

TOPIC PROPOSALS FOR THE MASTER THESIS

Here is a list of proposals based on input from several of the teachers/researchers relevant to the study programme. There is however some researchers that have not submitted proposals, but they can still act as supervisors.

It is now up to you to narrow down the area of your interest and make the necessary appointments with the researchers. And it is of course welcome that you develop your own research idea/topic and then find a supervisor. Ideally, you can develop your idea together with a supervisor. And remember, you will need a main supervisor and a co-supervisor, one from each “side”, *i.e.* one from natural/technical science and one from social science.



BROOKS KAISER



Environmental economic consequences of increased Arctic shipping

- Starting perhaps from the Arctic Marine Shipping Assessment (2009), a variety of options exist, including:

Recent plankton blooms suggest a warmer Arctic may provide a boost to fisheries there (Economist, Sept 24, 2011). What are the economic consequences of this and/or other expected ecosystem changes in the warming Arctic? What about local populations and their interests? (see also Parry et al, IPCC 2007 ch. 15)

Identification and assessment of economic feedback concerns in a dynamic model, e.g. increased traffic increasing the rate of ice melt and changing the expected damages to ecosystems

Identifying strategic international trade concerns and proposing models for developing optimal international policy regarding arctic shipping.

Oil and Gas in the Arctic

The Arctic is reckoned to hold around 15% of the world's undiscovered oil reserves and 30% of those of natural gas. (Economist, Sept 24, 2011). What are forecasts of the ramifications to world mineral and energy markets from mining investments in the Arctic (timing and scale of impacts)

Statoil has drilled a dry hole in the Korpffjell field in the Norwegian portion of the Barents Sea (Aug., 2017). They have stated that they will return next season to drill 5 more. Is this a rational use of the company's capital? What are the opportunity costs of this decision?

Ocean Acidification

Ocean acidification due to increased carbon absorption is changing biogeochemical conditions in ways that affect ocean productivity. Impacts from, and solutions to, the problem are difficult to separate from other climate impacts (e.g. temperature increase) and carbon reduction efforts. Changes are not uniform across locations. How should monitoring, control, mitigation and/or adaptation efforts be assessed and compared?

Macroeconomic cycles and optimal resource extraction. Anecdotal reports suggest that panics and booms may intensify perverse incentives for resource extraction. Can we find data to support this for forestry? Petroleum? Coal? Other resources?

What happened to deforestation and other extractive or land-conversion activities in 2009? In the one-year blip was there a pause in frontier expansion (in various regions in the world and/or

globally), or an acceleration, or a non-event? There should exist high-frequency, high-resolution satellite data that can enable a tech-savvy student to answer this quite well.

Generate a catalogue of the natural resource data associated with the historical incidents in the Reinhart & Reinhart NBER (2008) paper, “Capital Flow Bonanzas: an encompassing view of the past and present” indicating what happened to total mining, forestry, export agriculture.... in the time surrounding each of the times/places in Appendix Table 4. Throw in a few regressions if desired, but construction of such a database would itself be enormously valuable and enormous, raising issues of international comparison similar to those Angus Madison struggled with -- so that should be at least a thesis.

Reports of the scale of illegal logging vary widely by location as well as globally (see, for example, illegal-logging.info). How much illegal logging is there, really, in today’s forests?

How does a ‘frontier setting’ to resource ownership (i.e., as property rights are in flux, due perhaps to dispersal of public domain or other changes in ownership regimes) affect extraction outcomes?

Design a simple pure-rules (i.e., no discretion) REDD -- the climate deforestation program. Perhaps one could envision that every country has a baseline forest biomass and must buy carbon credits to go below it, and can sell credits by exceeding the baseline. To be incentive compatible, countries will need compensation at least equal to enforcement costs, and cash + trade benefits at least equal to the total cost (i.e. mostly agricultural opportunity foregone) in order to stay in the program.

How much will that cost? Is keeping the REDD that simple losing a lot of benefit from detail -- for example, credits that could be claimed based on soil quality? Is the high-discretion REDD we seem to be developing doomed to become a rent-seeking bonanza?

