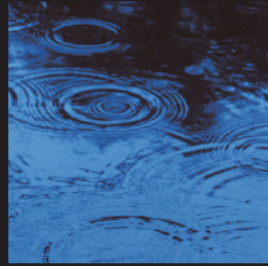


CLIMATE CHANGE TEAM

ENVIRONMENT DEPARTMENT

SUSTAINABLE DEVELOPMENT NETWORK
THE WORLD BANK



For more links on climate change refer to

www.worldbank.org/climatechange

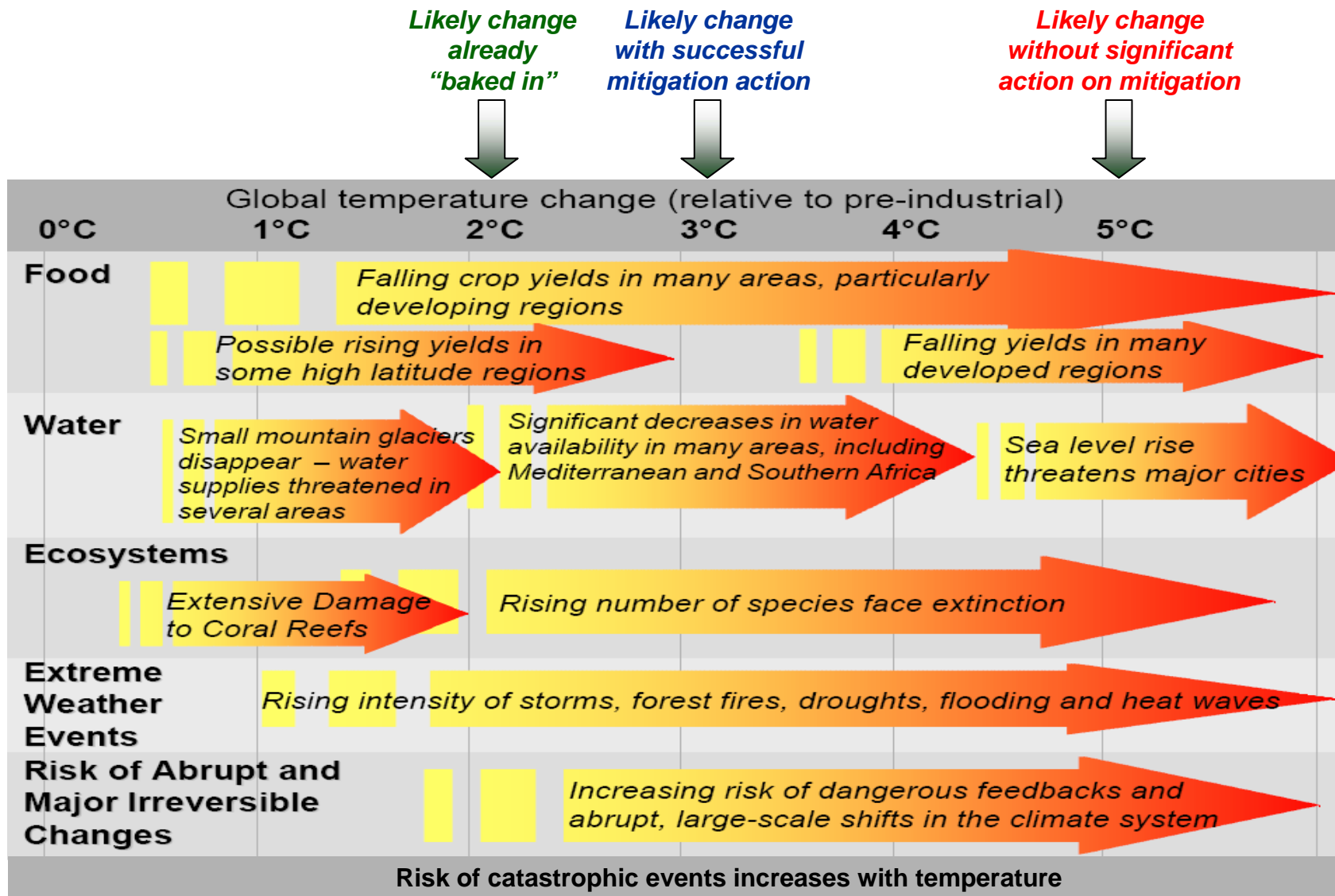


Planning adaptation responses: data needs

Kseniya Lvovsky
Program Leader, Climate Change

UN Conference on Climate Change and Official Statistics
Oslo (Norway) 14-16 April 2008

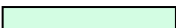


Adaptation to what? Likely impacts...



Source: Adapted from IPCC 2007.

