AFAD
REPUBLIC OF TÜRKİYE
MINISTRY OF INTERIOR
DISASTER AND EMERGENCY MANAGEMENT AUTHORITY

ASIAN DISASTER REDUCTION CENTER

ADAPTATION AND RISK REDUCTION STUDIES TO DISASTERS CAUSED BY CLIMATE CHANGE: A COMPARISON BETWEEN JAPAN AND TÜRKİYE

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26.03.2025

Kobe, JAPAN

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HAZARD CHARACTERISTIC OF TÜRKİYE AND JAPAN

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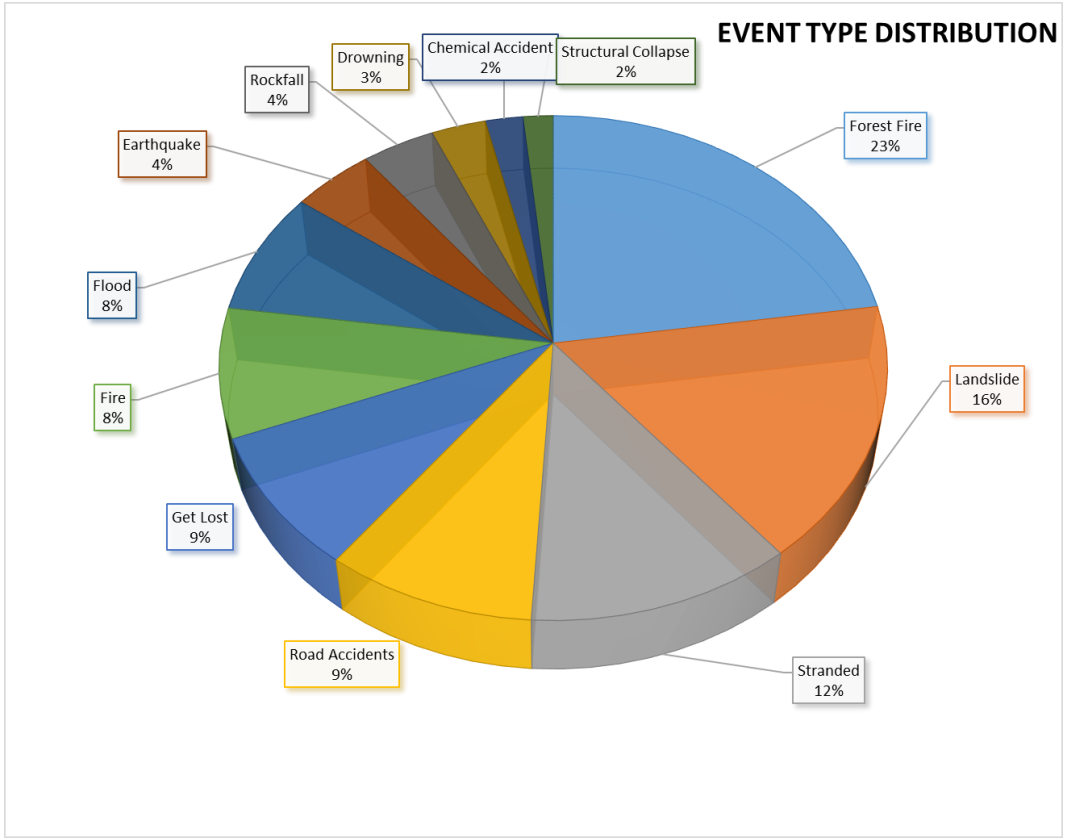
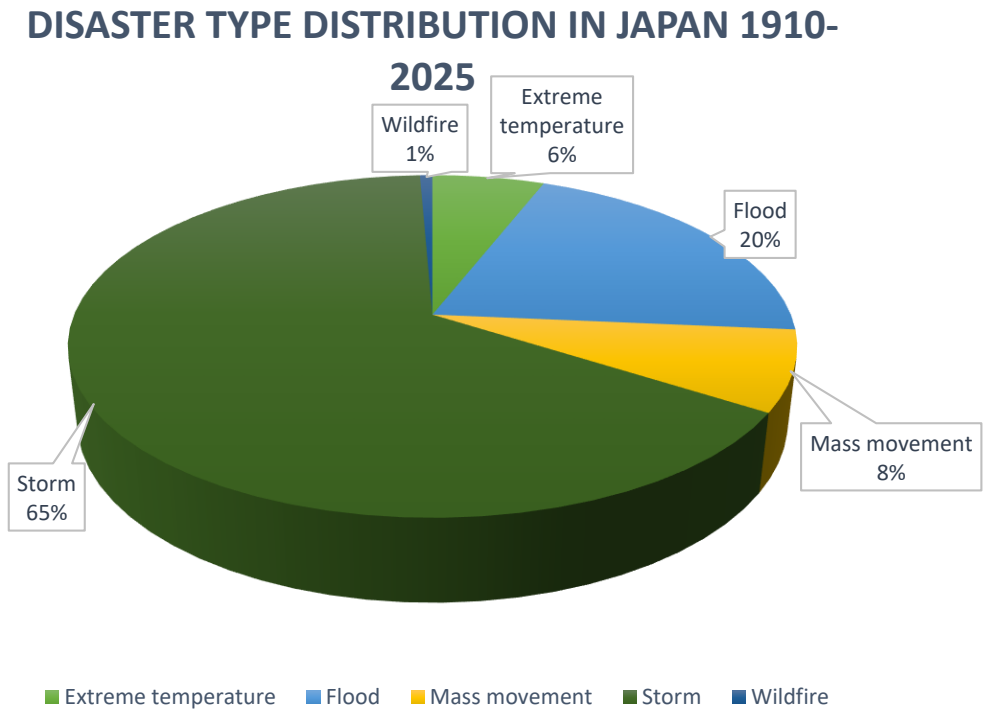
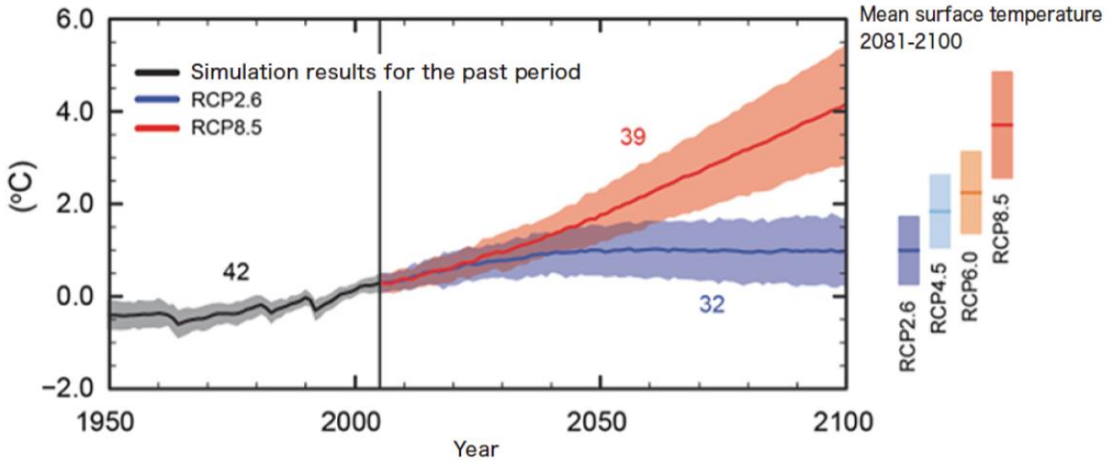




- **Forest fire 23%**
- **Landslide 16%**
- **Flood 8%**
- **Storm 65%**
- **Flood 20%**