Resource transitions in historical perspective

Use economic theory to elucidate the role of coal in the transition from whale oil to petroleum in the illumination industry of the 19th century

Investigate capital market misallocations in the transition from whaling to petroleum in the 19th century

Wildlife protection and geopolitical boundaries. How does the dispersion of costs and benefits from land use restrictions for the preservation of wildlife (e.g. endangered species, migratory species, other wildlife) affect political outcomes to generate wildlife protection? This could be internal to a country, or international.

Invasive species.

Identify economic threats from terrestrial or marine invasive species in Denmark and/or Scandinavia, and how climate change may affect these threats.

Develop an economic ranking of priorities for managing threats from invasive species to Denmark/Scandinavia.

What are the existing pests, and what are their relative expected net damages, given control options?

What are perceived external threats, and how should they be prioritized vis-à-vis existing ones?

How should we be thinking about threats from the known unknowns as well as the unknown unknowns?

DEWAN AHSAN



Application of ISO 31000 risk management framework for risk management of Danish shipping industries

ISO 31000 is a widely applied risk management guideline which could be used by any public, private or community enterprise, association, group or even an individual. ISO 31000 framework assists the organizations to manage any risky situation by providing generic guidelines.

This research attempts to explicitly identify existing and future risks of shipping industries by applying ISO 31000 risk management guideline and how to manage those risks based on a risk assessment specially from economic and societal angles.'

A systemic evaluation to determine the effectiveness of emergency management plan applied in Danish offshore wind farms

The main aim of this research is to assess the strength and weakness of the existing emergency management plans and to suggest what to do to overcome the existing challenges for the development a systematic emergency management plan that allows the managers to manage the emergency situations more efficiently to achieve the vision zero accident.

EVA ROTH



Shipping and the Environment and Arctic Port Development

1. How do ports' pricing structures for waste and pollution, and integration of the physical use of the ports for waste, pollution, and electricity with the harbor city facilities factor into decision-making and how can improved economic incentives increase well-being in these harbor cities?

2. Arctic Port Development
 - Applied case of (1)
 - What is the potential for a League of Arctic Ports, whose aim is providing networking solutions to boom/bust disincentives for investment;
 - Developing economically feasible port structures across diverse stakeholders, with prioritization of benefits, social and investment costs according to multi-use criteria that extend beyond accounting profit and range from indigenous local uses to extractive global resource industries, that is, developing multi-purpose/multi-need Arctic ports for local and regional demands;
 - There is an endogeneity of port infrastructure and community well-being. This is an economic question that requires economic logic to resolve efficiently.

HENNING JØRGENSEN



New District heating opportunities

Over time district heating has developed from high temperature (steam and almost boiling water) to lower temperature distribution LDH. This reduces transmission loss and provides new opportunities for using other renewable energy sources, such as ground heat pumps. It also allows more surplus heat from retail and production to be integrated in the distribution system. The subject of the thesis is to look at the potential for developing LDH and integrate these new energy sources and surplus energy from cooling in retail trade and industrial processes.

Bioenergy as a new opportunity for meeting the agglomeration challenge

With the transition from fossil to renewable energies, new opportunities for rural development seem to be possible. The urban development has benefited from the high energy density of fossil energy. The relatively lower energy density could appear to be putting rural and periphery areas in a relatively better position compared to high-density urban areas. The subject of the thesis is to look at the potential for developing energy sources particularly relevant to peripheral areas far from the urban agglomeration centers.

Globalization skepticism and gains from trade

Globalization has generated benefits to many countries and has allowed some developing countries to take advantage of international division of labor with impressive growth in GDP as a result. However, at the same time distributional consequences has put political pressure on many institutions previously in favor of globalization, leading to globalization skeptical movements and new political parties. The connection between globalization and distributional consequences may be analyzed from a set of perspectives, which explain some of the new resistance against further liberalization. The subject for the thesis is to analyze how different aspects of gains from trade and different aspects of redistributions are connected.

JENS BO HOLM-NIELSEN



What tools can be used to reach 100 % Renewable Energy Systems in the world – How to make a fast Green Change in a climate context.

