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Climate Change Adaption Planning in Korean Railway

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Impacts of climate change in Korea

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< Typhoon “Chaba” (2016.10.05) >

Impacts of climate change in Korea

RAINFALL	Annual precipitation of 6 major cities increased by 19% in 100yr Rainfall intensity is doubled compared with that of the 1970s
PUBLIC HEALTH	Increase of infectious diseases spreading wide Heat wave victims increase
NATURAL DIASTER	Increase of the cost of extreme weather events
INFRASTRUCTURE	Highway and bridge damages by heavy rainfalls
ECOSYSTEM	Especially vulnerable in the subtropical zone and mountain areas
AGRICULTURE	Cultivation areas shifting/moving.

< Cost of property damage(2004-2013) >

National Climate Change Adaptation Master Plan(1st, 2011-2015)

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- Based on 'Low Carbon Green Growth Act'(Article 48)
- Master plan and rolling plan for every 5 years

Adaptation Measures by Sector

Health	Protecting Public Health from Climate Change Impact, such as Heat Waves and Air Pollution
Disasters	Minimizing harm through Prevention and Strengthening Infrastructure
Agriculture	Transition to climate-friendly agriculture systems
Forest	Improving Forest and Reducing Forest Disaster
Marine/Fisheries	Securing Marine Resources and Minimizing Damage
Water Management	Establishing Climate Resilient Water Management Systems
Ecosystem	Ensuring Biodiversity through the Protection and Restoration of Species

Basis Measures for Adaptation

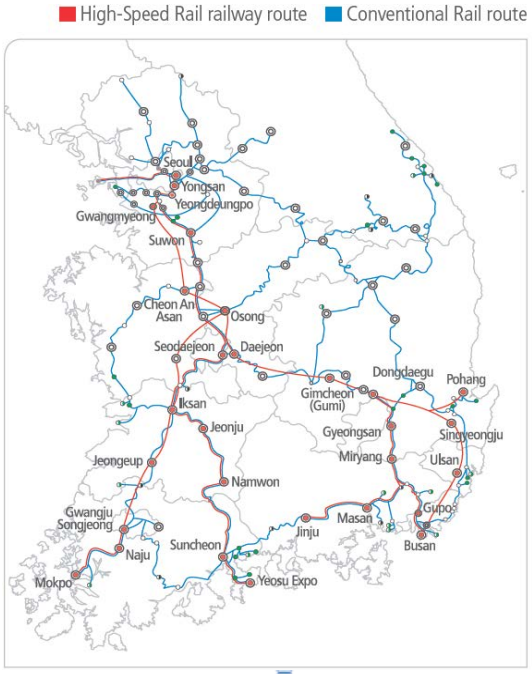
Monitoring/Forecasting	Providing Basic Data and Stat. for Adaptation
Industries/Energy	Finding New Business Model based on Adaptation
Education/Cooperation	Strengthening Communication on Adaptation

National Climate Change Adaptation Master Plan(2nd, 2016-2020)

1st Adaptation Policy	2nd Adaptation Policy
o 9 sectoral adaptation policy - 67 specific projects	1.Economy-society-environment sectoral integrated adaptation system - Policy efficiency through 20 core projects
o Sectoral measure to achieve long-term vision	2. Goal differentiation and short-term, and medium-and long-term vision for national climate change adaptation - Specific national strategies through medium term and short term action plan
o Identify measures, limited to climate change adaptation	3. Co-benefit through climate change adaptation and greenhouse gas emissions reduction
o Prior to Government departments' climate change adaptation plan - Adaptation issue as core projects	4. Scientific plan based on climate change impact assessment and risk
o Sectoral plans(Parallel) - Focusing climate change impact prevention	5. Economy-society-environment virtuous circle through core strategies and priority list for climate change adaptation
o Secure linkages between governmental basis and top plan system - Consistency of green growth 5-year plan, etc	6. Policy value and direction based on climate change adaptation principle - Sustainable development, vulnerabilities, scientific based integrated synergic impact, adaptation principle
o Regular check on progress of the plan	7. Implementation and examine system empowerment - Effective response through integrated examination of climate change impact monitoring and adaptation assessment

