

"Requirements of Climate Services for Water Sector in India"

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Photo Credits: NASA, Pedro Sanchez, Renzo Taddei

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Banaras Hindu University, Varanasi, October 24, 2018,



SUSTAINABLE DEVELOPMENT GOALS





WATER FOR FOOD

7 BILLION
PEOPLE TO FEED TODAY

9 BILLION
IN 2050

= 60% more food needed

+19% increase of agricultural water consumption
(including both rainfed and irrigated) by 2050

GLOBAL WATER WITHDRAWALS

70% AGRICULTURE

10% DOMESTIC

20% INDUSTRY



EVERY DAY 1 PERSON

DRINKS



2-4

LITRES
OF WATER

EATS



2000-5000

LITRES OF VIRTUAL WATER
EMBEDDED IN FOOD

ALL WE EAT NEEDS WATER TO GROW

1 APPLE

70
litres



150G OF BEEF
STEAK

2025
litres



100G OF
VEGETABLES

20
litres



1 SLICE
OF BREAD

40
litres



ENSURING WATER SECURITY

Climate change poses a serious threat to agriculture with its negative impact on the quantity and quality of water. Currently agriculture uses 70% of the world's water. To ensure a sustainable future, agriculture must employ advanced irrigation techniques and technology-enabled seeds to reduce its usage of water.

It's time to embrace technology today to find the solutions for tomorrow.



10%
reduction in **India's monsoon** rainfall from 1951 to 2014



80%
of **surface water** in India is polluted



Water Table is dipping at the rate of **1 foot** every year in India.



330 million Indians will be affected by the 2016 drought, costing the Indian economy by ₹6,50,000 crores.



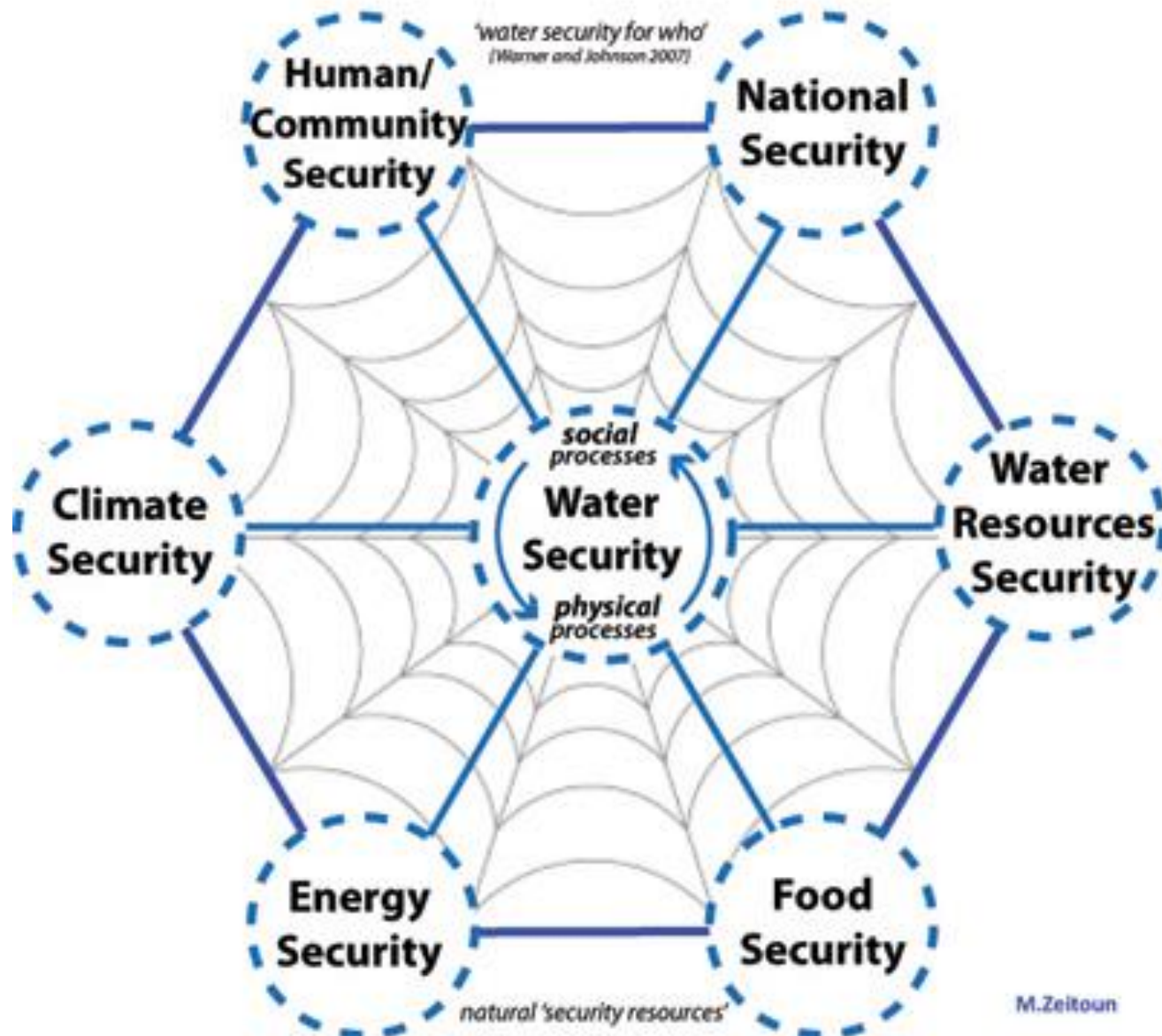
66% of the world population faces water scarcity for at least one month every year. In India, it is 80%.