In this context, you have to survey and research how to get use of Wind, Solar, Bioenergy and Water sources to make techno – economical changes and disrupt the fossil fuel era.

What kind of easy adaptable tool are available for the consumers / prosumers

Give clear case examples; discuss these in detail with the supervisor. The country and/or area is your choice.

Biogas Production in Denmark or Europe. What is sustainable feedstock's. Analyzing political & implementation stages of biogas projects in Denmark and/or Europe. What upstacles exists?

- Increasing biodiversity and sustainability in the lowland areas of the Danish farming areas
- Optimizing feed-in technologies for lignocelluloses based materials like hay or straw types
- Create a new income for farmers of biomass with a decreasing utilization in the food-feed chain
- (Green feed in lines at existing biogas plants and new biogas plant projects)

Systematic planning and transferring knowledge and knowhow for tapping wind resources in countries with big needs of utilizing own indigenous wind and/or other natural energy sources.

- How to get started - catalogue
- Planning of wind mapping and area planning, site mapping integrated in regional planning
- Organizing systematic transfer of wind farm knowledge
- Financing instruments
- Political frame conditions actual in the country

Sustainability Criteria's and Indirect Land Use Criteria's for large scale implementation of solid biopellet into coal power CHP plants in the Danish Power supply chain.

- Critical review of the International criteria developments, making state of the art analysis of international organization standards like FSC. Use BATI-standards (Best Available Technologies) and Implementation Standards from the International communities'
- Systematic approach for large scale cooperation between Russia – Baltic States- Scandinavia.

African or other continents states planning tools for targeting 100 % RES solutions.

- Analyzing political frame conditions in the factual country
- Resource mapping in the Country - see next;
- Forestry; Natural forests areas and commercial forestry areas like plantations
- Farming area; intensive areas mainly focusing into food production, extensive areas for grazing goats, sheep's, cattle's or set aside farming areas
- Solar power mapping; tapped and un-tapped sources
- Hydro power resources; taped and untapped sources
- Wind power atlas; tapped and untapped sources
- Geothermal sources taped and untapped sources
- How to speed up a rapid commercialization of RES sources
- Introducing action plans and/or fast stepwise RES implementation

Renewable Energy System planning, organizing, investing projects

- Decide a focal area, local or regional in Europe
- State of the art Energy mix
- Scenario of 100% RES
- Energy efficiency in the society
- energy savings
- Smart grid and integration possibilities of the above
- Cost-benefit analysis and action planning

KNUD SINDING



Waste management, energy production and water treatment in refugee camps

Many refugee camps are large, providing shelter for many thousands. This generates large volumes of waste materials. While a small fraction may be reused a large fraction is simply waste that has to be disposed of. One way of doing this is incineration in a mobile and modularized plant that produces electricity or heat or both. This might supply the camp either directly with electricity or in part with drinking water.

A project of this kind faces many challenges. Some are technical while others are financial. Amongst the technical challenges are plant design, robustness, distribution grid, feedstock and emissions. Among the financial and financial challenges are the capital cost, operating cost, financing development and testing of the concept as well as establishing a tariff system that works under the difficult conditions in camps of this nature.

Harvesting waste heat from short-haul diesel ferries

Any diesel engine produces heat that is lost through the cooling system. Most such engines move around erratically in trucks and ocean-going ships. Ferries, however, keep returning to the same locations over long periods. At the same time most vessels have enough space to allow storage tanks to be installed. There are both technical and economic challenges involved in harvesting this waste energy. The technical challenges include system design, energy balance, transfer points etc. The economic challenges involves costs (capital and operating) as well as estimating the value of energy harvested and transferred.

Utilities in refugee camps

Any refugee camp is challenged by basic demands for the supply of basic utilities such as water, electricity, sewers and waste removal. Such a camp is an economy all by itself and may be encountering the same problems as any other economy: making markets work and supplying public goods. The starting point suggested here is to map current practice in camp design as well as finding data on camp conditions in order to determine what public goods should be supplied and what should be/can be provided by markets. Sewage, water and power systems are candidates for public goods, water, energy and waste removal are candidates for market transactions.

