Special Report on Climate Change and Land
Food Security Findings

Agricultural landscape between Ankara and Hattusha, Anatolia, Turkey (40°00' N – 33°35' E)
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Cynthia Rosenzweig
NASA Goddard Institute for Space Studies
UN DESA Population Division
September 16, 2019

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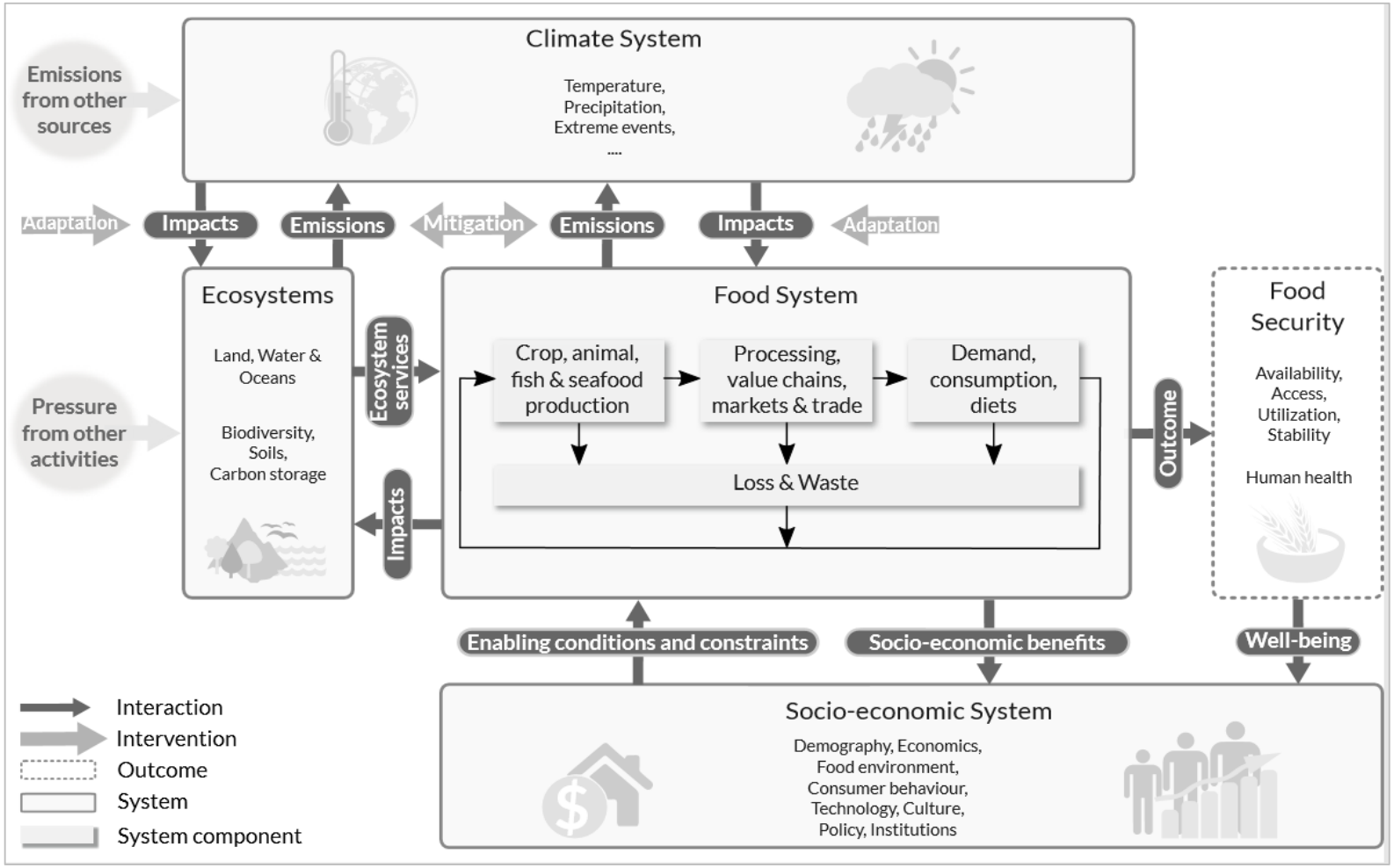
The Food System



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Why the Food System?

