

Impact of Global Climate Change on Cyprus

Economy Related Issues

Fisheries in Cyprus and the potential impact of climate change

Introduction. The economy of Cyprus is mainly founded on two sectors: tourism and financial services. However, agriculture and **fisheries** also have their own contribution and significance in GDP and employment. Approximately 1400 individuals are directly occupied in the fisheries sector as fishermen or aqua-culturists or in the processing sector, and approximately another 1000 individuals are occupied indirectly in ancillary professions, such as boat builders, retail fish sellers, importers of fishing items, maintenance of fishing gear and equipment. Additionally, despite its relatively small contribution to the Gross National Product (GNP), which does not exceed 0,3% according to [EUROSTAT](#), the fisheries sector is an important activity for the economy of several coastal areas, since it generates income and work opportunities, contributing to the social and economic welfare of the residents of these areas.

Institutional infrastructure. The authority responsible for fishery matters in Cyprus is the Department of Fisheries and Marine Research (DFMR) of the Ministry of Agriculture, Natural Resources and Environment. The DFMR Head-Office is situated in Nicosia, and there are four District Units located in the four coastal towns of Limassol, Larnaka, Pafos and Paralimni. There are also two research stations in operation at Meneou and Kalopanayotis, which are specialized in research and development of marine and freshwater aquaculture respectively. The activities of the DFMR concern the development and management of fisheries and aquaculture, marine ecology, the protection of endangered species and habitats, physical and chemical oceanography and the prevention and combat of marine pollution. Furthermore, the Department promotes supporting programmes for the fishermen, including the construction of fishing shelters. It is also responsible for the enforcement of the relevant Legislation.

Contact information. For cross-sectional information of the current state of play of fisheries in Cyprus, use the following links:

- The [official web site](#) of the Department of Fisheries and Marine Research;
- The [Annual Report 2008](#) for fisheries and marine research in Cyprus;
- A relevant study on [The Fishery profile of Cyprus by Nicos Hadjistephanou, PhD](#) ;
- [Fisheries Statistics for Cyprus](#) ;
- [Management of Fisheries resources](#) in Cyprus;

George L. Georgiou Director, Department of Fisheries and Marine Research
101Vithleem Street
1416 Nicosia

Tel no: 22807868

Fax no: 22775955

E- mail: director@dfmr.moa.gov.cy

In the previous sector of the report, I have focused on the current situation of Fisheries sector in Cyprus, its importance for the economy, the institutional infrastructure and contact information with the relevant authorities in this field.

In the next section, I will focus on the problem of Fisheries and the impact of climate change on a global level. Then, I will focus on the Mediterranean and more specifically the region of Eastern Mediterranean, involving countries around Cyprus with similar climate and problems. Thus, starting from a global level, I will “zoom in” on Cyprus and position its standing in terms of efforts done or planned (or should be planned) for coping with this serious climate challenge.

Global level. The [State of World Fisheries and Aquaculture](#) (SOFIA) is the flagship publication of the FAO Fisheries and Aquaculture Department. This premier advocacy document is published every two years to provide policy-makers, civil society and those whose livelihoods depend on the sector a comprehensive, objective and global view of capture fisheries and aquaculture, including associated policy issues. Each edition of SOFIA also includes an updated version of the FAO World Fisheries and Aquaculture Atlas CD-ROM. One could consider this publication analogous to the Reports issued by the IPCC, as every two years they present the current state of play for fisheries, the most pressing problems, and predictions for future trends.