1545 cubic meters is the per capita availability of fresh water in India. The global average is 6000 cubic meters.

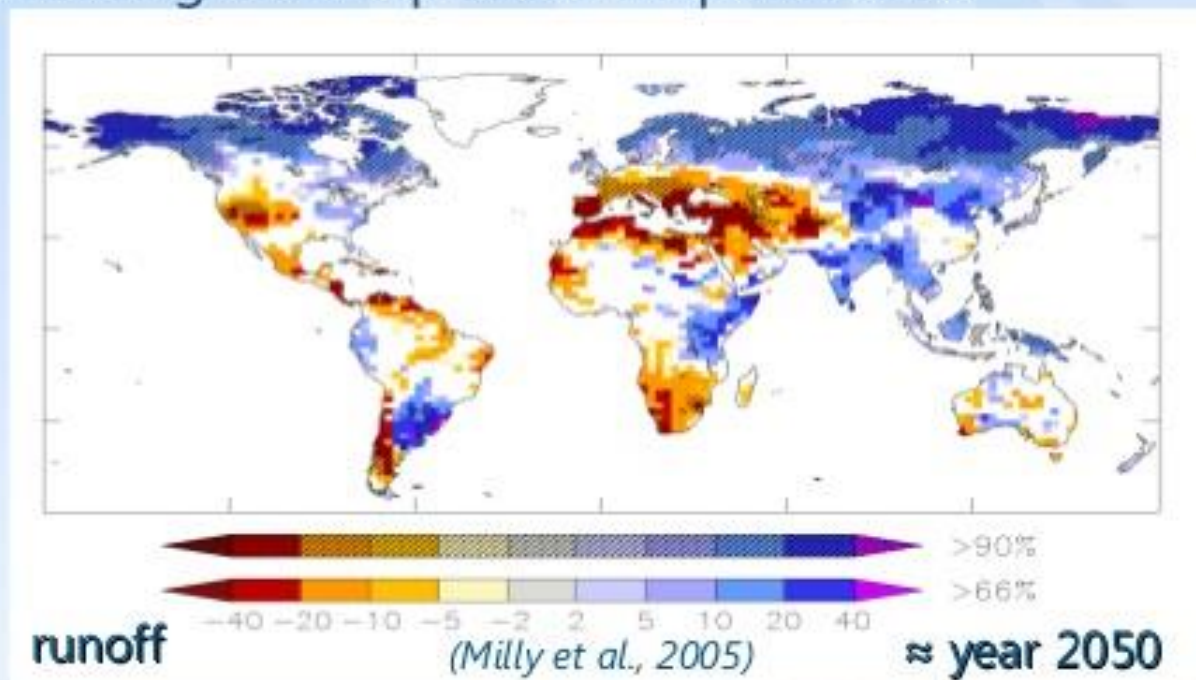


Water Security...

