Human Development Report Croatia 2008

A Climate for Change

Climate change and its impacts on society and economy in Croatia





Fast Facts

Fast Facts – Climate Change and Croatia

General Information

- The Croatian economy has many sectors that are directly influenced by climate and therefore may be affected by climate change.
- These sectors account for an equivalent of almost 25% of the economy almost EUR 10 billion per year.

Croatian Climate

- In Croatia, temperatures are already increasing, precipitation appears to be decreasing, and there appear to be more extreme weather events especially droughts and heat waves.
- In the future, Croatia is expected to become hotter and drier especially in the summer. Climate models suggest if emissions continue to increase, the period between 2040-2070 will be between 3 and 3.5° warmer throughout Croatia during the summer. By the end of the century, the increase in temperature and decrease in precipitation would be even more severe.

Public Opinion

- Croatians are highly concerned about climate change 96% believe it is a problem.
- Most Croatians are supportive of proactive solutions to reduce emissions 91% believe that Croatia should do as much or more than the average EU country.

What would climate change affect in Croatia?

Tourism

- Tourism generates about 20% of GDP and 28.7% of total employment in Croatia.
- Most models predict that climate change will create uncomfortably hot summers along the Adriatic coast which may cause many beach tourists to avoid these destinations. Instead, tourists will visit locations in Northern Europe which will become more attractive with climate change.
- However, the spring and autumn seasons are also expected to become more attractive for tourists at the Croatian coast.

Coastal Zone and Sea-Level Rise

- Global sea level is expected to rise between 9 and 88 cm by 2100 though large-scale melting of ice in the Antarctic or in Greenland could mean that sea level would rise much higher.
- Particularly vulnerable areas to sea-level rise are the Neretva Delta, the Krka River, Vrana Lake near Biograd, the island of Krapanj.
- According to the approximation of this Report, the total amount of land submerged with sea-level rise of 50 cm would be over 100 million square metres. With a sea-level rise of 88 cm, over 112 million square metres would be submerged.
- However, there is a lot of uncertainty about sea-level rise and it will occur slowly, meaning that there will be time to adapt. At the same time, plans for infrastructure and long-term investments should consider possible sealevel rise.



Health Impacts

- The future health risks of climate change in Croatia are not fully understood because there has not been sufficient research. However, the effects may include:
 - higher cardiovascular risk due to heat waves
 - increases in allergic reaction and increased frequencies of heat stroke
- increases in the vector-borne illnesses carried by mosquitoes, birds and other organisms
- Already, heat waves pose a risk to human health. In the summer of 2003, it is estimated that 185 additional deaths occurred due to the heat wave.
- While heat related health problems may occur, deaths due to cold weather may decrease during the winter time.

Water Resources

- Climate change is expected to result in changes to evapotransporation, soil humidity, ground water recharge, and the amount of water flowing through the rivers.
- Hydro-electric power production makes up half of electricity production in Croatia. Decreased river flow would lead to a reduction of hydro-electric power production resulting in significant extra costs (tens of millions of Euros) to replace the generating capacity if river flow is reduced.
- Additional natural resources such as wetlands services (flood protection, water filtration, etc.) could also be at risk in a drier future.



Agriculture

- Extreme weather events such as droughts and hail have resulted in average losses of EUR 176 million per year from 2000-2007 0.6% of national GDP, or 9.3% of GVA generated by the agriculture, forestry and fisheries sector this is more than the average value of subsidies in this sector during that time period.
- In the future, crop models predict that maize production will likely be affected by climate change resulting in losses of between EUR 6-16 million in 2050 and EUR 31-43 million in 2100.
- Other crops may also face problems due to lack of water and extreme heat, though there may be advantages as well. There is not enough information available to predict the impacts for all the important crops in the future.

Fishing and Mariculture

- Marine fish populations in the Adriatic are already showing significant fluctuations and changes in behaviour/migration patterns due to climate.
- It is expected that climate change will change the growing season and rearing time for farmed fish such as tuna. In some cases this may require adaptation, but in others, it may increase the potential for aquaculture.
- In addition to the migration of existing species of commercial fish, there is the potential for increase of invasive species.
- Already, the invasive species such as Bluefish (Pomatomus saltatrix) and Groupers have had a large impact. While Groupers have become a marketable fish, Bluefish have had a very negative impact especially in the Neretva River Estuary.