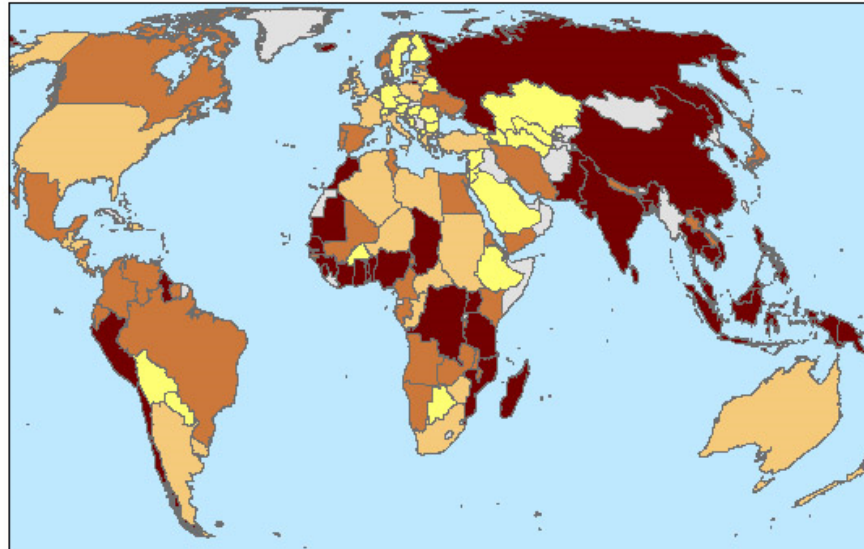
The State of World [Fisheries](#) and [Aquaculture](#) 2008 concludes that developments in world fisheries and aquaculture during recent years have continued to follow the [trends](#) that were already becoming apparent at the end of the 1990s: capture [fisheries production](#) is stagnating and aquaculture output is expanding faster than any other animal-based food sector. There are growing concerns with regard to safeguarding the livelihoods of fishers as well as the sustainability of both commercial catches and the aquatic ecosystem from which they are extracted. About three quarters of monitored marine stocks are now fully exploited, overexploited, or even depleted. Therefore, there seems to be no further potential for increasing marine catches and the current state of fishery resources and their ecosystems allows little room for delay in actions for better management of fish stocks that should have been taken in the last three decades.

With climate change threatening to ruin ocean reefs, push salt water into freshwater habitats and produce more coastal storms, millions of struggling people in fishery-dependent nations of Africa, Asia and South America could face unprecedented hardship, according to a new study published in the February issue of the peer-reviewed journal Fish and Fisheries. The study by a team of scientists at [The WorldFish Center](#), the [University of East Anglia](#), [Simon Fraser University](#), the [Centre for Environment, Fisheries and Aquaculture](#)

[Science](#), the [University of Bremen](#), and the [Mekong River Commission](#) is the first to identify individual nations that are “highly vulnerable” to the impact of climate change on fisheries.

The following Figure 1 depicts the regions with highest fisheries sensitivity:

(a) Fisheries sensitivity



(b) Adaptive capacity

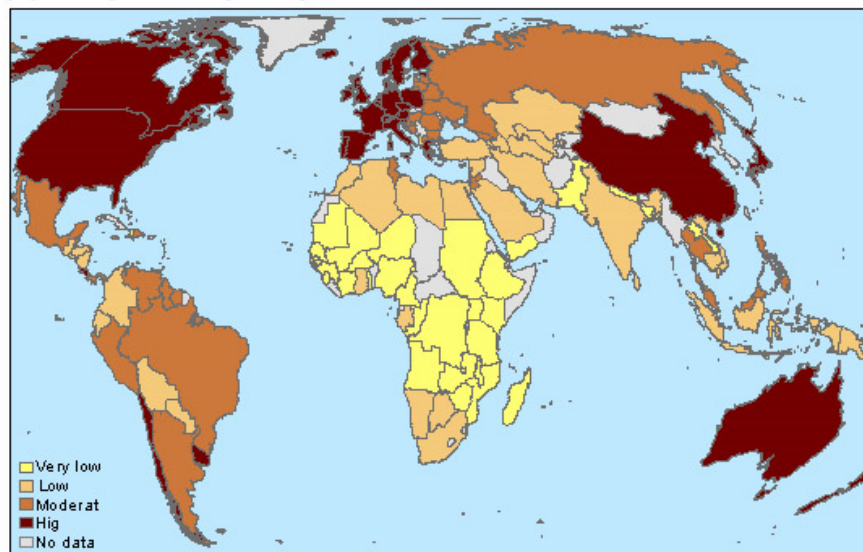


Figure 1: Fish and Fisheries Access to this journal is available free online within institutions in the developing world through the [AGORA](#) Initiative with the Food and Agriculture Organization of the United Nations (FAO), and the [OARE](#) Initiative (Online Access to Research in the Environment) with the United Nations Environment Programme (UNEP). *Fish and Fisheries* is published by [Wiley-Blackwell](#).