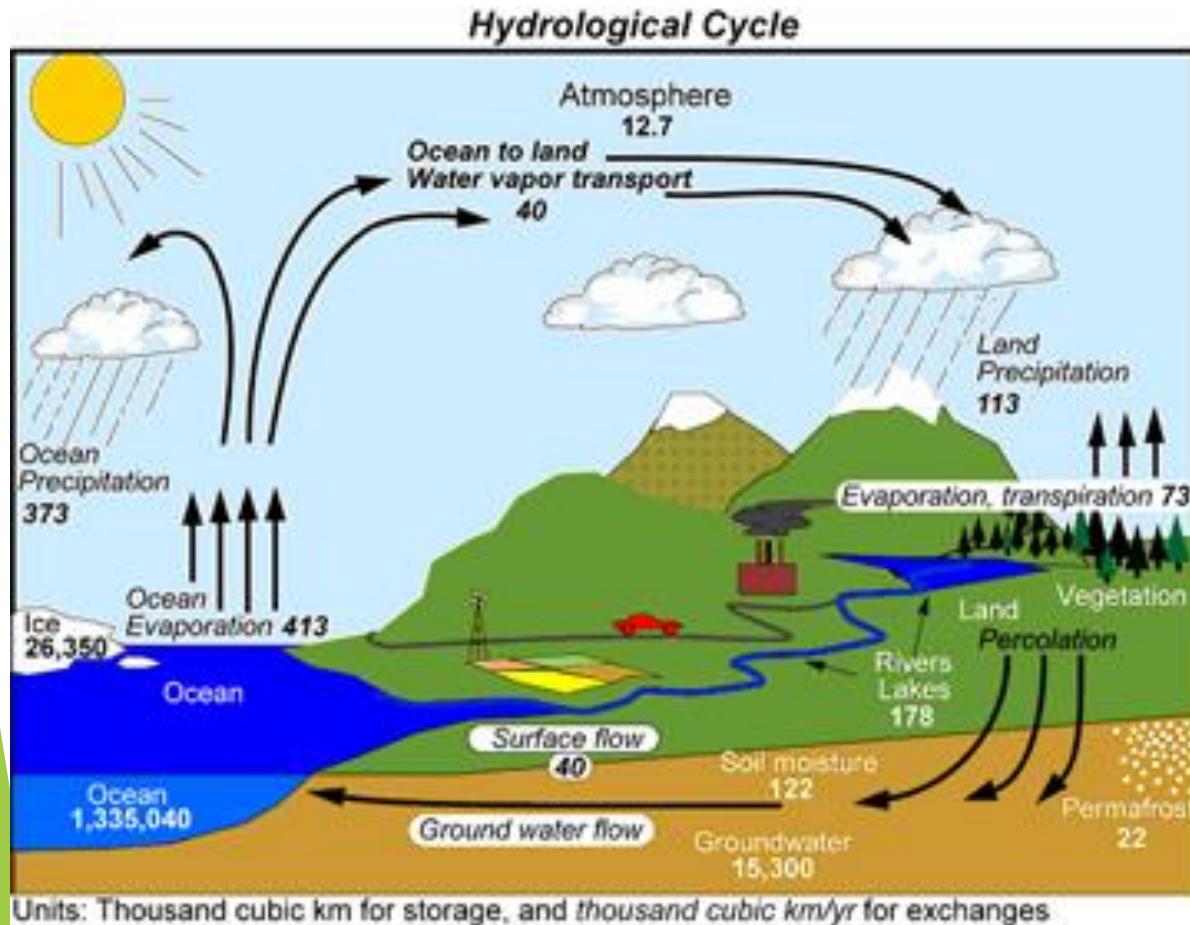


Climate change is expected to accentuate the already severe shortage of water availability

- ✓ rainfall reduction (and unpredictability)
- ✓ increasing the crop water requirements