21-37% of all anthropogenic emissions from food systems *(medium confidence)* **[A3.6]**

Projected to increase by about 30–40% by 2050 *(high confidence)* **[A3.6]**

Climate change creates additional stresses on the food systems *(high confidence)* **[A5]**

At 2°C the risk of food system instability is very high *(medium confidence)* **[A5.1]**

Integrated supply- and demand-side options can be scaled up in all segments of the food system to advance adaptation and mitigation climate responses *(high confidence)* **[A5.1]**

Diversification in the food system can reduce risks from climate change *(medium confidence)* **[B6.2]**

Dietary changes can ease the economic burdens of ill health caused by malnutrition *(medium confidence)* **[D2.3]**

Importance of integrated policies operating across the food system [C2]

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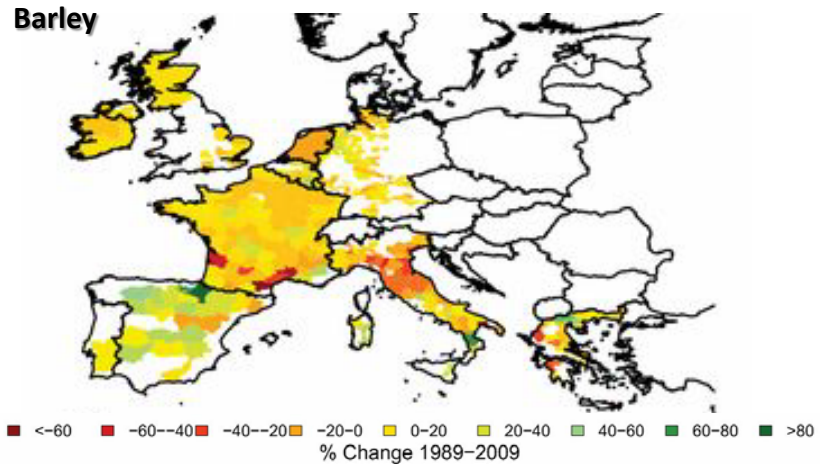
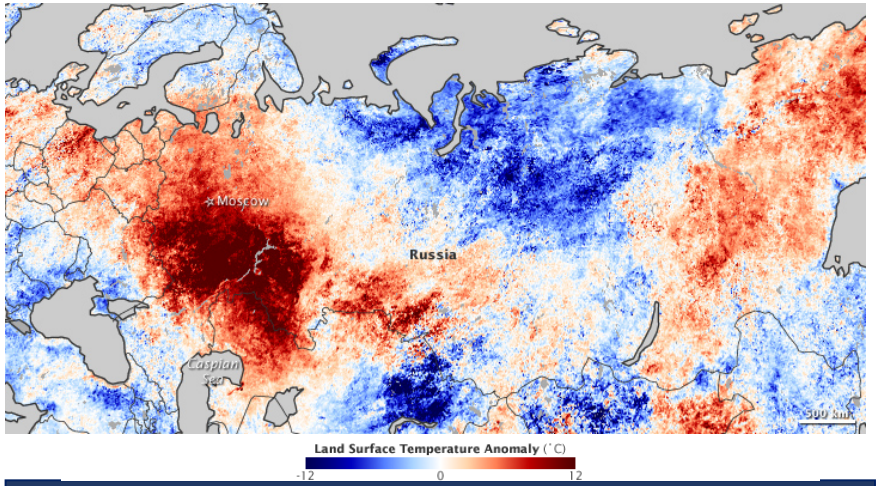
Food System Vulnerabilities - Observed



Availability – Decreases in wheat and barley yields in Southern Europe.
Moore and Lobell, 2015