Mediterranean Level. An EU-wide project is comprehensively approaching the issue of climate change and its implications in the Mediterranean. [Climate Impact Research Coordination for Larger Europe \(CIRCLE\)](#) has been launched in 2004 supported by EU funding, has the following mission statement:

“Climate change is increasingly seen as one of the greatest issues facing the world in the 21st century, and Europe is taking a leading role in responding to its challenges.

Whatever the success of mitigating climate change may be, certain impacts are unavoidable and European countries will need to adapt to those impacts driven by certain vulnerabilities and exposures in the regions of Europe.

Their adaptation response must be informed by a coherent body of research and it is CIRCLE’s prime objective to contribute to such efforts by aligning national research programmes. This process will be a strong support for the overall goal: Implementing a European Research Area (ERA) for the field of climate change.

CIRCLE started in summer 2004 and is currently extending its activities within the ERA-Net frame for 2005-2009.”

More information about could be found at [ERA-Net](#).

Related Publications & Presentations:

- Kropp J., Eisenack K., J. Scheffran (2006): [Marine Overexploitation: a Syndrome of Global Change](#). In: *Multiple Dimensions of Global Environmental Change*, edited by Sangeeta Sonak, TERI Press, New Dehli.
- Eisenack K., Welsch H. & Kropp J. (2006): [A qualitative dynamical modelling approach to capital accumulation unregulated fisheries](#) *Economic Dynamics and Control*, (DOI:10.1016/j.jedc.2005.08.004).
- Eisenack K., Scheffran J. & Kropp J. (2006): [Viability Analysis of Management Frameworks for Fisheries](#). *Environmental Modelling and Assessment*, 11(1): 69 - 79 (DOI:10.1007/s10666-005-9018-2).
- Kropp J., Eisenack K. & Scheffran J. (2004): [Model Strategies for an ex-ante assessment of multi-criteria decisions in fisheries](#). Poster presented of the World Fisheries Conference, Vancouver.
- Kropp J., Eisenack K. & Scheffran J. (2004): [Sustainable Marine Resource Management: Lessons from Viability Analysis](#). In: Proc. IEMSS 2004: Complexity and Integrated Resources Management (C. Pahl-Wostl, S. Schmidt and A. Jakeman eds.), Osnabrück.
- Kropp J., Eisenack K., Zickfeld K. (2002): The breakdown of marine fisheries and the North Atlantic circulation: Assessment and management of critical events. in: [The Science of Disasters: Climate Disruptions, Heart Attacks, and Market Crashes](#), A. Bunde, J. Kropp & Schellnhuber H.J. (Eds.) Springer, Berlin
- Eisenack K. & Kropp J. (2001): [Assessment of Management Options in Marine Fisheries by Qualitative Modelling Techniques](#). *Marine Pollution Bulletin*, 43(7-12): 215 - 224.
- Kropp J. & Eisenack K. (2001): Qualitative Modeling and Simulation of a Coupled Bioeconomic System. In: *Working Papers of 15th Workshop on Qualitative Reasoning* G. Biswas (ed.), p. 182 - 187, AAAI Press, New York.

Going through the literature, it became evident to me that more has been done on this issue regarding the Northern European countries than on the Mediterranean. The above mentioned studies are a good example of that. However, these valuable experiences can be used as guidelines for assessment of the impact in the Mediterranean too.

Neighboring countries. As Cyprus doesn't have an developed plan for coping with the climate change in general and specifically with fisheries, I have looked around other countries from the Mediterranean region that could have the necessary mechanisms set in place.

- [Climate Change and its impact on the Black Sea ;](#)
- [Israel National Report on Climate Change;](#)
- [Lebanon – National Aquaculture Overview;](#)
- [The first communication of Malta to the UNFCCC;](#)
- [Greece – National Aquaculture Overview ;](#)

All of the above mentioned countries have more or less the same climate with Cyprus and are sharing the Mediterranean Sea. They have already taken certain steps in predicting the potential impact of climate change on fisheries and reports of some sort have been drafted. Some of them are cited here, in the given links. They all could prove useful in the exercise of creating similar action plans for Cyprus.