Hydrologic Cycle



- Temperatures
 - Precipitations
 - Sea level rise
 - Evaporation
 - Soil moisture
 -
- Melting of Glaciers
 - Streamflow
 - Groundwater
 - Floods and droughts
 - Low flows
- Changes in Water Demand

Decision Framework On

Climate Variability and Change

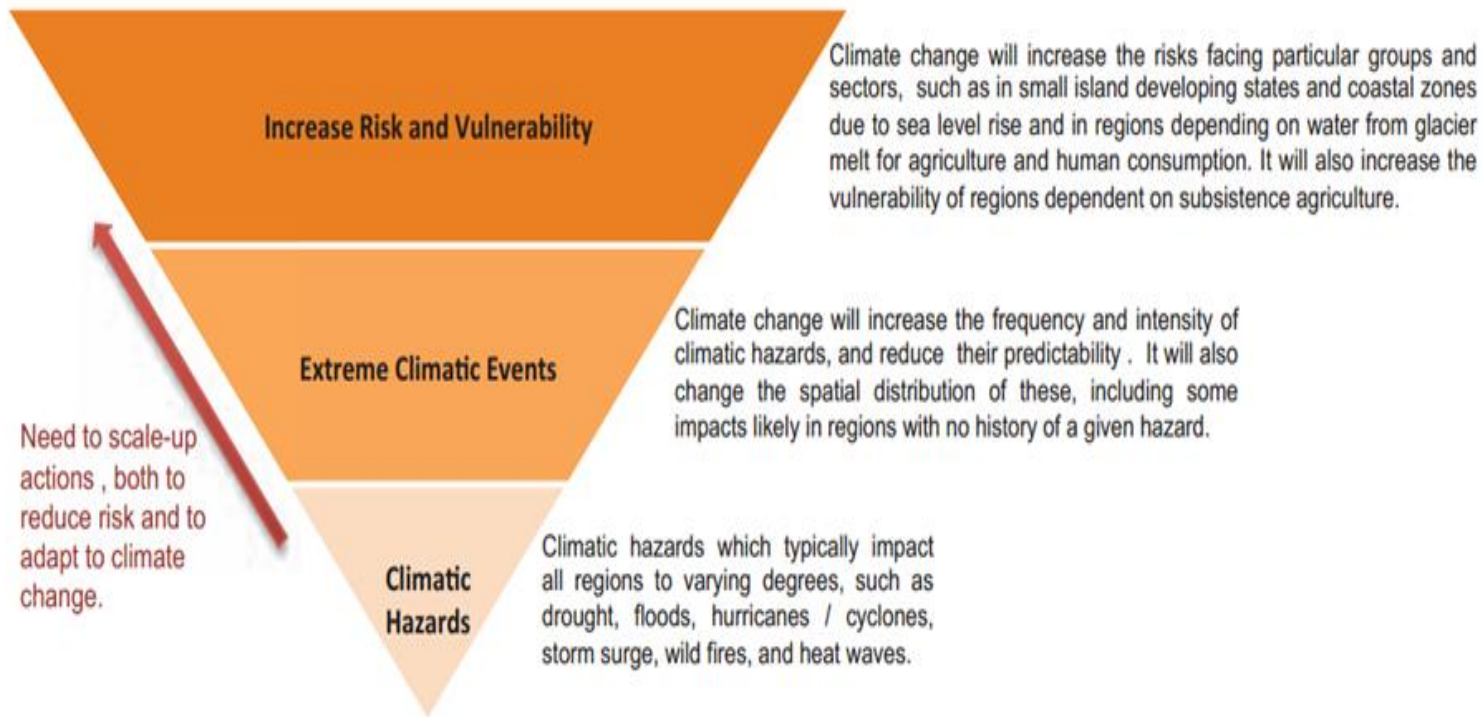
TYPE OF DECISION	CLIMATE		WEATHER
	Long Term (1-30yrs)	Medium Term (1-12 months)	Short term (0-15days)
	Decadal Changes	Seasonal Forecasts	Real Time → Week
Strategic			
Tactical			
Operational			