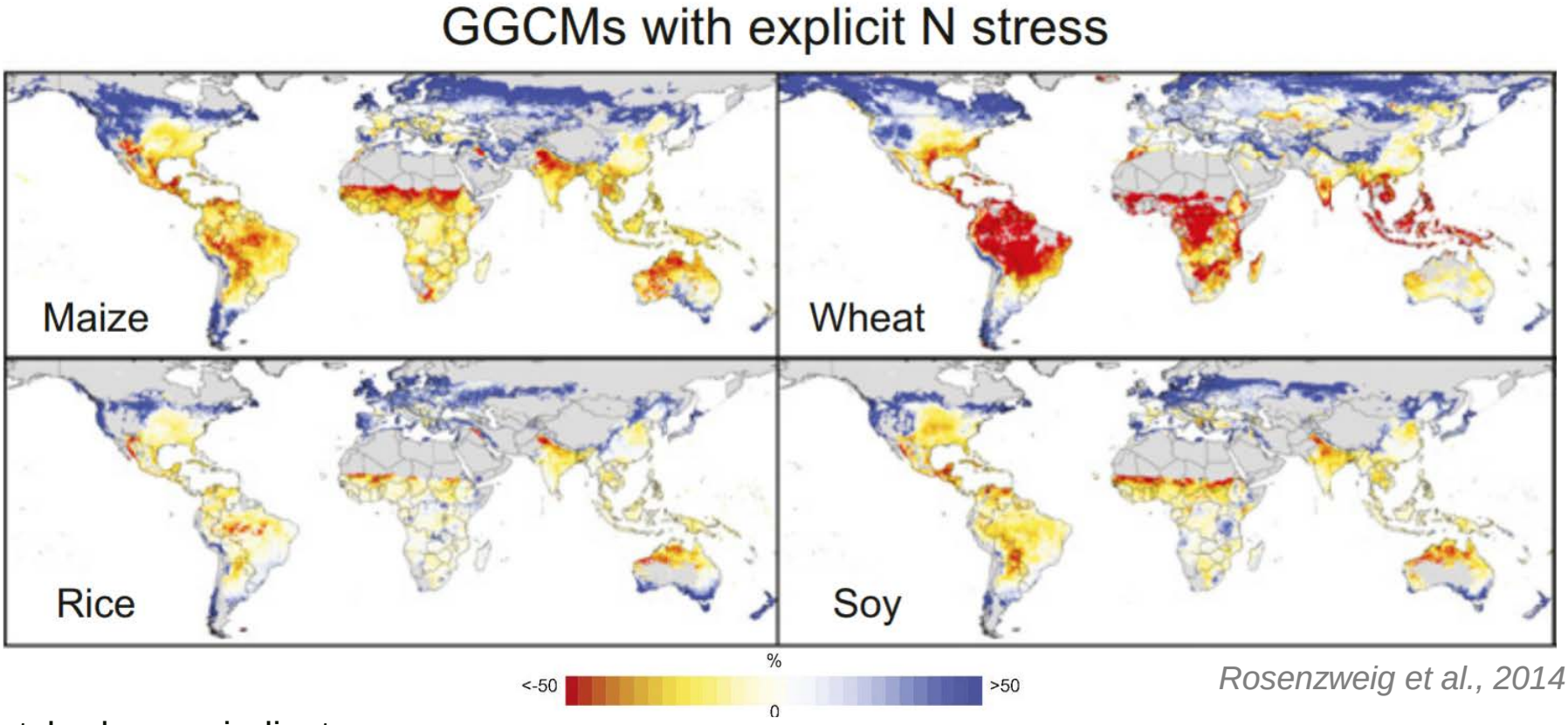


Access – 2010-2011 global food price spike, triggered by heatwave in Eastern Europe/Russia
Hoag 2014,Watanabe et al 2013,Barriopedro et al 2011. Image: NASA

Utilization – Reduced quality of apples in Japan due to exposure to higher temperatures.
Sugiura et al 2013. Image: LA Times

Stability – 2010 extreme rainfall/flooding in Pakistan led to massive loss of food reserves
Kirsch et al 2012, WFP 2010. Image: Kevin Frayer/AP

Food System Vulnerabilities - Projected



Rosenzweig et al., 2014

Hatched areas indicate
>70% model agreement

RCP8.5

2080s

median of 4 GGCMs and 5 GCMs/AgMIP led agricultural contribution to ISIMIP

Lower latitudes: more vulnerable to climate change, especially under N stress

Mid- and high-latitudes: small benefits at moderate-to-medium Temp increase (1-3 C)

Role of Diets

Food security requires diets for a healthy life - ensuring healthy diets has both adaptation and mitigation benefits