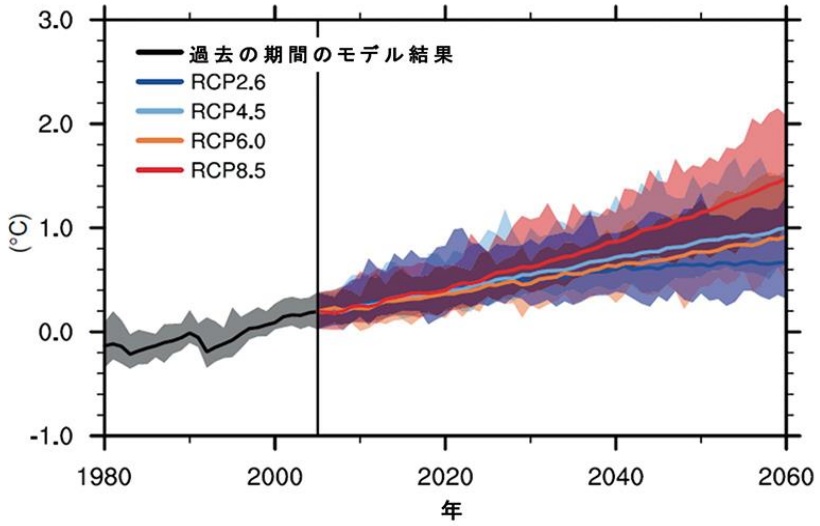
CLIMATE CHANGE PROJECTIONS AND DISASTER-BASED SCENARIOS

CLIMATE CHANGE PROJECTIONS AND DISASTER-BASED SCENARIOS - WORLD



Surface Temperature

Global annual mean surface temperature for the end of the 21st century (2081-2100), compared to that for the end of the 20th century (1986-2005), is projected to **rise by 0.3 to 1.7°C** under the RCP2.6 scenario and **2.6 to 4.8°C** under the RCP8.5 scenario

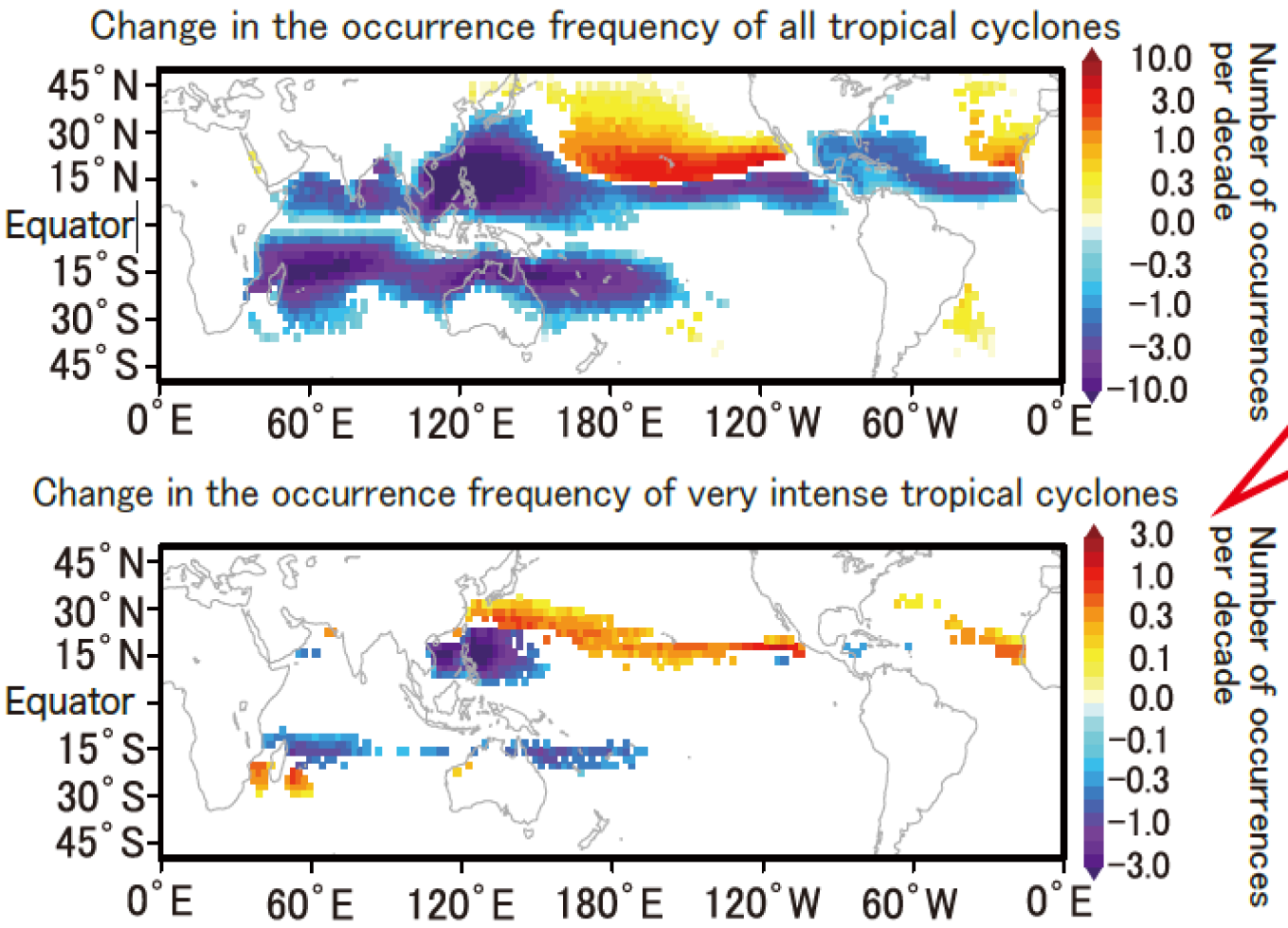


Sea Surface Temperature

21st century is projected to **increase by 0.6°C** under the RCP2.6 scenario and **2.0°C** under the RCP8.5 scenario.

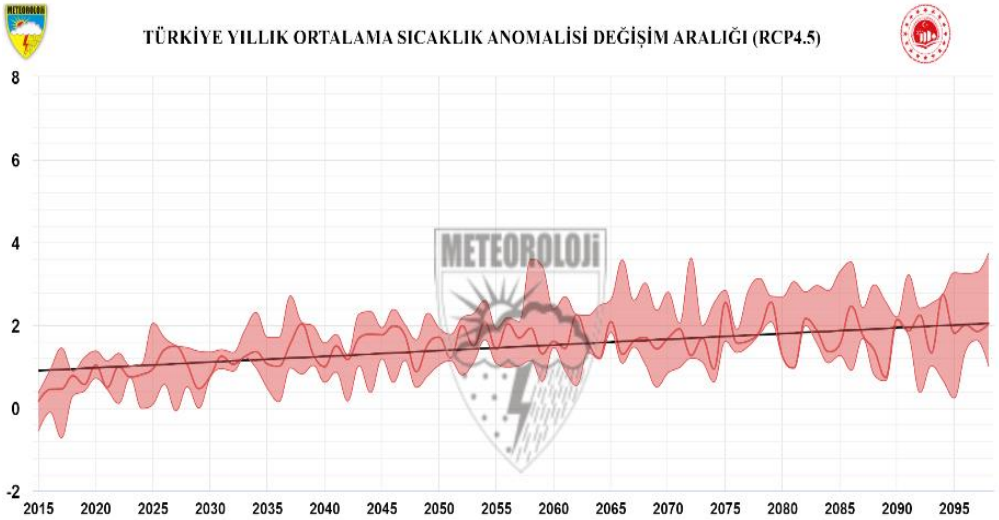
CLIMATE CHANGE PROJECTIONS AND DISASTER-BASED SCENARIOS - WORLD

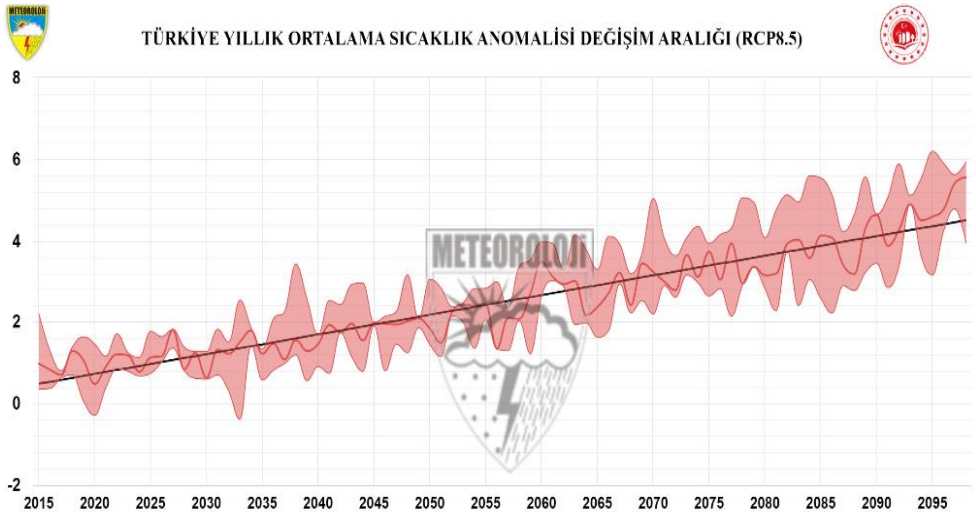
Cyclones



Occurrence frequency of tropical cyclones will increase in the area shaded in red to yellow