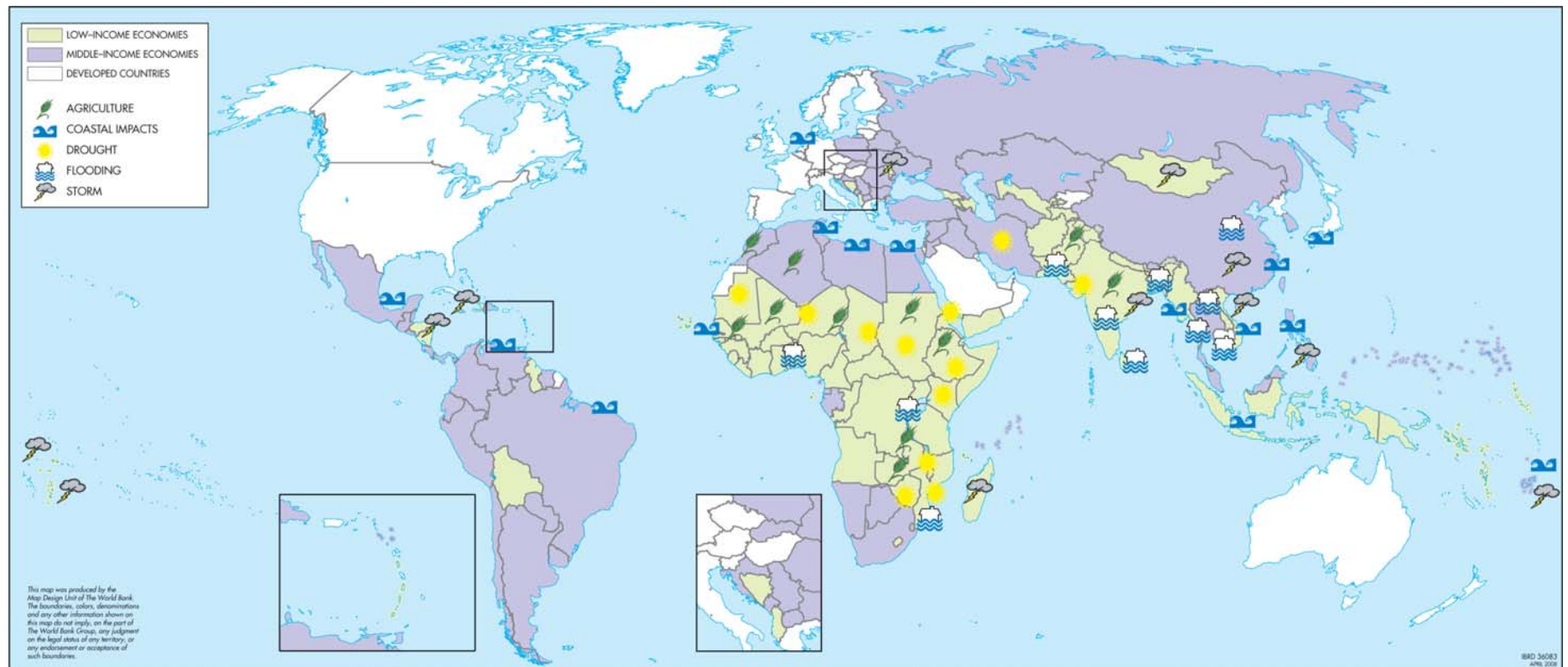
Six Climate Threats

Top 12 Countries Most at Risk from Each

| |  Low Income |  Middle Income |  High Income | | | |
|------------|--|--|---|-----------------------------|-------------------|--------------------|
| | <i>Drought</i> | <i>Flood</i> | <i>Storm</i> | <i>Coastal 1m</i> | <i>Coastal 5m</i> | <i>Agriculture</i> |
| Malawi | Bangladesh | Philippines | All low-lying Island States | All low-lying Island States | Sudan | |
| Ethiopia | China | Bangladesh | Vietnam | Netherlands | Senegal | |
| Zimbabwe | India | Madagascar | Egypt | Japan | Zimbabwe | |
| India | Cambodia | Vietnam | Tunisia | Bangladesh | Mali | |
| Mozambique | Mozambique | Moldova | Indonesia | Philippines | Zambia | |
| Niger | Laos | Mongolia | Mauritania | Egypt | Morocco | |
| Mauritania | Pakistan | Haiti | China | Brazil | Niger | |
| Eritrea | Sri Lanka | Samoa | Mexico | Venezuela | India | |
| Sudan | Thailand | Tonga | Myanmar | Senegal | Malawi | |
| Chad | Vietnam | China | Bangladesh | Fiji | Algeria | |
| Kenya | Benin | Honduras | Senegal | Vietnam | Ethiopia | |
| Iran | Rwanda | Fiji | Libya | Denmark | Pakistan | |

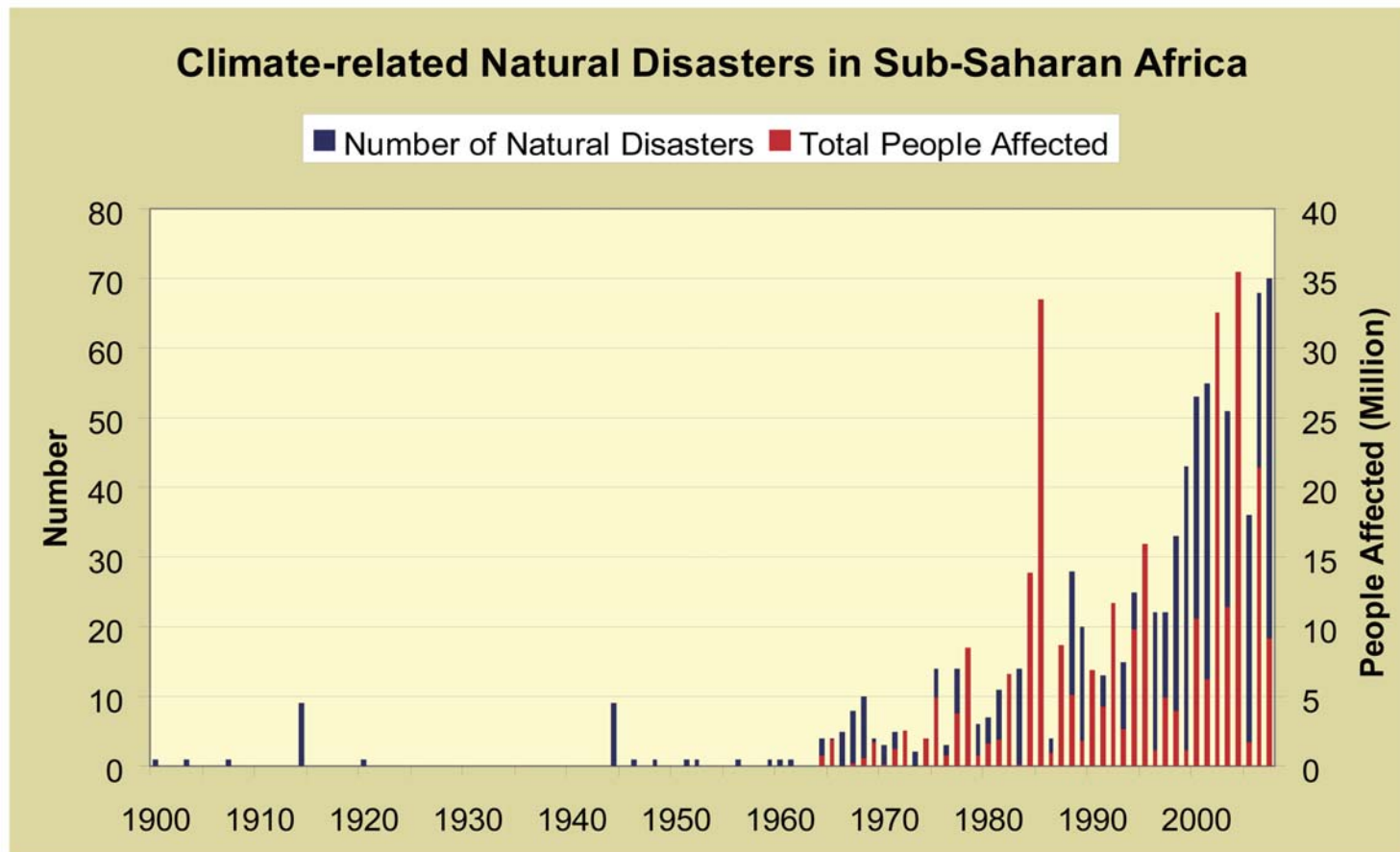
Source: World Bank staff.