Analyses of corporate CSR reports

Such reports are required under EU directive 2014/95 on non financial reporting. Each country implements legislation. What must reports contain for them to be meaningful for stakeholders and what is the track record from existing reports?

Environmental Agreements in general:

Many international environmental agreements (IEAs) exist. Some IEAs have very ambitious targets while others are progressing very slowly. They cover various environmental issues with transnational impact, like ozone depletion, pollution of oceans and rivers and over-exploitation of numerous species of land- and marine mammals, birds and fish and climate change.

Due to severe free-riding problems, IEAs often struggle with weak participation and compliance levels.

Research projects in this area could be in the empirical assessment of specific IEAs (e.g., Montreal Protocol, Helsinki Protocol, Paris agreement...) or IEAs in general and discuss for example following research questions:

- What influences a country in acceding to an IEA?
- What explains a country's compliance with an IEA?
- Are there specific factors of an IEA that makes it easier to reach an agreement, and related to this:
- How are targets set and what does a successful agreement mean?
- Are targets set out of environmental economic principles, or what objectives?

Specific on climate change negotiations and renewable energy systems:

- For many economists (and others), the price development for RES is an important driver for moving the climate negotiations forward. A research question related to this could cover the following issues:
- How important are the role of RES (renewable energy system: Wind, Solar PV..) for success for the climate negotiations
- How are the prognosis about their share of energy production and price development in the future?
- Are there first-mover advantages (for countries companies) in developing such RES □ Should development of RES be subsidized?

YINGKUI YANG



Recycling behaviour of households living in the rural area of Denmark

The aim of the project is to examine the possible determinates for recycling behavior of households living in the rural area of Denmark. The results of this research are expected to provide knowledge for policy makers about designing and plaining of the recycling facilities in the rural areas of Denmark.

Reference: *Stogia, A., Sardianou, E., Lasaridi, K., & Abeliotis, K. (2015). Determinants of Packaging Recycling Behaviour by Households of Athens, Greece. International Conference on Sustainable Solid Waste Management.*

Miliute-Plepiene, J., Hage, O., Plepys, A., & Reipas, A. (2016). What motivates households recycling behaviour in recycling schemes of different maturity? lessons from lithuania and sweden. Resources Conservation & Recycling, 113, 40-52.

Vencatasawmy, C. P., Öhman, M., & Brännström, T. (2000). A survey of recycling behaviour in households in kiruna, sweden. Waste Management & Research, 18(6), 545–556.

Why not buy green products?

About 30% of consumers report that they are very concerned about environmental issues but they are struggling to translate this into final behavior. The aim of this project is to find out the reason for not buying green although s/he is positive towards green product.

Reference: *Junior, S. S. B., & Silva, D. (2014). Consumption of green products in retail: the purchase intention versus buying declared. Agroalimentaria, 20(39), 155-170.*

Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: extending the theory of planned behavior. Journal of Cleaner Production, 135, 732-739.

Young, W., Hwang, K., McDonald, S. and Oates, C. J. (2010), Sustainable consumption: green consumer behaviour when purchasing products. Sust. Dev., 18: 20–31. doi:10.1002/sd.394

Public knowledge and perception for environmental policy

The project aims to examine the relationship between public knowledge and the success of governmental environmental policies. This project provides knowledge on how public understand environmental policy and their influence on the implementation of environmental policy.

Reference: *Vignola, R., Klinsky, S., Tam, J., & McDaniels, T. (2013). Public perception, knowledge and policy support for mitigation and adaption to Climate Change in Costa Rica: Comparisons with North American and European studies. Mitig Adapt Strat Glob Change, 18(3), 303-323. doi:*

10.1007/s11027-012-9364-8

Does green value-added tax facilitate sustainable consumption and production? The aim of this project is to investigate the impact of green value-added tax on sustainable consumption and production.