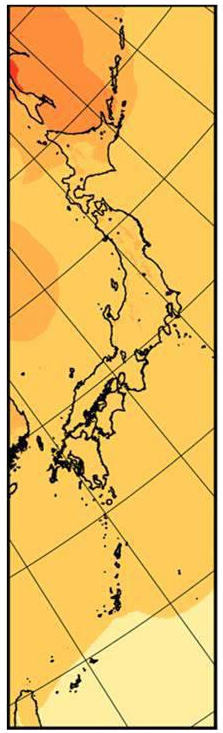
TEMPERATURE PROJECTIONS – TÜRKİYE &JAPAN





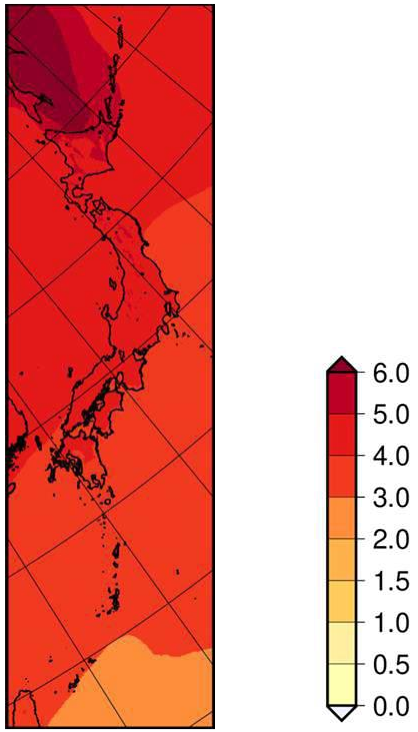
2.2°C.