Adaptation is particularly important for poor countries where climate risks are higher...

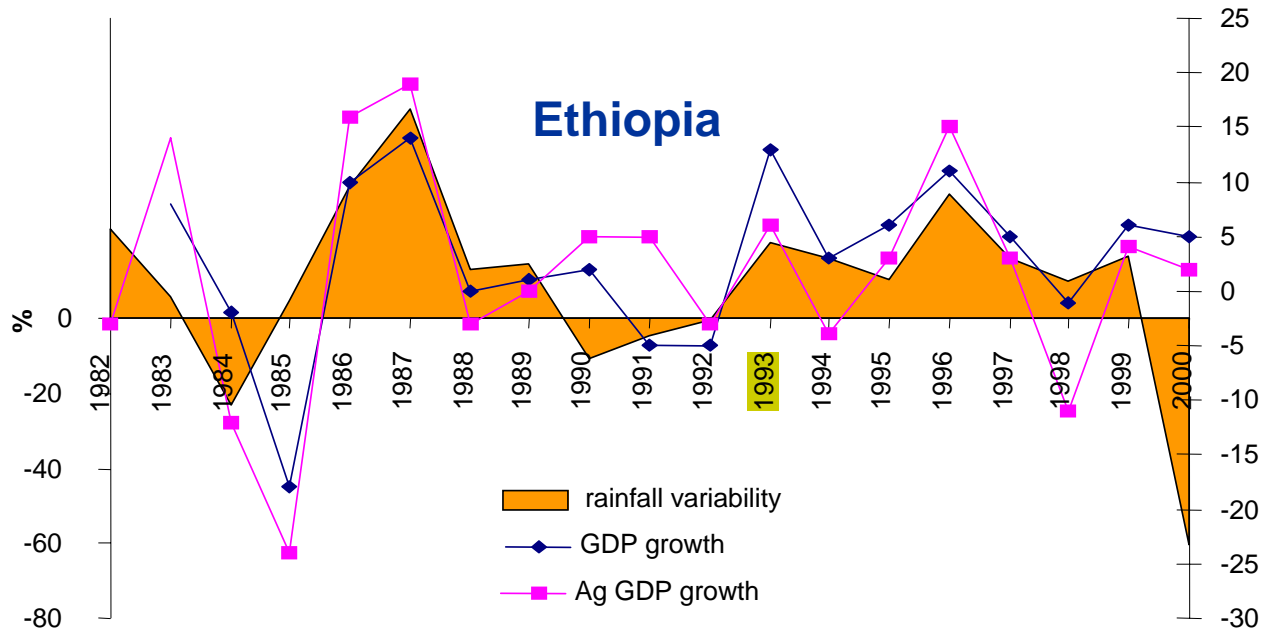


Source: World Bank staff.

Adaptation is today's priority: number and impact of natural disasters are both increasing...

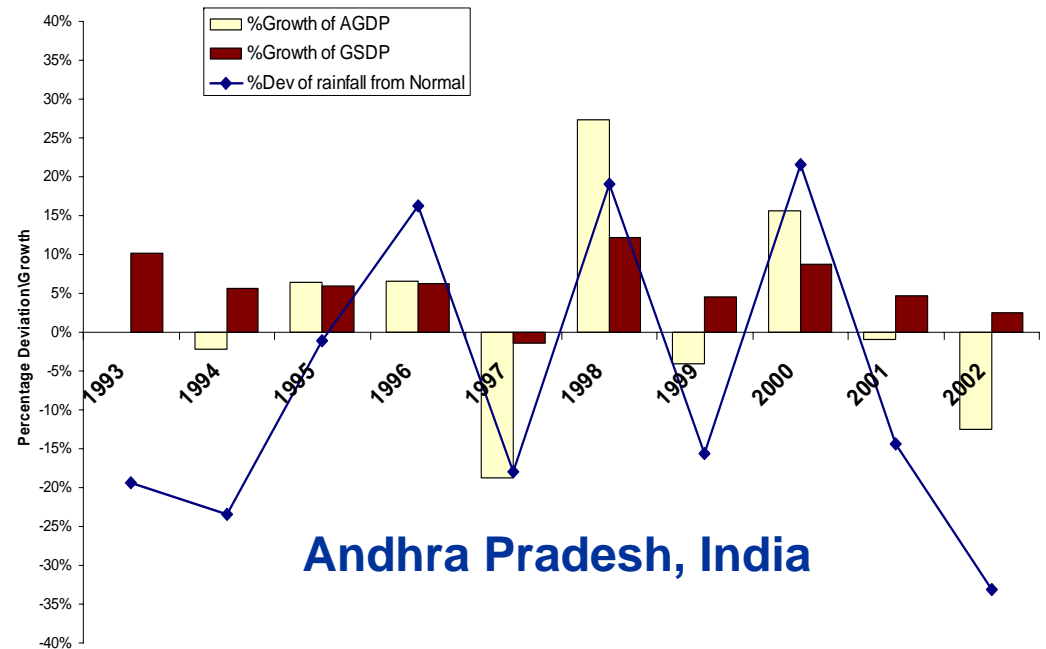


Source: Centre for the Research on the Epidemiology of Disasters, Universite Catholique de Louvain.
www.emdat.eb Disasters include floods, droughts, landslides, extreme temperature events, wind storms, wave/storm surges and wildfires.



