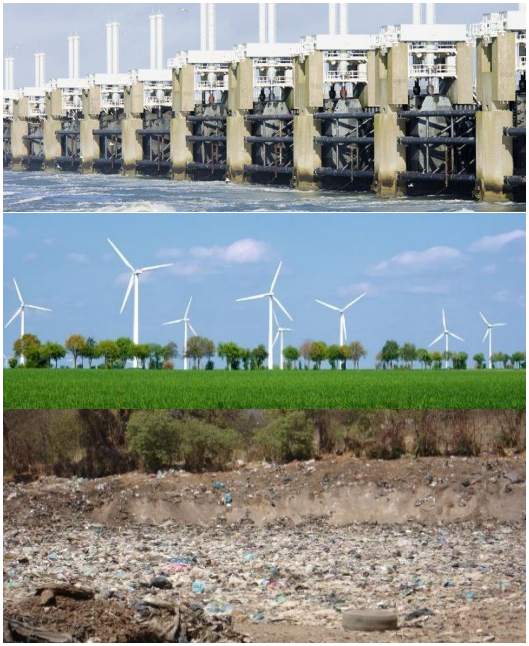
WAGENINGEN UR
For quality of life

Environmental Economics and Natural Resources

Thesis topics at the Environmental Economics and Natural Resources Group



DATE
9 July 2025

AUTHOR
Rolf A. Groeneveld

Introduction

Environmental and resource economics is an exciting field that integrates insights from economics and the natural sciences to address a pressing issue: how do we cater for the needs of current generations without imperilling future generations and ecosystems?

This brochure lists possible topics for a BSc or MSc thesis at the Environmental Economics and Natural Resources Group (ENR). *The brochure is by no means meant as an exhaustive list of thesis topics.* You are always free to suggest a topic by yourself!

The topics are listed in no particular order, so you can browse through the list to find a topic of your liking or just be inspired. At the end of the brochure you will find an index of keywords to help you find thesis topics associated with a particular policy domain or methodology.

For each thesis topic we also suggest courses that will be helpful. Be aware that this is an indication of relevant knowledge and not necessarily a requirement. You can discuss the required background with the contact person.

For more information on BSc and MSc theses and internships at ENR you can contact Mohammed Degnet: mohammed.degnet@wur.nl.

You can also enrol in the ENR thesis and internship Brightspace site by downloading and filling out the intake form[1] and sending it to Mohammed Degnet.

[1] https://www.wur.nl/en/show/thesis-and-internship-intake-form-enr.htm

ENR staff

Francisco Alpízar
francisco.alpizar@wur.nl
Prof Alpízar is the chair of the Environmental Economics and Natural Resources Group. Alpizar's work has explored incentive based approaches to generate improved private and public management and use of natural resource with a particular focus on climate change and developing countries.

Hans-Peter Weikard
hans-peter.weikard@wur.nl

My research examines game theoretic modelling options for cooperation between agents that are assumed to be either selfish or have other-regarding preferences (altruism, fairness). I focus on the management of public goods, where free-rider incentives hamper cooperation. I am also interested in theoretical issues of environmental ethics, biodiversity, and natural resources.

Rolf Groeneveld

rolf.groeneveld@wur.nl

I am the education coordinator of the ENR group. My teaching and research focus on the economic analysis of ocean and coastal management. This includes such issues as fisheries policy, non-market valuation of marine and coastal ecosystem services, and spatial planning. I am open to all kinds of theses in this domain, but my main expertise lies in applied bioeconomic modelling, and in non-market valuation and cost-benefit analysis.

Andries Richter

andries.richter@wur.nl

My research deals with the interaction between society and ecosystems, and the role of institutions in this interaction. In such "social-ecological systems" human behaviour has profound impacts on natural resources and vice versa. Whether these systems are sustainably managed depends on the formal laws and informal norms that couple the natural and the socioeconomic system. In my research I disentangle the two-way feedback between humans and nature by using theoretical models, empirical analyses, and behavioural experiments.

Xueqin Zhu

xueqin.zhu@wur.nl

My research develops integrated environmental-economic models of food, water, and biofuel. I focus on two issues: (1) regional food production under climate change; and (2) the food-biofuel-water nexus. Water is an essential input for both food and biofuel production and the natural environment is an input for agricultural production. Both are likely to be heavily affected by climate change. My methods include applied general equilibrium modelling, mathematical programming, econometric analysis and stochastic frontier analysis, in GAMS and Stata.

Anna Lou Abatayo

anna.abatayo@wur.nl

I am interested in understanding the way in which individuals affect their natural environment (and vice versa) through environmental policies, both formal and informal arrangements. In the past, I have worked on projects on the management of common pool resources (i.e., fisheries), biodiversity conservation (i.e., 30-by-30, protected areas), and climate change (i.e., climate engineering); and would like to continue working on similar topics. I enjoy working with data from economic experiments, surveys, publicly available longitudinal surveys, and spatial data.

Suphi Sen

suphi.sen@wur.nl

My research focuses on applied econometrics and applied theory to analyse questions within environmental and resource economics, with a particular focus on climate policy and fossil resources. One of my current research interests, for example, is the issue of asset stranding which can arise in the transition to a clean economy. In this research, I analyse stock market data with econometric methods to answer questions such as: How do climate change and policy beliefs interact with asset prices?

Theo Kónc

theo.konc@wur.nl

My research evolves around the design of environmental policies, taking into account inequalities, social interactions, and political obstacles. I am interested in projects aimed at measuring the social effects of environmental policies and integrating political dynamics into environmental economics theory. For instance, I am currently studying why citizens do not support efficient environmental policies. I combine a variety of methods including analytical and numerical modeling, survey experiments, and analysis of consumption data.