3.8 °C



Projection under the 2°C Warming Scenario

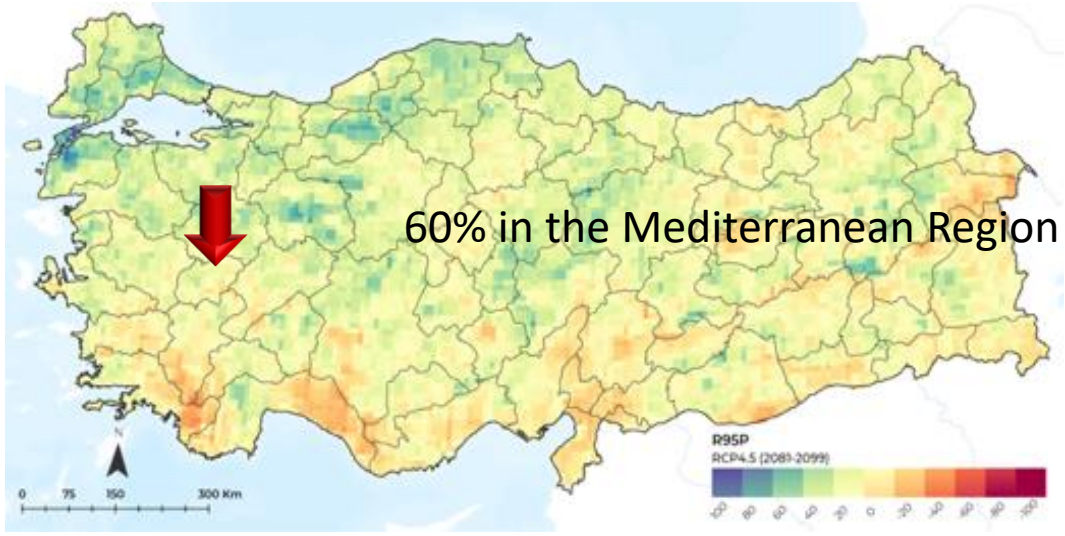
1.4°C

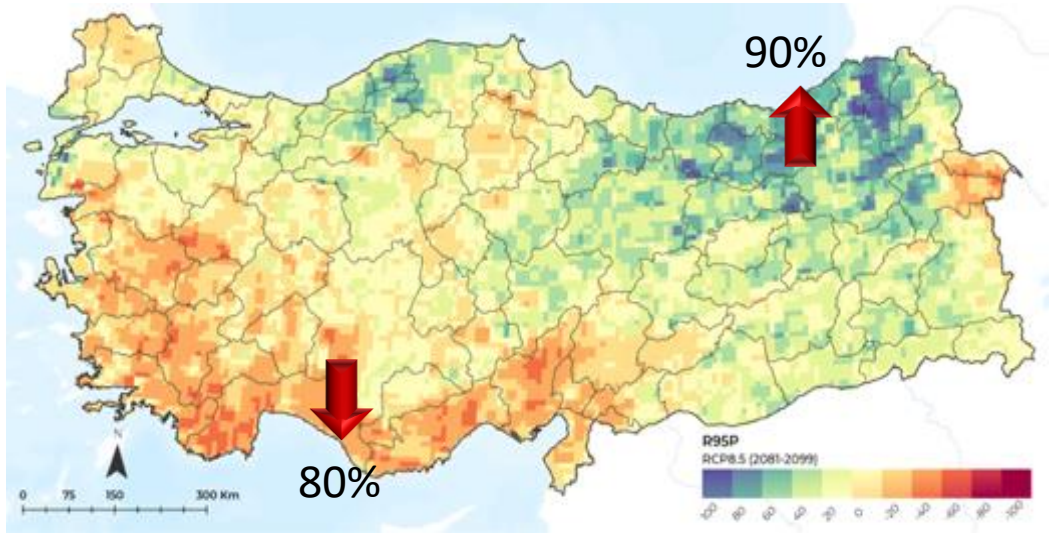


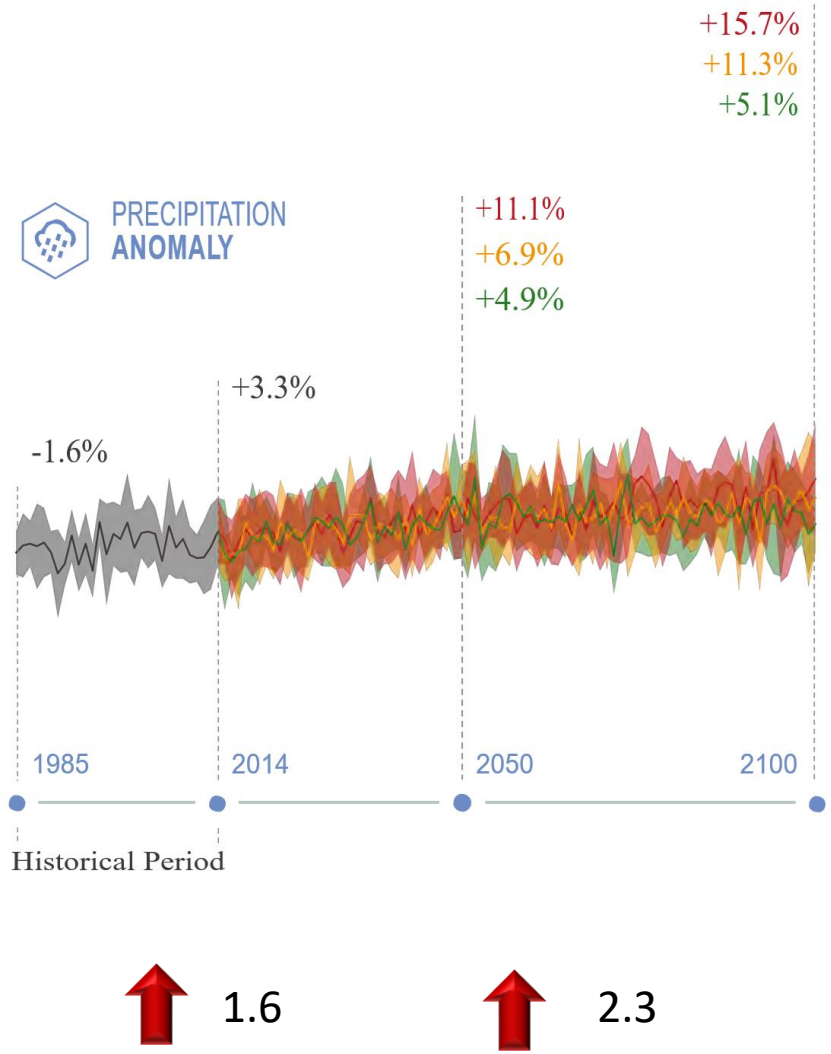
Projection under the 4°C Warming

4.5°

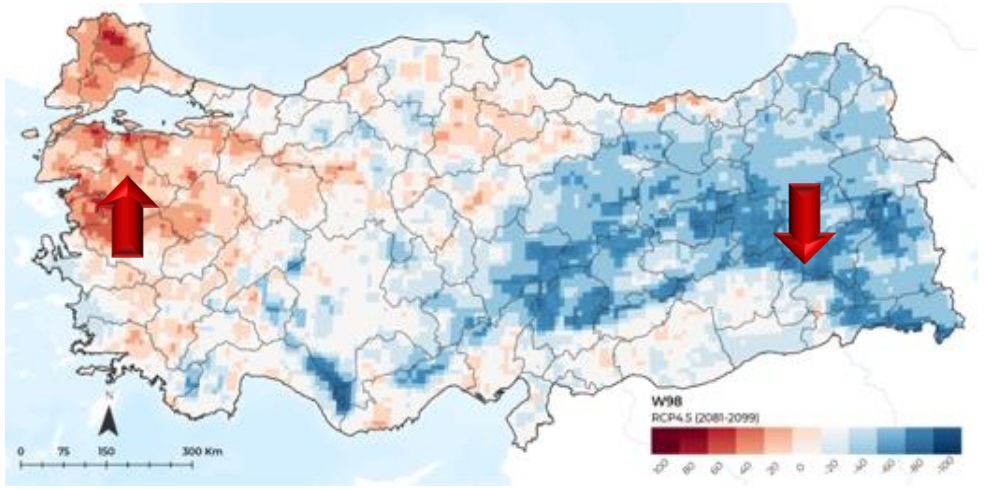
PRECIPITATION PROJECTIONS – TÜRKİYE &JAPAN

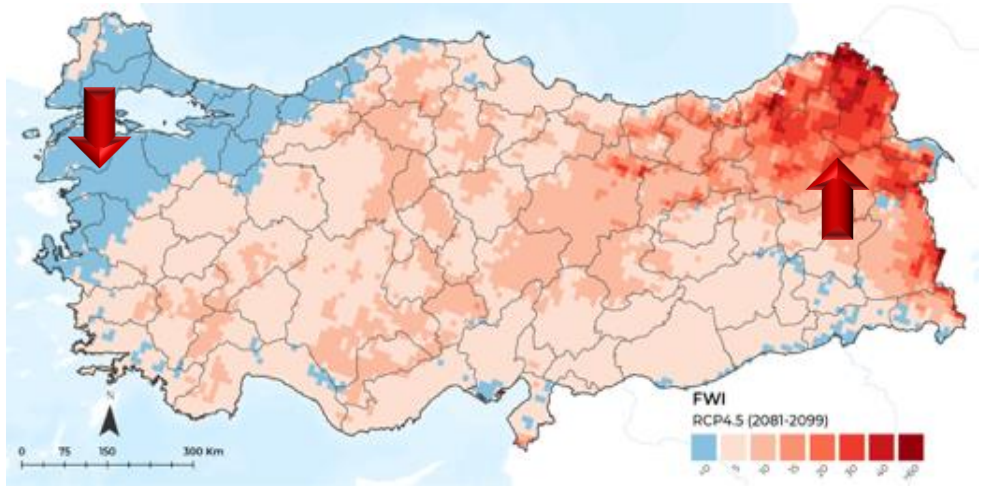


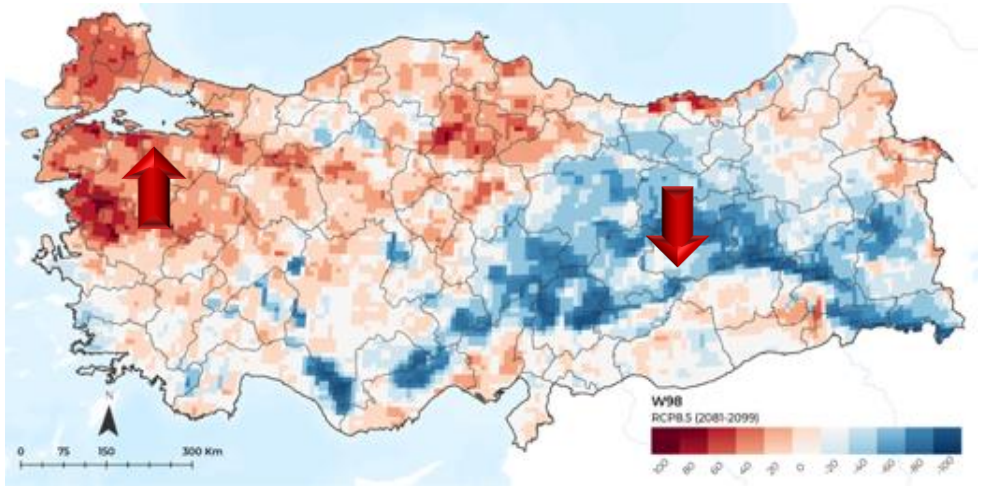


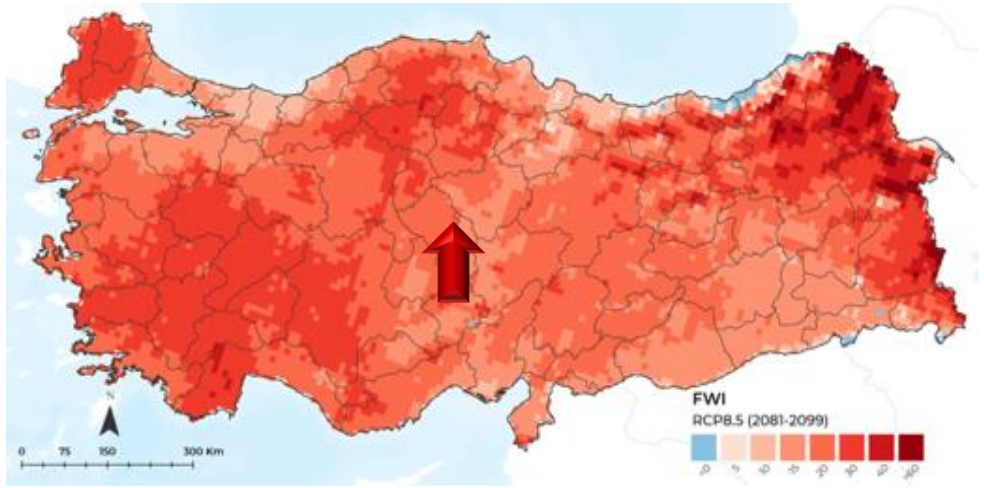


EXTREME WIND - FOREST FIRE PROJECTIONS – TÜRKİYE



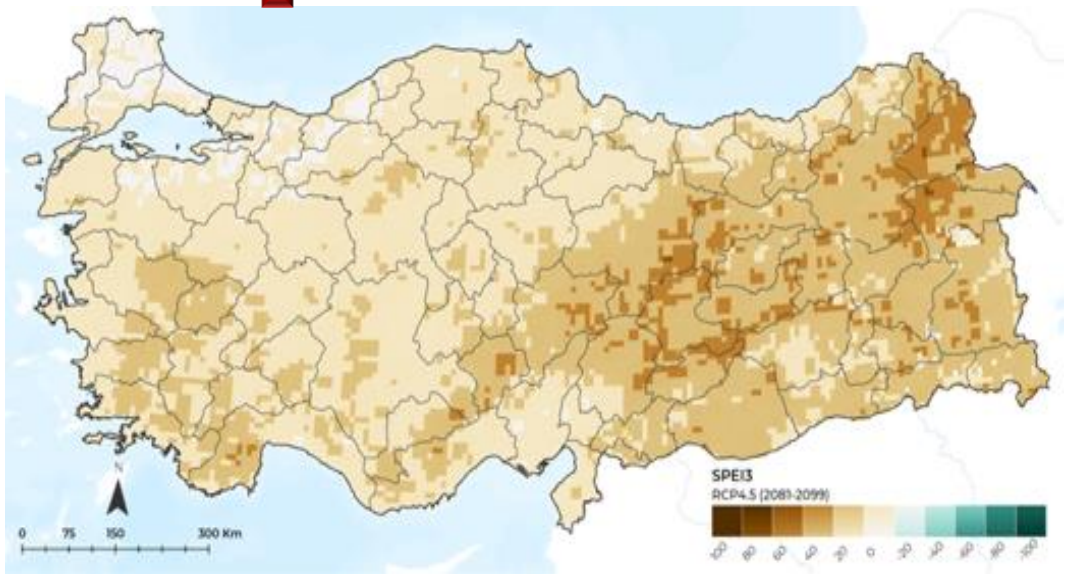