Reference: *De Camillis, C. & Goralczyk, M. (2013). Towards stronger measures for sustainable consumption and production policies: proposal of a new fiscal framework based on a life cycle approach. International Journal of Life Cycle Assessment. 18:263–272. DOI: 10.1007/s11367-0120460-5.*

Public acceptance of flexible energy pricing

The objective is to assess the consumer acceptance for flexible pricing energy and to identify the barriers for consumers to switch to a flexible pricing energy contract.

Reference: *Bjorgan, R., Song, H., Liu, C. C., & Dahlgren, R. (2000). Pricing flexible electricity contracts. IEEE Transactions on Power Systems, 15(2), 477-482.*

Rentziou, A., Milioti, C., Gkritza, K., & Karlaftis, M. G. (2010). Urban road pricing: modeling public acceptance. Journal of Urban Planning & Development, 137(1), 56-64.

Savvanidou, E., Zervas, E., & Tsagarakis, K. P. (2010). Public acceptance of biofuels. Energy Policy, 38(7), 3482-3488.

AMIN HAJIZADEH



1- Power-to-X : Increasing the society contribution and Economic aspects

Power-to-X (P2X) processes are defined as processes with the goal to exploit the environmental and economic potential of renewable electricity. P2X is an upcoming sector-coupling technology that can play a role in the decarbonization of energy systems. In the current, fossil fuel based energy system, the flexibility to meet the demand lies within (the storage of) the resources. Fluctuating renewable energy sources, however, cannot provide this flexibility. By coupling the electricity, heating and transport sector and utilizing energy storage, the lost flexibility can be generated in the energy system. Power-to-X (P2X) is a key element of sector coupling. Most commonly, P2X stands for power-to-fuels or chemicals, where electricity production is typically via electrolysis converted to different types of end products such as hydrogen, synthetic gases, hydrocarbons or chemicals.

In this thesis, the following questions will be address:

- 1- What are opportunities and threats (SWOT and economic challenges of P2X
- 2- How we can increase the contribution of the society
- 3- What are technological gaps for improving P2X



EGON NOE

Arguments for proceeding with the development of the Danish Pork production.

Agumentation for more environmentally friendly production and resource use than alternatives.

Contribution to GDP after adjusting for externalities.

Contribution to employment and economics in rural districts.

JENS MUFF



- Management of groundwater based drinking water resources in light of increased pesticide contamination of aquifers – how to ensure future demands?
- Management of perfluorinated compounds (PFAS/PFOS) in the environment – risks to human health and what management strategies are there?
- Remediation of contaminated Megasites (Kærgaard Plantation, Grindsted, Høfde 42 etc) and technology export potential – the DK politicians have allocated substantial funding to clean up some major contaminated sites. Are the funds well spend?
- Centralized versus decentralized softening of drinking water – when does it make sense? Engineered drinking water?

JULIA BRONNMANN

To be added.

TANMAY CHATURVEDI

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To be added.

METTE HEDEGAARD THOMSEN

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MELINA KOURANTIDOU



From Waste to Value: Barriers, Opportunities and Challenges in Vessel Recycling

Impressive progress as well as persisting challenges are found in practices of ship recycling, therefore providing several avenues for research, including interdisciplinary ones. Recent regulatory changes at the EU level as well as increasing digitalization and technological advances in vessels (that is likely to shorten their operating lifetime) are developments that are expected to grow the demand for machinery and infrastructure window of opportunity for the maritime industry as well as ports (including the Danish one) to lead a transition towards sustainable, closed-loop (cradle-to-cradle) vessel recycling. Safe disassembly of vessels for recycling can be included already in the vessel design stage, where all materials, quality of steel, cables, inventory of hazardous materials are in conformance with global regulation (e.g., the Hong Kong Convention). Through modular design strategies, ship designers and ship owners can have a wide range of technological solutions to choose from in order to balance the complexity and standardization required by each vessel, particularly for its operation over its life cycle throughout the forward supply chain (starting from vessel building, to operation, to decommission) as well as the reverse supply chain (after the vessel is disassembled for recycling).

The thesis can address various unresolved economic, social, environmental and health-related challenges in vessel recycling. Among the most prominent challenges are the lack of proper incentives for ship owners to comply with existing regulations, economic inefficiencies, and the occupational health risks and severe environmental hazards of ship recycling as practiced in South Asia (mainly Bangladesh, India and Pakistan), where currently more than three-quarters of the world's ship recycling capacity is located.