Mohammed Degnet
mohammed.degnet@wur.nl

I am the thesis and internship coordinator at the ENR group. My research interests centre around the topics of sustainable natural resource management and environmental economics. In particular, I am keen to carry out research on the role of behavioural factors in influencing resource management and the impacts of interventions on sustainable production and consumption. In addition, I am interested to look into the development outcomes of sustainable resource management. My research methods are mainly applied econometric and statistical analyses, but I am open to other research methods.

Maartje Oostdijk
maartje.oostdijk@wur.nl

I am a postdoctoral researcher at the ENR group. My research focuses on environmental policies and their outcomes for people and environment, as well as climate change impacts and interactions in coupled social-ecological systems. I've mainly focused on coastal and marine systems. I will continue this research at ENR with a project focused on climate change impacts on seafood contributions to food security in interaction with trade.

Antonio Laplana
antonio.laplana@wur.nl

I am a postdoctoral researcher at the ENR. I am interested in applied microeconometrics, with focus on the intersection between Development and Environmental Economics. In my research, I study topics of environment and climate change, conflict, drug decriminalization, migration, religion, and inequality. I have used administrative data and lab-in-the-field experiments in my papers. Currently, I am working on the GALILEO project, assessing the impact of agroforestry adoption in sub-Saharan Africa.

Thesis topics

Winners and Losers of Protected Areas

Protected areas play a crucial role in conserving biodiversity, mitigating climate change, and supporting ecosystem services that benefit society. While these areas offer important environmental and social benefits, their impacts on surrounding communities can vary widely. Some groups may gain improved health, nutrition, and well-being from ecosystem services provided by protected areas, while others may face restrictions on resource use or displacement, leading to unequal outcomes.

This project examines how proximity to protected areas influences key outcomes across diverse populations, considering variations in income, education, health and other socioeconomic factors. Using econometric techniques combined with geospatial data, the study aims to identify which groups benefit most and which may be disadvantaged by the establishment and management of protected areas.

Starting Literature

Abatayo, A. L., van Adrichem, M., & Lynham, J. (2024). Comparing access to US marine and terrestrial protected areas. *Nature Sustainability*, 7(3), 255-259.

Suggested courses	AEP33806, ENR32306, DEC32806
Keywords	econometrics, protected areas, GIS
Contact	Anna Abatayo

Carbon inequality and climate policy

Climate change is linked to other societal issues such as economic inequality. In recent years, the concept of "carbon inequality" has become more prominent in many countries. It mainly refers to

the unequal responsibility of individuals in the causation of greenhouse gas emissions, though it may also be used to highlight other inequalities, such as those related to the opportunities to engage in low-carbon solutions or those related to the damages from climate change.

The objective of this thesis is to analyse the concept of "carbon inequality" and its implications for climate policy.

Starting literature

Chancel, L. (2022). Global carbon inequality over 1990–2019. Nature Sustainability, 5(11), 931-938

Suggested courses	AEP21306, INF34306
Keywords	climate change, inequality
Contact	Theo Kónc

Design of payment schemes for carbon remuneration in plantation forests

A recent analysis of the VCS (Verified Carbon Standard) has revealed that the fund can improve its carbon payment scheme to more effectively incentivise carbon storage in plantation forests. This leaves open the question of how an ideal carbon remuneration scheme would look like.

Starting literature

Documentation of the VCS payment scheme from their website (https://verra.org/project/vcs-program/)

Indrajaya, Y., Weikard, H. P., Mohren, F., & van der Werf, E. (2024). Paying for forest carbon: Cost-effectiveness of the Verified Carbon Standard (VCS) remuneration scheme. *Natural Resource Modeling*, *37*(1), e12387.

Suggested courses	ENR31306
Keywords	Forest management, optimal rotation, price setting, carbon markets
Contact	Hans-Peter Weikard

Estimating the economic benefits of healthy plants on human health

About 2 billion people are malnourished with iron, zinc, and vitamin deficiencies, which leads to higher maternal and child mortality and to stunting, wasting, chronic illnesses, and loss of cognitive skills. One of the drivers of this problem is that the nutritional content of cereals, fruits and vegetables have decreased dramatically over the past five decades due to breeding and unbalanced fertilization. The application of fertilizers that contain balanced amounts of (micro)nutrients has been found to increase crop yield and nutritional content. This approach of "agronomic fortification (AF)" improves the overall health of the plants and comes with co-benefits include enhanced crop resilience to drought, pests, and diseases, elongation of shelf-life, and hence human nutrition. However, cost-benefit analyses of AF that include human health are scarce.

The objective of this thesis research therefore is to 1) create an overview of current economic estimates about AF through literature search, to 2) develop a methodology to estimate the economic impact of AF on human and national benefits and 3) to estimate these benefits.

Suggested courses	AEP32306
Keywords	food security, health, fertilizers
Contact	Xueqin Zhu

Trends in Marine Protected Area Expansion

As countries move toward the "30x30" marine conservation goal, it is crucial to understand how marine protected areas (MPAs) have expanded over time and where enforcement challenges may arise. Using data from the World Database on Protected Areas (WDPA), ProtectedSeas, and various national government sources, the student will map the spatial and temporal evolution of MPAs in the Coral Triangle (Indonesia, Philippines, Timor Leste, Solomon Islands, and parts of Malaysia) or parts of it. The project will analyze trends in MPA designation, comparing them to fishing pressure or coastal population growth, and evaluate economic drivers of MPA expansion.

Starting Literature

Abatayo, A. L., van Adrichem, M., & Lynham, J. (2024). Comparing access to US marine and terrestrial protected areas. *Nature Sustainability*, 7(3), 255-259.

Suggested courses	AEP33806, ENR32306, DEC32806
Keywords	econometrics, protected areas, GIS
Contact	Anna Abatayo

Voluntary carbon markets

Voluntary carbon markets have been growing in recent years. They cater for firms who want to offset their greenhouse gas emissions in an attempt of "greening" the firm. On the supply side afforestation projects are playing a major role. The largest schemes are probably the *VCS (Verified Carbon Standard*) and *Gold Standard*.