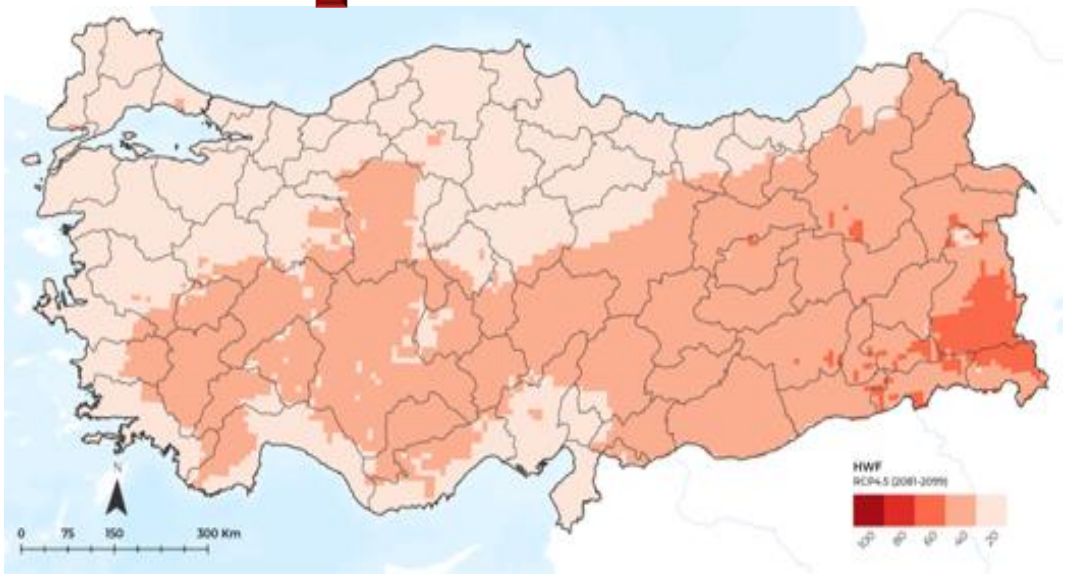


DROUGHT – HEATWAVE PROJECTIONS – TÜRKİYE

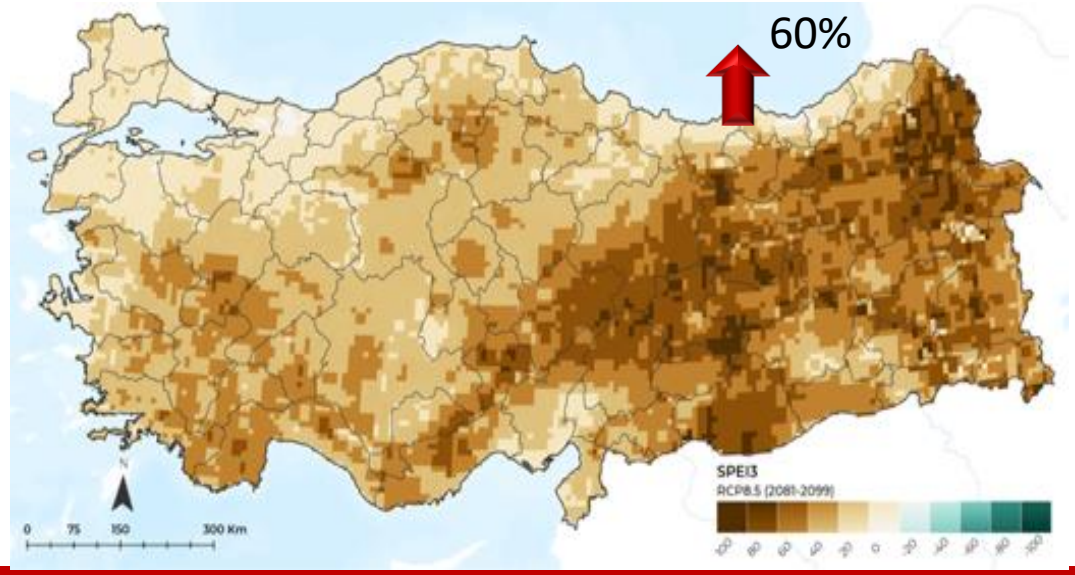
20%



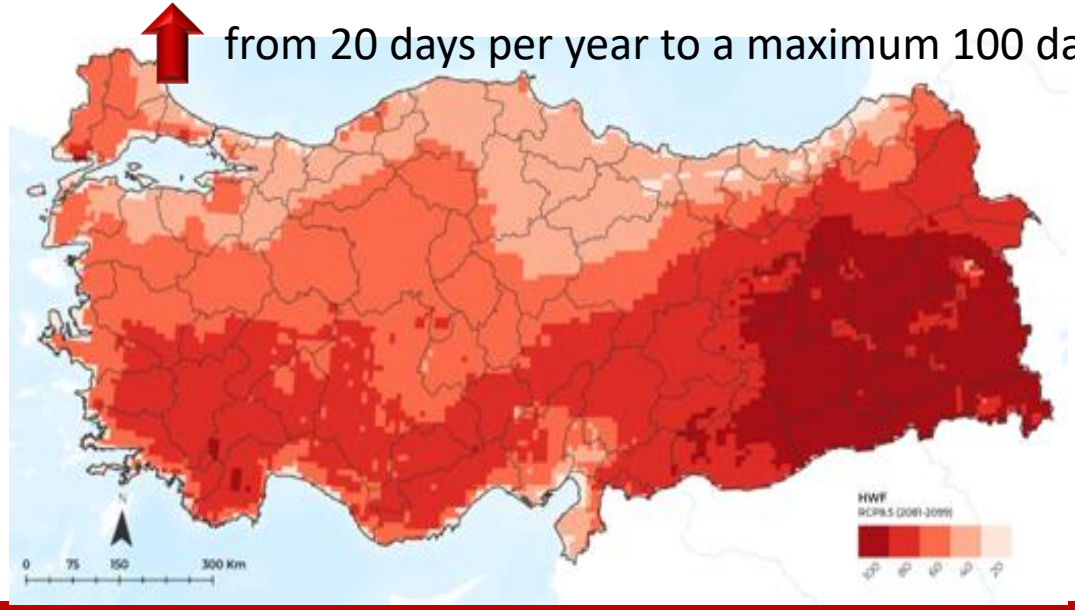
up to 60 days per year



60%



from 20 days per year to a maximum 100 days



Projected climate conditions for areas in and around Japan
for the end of the 21st century relative to the end of the 20th century or present:

Yellow and purple figures represent the 2°C and 4°C Warming Scenarios (RCP2.6 and 8.5 scenarios), respectively.