Vulnerable Groups

- Vulnerable groups those in regions with fewer economic opportunities and more affected by climate change, the poor, and the elderly

 are particularly vulnerable to the current effects of climate variability and to the future impacts of climate change.
 - They are disproportionately exposed to the effects of climate impacts.
 - They are the least able to adapt to the effects of climate impacts.

What can Croatia do to Change the Climate?

The Cost of Mitigation

- To avoid dangerous climate change resulting from an increase in temperature of over 2°C, global GHG emissions must be cut by 50-85% by 2050.
- Croatia's trajectory for emissions growth in the Business as Usual (BAU) case is estimated to result in 42 million tones of CO2e in 2020, which
 represents a 36% increase from 2006 levels of 30.83 million tonnes of CO2e.
- The EU has committed to reducing emissions by 20% by 2020 and Croatia has committed under the Kyoto Protocol to reducing emissions by an average of 5% from the agreed upon 1990 levels of 36 million tonnes by 2012. Croatia will also share at least part of the EU commitment for 2020.
- There are many "no regrets" mitigation measures that will actually save money and provide an economic benefit to Croatia. Most of these are related to energy efficiency. There are many other measures that will either be cost-neutral or cost a relatively small amount.
- In total, it is projected that Croatia should be able to stabilize its emissions at around 30 million tonnes with a slight economic benefit due to energy saved.
- In addition to measures that are not likely to be too expensive, there are other mitigation options which may be good to implement either because of their social popularity (such as solar panels) or additional benefits aside from mitigation. For example, increasing the carbon content in agricultural soils would decrease net emissions and have a positive impact on soil moisture.
- According to the estimate in the NHDR, Croatia could theoretically achieve a 30% cut in emissions by 2020, from the baseline of 36 million tones per year. The economic costs of achieving this reduction in 2020 are estimated to be EUR 115-536 million in that year.

Institutional Analysis for Mitigation

- Croatia has made a firm commitment to reducing emissions by introducing a carbon fee, promoting renewable energy, encouraging energy efficiency, and committing to GHG reductions under the Kyoto Protocol.
- There is a good amount of technological and intellectual capacity in Croatia to reduce emissions. Various businesses, NGOs and expert organizations are already engaged.
- Better coordination and information sharing would make progress easier. This is especially true among state actors that are not already heavily engaged such as the Ministry of Agriculture, Fisheries and Rural Development, the Ministry of the Sea, Transport and Infrastructure, and the Ministry of Tourism.

Recommendations

- Improve data availability In many sectors such as agriculture, tourism, water resources, and others, the data is not available to estimate the impacts of future climate change. Many of the data needed to estimate the future damages from climate change and avoid them through adaptation would also help with existing climate variability and help better target existing policies/ programs. This includes making data openly available which is paid for by the public budget.
- Improved modelling of environmental and economic systems Models of the Croatian economy, the climate, and various sectors can be very helpful in understanding the causal relationships within the Croatian economy. This is important for climate change and for economic development in general. The link between climate and economic systems still needs to be made within Croatia.
- Coordination of the activities of various actors Because climate change is such a multi-sectoral issue, many Government agencies/ ministries and private entities/ firms will need to be engaged in the discussion on what Croatia does to address it. This is important for both mitigation efforts and addressing climate vulnerability. The report recommends an inter-ministerial committee on climate change to deal with efforts in addressing vulnerability to climate and in mitigating Croatia's emissions.
- Integration of climate into planning As plans are developed for the coming 20-30 years and beyond, climate and climate change should be incorporated as a factor. This includes the development of physical plans on the coast to minimize the risk from sea-level rise, targeting subsidies in the agriculture sector to reduce climate vulnerability, physical planning and energy planning that will reduce emissions but also take into account changing environmental conditions, being prepared to deal with health problems which may arise from heat waves, and many other areas.
- Involve and engage the Croatian public The Croatian public express a strong desire to help reduce emissions and work towards a better climate future. They should be engaged as critical actors in the effort to reduce Croatia's impact on climate change and adapt as well.



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