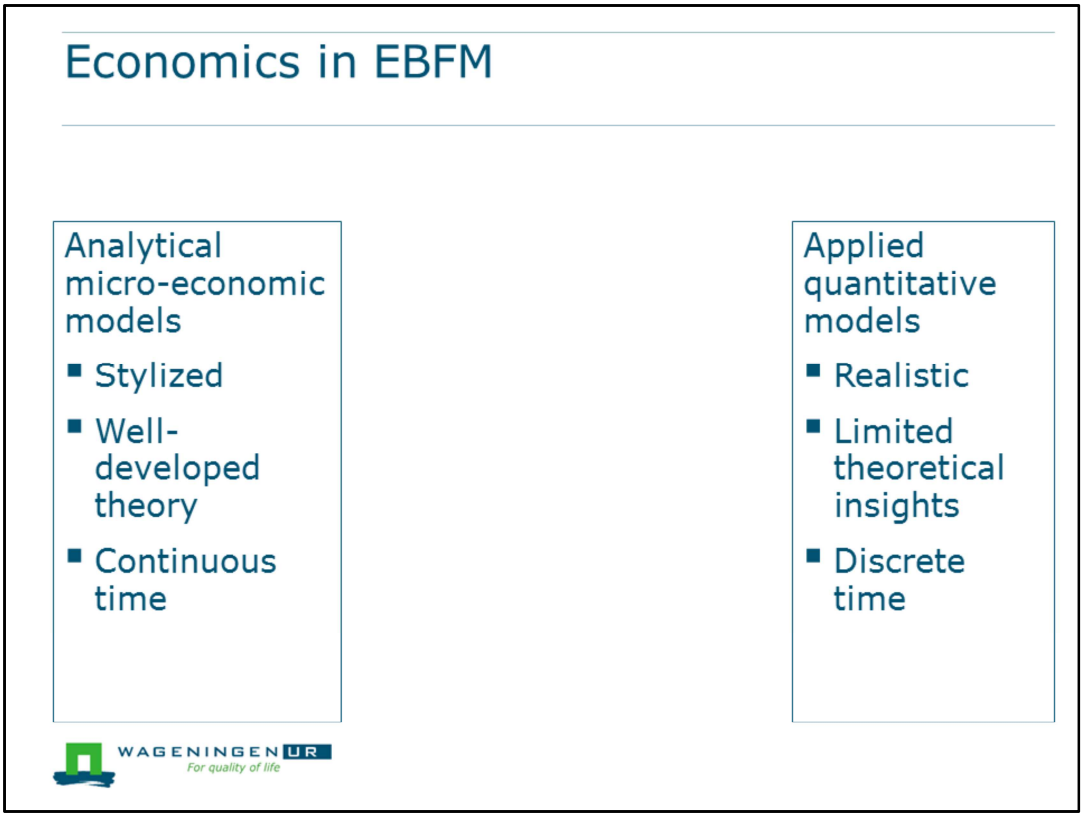


The background of this domain is the increasing demand for coastal and marine ecosystem goods and services. Most projections of world population foresee a substantial growth in the foreseeable future, and most likely these people will also be richer than people are now. They will demand more animal protein, living space, recreation opportunities, and so on.

At the same time we find that we are reaching the limits of what coastal and marine ecosystems can provide. More and more fish stocks are either fully exploited (in other words, they cannot be anymore productive) or overexploited (meaning that they could be more productive but then we should let them recover first). Environmental pollution, climate change, ocean acidification and other environmental pressures put coastal and marine ecosystems under even more stress, further limiting their potential to provide the goods and services we need from them.