The aim of the thesis is to critically examine the role of voluntary carbon markets and to compare different carbon payment schemes on the supply side.

Starting literature

Santikarn, M., A. N. C. Kallhauge, S. Rana, D. Besley, and J. Pryor. 2020. State and Trends of Carbon Pricing 2020. Washington DC: World Bank.

Documentation of the VCS payment scheme from their website (https://verra.org/project/vcs-program/).

Suggested courses	ENR31306
Keywords	carbon markets, voluntary markets, forests, payments for environmental services
Contact	Hans-Peter Weikard

Do Sunny Days Lead to Better Restaurant Reviews?

Online recommendation sites are valuable information sources that people contribute to and use to choose restaurants. However, little is known about the dynamics behind participation in these online communities and the how these recommendations are formed. This project looks at the effect of sunny days on consumer reviews using the Yelp Open Dataset for restaurant reviews and historical weather and climate data from the National Oceanic and Atmospheric Organization. The project requires knowledge on how to handle big datasets, econometrics / statistical analysis, and possibly, content analysis.

Suggested courses	AEP33806, DEC32806
Keywords	econometrics, weather, public perceptions
Contact	Anna Abatayo

Radioactive Waste disposal: How is it done and what does it cost?

Storing radioactive waste involves a long-term cost. The (perceived) risks involved in operating nuclear power plants but also the unresolved question how waste should be stored has led the German government to decide a phase-out of nuclear power. In France, policy makers have not taken such action. Also, the share of nuclear power in the energy sector in France is high compared to other countries. Therefore, an understanding of French policies concerning nuclear waste management is important in a European perspective. The thesis would have descriptive part with an up to date summary of relevant policies and it would offer a risk assessment of the nuclear waste disposal. This thesis can be done for a single country, like France, or comparing strategies of different countries.

Starting literature

Lehtonen, M. (2015) Megaproject underway: Governance of nuclear waste management in France. In Brunnengräber et al. (eds.) Nuclear Waste Governance. Berlin: Springer. 117-138.

Suggested courses	ECH51806, ENR21306
Keywords	nuclear waste management, risk and uncertainty, France
Contact	Hans-Peter Weikard

Risk!

Attitudes towards risk have a profound impact on how we deal with decisions. But why are some individuals more risky than others? And to what extent are attitudes towards risk shaped by our environment?

We collected survey data in Norway where we elicited risk preferences with fishers (a risky profession) and the general

public. You will analyze what explains risk and whether risk preferences are distributed across Norway. Are people living in isolated areas more or less risky than people living in urban areas? We are looking for a master student with a working knowledge of multivariate analysis in Stata or R.

Suggested courses	MAT20306, AEP21306, AEP33806, DEC30306, ENR30236
Keywords	risk and uncertainty, social norms, Norway
Contact	Andries Richter

Building a Marine Protected Area Compliance Index

Economists often use indices to track behavior under regulation. A marine protected area (MPA) Compliance Index offers a scalable way to identify where illegal fishing is most likely and how vessel characteristics shape that risk. The student will define and construct an MPA Compliance Index using fishing vessel behavior data and MPA characteristics. This includes identifying risk factors (e.g., gear and vessel size), standardizing them, and combining them into a composite index. The work will apply principles form environmental economics and enforcement theory. The student will need basic GIS skills (or willing to learn them) and good programming skills in Stata, R, or Python.

Starting Literature

Abatayo, A. L., van Adrichem, M., & Lynham, J. (2024). Comparing access to US marine and terrestrial protected areas. *Nature Sustainability*, 7(3), 255-259.

Suggested courses	AEP33806, ENR32306, DEC32806
Keywords	econometrics, protected areas, GIS
Contact	Anna Abatayo

What can be done about land subsidence? What does it cost? who should pay?

Land subsidence in the Netherlands (but also in other parts of the world) threatens agricultural production, causes damages to buildings and infrastructure, and increases flood risks.

There are open questions about the adequate adaptation measures. These should be guided by assessments of costs and benefits of measures. The thesis would comprise a description of the costs of land subsidence and the costs of measures to slow it down. Interesting economic questions arise around the issue of responsibility and fair burden sharing.

Starting literature

van Hardeveld, H.A., Driessen, P.P.J., Schot, P.P., Wassen M.J. (2018) Supporting collaborative policy processes with a multi-criteria discussion of costs and benefits: The case of soil subsidence in Dutch peatlands. *Land Use Policy* 77, 425-436.

Suggested courses	ENR21306, AEP32306
Keywords	land subsidence, cost-benefit analysis, institutions, burden sharing
Contact	Hans-Peter Weikard

Information and uncertainty – the case of Fisheries

Fishing is uncertain business. How do fishers deal with risks and take important decisions, such as investing in equipment, vessels or quota in light of immanent uncertainty? And what do fishers do to make the future a little bit more certain?

We have conducted a survey conducted with Fishers in Norway that may shed light on those questions. We are looking for a master student with a working knowledge of multivariate analysis in Stata or R.

Suggested courses	MAT20306, AEP21306, AEP33806, DEC30306, ENR30236
Keywords	risk and uncertainty, Norway, fisheries
Contact	Andries Richter

Was Faustmann right?

Recently the famous Faustmann model that determines the optimal rotation for a forest stand has been challenged by Li et al. (2020); see starting literature. Li et al. claim that the cost function of the timber producer (forest manager) implicit in the Faustmann model is not appropriate. This challenge of the seminal Faustmann model deserves scrutiny. An MSc thesis on this topic would review the competing model approaches and spell out the conditions under which one or the other approach is preferred. It should also be explored how recommendations for forest managers differ when one or the other approach is used.

Starting literature

Any textbook chapter on the Faustmann model.

Li, X.Y., G. Lu, R.S. Yin. 2020. Research Trends: Adding a Profit Function to Forest Economics. *Forest Policy and Economics* 113 (102133).