Diets for a healthy life

Grains, legumes, fruits and vegetables, nuts and seeds, and animal-sourced food produced in low-GHG emission systems **[B6.2, 5.5]**

Opportunities for adaptation and mitigation while generating co-benefits in terms of human health *(high confidence)* **[D2.3, 5.6]**

Mitigation potential

Technical: 0.7-8.0 $GtCO_2eq/yr$ by 2050
Economic: 1.8-3.4 $GtCO_2eq/yr$ by 2050 at prices ranging from 20-100 USD/tCO_2 **[B6, 5.5]**

Dietary changes can ease the economic burdens of ill health caused by malnutrition and allow redirection of revenues to sustainable intensification and sustainable land management practices *(medium confidence)* **[D.2.3, 5.5]**

Co-benefits

Human health, such as reduced risks of coronary heart disease, some forms of cancer and Type II diabetes *(medium confidence)* **[D2.3, 5.7]**

Role of Food Loss and Waste

Definition: The decrease in quantity or quality of food. Food waste is part of food loss and refers to discarding or alternative (non-food) use of food that is safe and nutritious for human consumption along the entire food supply chain, from primary production to end household consumer level. Food waste is recognised as a distinct part of food loss because the drivers that generate it and the solutions to it are different from those of food losses

Reducing food loss and waste is directly relevant to food security

Reduction of loss and waste can support both adaptation and mitigation

Different contexts in different countries must be considered

Food Systems and Bioenergy/Carbon Capture and Storage

Figure SPM3

If applied on a limited share of total land and integrated into sustainably managed landscapes [B3.2]

There will be fewer adverse side-effects and some positive co-benefits (e.g., salinity control, biodiversity, reduced eutrophication, increased soil carbon) can be realised *(high confidence)*. **[B.3, 5.5]**

Some BECCS can increase demand for land conversion at a scale of several millions of km² globally *(high confidence)* **[B3.2]**

Could lead to ***adverse side effects for adaptation, desertification, land degradation and food security*** *(high confidence)*. **[B.3, 5.5]**

Compromise sustainable development with increased risks for desertification, land degradation and food security *(medium confidence)*. **[B3.2]**

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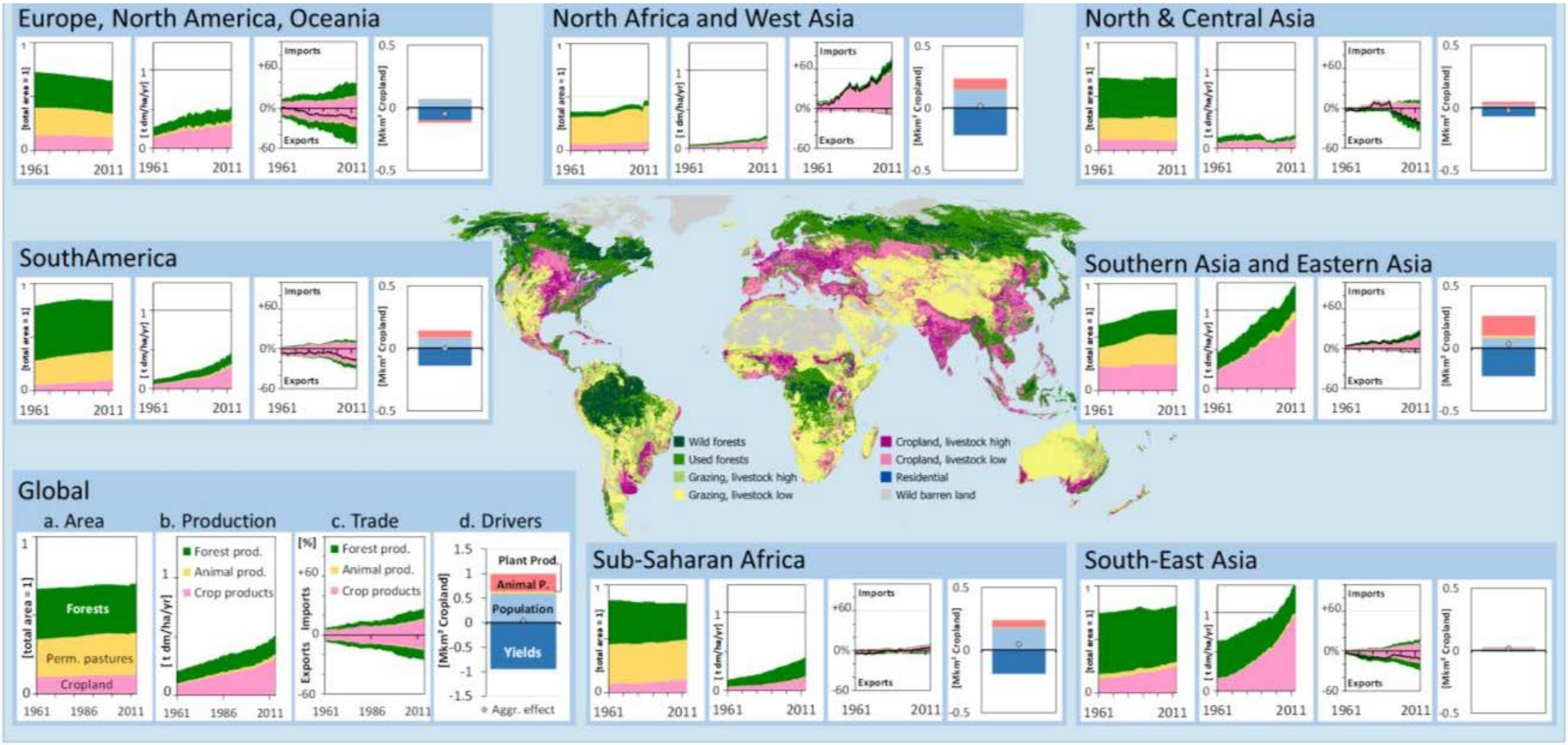
Regional Aspects