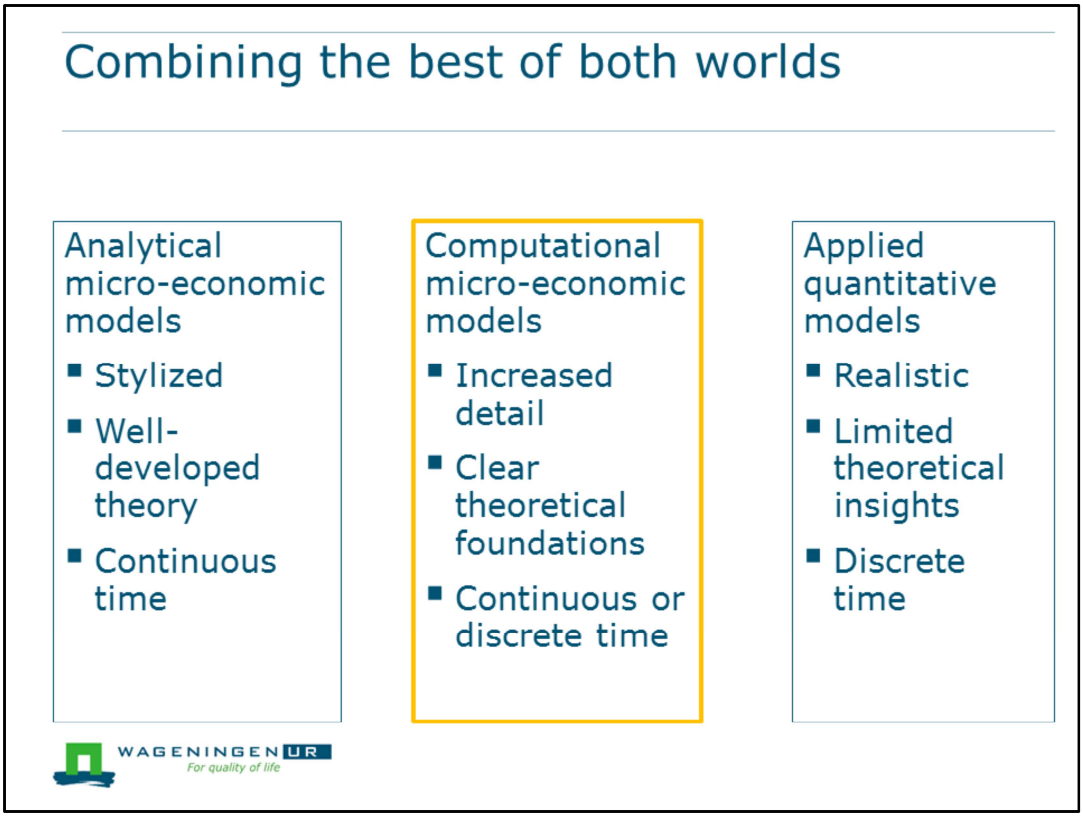
This diversity of demands and pressures, as well as the sheer complexity of coastal and marine ecosystems, has led to a shift from single-species fisheries management to a more holistic approach, which is generally referred to as Ecosystem-Based Fisheries Management (EBFM). EBFM considers the ecosystem with all its different users, impacts, and stakeholders, and does so from many different disciplinary angles. There is still some discussion on the right term, and I would argue that the word “fisheries” suggests a narrower focus than is warranted. It is not only about fisheries, but also shipping, tourism, aquaculture, and other uses of the coastal and marine environment. However, the term reminds us that to manage an ecosystem you need to manage its users.



Economic research contributes to Ecosystem-Based Fisheries Management in largely two ways. First, economists have developed theoretical models that provide valuable insight into the trade-offs and incentives present in fisheries management. These models are usually very stylized, in order to allow for formal algebraic analysis, and they mostly treat time as continuous, even though decisions are usually made at discrete points in time. Their contribution to fisheries management lies in concepts such as Maximum Economic Yield and the open access equilibrium, and policy instruments such as Individual Transferable Quota and Payments for Ecosystem Services.

