Kazakhstan|Impacts of Climate Change and Adaptation in Infrastructure

Annual changes in % are between a climate change scenario without adaptation (SCC) and a climate change scenario with adaptation (SCCA).

Find the underlying analysis in the sectoral policy brief "Kazakhstan: Economy-wide Effects of Adaptation in Infrastructure" and in the report "Supporting climate resilient economic development in Kazakhstan"

Kazakhstan's infrastructure is vulnerable to climate change

Floods damage infrastructure like roads and buildings, which then need to be reconstructed.

Extreme wind events may partly or fully damage buildings and cause costs for rebuilding them.

Extreme temperatures can deform roads and rails.

Negative impacts on infrastructure can lead to **lower growth in other sectors, lower GDP** and **employment.**

Exemplary adaptation measures for reducing vulnerability to extreme precipitation & wind

Climate resilient roads

Construction and **regular maintenance of road infrastructure** offers the opportunity to adapt to climate change impacts like floods following extreme precipitation in a proactive manner. Climate-proofing roads (e.g., drainage structures, new pavement structure) increase costs by 7-9% of regular road investments.
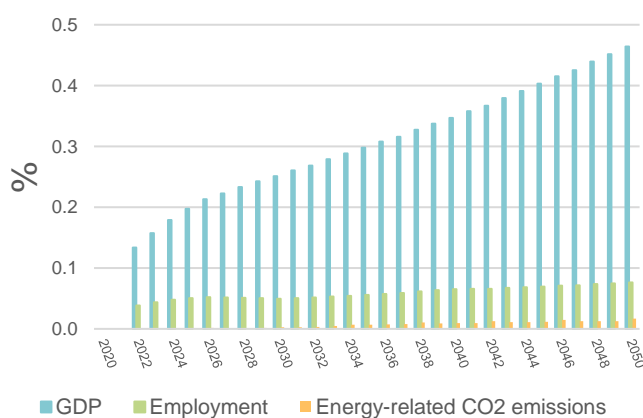
"Green belt" Mass afforestation

The **"Green Belt" of Nur-Sultan** consisting of approximately 12 million trees around the city is a prominent example of how to **reduce wind speed, improve soil moisture and reduce CO_2 emissions** (Tulepov, 2019). Such "green belts" are a **nature-based adaptation measure** to mitigate damages from extreme wind while also harnessing climate adaptation and mitigation synergies.

Economy-wide impacts of climate resilient roads and "green belt" mass afforestation

Economy-wide impacts of investment in climate resilient roads (SCCA compared to SCC)

- GDP
- Employment
- Energy-related CO2 emissions

Macroeconomic modelling allows for **long-term assessment of economy-wide effects** of adaptation measures.

→ Investments in climate resilient roads result annually in up to **0.46% higher GDP (resp. 389 bn. KZT)** and **up to 0.1% higher employment corresponding to a maximum of 7,700 additional jobs** in e.g., construction and transport sector (SCCA compared to SCC). However, CO_2 emissions rise by up to 0.1% per year – mainly in the energy and transport sector (SCCA compared to SCC).

→ The economy-wide impacts of investments in **mass afforestation to create "green belts"** are positive once the benefits of the measure are fully exploited. GDP growth is slightly higher compared to SCC due to the import dependency of the forestry sector on e.g., machinery and trailers.

References
Tulepov (2019): Climate change: the capital's experience. URL: https://vechastana.kz/izmenenie-klimata-opyt-stolicy/

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