Wang, Y.F., L.Y. Li, R.S. Yin. 2021. A primer on forest carbon policy and economics under the Paris Agreement. *Forest Policy and Economics* 132 (102595).

Suggested courses	ENR-31306
Keywords	forests, optimal rotation, theory of the firm
Contact	Hans-Peter Weikard

Economy-wide impacts of a biofuel policy

Population growth and increasing per capita income will increase demand for food and energy in the coming decades. It is projected that 9 billion people will need to be fed by 2050, while biofuels have been advocated as an alternative renewable energy source in many countries for energy security. Agricultural production of food and biofuels imposes tougher demands on the land available and other natural resources such as water and phosphorus. The need to ensure food security and preserve the planet's resources for future generations is pressing (FAO, 2009). In the thesis, you are going to analyse economy-wide impacts of a specific biofuel policy in a particular country. This will require you to develop an applied general equilibrium model with relevant sectors (e.g., food, biofuel and other sectors) or modify an existing model from literature (e.g., Zhu & Van Ierland, 2005). The model is solved by the GAMS software programme and can be applied to various scenarios (e.g., different policy targets).

References

Zhu, X. and E. C. van Ierland (2005). A model for consumers' preferences for Novel Protein Foods and environmental quality. *Economic Modelling* 22:720-744.

FAO (2009). *How to feed the world in 2050*. Rome.

Suggested courses	ENR31306, ENR32806
Keywords	food security, water, biofuel policy, GAMS modelling, Applied General Equilibrium modelling
Contact	Xueqin Zhu

Stability and effectiveness of the Paris Agreement

The Paris agreement opens a new chapter in climate policy making. But whether the agreement can be successful remains an open question. This question can be examined with the tools of game theory to reveal countries' incentives to participate (ratify) in the agreement and to make substantial contributions to greenhouse gas abatement.

Suggested courses	ENR31306, ECH31306
Keywords	climate change, international environmental agreements, game theory
Contact	Hans-Peter Weikard

Sustainable lifestyles and economy-wide impacts

New concepts such as circular economy, sustainable lifestyle (such as switching to renewable energy and alternative plant-based food products) become interesting options for the improvement of economic efficiency and the environmental quality, which requires fundamental research. Sustainable lifestyle is defined as a way of living with lower environmental impact. It attempts to reduce the use of resources and to enhance the sustainability of the planet. For example, a low animal-based protein diet is advocated to reduce the environmental pressure from animal production, and green energy produced from non-fossil fuel is advertised to consumers to replace the traditional fossil fuel-based energy. Although we need to know that lifestyle change is not easy, it provides great opportunities to sustainably use our resources in the world. Meanwhile, a lifestyle change is not automatically leading to a saving of the resource use because there is a general-equilibrium effect, i.e., consumers may consume more other products or producers may export their products to other countries without sustainable lifestyle (e.g., externalities). In the thesis, you can look in depth how a small

change in the consumption of a green product can impact the reallocation of the resources and the emissions from the economic system. You can use a stylized economic model (e.g., an applied general equilibrium model cf. Zhu and van Ierland, 2005; Zhu et al., 2006) to simulate the changes of a lifestyle in a certain country/region/world to identify the real impacts. This would allow you to discuss to what extent the lifestyle change can make a real contribution to the saving of the resources in the planet.

References

Zhu, X. and E. C. van Ierland (2005). A model for consumers' preferences for Novel Protein Foods and environmental quality. *Economic Modelling* 22: 720-744.

Zhu, X., L. van Wesenbeeck and E. C. van Ierland (2006). Impacts of Novel Protein Foods on sustainable food production and consumption: lifestyle change and environmental policy. *Environmental & Resource Economics* 35: 59-87.

Suggested courses	ENR31306, ENR32806, ENP32306
Keywords	sustainable lifestyle, green products, modelling
Contact	Xueqin Zhu

Modelling stock dynamics of macro- and/or microplastics

The amount of plastic waste has increased exponentially during past decades. In Europe, post-consumer plastic waste was estimated to be about 25.8 million tonnes in 2014 (Plastics Europe 2015). There is increasing concern about the risks caused by plastic waste in general and by microplastics in particular. Being highly persistent, microplastics degrade very slowly into smaller pieces (called microplastics). As such they can become easily ingested by living organisms (fish, birds), and can sorb other toxic (PBT) chemicals, increasing the risks of exposure to

humans. So far, very little has become known about the severity of this externality. One possibility to approach this problem is to examine stock pollution properties of macro- and microplastics. The aim of the MSc thesis is to develop a (dynamic) stock pollution model for analysing the accumulation of plastic waste in, for example, marine or freshwater systems. We are looking for a student with interest in theoretical modelling, and basic programming skills (e.g. Matlab or Mathematica)

Suggested courses	ENP32306, ENR31306, UEC51806
Keywords	plastic pollution, stock dynamics, risk and uncertainty, modelling
Contact	Hans-Peter Weikard

Impacts of COVID-19 Pandemic on Coastal Livelihoods

The COVID-19 pandemic significantly disrupted nearshore fishing activities due to lockdowns, market closures, and supply chain interruptions, leading to reduced fishing effort and changes in coastal resource use. Small-scale fishers, who rely on daily catches for income and food security, were especially affected, often shifting their practices or temporarily abandoning fishing altogether. These shocks offer a unique opportunity to study the environmental and socioeconomic impacts of sudden reductions in human pressure on coastal ecosystems. High-resolution satellite data, such as those from Global Fishing Watch, can be used to monitor changes in vessel activity, coastal land use, and even nearshore water quality over time, providing a spatially explicit way to assess the pandemic's impact and recovery dynamics. Understanding these patterns is relevant for designing more resilient fisheries management systems and evaluating the effectiveness of temporary reductions in pressure on marine ecosystems.

