



Vlaanderen
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Evaluation of the socio-economic impact of climate change in Belgium

Een literatuurstudie, uitgevoerd door VITO, EcoRes en Kenter in opdracht van de Nationale Klimaatcommissie



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Context

- ▶ **Maatregel 7 uit het Nationaal Adaptatieplan**



- ▶ **Selectie Vlaamse Instelling voor Technologisch Onderzoek (VITO), i.s.m. Kenter en Ecores**
- ▶ **Literatuuronderzoek**

Opdeling en focus

► Globaal rapport (EN)

- Ecosystemen
- Infrastructuren
- Energievoorziening
- Land- en bosbouw
- De arbeidsproductiviteit
- De verzekeringssector
- De gezondheid
- Sociale aspecten

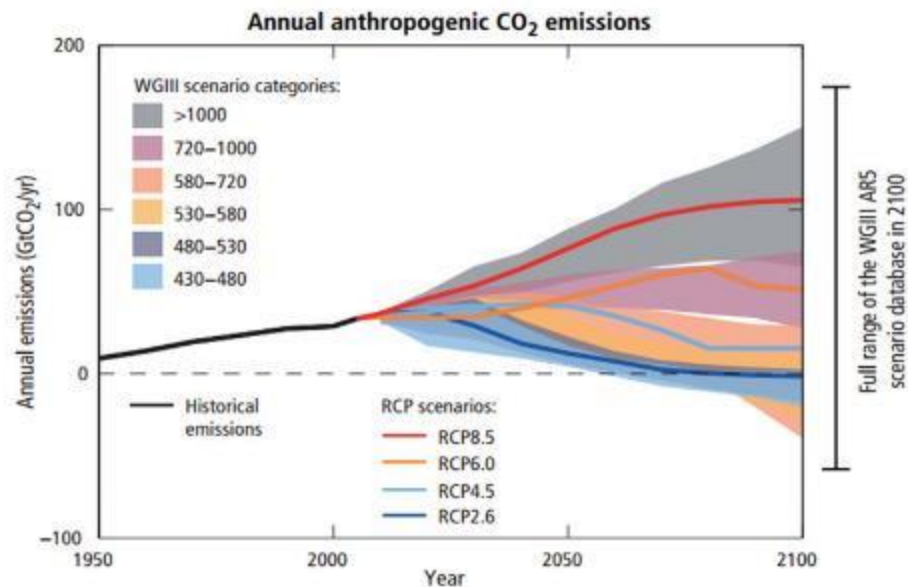
► Samenvatting voor beleidsmakers (NL, FR en EN)

- Vlotte verspreiding



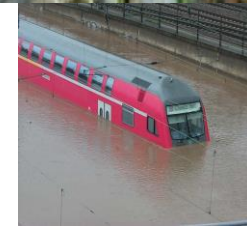
Klimaatmodellen

- ▶ RCP 2.6 ; RCP 4.5 ; RCP 6.0 ; RCP 8.5 (IPCC)
- ▶ 1°C ; 1,8°C ; 2,2°C ; 3,7°C
- ▶ CORDEX.be



Gevolgen van klimaatverandering in België

- ▶ Stijging van temperatuur en hittestress
- ▶ Droogte
- ▶ Extreme neerslag
- ▶ Overstromingen
- ▶ Stijging van de zeespiegel



Methodologie

- ▶ **Kwantificeren van de huidige en toekomstige impact van de klimaatverandering in België**
 - Per sector
 - Rekening houdend met verschillende scenario's en klimaatmodellen
- ▶ **Identificatie en validatie van analyse methoden & socio-economische indicatoren**
- ▶ **Globale analyse en evaluatie van de socio-economische gevolgen van klimaatverandering**

Impact van klimaatverandering

	rising temperatures and extreme heat stress	drought	peak precipitation and extreme weather (storms)	river flooding	sea level rise
biodiversity / ecosystem services	deterioration, loss or migration of marine species	loss of peatlands, wetlands & groundwater dependent species	damage to ecosystems from erosion, storms, hail	damage to unmodified terrestrial ecosystems pollution	drowning of coastal estuaries and wetlands higher groundwater position and salinity in coastal ecosystems changes in sludge & tidal land areas
	deterioration, loss, or migration of terrestrial species degradation of surface water quality in natural areas phenology changes				
	changes in habitat, species composition, ecosystems (services); increase of CO2 concentration: acidification of marine environment, (potential) growth of primary production; ecosystem services compromised: carbon capture/storage, pollination, water regulation, recreational activities, ...				
emergency planning	enhanced deployment of ambulances electricity blackout threatening hospitals		access roads to emergency sites blocked equipment and consumables storage		
health	heat-related morbidity & mortality new diseases vectors enhanced food spoilage less cold-related disease increase of allergies and changes in season (e.g. hay fever onset) psycho-social impact	threatened drinking water	water-related diseases diseases due to floods effects of floods and other extreme events on mental health injuries and deaths caused by extreme weather		
	health impact of deteriorating water and air quality				