Figure 1.3



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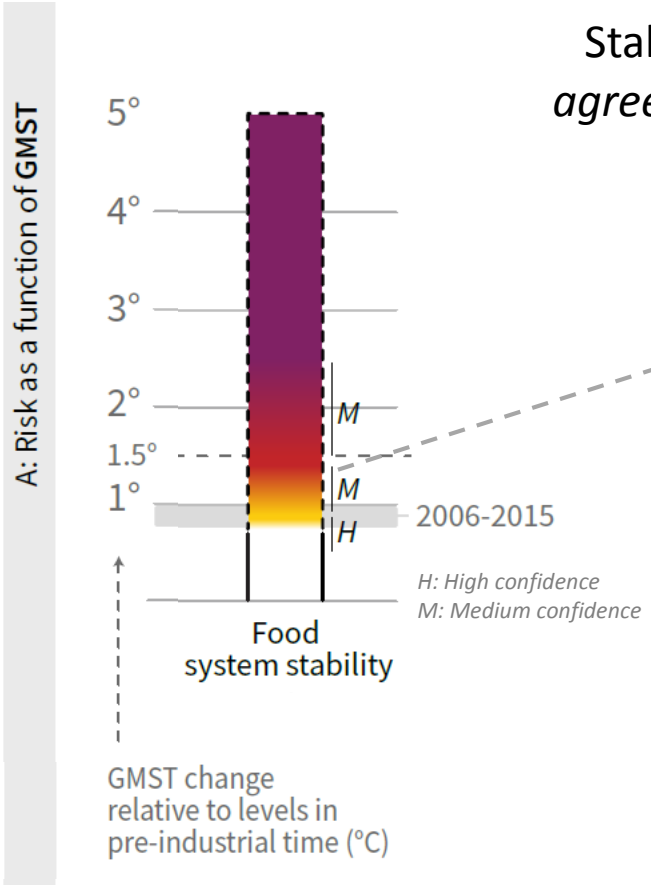
Food System Instability



Stability of food supply is expected to decrease (*high agreement, medium evidence)* → Extreme events, trade

Articles assessed: 22

Transition to high risk: particularly for food import reliant countries and regions

Linkages: GDP, price spikes, social tension, poverty, migration

Threshold Guidelines:
Moderate (yellow): up to 1 million people
High (red): up to 100 million people
Very High (purple): more than 100 million people

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Thank You

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