Suggested courses	AEP21306, DEC33806, ENR32306
Keywords	fishing, welfare, econometrics, GIS
Contact	Anna Abatayo

Rebound effects in the Circular Economy

The recent policy initiative towards a circular economy aims at a reduction of waste and an improvement of the availability of raw materials. This calls for technological advances that favour reuse and recycling. However, through reuse and recycling material become more readily available and good produced with such materials will get cheaper such that a reduction of resource use will not be achieved: a rebound effect. The research examines determinants of the strength of the rebound effect and how it can be built into analytical resource extraction models.

Suggested courses	ENR31306
Keywords	circular economy, reuse and recycling, raw materials, dynamic modelling, behavioural responses, waste management, rebound effect
Contact	Hans-Peter Weikard

Rounding up the literature on the socio-economic impact of marine protected areas

Marine Protected Areas (MPAs) are designated regions in oceans or coastal zones aimed at conserving marine biodiversity and sustaining ecosystem services. MPAs can influence various socio-economic variables, including livelihoods, income, food security, and community well-being. While numerous individual studies have examined specific socio-economic impacts of MPAs under

different contexts, there is limited work that synthesizes these findings into a comprehensive understanding of their overall socio-economic effects.

Key questions remain: How do MPAs impact different socioeconomic groups, such as fishers, tourism operators, or local communities? Are there variations in impacts depending on MPA management type or location? How do social, economic, and cultural factors shape these outcomes? This project proposes a meta-analysis of existing socio-economic studies related to MPAs by gathering datasets from diverse publications to provide a coherent synthesis of how MPAs affect socio-economic variables.

Starting literature

Baum, C. M., Fritz, L., Low, S., & Sovacool, B. K. (2024). Public perceptions and support of climate intervention technologies across the Global North and Global South. Nature Communications, 15(1), 2060. https://www.nature.com/articles/s41467-024-46341-5

Hansen, C., Steinmetz, H., & Block, J. (2022). How to conduct a meta-analysis in eight steps: a practical guide. Management Review Quarterly, 1-19. https://link.springer.com/article/10.1007/s11301-021-00247-4

Mascia, M. B., Claus, C. A., & Naidoo, R. (2010). Impacts of marine protected areas on fishing communities. Conservation Biology, 24(5), 1424-1429.

Suggested courses	AEP33806, AEP21306, ENP36306
Keywords	Protected areas, meta-analysis, welfare
Contact	Anna Abatayo

Approaches for transforming environmental impacts of chemicals into values for decision-making

Under the new European chemicals legislation REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) chemicals of very high concern (particularly toxic, persistent, bioaccumulative chemicals) can only be placed on the market if its use is explicitly authorised by the European Commission. Applying for an authorisation requires that a company provides a socio-economic assessment (SEA) showing that the benefits of use outweigh the potential negative (human health and/or environmental) impacts of the chemical. The MSc project will explore how negative environmental impacts arising from the use of chemicals can be monetarised in order include these values in a standard cost-benefit analysis. The student will investigate if – and to what extent - existing of approaches for monetarising negative impacts as used in other risk management domains (water management, human health care, traffic) can be used or need to be modified. The valuation approaches identified will be applied to selected chemicals as a case study. In addition, the student will develop a database format for transforming environmental impacts into monetary values in order to support data compilation and the identification of existing data gaps.

Suggested courses	ENP32306, AEP32306
Keywords	chemical tests, risk and uncertainty, cost-benefit analysis, cost-effectiveness analysis
Contact	Hans-Peter Weikard

Options for an International Environmental Agreement to combat marine plastic litter

Marine Plastic litter has been recognised as a problem with growing importance. Plastics are stock pollutants and their impact

stretch over long periods of time. At the same time the quality of the marine environment requires global international cooperation. What are key elements of an international agreement for the reduction of marine litter? What are the incentives for countries to participate in such an agreement?

Suggested courses	ENR31306, ECH31306
Keywords	plastic pollution, marine plastic litter, stock pollutants, international environmental agreements
Contact	Hans-Peter Weikard

How does a subsidy removal on kerosene affect cooking fuel choice and health outcomes of Nigerian women and children?

Because of shortages in household kerosene, the Petroleum Products Pricing Regulatory Agency (PPRA) of Nigeria removed the subsidy on kerosene in January 2016 and deregulated the kerosene market. Previous literature has found that a national fuel-switching program in Indonesia (i.e., from kerosene to LPG) led to declines in infant mortality and the prevalence of low birth weight. How effective has the PRRA subsidy removal been in switching household cooking fuel choice from kerosene to cleaner fuel alternatives such as LPG? What is the effect of this switch on multiple health outcomes of Nigerian women and children? This project will mainly be using the Nigerian General Household Survey Panel from 2015-2016.

Starting literature

Imelda. (2018, May). Indoor air pollution and infant mortality: A new approach. In *AEA Papers and Proceedings* (Vol. 108, pp. 416-421). 2014 Broadway, Suite 305, Nashville, TN 37203: American Economic Association.

https://www.aeaweb.org/articles?id=10.1257/pandp.20181119

Verma, A. P., & Imelda. (2023). Clean energy access: gender disparity, health and labour supply. *The Economic Journal*, *133*(650), 845-871. https://academic.oup.com/ej/article/133/650/845/6780196

Suggested courses	ENR32306
Keywords	subsidies, indoor air pollution, impact evaluation, health
Contact	Anna Abatayo

Assessing and valuing impacts of endocrine disrupting chemicals

Endocrine disrupting chemicals (EDs) are substances which interfere with the hormonal system of living organisms. A prominent example is Bisphenol A, which has been used in plastic bottles. Exposure to EDs can lead to a number of severe adverse effects in humans and animals even at low exposure doses. Therefore, EDs are classified as 'Substances of Very High Concern' under the European Chemicals Legislation REACH. Companies producing or manufacturing EDs require an authorisation from the European Commission. Such formal approval can only be granted if companies can show that socio-economic benefits outweigh negative impacts of use. In this MSc projects the student will develop a framework for socio-economic assessment of EDs. The framework can either use cost-effectiveness or cost-benefit analysis. Part of the research will be to develop an inventory of health impacts and costs for control measures for EDs. Interested students should be willing to study into both the economics and toxicological literature. Interest in interdisciplinary modelling is required. Students with a

background in natural sciences, who have followed courses in (environmental) economics are also explicitly encouraged.