Impact van klimaatverandering

	rising temperatures and extreme heat stress	drought	peak precipitation and extreme weather (storms)	river flooding	sea level rise
industry & services	impact of heat on labour productivity (in particular outdoor workers) cooling units (e.g. meat storage) breaking down	farmers insurance for drought related damage (FI Region, 2020)	impact of floods and extreme weather phenomena on buildings and supply lines (in/out) damage to property (insurance is sensitive through assets & claims)		
	impact of heat and water shortage on production processes (beer, textile industry, agri-food)				
	impact on the supply chain over the impact on raw materials and commodities, and transportation; changes in demand for certain goods or services; impact on the insurance services sector;				
transport & infrastructure	bent rails, asphalt bulging compromised moving parts of bridges and locks reduced air cargo (enhanced take-off distance) overheating electrical components of transport systems train wagons overheating and/or airco breaking down reduced problems related to snow and ice	cracking in private and public buildings by changing soil moisture conditions impact of drought on navigability of rivers and canals drought-induced forest fires affecting road/rail transport	impact of extreme weather events and floods on infrastructure (roads, railways, ports, networks, ...) damage from flash floods & river flooding temporarily reduced accessibility damage caused by groundwater salinization		
	impact of climate change on maintenance of infrastructure and rolling stock, changes in accident frequency, accessibility and evacuation compromised in emergency situations, impact of extreme weather events and their effects (heat, flooding, erosion, landslides, ...) on infrastructure and the functioning of networks (including data networks, utilities, ...)				

Impact van klimaatverandering

	rising temperatures and extreme heat stress	drought	peak precipitation and extreme weather (storms)	river flooding	sea level rise
agriculture	thermal stress for livestock and crops sunburn damage to crops stables (livestock): less winter heating, more summer cooling	loss of soil organic matter drought stress	rinsing of arable land damage to agriculture flood damage to agriculture caused by storms, hail, ...	damage to agriculture from flooding	damage to agriculture during flooding events loss of farmland by coastal erosion and salinisation
	change in length of the growing season changes in temperature and moisture regime for crops change in incidence of plant/animal diseases & pests threat from nature/forest fires				
forestry	changes in crop selection, changes in revenues, changes in food and feed availability and prices of agricultural crops; increase of CO2 concentration: increased (potential) primary production; social impact on farmers; increase interannual variability				
	high ozone affecting trees changes in incidence of pests and diseases thermal stress	drought damage increased risk of forest fires	damage caused by extreme weather events	damage and loss of area through flooding	damage and loss of area through flooding and salinisation
	reduced resilience of trees (e.g. against pests)				
changes in productivity and functions of forests; ecosystem services compromised: wood production, water regulation, natural protection, recreation, ...					
energy	increased energy demand (cooling) transformers overheated reduced efficiency of photovoltaic panels (renewable energy) energy distribution losses (current mean is 7-8%)	reduced potential for hydro-electricity	damage to infrastructure for generation, transmission and distribution – including renewable energy (wind turbines) damage caused by trees falling on power lines during storms enhanced southerly wind direction correlates with lower wind speeds hence reduced yield of wind turbines		
	reduced availability cooling water for thermal and nuclear power plants				
changes in demand and supply, damage to infrastructure for generation, transmission and distribution					



Grensoverschrijdende impact

- ▶ **Daling in landbouw- en arbeidsproductiviteit buiten Europa**
 - > afname export / import
 - stijgende prijzen
- ▶ **Migratie**
 - > 2/3 zeespiegelstijging
 - > 1/3 productieverliezen door droogte

Resultaten

Tegen 2050 en RCP 8.5:

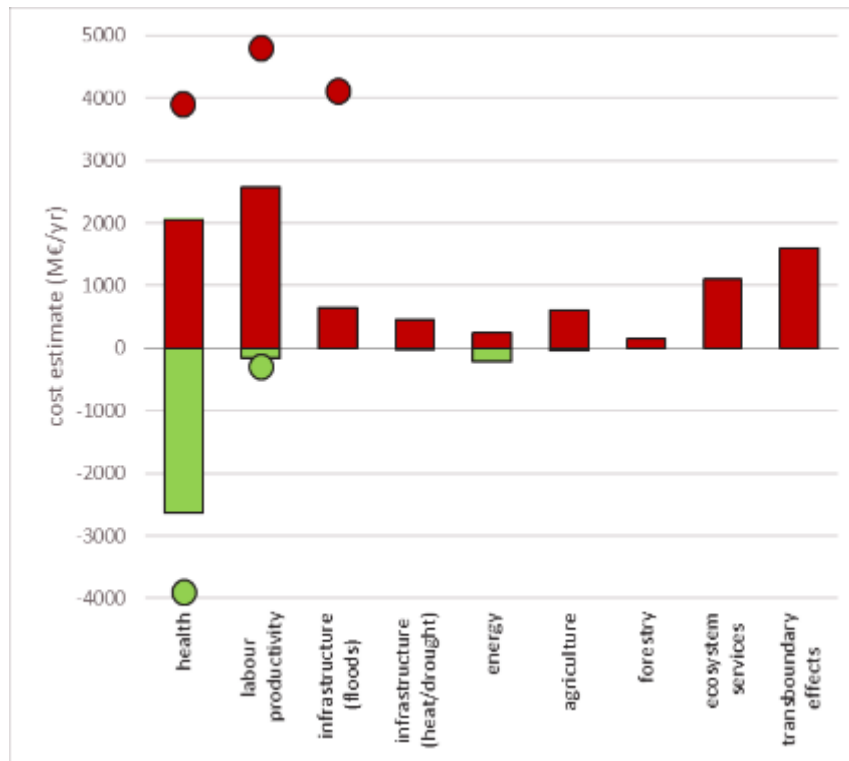
▶ **Totale kosten:**

→ Bijna 9,5 miljard € per jaar = ongeveer 2% van Belgisch BBP

▶ **Winsten** (zachtere winters):

→ Bijna 3 miljard € per jaar = 0,65% van BBP

Resultaten



	Sectoral costs/gains in M€/yr			
	2050		2100	
	costs	gains	costs	gains
Health	2058 ± 682	2635 ± 875	3900 ± 1300	3900 ± 1300
Labour productivity	2565 ± 2395	149 ± 33	4805 ± 4195	298 ± 66
Infrastructure (flooding)	641 ± 299	-	4112 ± 1478	-
Infrastructure (drought/heat)	460 ± 306	9.1	-	-
Energy	242	220	-	-
Agriculture	606	45	-	-
Forestry	150	-	-	-
Ecosystem services	1108	-	-	-
Transboundary	1596 ± 604	-	-	-
TOTAL	9427 ± 4285	3058 ± 908	-	-

Sociale aspecten

- **Grotere impact op kwetsbare groepen**
 - Gezondheidsproblemen
 - Laag inkomen
 - Gebrek aan mobiliteit
 - Hoge relatieve uitgave aan basisvoorzieningen
 -

→ Noodzaak voor Fair & Just transition.



Beeld Lorenzo Quinn

Case studies

- ▶ Belgische frieten
- ▶ Belgisch bier



Belgische frieten

88% van de Belgen eet minstens eenmaal per week frieten

België is de grootste uitvoerder van voorgekookte diepvries-aardappelproducten

- Export naar meer dan 150 landen

Veel water nodig bij de kweek en verwerking

- De droogte-episode in 2018 veroorzaakte een aardappeltekort, met een prijsverhoging van 23% als gevolg.
- Overschakelen naar meer hitte en waterstress bestande soorten

Stijgende temperaturen zullen ook de energiebehoefte voor koeling (opslag) verhogen.

Belgisch bier

Gerst is voornamelijk geïmporteerd (97,5%)

- Globaal opbrengst verlies tussen 3% - 17%
- Bierproductie daalt met 10% - 40%

Hop

- Aanbod daling 7% -10%

Omgevingstemperatuur

- Lambiek: nu al 10% verkorting van productieseizoen

Waterschaarste



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<https://www.adapt2climate.be/studie-evaluation-of-the-socio-economic-impact-of-climate-change-in-belgium/?lang=nl>

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