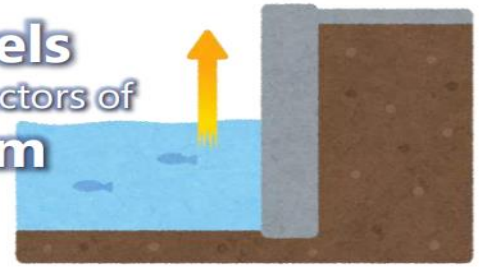
Annual Surface Temperature Increase: approx. 1.4 / 4.5°C

with more T_{max} ≥ 35°C days,
more T_{min} ≥ 25°C days
and fewer T_{min} < 0°C days

Sea Surface Temperature Increase: approx. 1.14 / 3.58°C

The degree of increase is greater than the global average due to geographical characteristics (i.e., greater continental warming than that from ocean and warm currents).

Increased sea levels
along the Japanese coast by factors of approx. 0.39 / 0.71 m



Heavy Precipitation Frequency Increase

Annual maximum daily precipitation increase of approx. 12% (15 mm) / 27% (33 mm)

Precipitation ≥ 50 mm/h event increase by factors of approx. 1.6 / 2.3

Snowfall and Snow Depth Decrease

Rainfall rather than snow
Ongoing risk of heavy snow

Reduced Sea of Okhotsk Ice Extent in March by approx. 28 / 70%

The Arctic Sea is expected to be practically ice-free by the mid-21st century under the 4°C Warming Scenario.

Proportion of Strong-Typhoon Increase

Increased Wind Speed and Precipitation Associated with Typhoons

Ongoing Ocean Acidification around Okinawa and southern Japan Similar to those of the Global Average

NATIONAL AND LOCAL CLIMATE ADAPTATION PLANS - TÜRKİYE

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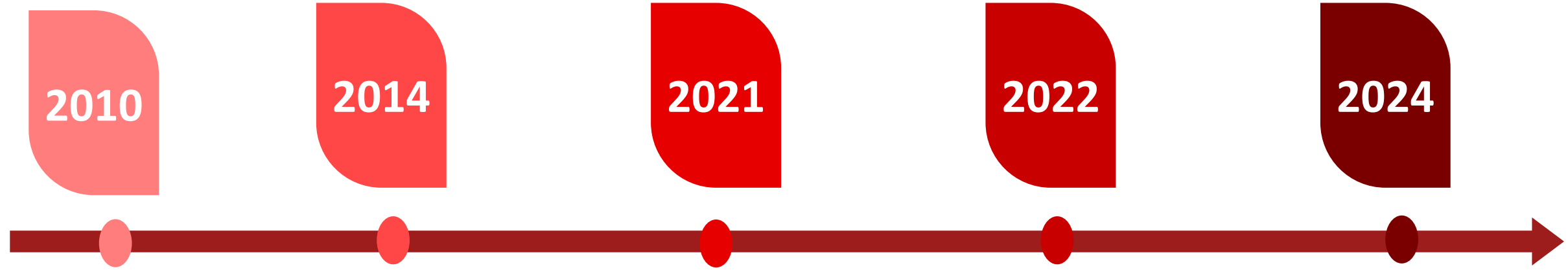


- Türkiye's Climate Change Adaptation Strategy and Action Plan (2011-2023)
- AFAD Climate Change Roadmap Document (2014-2023)
- Provincial Risk Reduction Plans (İRAP)
- Türkiye National Disaster Risk Reduction Plan (TARAP) (2022-2030)
- Climate Change Adaptation Strategy and Action Plan (2024-2030)

NATIONAL AND LOCAL CLIMATE ADAPTATION PLANS - JAPAN

Government-wide movement on climate change adaptation measures

(Impact Assessment)
March 2015 "First Climate Change Impact Assessment" was released (Ministry of the Environment)
(Planning)
November 2015 Cabinet approved the "Climate Change Adaptation Plan" (administrative plan)

(Legislation)
June 2018 Climate Change Adaptation Act promulgated.
(Planning)
November 2018 Cabinet approved the Climate Change Adaptation Plan based on the Act.

(Impact Assessment)
December 2020 the "Second Climate Change Impact Assessment" was released (Ministry of the Environment)
(Plan revision)
October 2021 Cabinet approved the revised "Climate Change Adaptation Plan"

History of the formulation and revision of the MAFF Climate Change Adaptation Plan

(Planning)
August 2015: Ministry of Agriculture, Forestry and Fisheries formulates climate change adaptation plan

(Plan revision)
November 2018: Revised Ministry of Agriculture, Forestry and Fisheries Climate Change Adaptation Plan

(Plan revision)
October 2021: Revised Ministry of Agriculture, Forestry and Fisheries Climate Change Adaptation Plan

Key points of the second round of climate change impact assessment

○ Enhancement of scientific knowledge on the impacts of climate change
In the field of agriculture, forestry and fisheries, 339 references were cited, **about 5. times** as many as in the previous survey (96 references in the previous survey).
(new predictions)

- Poor coloring of grapes
- Decreased production capacity and reproductive function of livestock
- Increased flood damage in low elevation paddy fields
- Simultaneous collapse of hillside slopes and increase in mudslides
- Decline in algae and shellfish aquaculture production due to changes in the distribution areas of migratory fish and increases in water temperature
- Many studies see global rice, wheat, soybean, and corn yields declining, but impacts vary by region, CO2 concentration, and adaptation measures

Key points of the revised MAFF climate change adaptation plan

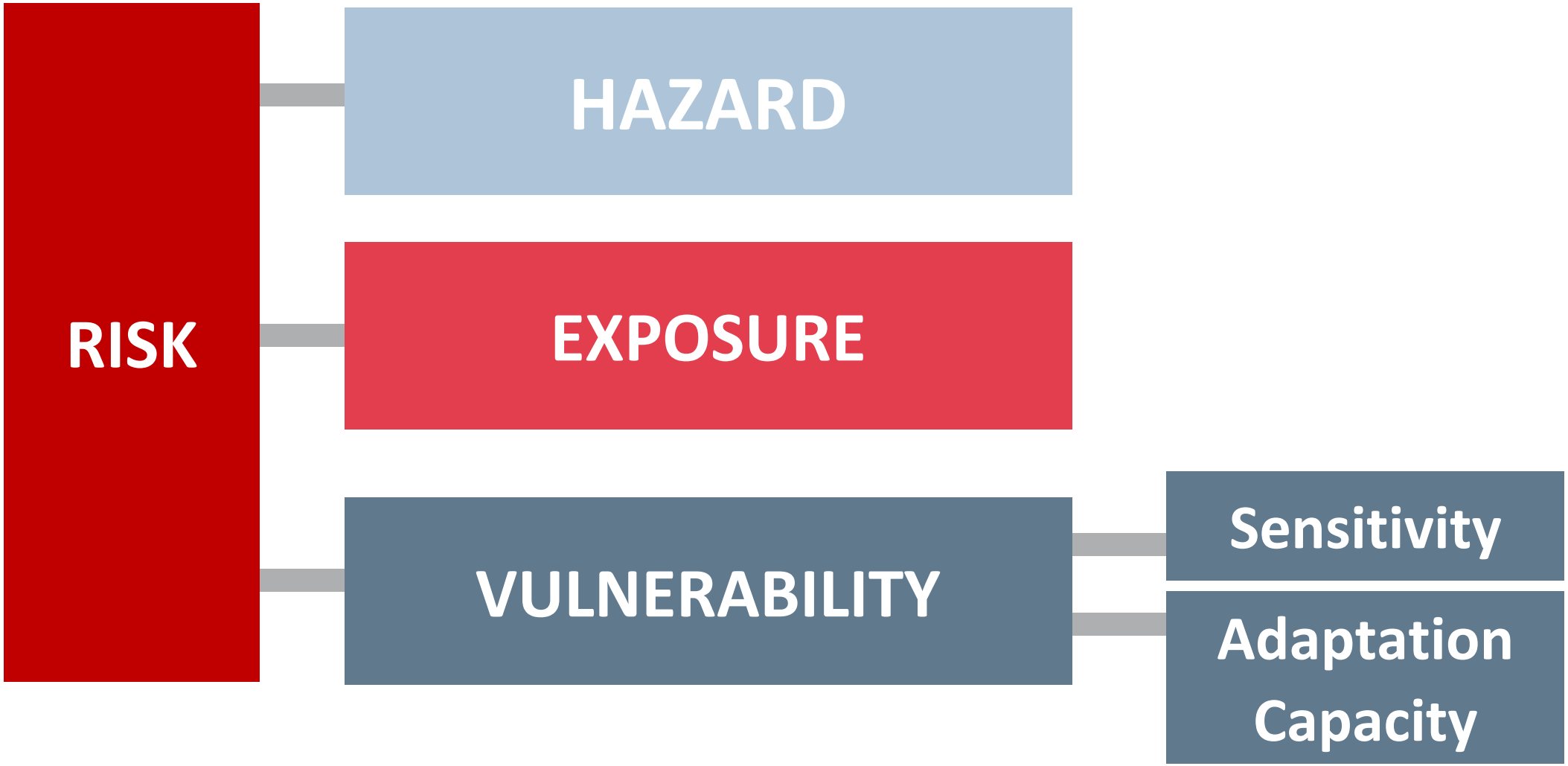
○ Promote the development and dissemination of stable production technologies and varieties that adapt to climate change based on Strategy for Sustainable Food Systems.
・In apples and grapes, the introduction of excellent coloring varieties, etc.
・Promotion of measures against heat, such as watering and ventilation in barns
○ Maintaining and improving of disaster prevention and mitigation functions in rural areas
○ Prevention of mountain disasters through the deployment of erosion control facilities and forest maintenance, etc.
○ Improvement of the precision of stock assessment and development of algae tolerant to high water temperatures, etc.
○ Establishing comprehensive food security by conducting research and analysis of food supply and demand, etc.

