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Perspectives into topical issues in society and ways to support political decision making.

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Proactive adaptation to climate change creates more benefits than reactive adaptation

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The key findings of the KUITTI study are:

- Proactive adaptation enables larger benefits than reactive adaptation, as both the avoidance of losses and the exploitation of opportunities are more effective. The cumulated financial benefit can amount to 8 billion euros by the year 2070;
- Gradual changes in temperature and precipitation patterns have eventually much larger economic effects than occasional natural hazards, owing to the ability to recover quickly from extreme events, i.e., resilience in Finland is high;
- Climate tipping points aside, the physical impacts of climate change on the Finnish economy in terms of effects on GDP seem to remain limited, but not negligible;
- The availability and accessibility of physical and socioeconomic impact data should be improved and better coordinated to more effectively support adaptation.

Climate change has modest macroeconomic effects in Finland, but this is no reason for inaction

The KUITTI study results indicate that climate change tends to cause quite modest yet lasting macroeconomic losses to Finland up to 2070, when no further adaptation would be implemented. Crudely summarizing, by 2040 and 2070 effects on GDP hover **between 0% and -0.3% of gross domestic product (GDP)**. These projections are based on effects on the forest sector and agriculture, as well as on effects of riverine and coastal floods, and of disruptions in electricity distribution, which subsequently propagate throughout the economy. Effects were included on the basis of a prior review of likely significance and available data. However, several potentially significant risks, such as for health and healthcare, could not be accounted for. Neither are possible global game changers, such as mass migration ignited by unsustainable heat stress, taken into account.

Even though Finland seems to get economically less affected than the global and European average, it still pays off to timely adapt to foreseeable effects of climate change. The study finds that proactive adaptation more effectively reduces losses incurred by climate change than reactive adaptation. The cumulated benefit (i.e., reduced losses) of a proactive strategy compared to a reactive one over the entire period varies between approximately 5 and 8 billion euros (net present value at a 2% discount rate) depending on the scenario. These amounts are an indication of how much proactive adaptation may cost more than reactive adaptation over a 50-year time span.

Adaptation to climate change is however not merely motivated by economic efficiency, but also by social and environmental responsibility, and by the overarching wish to retain and promote a resilient society with high and equitable levels of well-being for citizens. Based on this broader set of drivers, investment efforts could justifiably rise further. This notion is supported by findings in the report regarding welfare-based costing of selected damage effects based on so-called willingness-to-pay indicators.

Recommendation: *A methodology should be developed for coordinated and coherent assessment of financial, social, and environmental indicators aimed at providing versatile guidance to adaptation policy planning and implementation. This requires both research and societal discourse.*

Effectively coping with structural changes in operating conditions is to be the core of climate resilience policy

For social and economic reasons resilience to extreme events is important for a society. Resilience to extreme weather events is already high in Finland, while climate change is not expected to cause enormous changes in their severity or frequency in Finland. Obviously, this should not be a reason to get lax with damage prevention of extreme events, e.g., both for the management of flood risks and of power supply disruption risks further improvements are planned. Considering the study results and the high level of extreme weather resilience, from an economic point of view climate change resilience policy merits to have effective coping with structural changes in operating conditions in different sectors and regions as its guiding principle.

Effective coping with changing operating conditions includes efforts to enable continuation of current means of production and (public) service provision, but should not be confined only to efforts to retain current activities. In various cases, regions, companies, and public organizations may have to innovate more deeply or even change to completely new activities or modes of provision. Operating conditions refer here to ways of production in economic sectors as well as to (semi)public services like health care and urban management.

Recommendation: *The accessibility of information related to the physical and socio-economic impacts of climate change should be enhanced and better coordinated in order to support adaptation more effectively. Impact data is needed for research on finance and risks supporting public and private decision-making. This would help to enhance proactive adaptation and to enable timely implementation of adaptation to structural changes in operating conditions caused by climate change.*

National adaptation policy has strong international dimensions

Domestically born climate risks in Finland seem to remain small by international comparison. This raises the significance of the climate change induced risks outside Finland, which directly and indirectly also affect the Finnish society and economy. Climate change induced effects from abroad may reach Finland through economic, social, and natural connections. In a mutually dependent world, it is essential that more stable nations such as Finland assist countries in which the impacts of climate change are very strong, not only for humane reasons but also for the sake of overall global stability and development. In the long run, a globally well-adapted world is also the best outcome for Finland.

This study, and comparable ones abroad, encountered that the knowledge and supporting data regarding transboundary effects of climate change is still poorly developed. There are as yet poorly understood possibilities, that some transboundary risks are more serious for Finland than we tend to grasp now. On the other hand, there are indications that in several respects Finland and some comparable countries may slightly improve their international competitive position, as other regions are more negatively affected by climate change. This underlines again that risks of climate change should not be (solely) approached as a matter of avoiding cost rises for Finland. Better understanding of these processes and risks is evidently needed to elaborate adaptation policy and related policy areas at this point. Better understanding of transboundary effects is expected to also help to identify export opportunities for adaptation and resilience related innovations.

Recommendation: *As climate change tends to diverge different countries' competitive positions and related resilience, Finland, given its favourable outcomes, should provide aid to countries that face significant losses due to climate change. In order to enhance predictability, cooperation on monitoring and researching transboundary risks and effects of climate change should be increased both in the EU and globally.*

Adaptation policy can benefit from the momentum in private and public organisations to invest in adaptation

A survey among mainly larger companies and municipalities indicated that there is already a quite good awareness of possible risks of climate change to operations of organisations. Quite many have started to take measures and invest in improving the climate resilience of their operations, often involving some degree of innovation. Next to risk and sector specific measures, notably in forestry and agriculture, there is innovation and export potential for several smart solutions for climate neutral and resilient energy systems as well as advanced climate and adaptation information services.

Recommendation: *Open and high-quality risk information markets favouring proactive adaptation should be developed via open intelligent information systems. By these interconnected information and monitoring systems different parties may acquire information. In order to ensure fluent and high-quality service, both technical options and models for cooperation can be tested via innovation pilots.*

References:

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