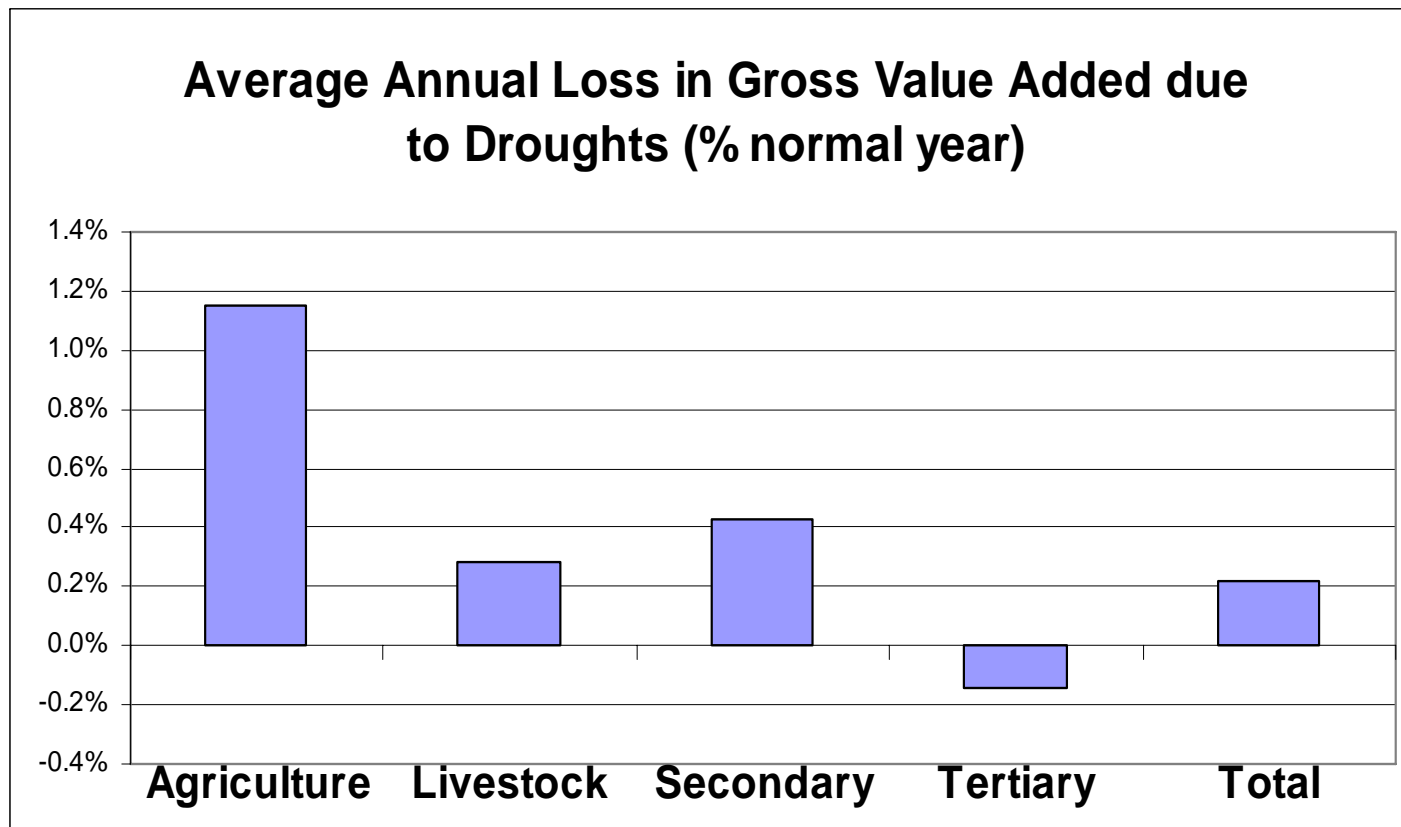
Source: World Bank

And affects economic performance: GDP growth follows rainfall in agriculture-dependent economies



Economic impact of drought is highest in agriculture, with the least impact on services