- Supply demand
- Reservoir safety
- Reservoir sizing
- Land management

- Operating rules
- Water orders
- Water allocation
- Demand management

- Irrigation scheduling
- Flood warning
- Field operations

Climate Change and Disaster Risk

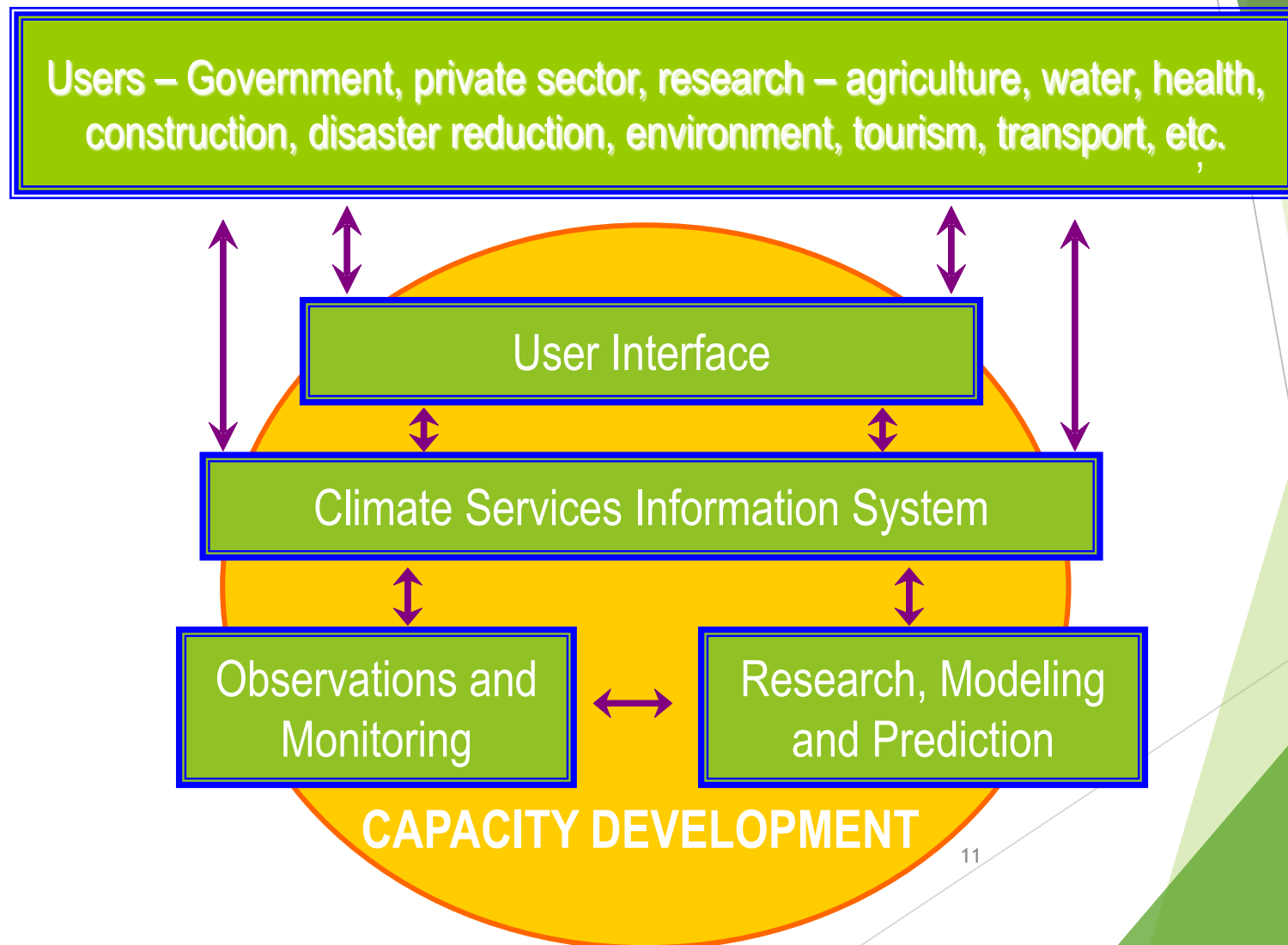


FAO. 2011. Resilient Livelihoods – Disaster Risk Reduction for Food and Nutrition Security Framework Programme