Different institutional mechanisms exist to ensure “safe and sound ship recycling”, e.g., the yet to be ratified Hong Kong Convention, the Basel Convention, the EU's Ship Recycling Regulation and the Ship Recycling Transparency Initiative (a private initiative to which, among other shipowners, A. P. Møller-Maersk is also a signatory). In addition to that, the EU has recently issued a list of vessel recycling facilities fulfilling the requirements set out in the EU Ship Recycling Regulation. Effective from the end of 2018, the EU requires that all large commercial seagoing vessels flying the flag of EU member states must be recycled only in facilities included in the list. While this mandate is a critical step towards facilitating “safe and sound ship recycling” it certainly has pitfalls, e.g., the possibility of switching to a non-EU flag that enables scrapping in a non-certified scrapyards, has not been adequately addressed.

At the same time, there is a need to further explore globalization aspects of circular economy in terms of stakeholder analysis. The new ship recycling initiatives and regulations in place are likely to result in “Winners & Losers”. The use of common, economic decision support tools such as cost-benefit analysis differs vastly between developed and developing countries. By exploring those discrepancies in the use and implementation of such tools, and depending on the focus (eg Danish, European or other spatial level) the thesis can create value for that will “spread” across international markets with

positive spillovers for third-world countries where most of the scrapping activity currently takes place.

Economics and management of invasive species with multiple roles

Invasive alien species (IAS) are generally known for their negative environmental and economic impacts, often times wreaking significant havoc in native ecosystems, others wiping out their native counterparts resulting in large biodiversity losses or in other cases causing losses to human infrastructure. However, there are also cases where invasive species may also have benefits or positive impacts besides their costs or adverse effects. In such cases decision-making for natural resource managers becomes very complex, considering the presence of hard-to-estimate trade-offs. In Denmark the studies documenting benefits from the presence of IAS are limited and most of them do not include monetary estimates. For example: The pumpkinseed (*Lepomis gibbosus*) has a positive value for recreational fishers, despite preying upon and competing with other native species that are also fished for recreation purposes (Callesen and Schou, 2019). The American mink has brought significant benefits to the Danish mink fur industry (average income was estimated at 5.75 billion DKK in 2013-2017) (Callesen and Schou, 2019; Schou 2019). The zebra mussel has positive impacts on benthic species that live off of its water filtration capabilities (Miljøstyrelsen, 2017). Despite the significant impact and potential costs of the common cordgrass (*Spartina anglica*) for higher trophic levels, such as waterbirds that forage in the Wadden Sea, Tang et al (2010) hint that there may exist benefits associated with protection and prevention of sediment re-suspension that may result in providing a refuge for certain species. While expressing mainly concern about negative impacts from wild boar introductions, Alban et al, (2005) frame their analysis of risks from wild boar re-introduction under the premise that Danish wildlife organizations want to reintroduce wild boar to Denmark. This indicates benefits from a potential introduction of wild boar in Denmark to at least some interested parties, and possibly to ecological systems, if rooting serves to promote botanical diversity and natural regeneration of forests.

This thesis calls for thorough examination of such cases in Denmark along with literature that assesses trade-offs in such cases of invasive species with multiple roles. This process should help bring to surface economic tools and mechanisms that will help feed into decision-making and natural resource management.

Alban, L., Andersen, M. M., Asferg, T., Boklund, A., Fernandez, N., Goldbach, S., ... Ydesen, B. (2005). Wildrisk: Classical swine fever and wild boar in Denmark: A risk analysis. Danish Institute for Food and Veterinary Research.