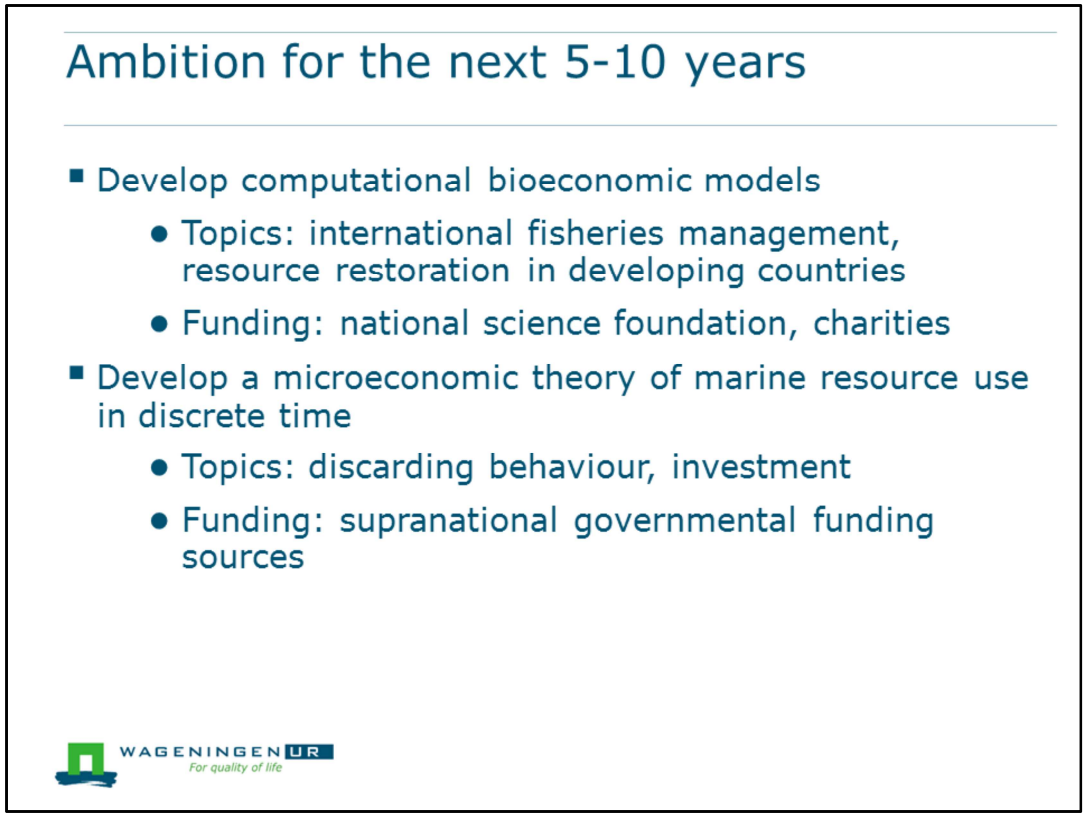
Second, economists have developed applied quantitative models that describe fishing fleets, their behaviour, and their interaction with the ecosystem in great detail. These models usually treat time as discrete, for practical reasons but also because they are developed to assist policy makers. The complexity of these models limits the extent to which theoretical insights can be drawn, but they are valuable in practical policy-making processes.

So we have a theoretical approach, which helps understanding the system but can be of little practical value, and an applied approach, which is of practical value but provides little theoretical insight.