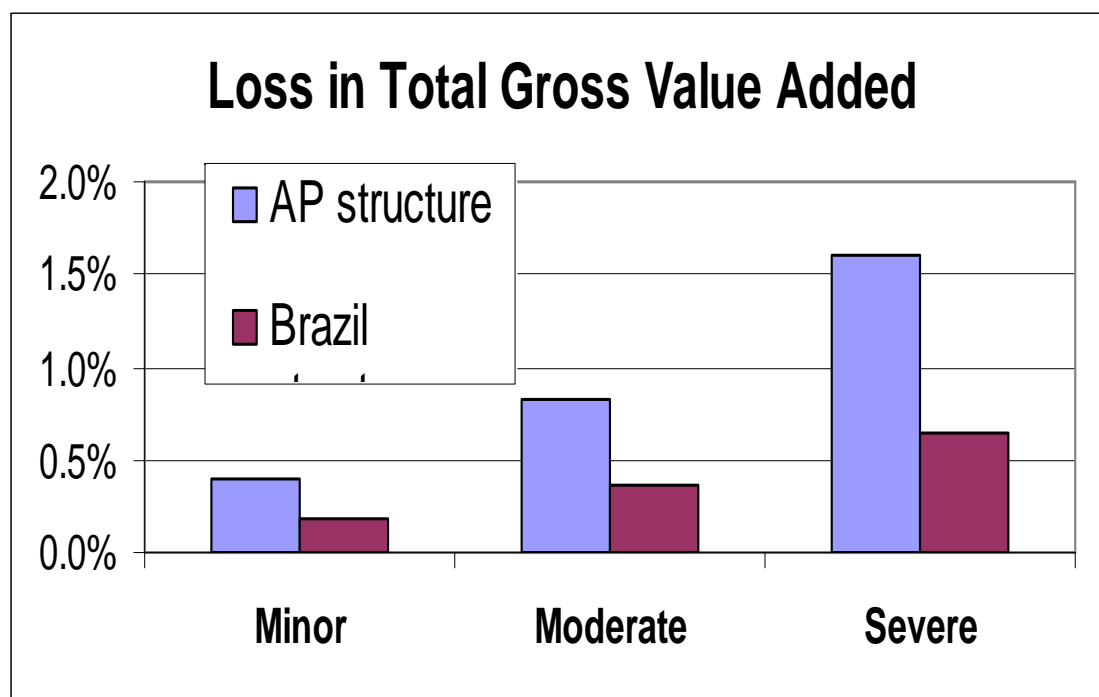
Andhra Pradesh, India



Source: World Bank

Overall economic impact will further decline due to a structural shift towards service sectors

- Scenario 1 – GVA Loss due to drought under the current structure of the AP economy:
 - GVA in agriculture – 20%
 - GVA in Services – 50%
- Scenario 2 - GVA Loss due to same drought risks under the structure similar to that of Brazil:
 - GVA in agriculture – 10%
 - GVA in services – 65%

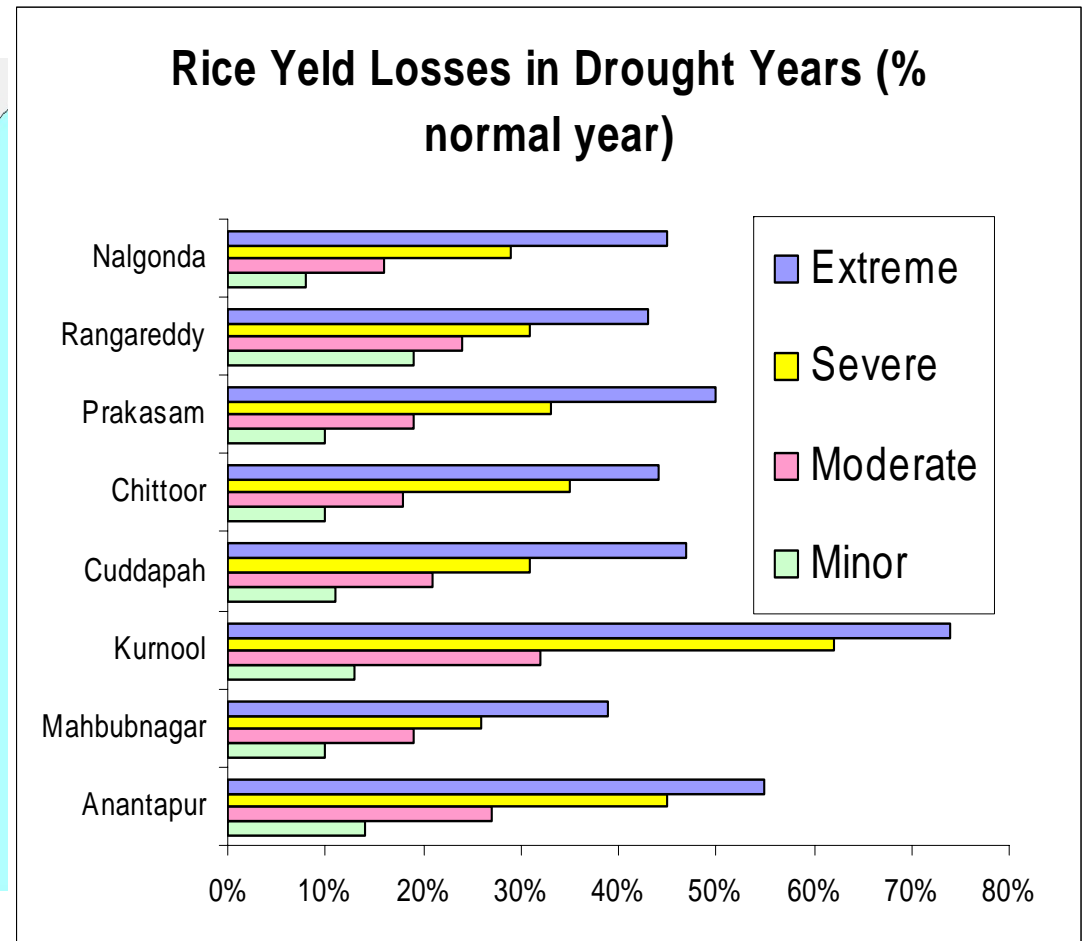
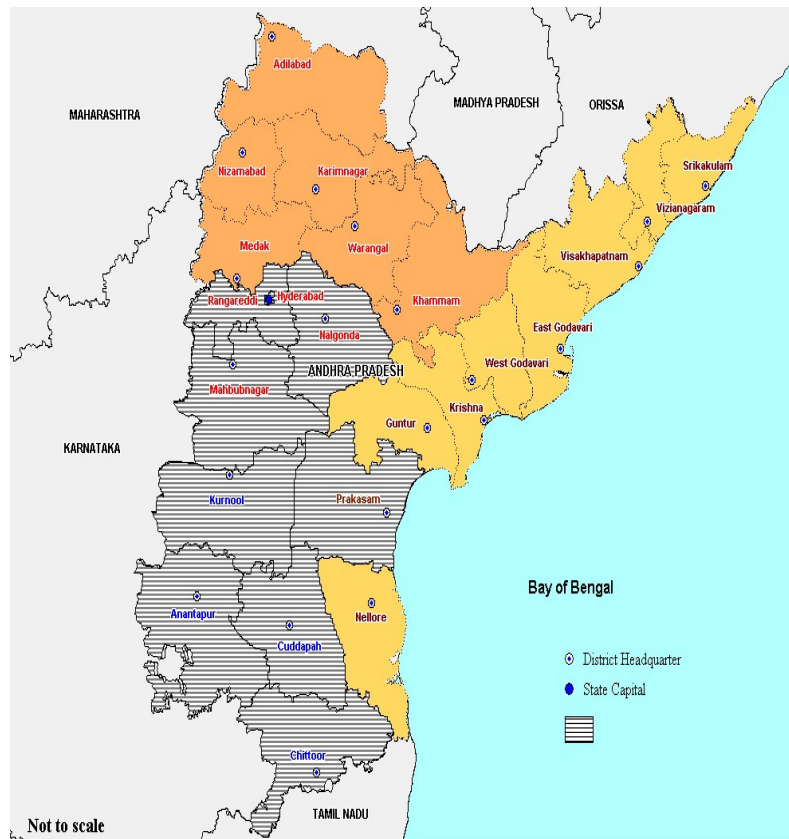