Suggested courses	ENP32306, ENR31306, UEC51806
Keywords	plastic pollution, stock dynamics, risk and uncertainty, modelling
Contact	Hans-Peter Weikard

Paris Allows Cyclists to Jump Red Lights!

In 2015, Paris allowed cyclists to ignore red lights when turning right or going straight through a T-junction. Many claimed that this has led to greater bicycle safety; i.e., fewer general crashes and fatal crashes. However, there is no proper empirical investigation on the effect of what is known as the "Paris Stop" on bicycle safety. This research project provides this empirical investigation using open data from the French national road traffic accident database.

Starting literature

Tekle, A. M. (2017). Roll On, Cyclist: The Idaho Rule, Traffic Law, and the Quest to Incentivize Urban Cycling. Chi.-Kent L. Rev., 92, 549.

Arkhangelsky, D., Athey, S., Hirshberg, D. A., Imbens, G. W., & Wager, S. (2021). Synthetic difference-in-differences. American Economic Review, 111(12), 4088-4118.

Suggested courses	AEP21306, DEC32806, ENR32306
Keywords	bicycles, law, policy evaluation, statistical analysis
Contact	Anna Abatayo

Time matters: Including stock dynamics in health impact assessments of toxic metal exposure in urban environments (MSc)

Urban populations are highly exposed to toxic metals such as methylmercury, cadmium, lead or arsenic. Exposure occurs either via the air, through drinking water, or through the uptake of food (e.g. fish). Recent studies (e.g. Nedellec and Rabl 2016, Giang and Selin 2016) have suggested an approach for assessing the impacts and health damage costs from metal pollution, or the benefits from pollution control measures. Existing approaches assume that exposure to the pollutants remains constant over time. However, several metals (e.g. methylmercury, lead) are known to be highly persistent. As a consequence, exposure concentrations in humans accumulate over time.

The aim of the MSc research is to explore how stock pollution effects can be included in existing models for health damage cost assessment. In addition, you can elaborate on a case study quantifying health damage costs for specific urban environments. Data can be compiled from the literature and national statistical databases.

References

Nedellec, V., Rabl, A. (2016). Costs of health damage from atmospheric emissions of toxic metals – methods and results. Risk Analysis 36(11), 2081-2095.

Giang, A., Selin, N.E. (2016). Benefits of mercury controls for the United States. PNAS 113(2), 286-91.

Suggested courses	ENR31306, UEC51806, DEC31306
Keywords	urban pollution, health, stock dynamics
Contact	Hans-Peter Weikard

An Economic Anatomy of Marine Protected Area Encroachers

Marine Protected Areas (MPAs) are only effective if compliance is ensured. However, patterns of vessel encroachment, particularly by specific types of fishing vessels, remain poorly understood. This project will use Global Fishing Watch data on analyze which fishing vessels (i.e., flag state, gear type, and size) are most likely to be present within the boundaries of MPAs in the Coral Triangle (Indonesia, Philippines, Timor Leste, Solomon Islands, and parts of Malaysia). Depending on the time constraint (i.e., a bachelor's or master's thesis), the student could focus on a specific MPA, all MPAs in a specific country, or all MPAs in the Coral Triangle. The student will help build descriptive statistics and simple models to compare vessel behavior across categories and identify patterns of non-compliance. The student should have good statistics / econometrics and GIS (i.e., ArcGIS, QGIS, R, or Python).

Suggested courses	AEP33806, ENR32306, DEC32806
Keywords	econometrics, protected areas, GIS
Contact	Anna Abatayo

Time matters: Including stock dynamics in health impact assessments of toxic metal exposure in urban environments (MSc)

Urban populations are highly exposed to toxic metals such as methylmercury, cadmium, lead or arsenic. Exposure occurs either via the air, through drinking water, or through the uptake of food (e.g. fish). Recent studies (e.g. Nedellec and Rabl 2016, Giang and Selin 2016) have suggested an approach for assessing the impacts and health damage costs from metal pollution, or the benefits from pollution control measures. Existing approaches

assume that exposure to the pollutants remains constant over time. However, several metals (e.g. methylmercury, lead) are known to be highly persistent. As a consequence, exposure concentrations in humans accumulate over time.
The aim of the MSc research is to explore how stock pollution effects can be included in existing models for health damage cost assessment. In addition, you can elaborate on a case study quantifying health damage costs for specific urban environments. Data can be compiled from the literature and national statistical databases.

References

Nedellec, V., Rabl, A. (2016). Costs of health damage from atmospheric emissions of toxic metals – methods and results. Risk Analysis 36(11), 2081-2095.

Giang, A., Selin, N.E. (2016). Benefits of mercury controls for the United States. PNAS 113(2), 286-91.

Suggested courses	ENR31306, UEC51806, DEC31306
Keywords	urban pollution, health, stock dynamics
Contact	Hans-Peter Weikard

Non-renewable resources and waste management

Many of the resources we use are non-renewable. The most well-known example are fossil fuels, but another example is phosphate, which is an essential fertilizer. Because of their non-renewability, the use of such resources needs to be well-planned, taking into consideration future generations. Moreover, we need to use (and reuse and recycle) these resources efficiently. You can therefore think of the following topics:

- How much recycling is optimal?
- What role can economic incentives play in stimulating people to collect waste separately?

- What barriers exist to investments in renewable energy projects in developing countries?
- What is the right discount rate in dealing with problems that affect future generations?

A thesis on non-renewable resources or waste management is likely to involve cost-benefit analysis, general equilibrium modelling, or other economic modelling techniques.