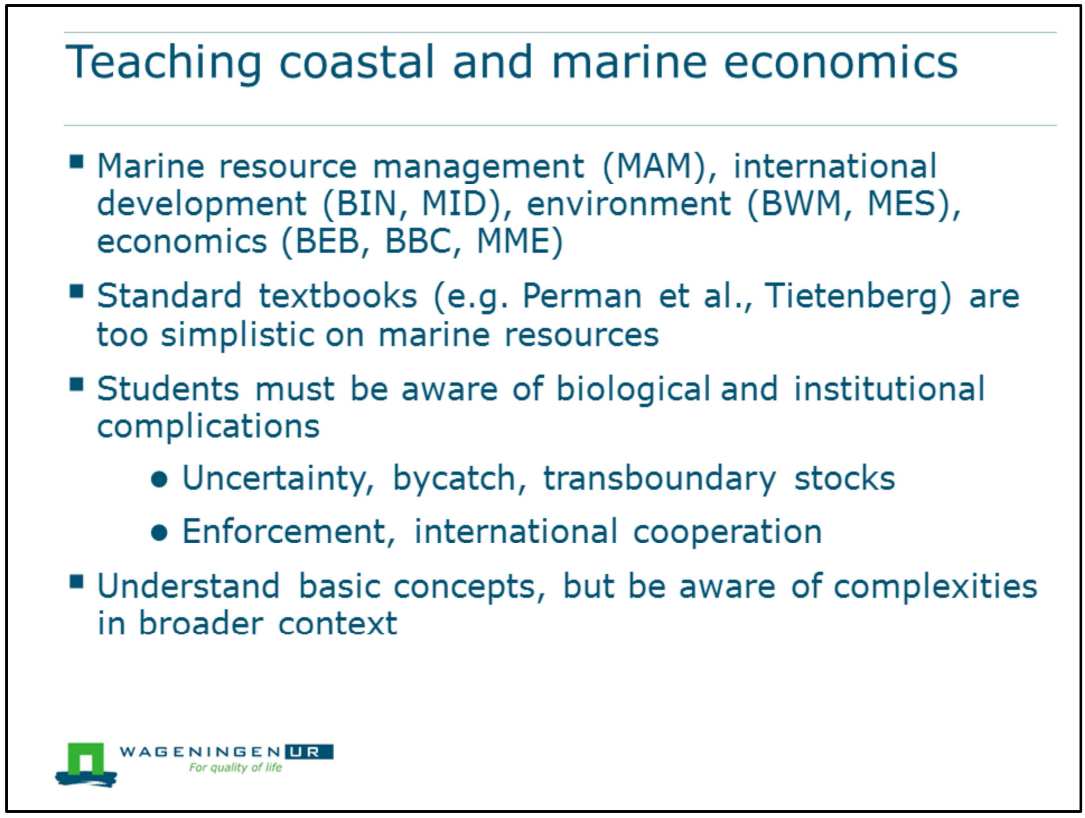
Macro-economists and financial economists have also deal with the problem that their object of investigation was getting more and more complex, leaving less and less scope for formal algebraic analysis. This has led to the development of computational economic methods, such as value function iteration, perturbation, and projection. My ambition is to apply computational economic methods to develop computational micro-economic models that have the theoretical clarity of the theoretical models but can handle more detail. These models can be specified in continuous time or in discrete time.

Why should Wageningen University develop such approaches? Our university prides itself of what it calls the "Wageningen approach": solving real-world problems by doing research that is interdisciplinary and scientifically robust. This approach is exactly what Ecosystem-Based Fisheries Management needs, as it is a real problem where many different disciplines are involved. Wageningen University has plenty of knowledge and experience in marine biology, ecology, governance, and business economics. My ambition is to add to that a strong tradition in coastal and marine economics that, other than business economists, address question at a societal level.



My ambition for the next 5 to 10 years is twofold. First, I will develop computational bioeconomic models of such issues as international fisheries management and resource restoration in developing countries. These topics are of theoretical interest, and they are relevant to environmental conservation and economic development. This makes them relevant to science foundations, like the Dutch NWO or environmental and development charities.

Second, I will develop a microeconomic theory of marine resource use in discrete time. This will facilitate the development of a firmer theoretical foundation of applied quantitative bioeconomic models. As such models serve to facilitate policy-making processes, this line of research is relevant for supranational bodies involved in marine resource management, such as the EU.



My topic is relevant for the BSc and MSc programmes in aquaculture and marine resource management, international development studies, economics and governance, and environmental science. Although the fishery is a standard case in textbooks on environmental and resource economics, those textbooks tend to treat this subject rather simplistically, ignoring the very complexities that have led to the development of Ecosystem-Based Fisheries Management. Therefore, to teach the next generation of marine resource managers what they need to know about economics, you need lecturers who are well aware of the myriad governance and biological issues in coastal and marine resources. In my teaching I aim to teach students the main concepts, while placing those concepts in a wider biological and policy context. Students don't need to understand all the complexities involved, but they do need to be aware of them.

Thank you

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