The Korean Rail Network

- 3,873 km of railway network, 673 stations (2015)
- Links the shortest distance with X type + ▭ type combination
- 70.4 percent was electrified in 2014
- High speed rail service from 2004
- 9 subway operating companies



Impacts of climate change in Korean Railway (1990-2011)

Sector	Heat wave	Cold wave	Precipit -ation	Heavy snow	Strong wind	Consequence
Track	3	1	110	9	12	- Freezing of track - Bucking risk of track - Flooding, landslide, loss
Rolling Stock	7	5	3	6	3	- Interrupt train service for heavy snow - Restrict train speed, Derailment - Breakdown of door and brake
Transmission and Telecommunication	1	1	1	10	0	- Signal error, Breakdown of switch - Suspend the power supply
Station	0	2	0	0	0	- Freeze the pipe in station
Worker (Human)	0	0	2	1	1	- Safety problem of the working condition
Total	11	9	116	26	16	

< Precipitation >

< Strong Wind >

Impacts of climate change in Korean Railway (2011-2015, KORAIL)

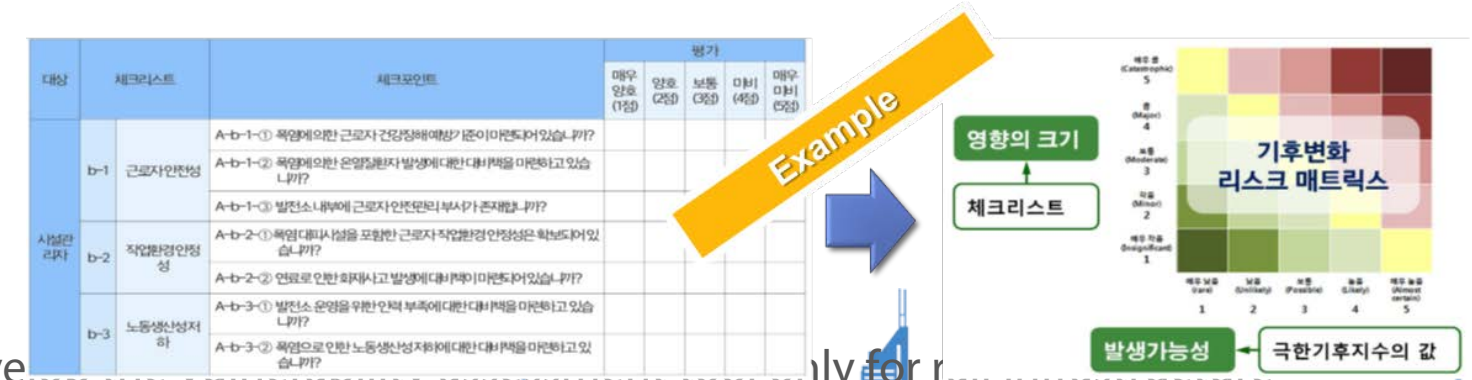
Sector	Heat wave	Cold wave	Precipit -ation	Heavy snow	Strong wind	Remarks
Track	1	10	1	0	16	
Rolling Stock	4	18	6	12	7	
Transmission and Telecommunication	0	6	1	9	3	- Lightening (17) : unstable power supply, transient abnormal voltage, signal error, etc.
Station	0	0	0	0	0	
Worker (Human)	0	11	0	0	0	- Falling accident from freezing site or during the removal of icicle
Total	5	45	8	21	26	

< Heavy Snow >

< High Temperature >

Planning of climate change adaptation in Korean Railway

- Public company related to transportation should report the climate change adaptation plans to national or local government by the end of 2017
- The designated companies are KORAIL and 7 subway operating companies
- Report a long-term vision after 20 years and the detailed implementation plans every 5 years and each year for climate change adaptation
- Arrange questionnaire for the risk assessment of railway company
  - ✓ Consider 5 climate change factors (Heat wave, Cold wave, Precipitation, Heavy snow, Strong wind)



- Develop the vulnerability assessment tool only for rail infrastructure

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Thank you for your attention!

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