Disaster risk reduction requires climate service

- ▶ **Identification of water-related risks** due to extreme weather and climate hazards;
- ▶ Identification of **populations vulnerable** to weather and climate hazards;
- ▶ **Implementation of risk management practices** and procedures;
- ▶ **Design of infrastructure** (i.e. water management organizations, structures and facilities);
- ▶ **Dissemination of information to users**, including the public, i.e. Public Service forecasts and alerts;
- ▶ Development and implementation of water and environmental policies, including **flood and drought management policies and strategies**;

Global Framework for Climate Services



Climate services for Development

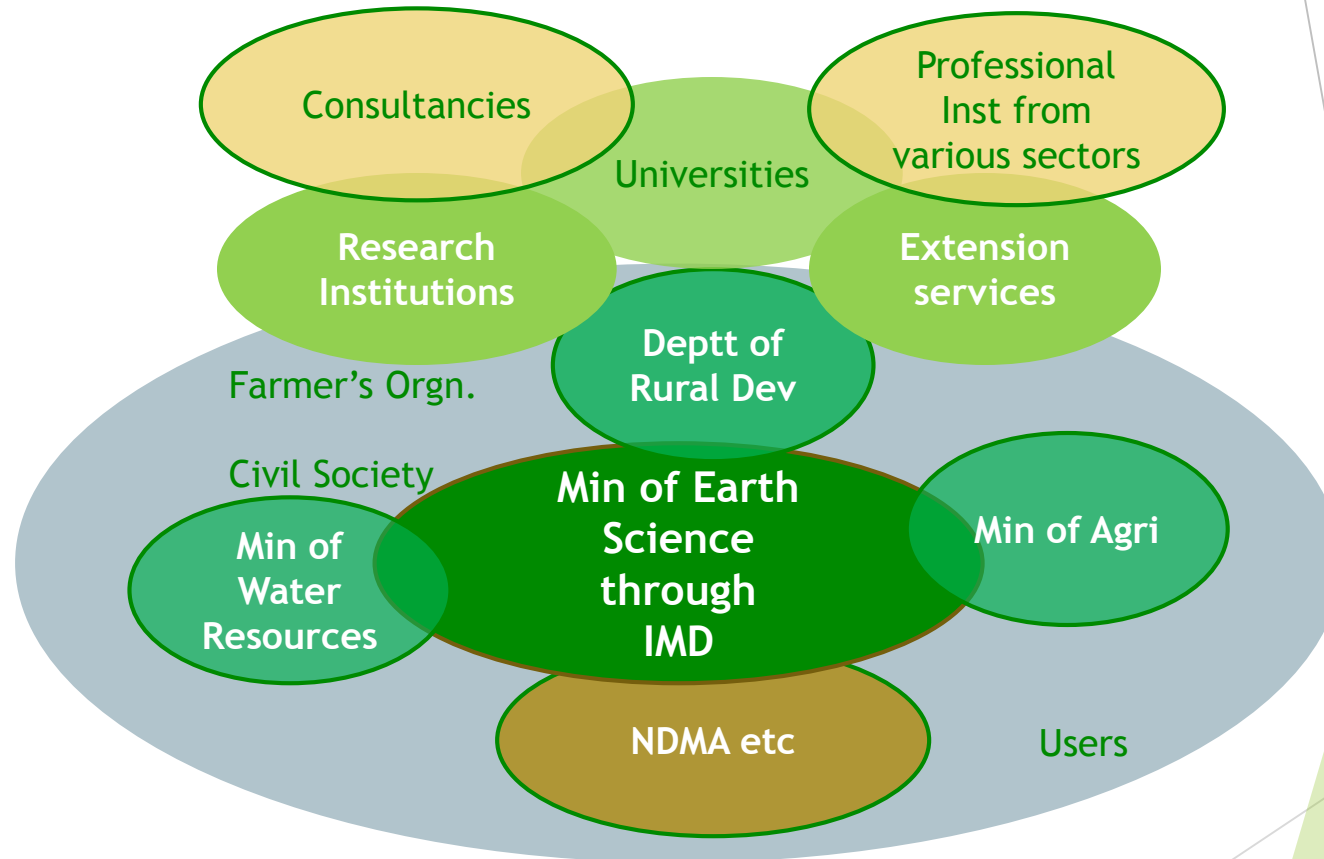
- ▶ **Enhanced understanding** of the needs for climate services in all the priority sectors
- ▶ **Improved knowledge** of the existing interface mechanisms and recommendations for improvements where needed;
- ▶ **Clear understanding of capacity development needs** to implement the GFCS at regional and national levels;
- ▶ Agreement on the necessary steps to develop a **robust plan for climate services for the various sectors**; and
- ▶ Strategic understanding of **institutional arrangements, partnerships and processes required to operationalize the GFCS** at the regional and national level.