IMPACT OF CLIMATE CHANGE AND ADAPTATION COUNTERMEASURES BASED ON THE SECTORS

IMPACT OF CLIMATE CHANGE AND ADAPTATION COUNTERMEASURES BASED ON THE SECTORS

	TÜRKİYE 12 Sectors	JAPAN 7 Sectors
Agriculture	• Drought • Floods • Storms and strong winds • Hail	• More rainless days • Less winter snowfall • Heat Stroke
Biodiversity	• Drought • Floods • Heat	• High temperature
Industry	• Heavy rain • Drought	• Tropical cyclones • Tornadoes • Heavy snow
Marine, Coastal areas and fisheries	• Heat waves	• high water temperature
Turishm and Cultural Heritage	• Heat wave	• Sea level rise • Less snowfall • High temperature
Forestry	• Fires • Drought • Strong winds	• Water stress
Energy, Transport and Communication	• Heavy rain • Floods • Drought • Storms and strong winds • Heat waves	
Urban	• Heavy rain • Heat wave	• Rainfall • Droughts • Tropical cyclones
Water management	• Drought • Heavy rain	• More rainless • Droughts
Livestock	• Drought • Heat wave	• Heat wave
Public health	• Extreme Weather Events • Heat and Cold Waves	• Extreme Weather Events

METHODOLOGY OF ADAPTATION PLAN IN TÜRKİYE



RELATIONSHIP BETWEEN AGRICULTURE-GRAINS AND DROUGHT

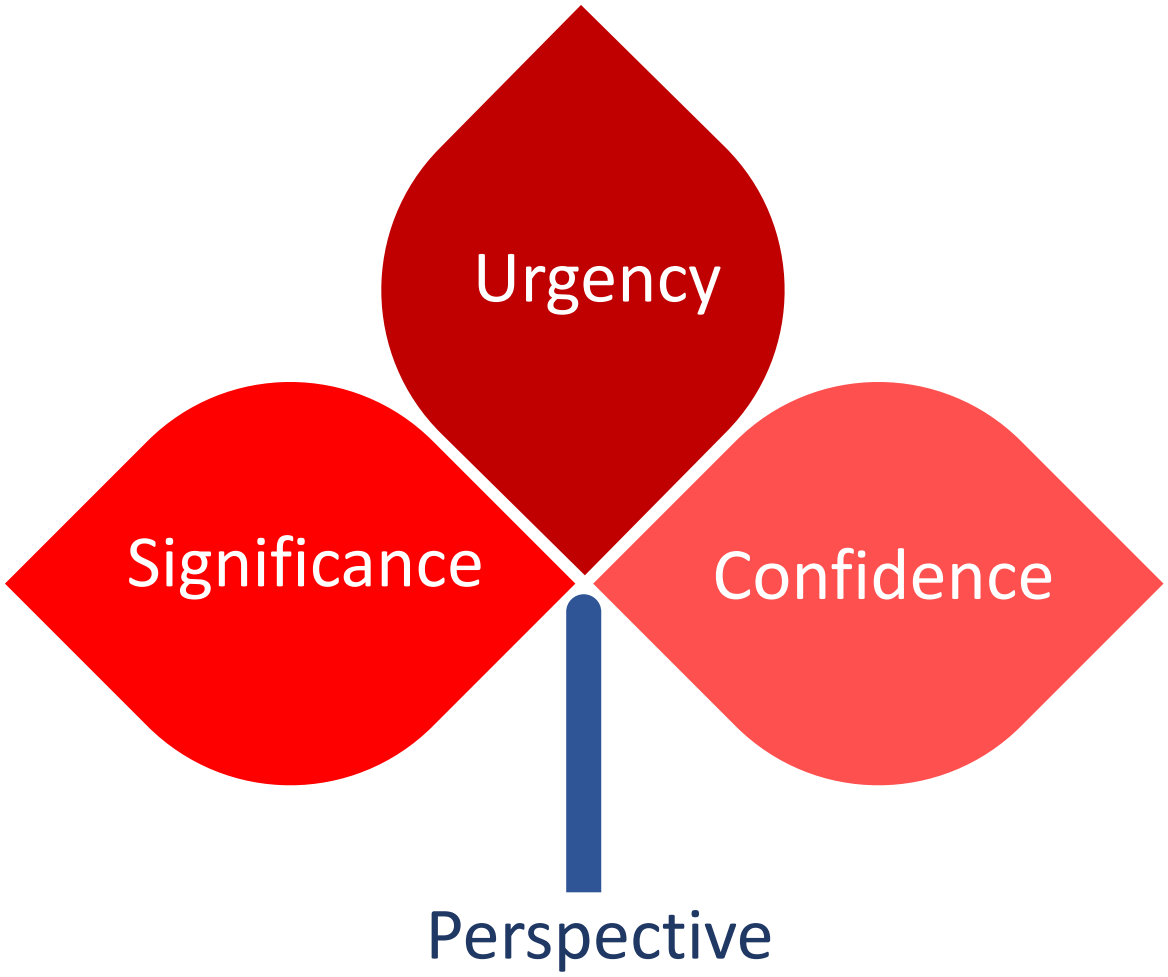
HAZARD		EXPOSURE
Climate Signal	Climate Impact	
Decrease in total precipitation amount	Drought	Proportion of agricultural areas
Average temperature increase	Decrease in precipitation amount and number of rainy days	Number of agricultural enterprises
	An Increase in the number of consecutive dry days	Proportion of irrigated areas
		Food chains*
		Regional economic linkages of the sector*
		Non-agricultural sector linkages*
		Producers and production*
		Soil and water ecosystems*