Source: World Bank

But disparities remain and may increase

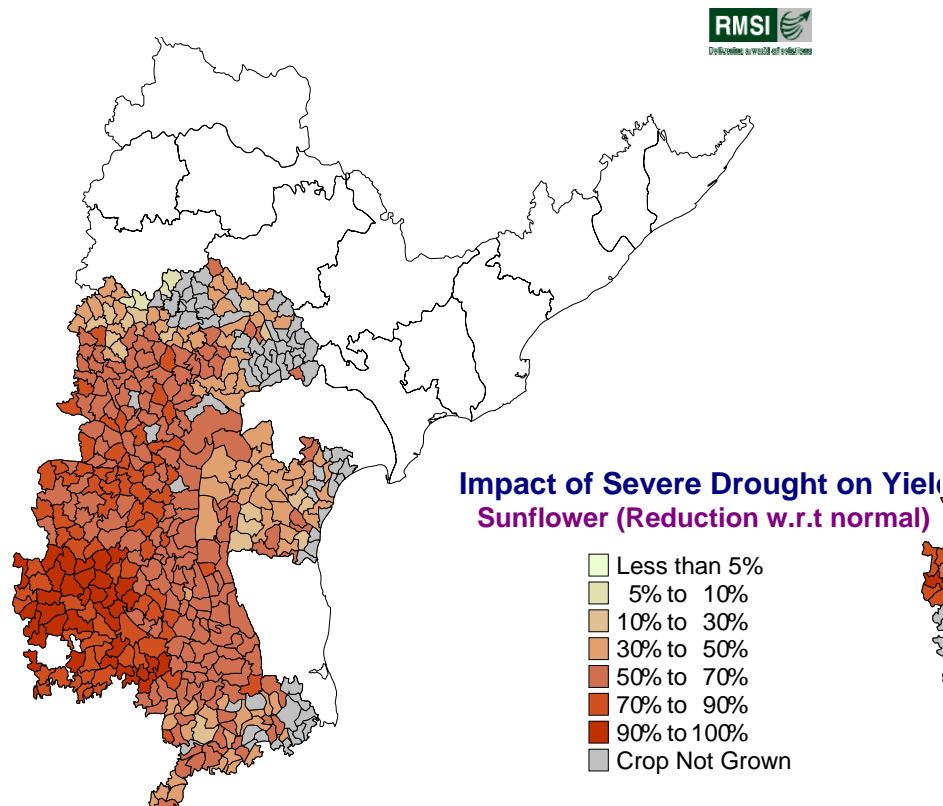
- Population dependent on agriculture remains significant
- Loss of employment remains key concern
 - The total employment loss due to 2002 drought was over 4 million
- Individual farmers and communities continue suffering severe losses and falling into poverty
- Adaptation needs and strategies are local: need strong local institutions and targeted, customized support programs to those in need

Impacts are highly variable by location, crop and drought severity: drought-prone districts in AP, India

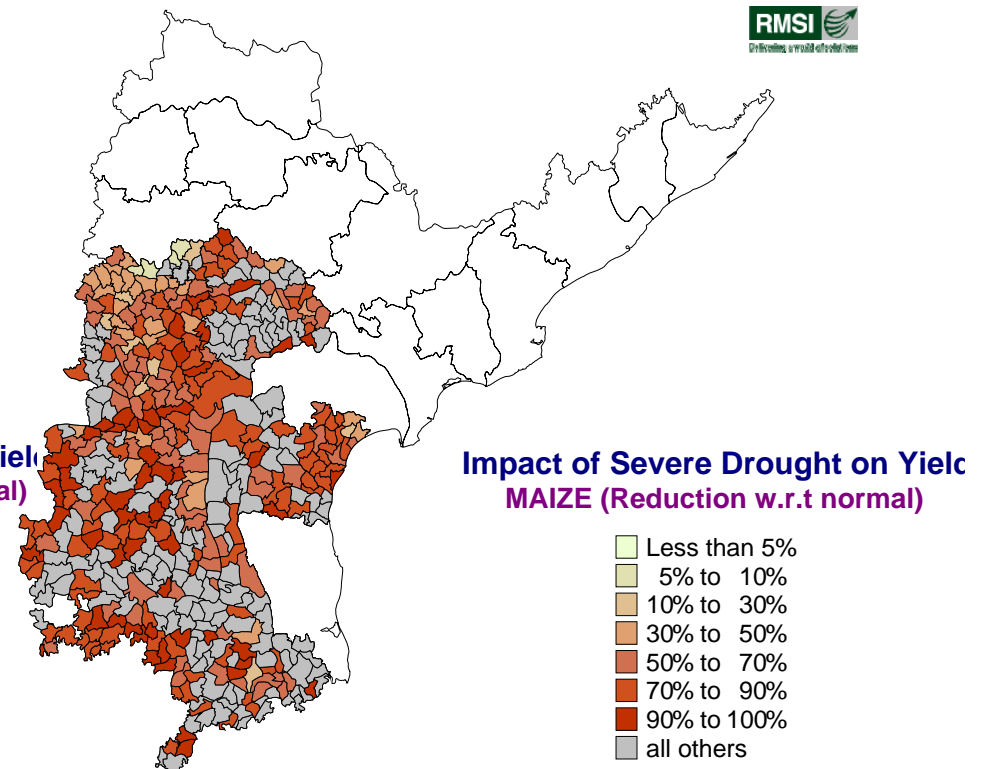


Impacts are highly variable by location, crop and drought severity: mandal level; AP, India