Callesen, G. E., & Schou, J. S., (2019). Erhvervs- og socioøkonomisk vurdering af invasive arter foreslået til EUlisten, 14 s., IFRO Udredning, Nr. 2019/12

Miljøstyrelsen 1 (2017) faktaark for invasive arter Downloaded 10 March 2020. <https://mst.dk/naturvand/natur/national-naturbeskyttelse/invasive-arter/hvad-goer-myndighederne/tiltag/faktaark/>

Miljøstyrelsen 2 (2017) Handlingsplan mod invasive arter [Action plan for invasive species]. Miljøstyrelsen. https://mst.dk/media/143350/handlingsplan_invasive-arter_juni17.pdf

Schou, J.S., & Jensen, F. (2019). Ragweed in Denmark: Should We Prevent Introduction or Mitigate Damages?. Journal of Benefit-Cost Analysis, 10(3), 469-502.

Tang, M., & Kristensen, E. (2010). Associations between macrobenthos and invasive cordgrass, *Spartina anglica*, in the Danish Wadden Sea. *Helgoland Marine Research*, 64(4), 321-329.

Trends in Invasive Species Costs using the InvaCost database

The InvaCost database, is the largest and most comprehensive database to data that brings together and standardizes economic costs of invasive species (IAS) from peer-reviewed and grey literature across the globe (Diagne et al. 2020). This version of the database contains detailed information on the costs (e.g. cost types, impacted sectors, regional attributes, cost estimation reliability, etc.) associated with a large number of IAS across different countries and the globe. A number of researchers from around the world have utilized the database, through quantitative analysis, to explore different research questions. Examples include assessment and trends of invasive species costs in specific countries (e.g. [Italy](#), [France](#), [North America](#)) or regions (e.g. the [Mediterranean](#), the Nordic region etc), or in specific environments (eg [aquatic environment](#) or protected areas in general) or across specific categories of species (eg [invasive fish species](#) and crayfish). Additionally, researchers utilizing the InvaCost database have attempted addressing broader research questions that in some cases involve both modelling and data such as understanding the costs of inaction when dealing with invasive species. Generally, there is a plethora of interesting research questions that can emerge and the database is openly available to everyone. The student can choose a research question or regional / thematic focus that interests them the most. Strong quantitative skills would be useful in pursuing this project. R code can be made available to support preliminary data analysis.

Diagne C, Leroy B, Gozlan RE, Vaissière A-C, Assailly C, Nuninger L, Roiz D, Jourdain F, Jarić I, Courchamp F (2020a) InvaCost, a public database of the economic costs of biological invasions worldwide. *Scientific Data* 7: 1–12. <https://doi.org/10.1038/s41597-020-00586-z>

Diagne C, Leroy B, Gozlan RE, Vaissière A-C, Assailly C, Nuninger L, Roiz D, Jourdain F, Jarić I, Courchamp F (2020b) InvaCost: references and description of economic cost estimates associated with biological invasions worldwide. Figshare. Dataset. <https://doi.org/10.6084/m9.figshare.12668570.v1>

Diagne, C., B. Leroy, A.-C. Vaissière, R. E. Gozlan, D. Roiz, I. Jarić, J.-M. Salles, C. J. A. Bradshaw, et al. 2021. High and rising economic costs of biological invasions worldwide. *Nature* 592: 571–576. doi:10.1038/s41586-021-03405-6.

Efficiency, profitability, management and inclusiveness in fisheries management

Fisheries are being managed very differently across the world and are often after very different economic objectives. Understanding these differences is key to making them more efficient, helping them overcome their weaknesses and enable cross-country collaborations. This thesis shall focus on understanding such economic and management type of differences in Snow Crab fisheries in Newfoundland (Canada) Vs Snow Crab in the Bering Sea. These may span from differences in fisheries management tools and approaches to markets targeted and even effects from Covid-19.

Davis, R. (2015). ‘All in’: Snow crab, capitalization, and the future of small-scale fisheries in Newfoundland. *Marine Policy*, 61, 323-330.

Davis, R., & Korneski, K. (2012). In a Pinch: Snow Crab and the Politics of Crisis in Newfoundland. *Labour: Journal of Canadian Labour Studies/Le Travail: revue d'Études Ouvrières Canadiennes*, 69, 119-146.

JENS LAURIDS SØRENSEN

To be added.

ANDERS SMITH KRISTENSEN

To be added.

RUDI P. NIELSEN



To be added.