Suggested courses	ENR31306, ENR32806, ENP32306, AEP32306
Keywords	phosphate, recycling, modelling, cost-benefit analysis
Contact	Hans-Peter Weikard

Discounting health impacts – do or don't?

Our modern lifestyle is increasingly causing diverse health problems such as obesity, the increase of allergies, diabetes, and pulmonary or cardiovascular diseases. Identifying appropriate health treatments or regulatory strategies (e.g. a ban of cars in urban centres) requires comparing the costs of an intervention against expected health benefits. In many cases expected health benefits cannot be monetised but are expressed in terms of utility measures such as quality of adjusted life years (QALYs) or disability adjusted life years (DALYs). Cost-effectiveness analysis is then used to compare and rank costs and benefits of the intervention. If monetary costs stretch over long(er) periods, economists apply discounting to determine the present value of costs. For many years, there is a controversial debate in the health economics literature whether health impacts expressed as QALYs or DALYs should be discounted as well, and how (e.g. Johannesson et al. 1994, Claxton et al. 2006).

The aim of this BSc or MSc thesis is to reflect upon the economic foundations of discounting in (regulatory) decision-

making, and to disentangle the arguments for and against discounting health impacts. The topic can be addressed at the level of a BSc or an MSc thesis. Furthermore, depending on your preference, it can be approached from a theoretical economics or an environmental ethics perspective.

References

Johannesson, M., PLiskin, J.S., Weinstein, M.S. (1994): A note on QALYs, time tradeoff, and discounting. Medical Decision Making 14, 188-193.

Claxtion, K., Sculpher, M., Culyer, A., McCabe, C., Briggs, A., Akehurst, R., Buxton, M., Brazier, J. (2006): Discounting and cost-effectiveness in NICE: stepping back to sort out a confusion. Health Economics 15, 1-4.

Suggested courses	ENR21306, ENR31306, UEC51806
Keywords	urban pollution, health , discounting
Contact	Hans-Peter Weikard

Do wildlife traders increase trade of a specie when an application to cease its trade is applied for?

The global wildlife trade is a highly lucrative business. However, wildlife trade contributes to loss of global biodiversity. Efforts to mitigate the harms of wildlife trade include the enforcement of strict regulations such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Under this convention, a country can apply to cease the trade of a particular specie. These applications and their subsequent approval, if approved, are often announced during the Biodiversity Conference of Parties.

This project examines whether there is an anticipatory effect in the trade of a particular specie after an announcement of an application but before its approval for a cessation of trade.

Suggested courses	DEC32306, ENR32306, AEP33806
Keywords	biodiversity, impact evaluation, econometrics, wildlife trade, CITES
Contact	Anna Abatayo

Does generating bioenergy from European forests help reducing carbon emissions?

Many European forests have seen a growth of stocks over the past decades. It has been suggested by policy makers at the national and the European level that forest resources, when used for bioenergy, could reduce carbon emissions and play a role in the transition to a low carbon economy. However, the effectiveness of such policy is debated. The research should survey and evaluate different assessment methods of carbon impacts of the use of forest resources.

Suggested courses	ENR31306
Keywords	climate change, forests, renewable resources
Contact	Hans-Peter Weikard

Economics of water management

Water is everywhere, but clean water for consumption or irrigation is becoming increasingly scarce. Economic analyses of water management deal with questions such as:

- How should water trading be organized?
- What are the costs and benefits of water management?
- How should international agreements on international rivers be organized?
- How can we allocate water within river catchments efficiently?
- What economic instruments should we use to manage water?

A student conducting an economic analysis of water management is likely to collaborate with hydrologists. He or she may develop an economic model, perform a game theoretical analysis, or conduct a monetary valuation survey.

Suggested courses	ENR31306, ENP32806, AEP32306
Keywords	water, flooding, modelling, food security, game theory
Contact	Xueqin Zhu

Is there a behaviouralist revolution in economics?

Economic orthodoxy has focussed on rational selfish agents and equilibrium states. Recent years have seen a rise of behavioural approaches in economics where economic agents are driven by other-regarding preferences (e.g. altruism) and they make "mistakes". The envisaged thesis research would explore these developments of the discipline of economics through the lens of Thomas Kuhn's theory of scientific revolution. Is the turn towards behavioural approaches in economics a scientific revolution in the Kuhnian sense?

Suggested courses	DEC22803, ECH51306
Keywords	economic methodology
Contact	Hans-Peter Weikard

Regulatory chemicals policies based on "essential use"

The European Union is preparing a revision of its chemical policies, that is how pollutive and toxic substances are regulated. A key concept that is potentially to become an important regulatory tool is the "essential use" concept. In brief, a chemical

can remain in the market if its use is considered essential for the functioning of society, otherwise it will be phased out.

The Dutch National Institute for Public Health and the Environment (RIVM) offers the opportunity to participate in the analysis of a large representative survey that explores people's assessment of which uses of chemicals are considered essential. RIVM is offering this opportunity to a student with strong quantitative skills (statistical analysis, econometrics) to work on the survey results and their interpretation. The research could be done as an internship or as MSc thesis research.

Starting literature

European Commision (2021) Chemicals Strategy for Sustainability.(https://ec.europa.eu/environment/strategy/chemicals-strategy_en).

DeCanio & Norman (2007) Journal of Environmental Management 85,1-8.

Suggested courses	AEP31306, Statistics, Econometrics
Keywords	chemical pollution management, regulatory policy design
Contact	Hans-Peter Weikard

Fish exports, poverty and undernourishment

Many developing countries that suffer from undernourishment are net exporters of seafood (Smith et al. 2010). One may think that food exports contribute to the undernourishment problem. However, exports also create revenues that may be used to import cheaper food or machines that help producing other types of food, making the link between food security and fish exports ambiguous. The students will econometrically analyse global trade and World Bank data and investigate the link between fish export, poverty, and undernourishment.

References

Smith, M.D. et al. 2010. Sustainability and global seafood. *Science* 327(5967):784-786.