Sunflower yields



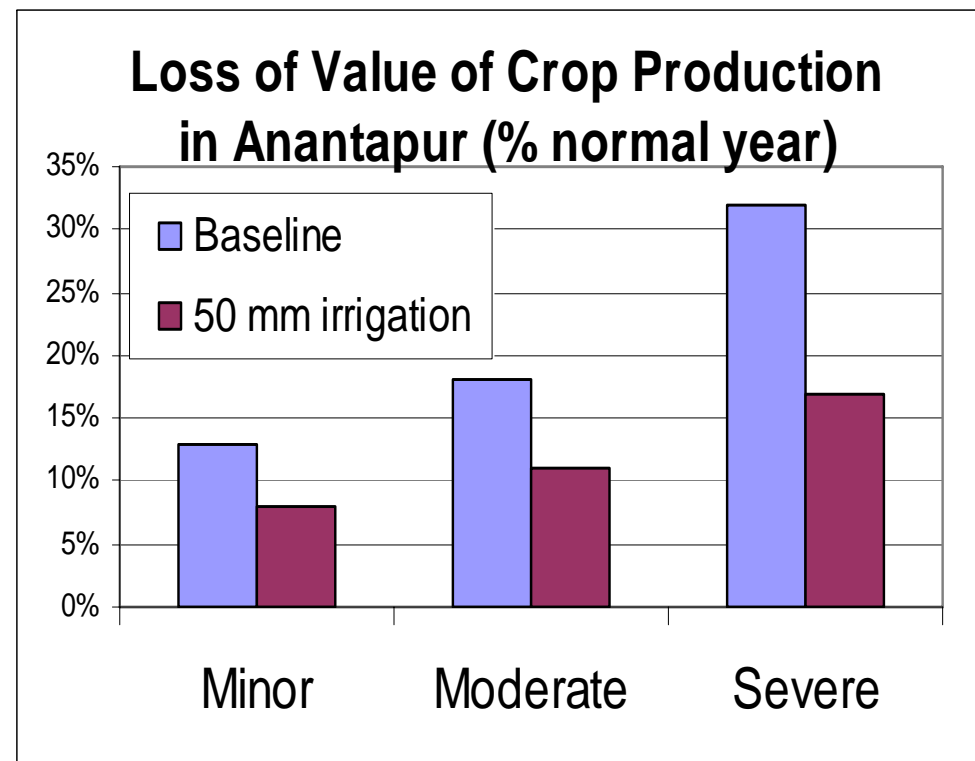
Maize yields



Effective coping strategies are location-specific

Analysis of adaptation responses in AP, India

- Coping (adaptation) strategy:
 - *Permanently* reduce rice area and use surplus water for irrigating less water intensive crops
- Effective for Anantapur
 - Increases crop production value by one-third
 - Reduces losses by half in drought years
- But limited scope in Mahabubnagar



Source: World Bank

Data Needs for Climate Change Adaptation (1)

- **Meteorological Data**

- First priority: digitization of historical records
- Breadth over depth: more weather stations collecting basic data -> rainfall variability often more important than mean
- Improved seasonal forecasting (e.g. droughts)
- Need long consistent time series – start now

- **Natural Disaster Data**

- Better understanding of spatial extent and duration
- Better estimates of impacts and costs
- Mitigating/exacerbating factors

Data Needs for Climate Change Adaptation (2)

- **Agricultural Data**

- Spatially-varying data on crop yields, soil degradation; groundwater recharge and drawdown
- Coping strategies (diversification), cultivars and varieties (e.g. drought resistant), soil/water/crop mgt practices, etc.

- **Water Management Data**

- Spatiotemporal distribution of river discharge/hydrology
- Water demand and scarcity

- **Ecosystems**

- Baselines of biodiversity, species ranges and ecosystem function; spread of invasive species; rate of deforestation

- **Health**

- Changes in incidence of climate-related vector-borne diseases and shifts in vectors' ranges

Data Needs for Climate Change Adaptation (3)

- **Climate Change Projections**
 - Global Circulation Model data: Utilize model outputs: mean changes but also climate extremes for the region
 - Need to understand where models agree and performance of GCMs for the area
 - Downscaling climate projections (Regional Climate Models, statistical techniques)
 - But depends on question and use (e.g. impact modeling for water resources)
 - In general, dearth of downscaling for critical areas in developing world, e.g. Africa

Data Needs for Climate Change Adaptation (4)

- **Economic data**

- Economic losses from impacts
- Costs of actions that reduce/avoid losses:
 - ✓ Investment costs, economic costs (and benefits)
 - ✓ By sector and location
 - ✓ By technology and type of infrastructure
 - ✓ At different level- country, local government, community, household
- Instruments: technical estimates, surveys (spatial referencing consistent with physical data important), I/O and macro-models