Recommendations for action. Activities related to adapting to climate change in Cyprus should span across three areas: research, public awareness and policy making. As a general guide, I would propose the [Code for Conduct for Responsible Fisheries](#), created by the FAO Fisheries and Aquaculture Department.

Research should mainly focus on the increasing problem of new migratory species coming from the Red Sea which seriously disturb the ecosystem. Namely, because of the higher temperatures of the Mediterranean Sea, new species can now migrate from the warmer waters of the Red Sea. One of these species, Lagocephalos, is not only dangerous to the ecosystem but is also poisonous for humans. This might have potentially high impact on the fisheries sector in Cyprus. This research should be undertaken by the Department of Fisheries and Marine Research (DFMR) of the Ministry of Agriculture, Natural Resources and Environment.

Regarding public awareness, Cyprus is a country that still has a lot of work ahead in this field. As the island is sinking deeper and deeper into water shortage crisis, a simple “fly over” using Google Earth will make it very evident that the number of private pools is very high and rising by the day. Water, previously safely located in underground aquifers, now is being actively pumped out and stored in these pools, and left to the will of the elements and rapid evaporation. Having the cake and eating it at the same time, is even less possible when it comes to climate change. In this case, I believe that many Ministries and Departments simultaneously should coordinate their efforts and bring about a gradual change in the perception of the value of water. Also, this campaign should extend to the impact on fisheries.

Policy makers should be well informed of the consequences for the fisheries sector resulting from climate change. At this moment, the issue is not even being seriously analyzed, let alone planned for. Therefore, a future potential Conference on the Impact of Climate Change for Cyprus, should include the above listed authorities. They should be warned on the eventual close down of fisheries activities on the island unless some adaptation measures are being taken. Of course, one can not expect that it would be possible to stop these large scale climate developments that might affect the island and the sea around it, however, the only thing worst that a disaster is a disaster for which one is ill prepared.

Additional Useful Websites:

FAO Fisheries: <http://www.fao.org/fi/>

Fisheries Management Science Programme (FMSP): <http://www.fmsp.org.uk/>

Aquaculture and Fish Genetics Research Programme: <http://www.dfid.stir.ac.uk/Afgrp/>

Intergovernmental Panel on Climate Change: <http://www.ipcc.ch>

Marine Resources Assessment Group (MRAG): <http://www.mrag.co.uk/>

School of Development Studies, University of East Anglia:

<http://www1.uea.ac.uk/cm/home/schools/ssf/dev>

Sustainable Fisheries Livelihoods Programme: <http://www.sflp.org/>

Tyndall Centre for Climate Change Research: <http://www.tyndall.ac.uk/>

UK Department for International Development (DFID): <http://www.dfid.gov.uk/>

[Guidelines for acoustic surveys in the northwest African region.](#) FAO (2009)

[Multispecies and ecosystem indicators, and biomass-fleet dynamics stock assessment: an initial ...](#)

Medley, P.; Cheung, W.; Fulton, B.; Minte-Vera, C. (2009)

[Aquatic Sciences and Fisheries Information System \[ASFIS\]. Aquatic Sciences and Fisheries ...](#)

Fagetti, E.; Privett, D.W.; Sears, J.R.L. (2009)

[Report of the FAO/APFIC Regional Workshop on Port State Measures to Combat Illegal, Unreported ...](#) FAO (2009)

[Factors of unsustainability and overexploitation in marine fisheries – Views from the southern ...](#)

Bodiguel, C.; Gréboval, D.; Maguire, J.J. (eds.). (2009)

[Strategic Framework on Human Capacity Development in Fisheries.](#) FAO (2009)

[Review of the current state of world capture fisheries insurance](#)

Van Anrooy, R.; Ahmad, I.U.; Hart, T.; Hotta, M.; Ping, Y.; Yang, W.; Shipton, T.; Benoit, C.; Ruchismita, R.; Upare, S.; Siar, S.V. (2009)