Suggested courses	ENR31306, AEP21306, AEP33806
Keywords	trade, fisheries, food security, poverty, econometrics,
Contact	Andries Richter

Water pricing and quality control

Water policies aiming at sustainable allocation and quality conservation of water becomes more and more important. The challenges in water management analysis include water pricing and dealing with externalities and compensation. We are looking for students with good modelling skills (preferably GAMS) who are interested in the development of integrated water management models to optimize the water allocation among different sectors and to determine the optimal water quality level in a local water system. A background in hydrological cycle and economics will be helpful.

Suggested courses	ENR-31306, ENR32806
Keywords	water, Applied General Equilibrium modelling, optimization modelling, food security
Contact	Xueqin Zhu

Economic Impacts of Agroforestry in Africa: A Systematic Review or Meta-Analysis

Agroforestry is widely promoted as a strategy to improve rural livelihoods and adapt to climate change in sub-Saharan Africa. But how much do we know about its actual economic effects?

This MSc thesis will contribute to the GALILEO project ("Strengthening rural livelihoods and resilience to climate change in Africa") by synthesizing empirical evidence on how agroforestry interventions affect income, agricultural productivity, household resilience, and related livelihood outcomes. The work involves conducting a systematic literature review or meta-analysis and is fully desk-based. It is ideal for a student with solid skills in econometrics and a strong interest in development economics, sustainable agriculture, or climate adaptation. Experience with meta-analysis or causal inference is an advantage but not required.

Starting literature:

Castle, S. E., Miller, D. C., Ordonez, P. J., Baylis, K., & Hughes, K. (2021). The impacts of agroforestry interventions on agricultural productivity, ecosystem services, and human well-being in low-and middle-income countries: A systematic review. *Campbell Systematic Reviews*, *17*(2), e1167.

Muthee, K., Duguma, L., Majale, C., Mucheru-Muna, M., Wainaina, P., & Minang, P. (2022).A quantitative appraisal of selected agroforestry studies in the Sub-Saharan Africa. *Heliyon*, *8*(9).

Brown, S. E., Miller, D. C., Ordonez, P. J., & Baylis, K. (2018). Evidence for the impacts of agroforestry on agricultural productivity, ecosystem services, and human well-being in high-

income countries: a systematic map protocol. *Environmental evidence*, *7*(1), 1-16.

Start date: September
Duration: 6 months
Supervisors: Anna Lou Abatayo, Francisco Alpízar, Antonio Laplana

Keywords	agroforestry, climate change, climate resilience, development economics
Contact	Antonio Laplana

Climate change adaptation in the South-West Delta of the Netherlands

The Southwest Delta of the Netherlands must adapt to climate change, especially to sea level rise. To assess different adaptation options, the various components of social welfare must be assessed and brought together. The overall well-being of the community should be considering social, economic, and environmental factors in line with sustainable development goals. The aim of the study is to compare different adaptation options for the Southwest Delta. The options have been defined in the DeltaWealth project. (https://www.zwdelta.nl/nieuws/delta-wealth-onderzoek-naar-strategieen-voor-een-klimaatbestendige-en-welvarende-zuidwestelijke-delta/)

Starting literature

Haasnoot, M. et al. (2020): Adaptation to uncertain sea-level rise; how uncertainty in Antarctic mass-loss impacts the coastal adaptation strategy of the Netherlands. *Environmental*

Research Letters, 2020, 15(3), 034007. http://dx.doi.org/10.1088/1748-9326/ab666c

Suggested courses	ENR-21306, AEP 32306
Keywords	climate adaptation, cost-benefit analysis, institutions, burden sharing, social welfare assessments
Contact	Hans-Peter Weikard

Index

agroforestry, 38
behavioural responses, 22
bicycles, 27
biodiversity, 33
biofuel policy, 18
burden sharing, 16, 39
carbon markets, 13
chemical pollution management, 35
chemical tests, 24
circular economy, 22
CITES, 33
climate adaptation, 39
climate change, 10, 19, 33, 38
climate resilience, 38
cost-benefit analysis, 16, 24, 31, 39
cost-effectiveness analysis, 24
development economics, 38
discounting, 32
dynamic modelling, 22
econometrics, 9, 12, 13, 15, 22, 29, 33, 36
economic methodology, 34
fertilizers, 11
fisheries, 17, 36
fishing, 22
flooding, 34
food security, 11, 18, 34, 36
forests, 13, 17, 33
France, 14
game theory, 19, 34
GIS, 9, 12, 15, 22, 29
green products, 20

health, 11, 26, 28, 30, 32
impact evaluation, 26, 33
indoor air pollution, 26
inequality, 10
institutions, 16, 39
international environmental agreements, 19, 25
land subsidence, 16
law, 27
marine plastic litter, 25
meta-analysis, 23
modelling, 20, 21, 27, 31, 34
  Applied General Equilibrium modelling, 18, 36
  GAMS modelling, 18
  optimization modelling, 36
Norway, 15, 17
nuclear waste management, 14
optimal rotation, 17
payments for environmental services, 13
phosphate, 31
plastic pollution, 21, 25, 27
policy evaluation, 27
poverty, 36
protected areas, 23
protected areas, 9, 12, 15
protected areas, 29
public perceptions, 13
raw materials, 22
rebound effect, 22
recycling, 31
regulatory policy design, 35
renewable resources, 33
reuse and recycling, 22
risk and uncertainty, 14, 15, 17, 21, 24, 27
social norms, 15
social welfare assessments, 38, 39

statistical analysis, 27
stock dynamics, 21, 28, 30
stock dynamics, 27
stock pollutants, 25
subsidies, 26
sustainable lifestyle, 20
theory of the firm, 11, 17
trade, 36
urban pollution, 28, 30, 32
voluntary markets, 13
waste management, 22
water, 18, 34, 36
weather, 13
welfare, 22, 23
wildlife trade, 33