- **Policies and institutions**

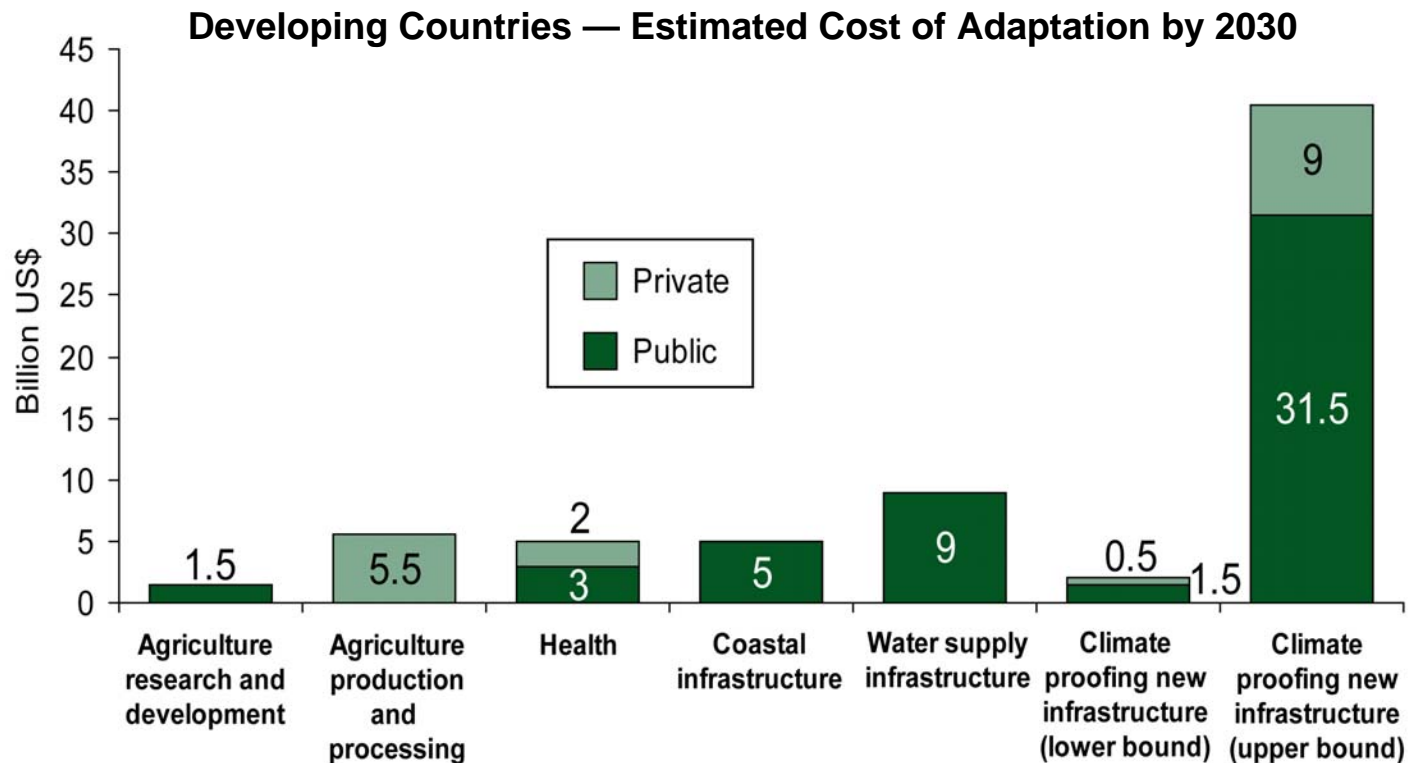
- Subsidies (water, crops), disaster management programs, insurance schemes, micro-finance, etc.
- Coordination mechanisms, particularly at the local level; planning processes, extension services, availability of weather and marketing information

How Much Does Adaptation Cost?

There Are Some Estimates, but the Ranges Are Wide and Uncertain

- The implied change in temperature is 1.5° C for 2030

- Cost estimates based on expert opinion



Source: UNFCCC 2007.

Key messages

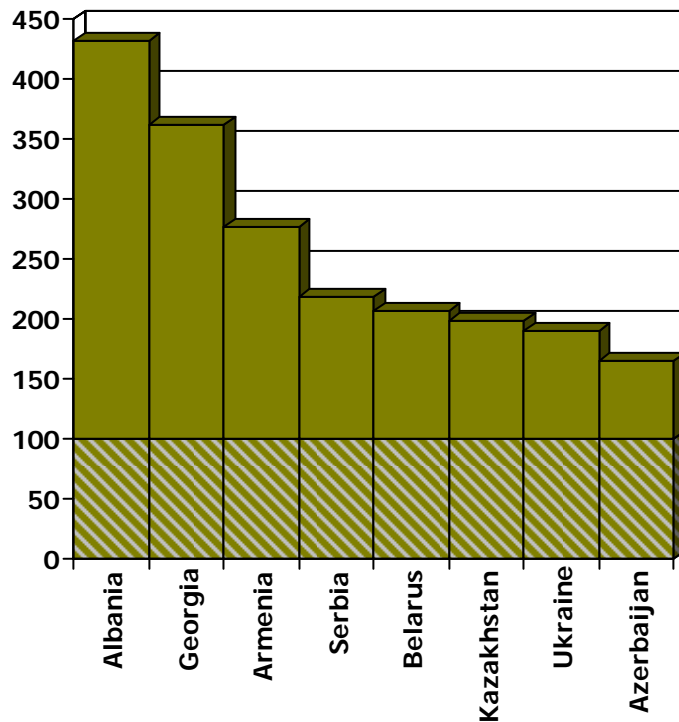
- **Large data needs: important to prioritize and use resources effectively**
 - Spatially disaggregated and referenced data
 - Level of complexity should match capacity to collect, analyze and maintain over long time periods
 - Complex data good; simple, reliable and consistent better
 - Easy to aggregate and link to other datasets
- **Build on existing instruments and capacity:**
 - Hydro-metrological service
 - more stations collecting basic data
 - Household and institutional surveys
 - Special referencing linked to hydro-met data, select additional questions
 - Economic statistics and modeling
- **Coordination** in collection, analysis and use of data across agencies

How can World Bank help?

- *IDA and Climate Change Paper*
 - A case for integrating adaptation in IDA-supported programs
- Global Economics of Adaptation study
 - Developing country case studies
 - Methodologies, estimates, capacity needs
- Country, regional and sectoral analyses
- Pilot adaptation programs: building knowledge, capacity, institutional and investment models
- Climate risk insurance products
- Hydromet services strengthening projects
- Proposed Pilot Climate Resilience Program
 - Integrating adaptation in development planning

Good News: Smart investment in Adaptation-relevant Data is Cost-Effective

Avoided damages per 100 Euros spent on National Meteorological and Hydromet Services



- Each 100 Euros spent in meteorological systems yields at least 200 Euros in avoided damages

THANK YOU!