VULNERABILITY		RISK
Sensitivity	Adaptation Capacity	
Number of notifications paid per enterprise	Number of policies per enterprise	Decline in agriculture-related ecosystem services
Proportion of agriculture sector in GDP	Total number of tractors	Decrease and fluctuation in agricultural yields
Total grain production quantity	Proportion of irrigated areas with efficiency above 55%	Price increases
Total number of drought notifications	Proportion of irrigated areas with piped irrigation systems	Loss of producer income and employment
Amount of compensation insurance paid per agricultural enterprise	Proportion of land consolidation areas	Sectoral, regional, and macroeconomic contraction, inflation, and trade deficits
Agriculture and grain concentration indices	Proportion of continuously irrigated areas	Food insecurity and impoverishment
Yield variability of wheat, barley, and corn	Stakeholders' perception of risk and exposure*	Increase in social inequalities
Seasonal and crop growth phase sensitivities*	Human and social capital*	Increase in plant diseases
Sensitivity of agricultural yield to physical impacts*	Physical infrastructure and capital*	Food security risks due to price increases caused by yield and production losses
Sudden crop losses caused by extreme climate events*	Technological options and access*	Increased macroeconomic risks (inflation, trade deficit) due to sectoral price increases
Specific sensitivities of agricultural production and cropping patterns*	Decision-making processes related to critical institutions and resources*	Increased competition over land and water resources
Household agricultural income*	Risk management processes*	Loss of local biodiversity
Macro and regional economic linkages of the sector*	Information management and access to information*	

METHODOLOGY OF ADAPTATION PLAN IN JAPAN

7 sectors

71 categories



Mountainous Disaster and Forest Conservation Works and Forest Road Facilities

	Current Status	Future prediction
IMPACT	• Concentrated torrential rainfall caused by the formation of linear precipitation zones triggers multiple surface collapses and mudslides. • Driftwood disasters occur frequently when collapsed sediment flows downstream, engulfing standing trees and sediment in the vicinity of the stream, causing a large amount of driftwood.	• Increase in the frequency of heavy rainfall due to climate change, and increase in the number of simultaneous collapses of hillside slopes and mudslides due to increased localized heavy rainfall • Increased risk of damage from storm surges, tidal waves and tsunamis, and increased coastal erosion trends.
COUNTERMEASURE	**Implementation of countermeasures, research and development, etc**	
	Increased risk of occurrence of mountain disasters • Promotion of mountain control measures and forest improvement based on the "Five-Year Acceleration Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience" and other measures • Development of forest road facilities in consideration of the increased frequency of torrential rains. Response to changes in the form of disasters such as river flooding • Promote efforts to improve and conserve forests in the upper reaches of rivers, etc., in cooperation with efforts for watershed flood control. • Reduce the risk of driftwood disasters by installing driftwood-catching dams, conducting forest maintenance such as thinning to promote the development of root systems, cutting down dangerous trees in mountain streams, and changing forest types with consideration for the stream ecosystem.	Increased risk from storm surges, tidal waves and tsunami • Strengthen development of coastal disaster prevention forests to protect against tsunami and wind damage. Research and development, etc. • Study to improve the accuracy of identifying high-risk areas for mountain disasters by using laser surveying, etc. • Study on the development of facilities to cope with disaster risks and forest management utilizing the disaster prevention and mitigation functions of forests.

CONCLUSION

CONCLUSION

- Climate and disaster risks are increasing across the world, with climate-related disasters becoming more frequent in the last 50 years
- In order to understand the effects of climate change, projections were made in both Türkiye and Japan using IPCC reports
- it was observed that temperature and precipitation projections are common

TÜRKİYE & JAPAN

↑ Temperatures

TÜRKİYE ↓ JAPAN ↑

Precipitation

PROJECTIONS

Türkiye

Heatwave
Coldwave
Drought
Forest fire
Extreme wind

Japan

Sea level
Sea ice
Snowing
Ocean acidification
Ocean surface temperature

Türkiye & Japan

Temperature
Precipitation

IMPACT

Heat

Türkiye & Japan

- Agriculture
- Animal husbandry
- Biodiversity
- Public health

Precipitation

Türkiye & Japan

- Animal husbandry
- Agriculture
- Urban
- Forestry

Tourism

Türkiye

- Heat

Japan

- Sea level rise
- Less snowfall
- High temperature

Industry

Türkiye

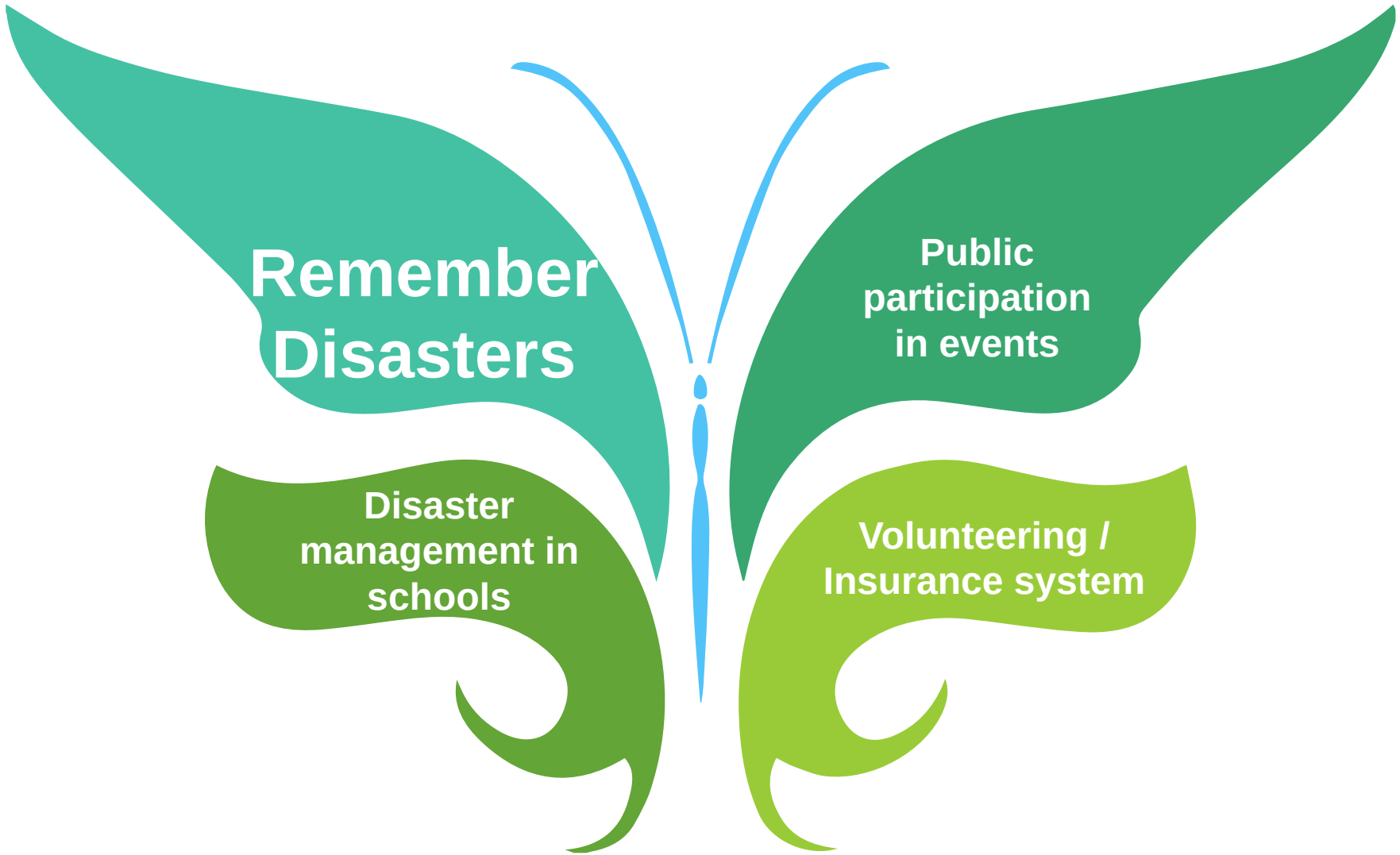
- Heavy rain
- Drought

Japan

- Heavy snow
- Tropical cyclones

CONCLUSION FROM JAPAN VISIT

CONCLUSION IN JAPAN VISIT



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TEŞEKKÜRLER

감사해요

ありがとう

VINAKA
VAKALEVU

TERIMA
KASIH

धन्यवाद