User Interface Platform



The needs of the user community are diverse and complex

National Framework for Climate Services



Requirements of a successful NFCS (Cont....)

1. **Modernize** and increase the density of the national hydrometeorological **observing network**, to improve the capacity to meet growing end-user needs
2. **Improve collaborative climate research**, towards climate research outputs that are more salient and end-user driven
3. **Improve and widespread communication** of climate services: Diversify communication channels, utilization of innovative and suitable channels for broadcasting
4. Build the capacity of Met Deptts and other national technical services to **jointly elaborate salient climate products and services** with their users from each sector,

Requirements of a successful NFCS

5. Meet the demand for **tailored climate service** provision in the priority climate-sensitive sectors in the country
6. Develop and **strengthen the capacity of end users** to further access and effectively apply climate services
7. **Engage all national stakeholders** involved in the production, tailoring, communication and utilization of climate services in a national dialogue; and
8. Sustain the **National Framework for Climate Services** at the national level with a strong anchorage in IMD

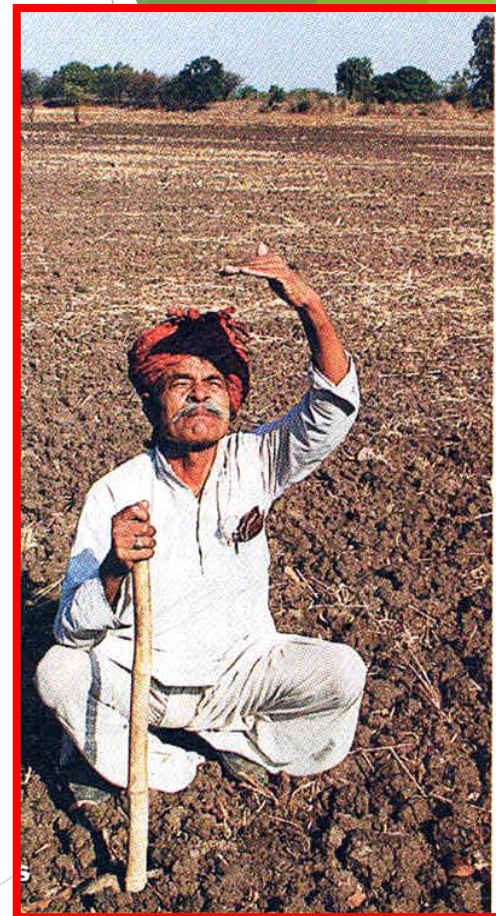
Water and Climate platform

- ▶ Initiate mechanisms for a **continuing dialogue** between water managers and climate scientists;
- ▶ **Strengthen interagency platform** for extended hydrological prediction;
- ▶ **Develop decision making processes** to use the extended predictions,
- ▶ Integrate of water security and climate resilience in development planning processes
- ▶ **Develop partnerships** and capacity of institutions and stakeholders to build resilience to climate change through better water management



Drought as an exemplar

- ▶ There is a need to **shift emphasis from disaster response to risk management**
- ▶ Need for a validated system of **Drought Monitoring** that could meet the requirement for information at **high spatial resolution** in the country
- ▶ Development of an institutional mechanism of **functional collaboration across ministries** and departments at the local, state and national level

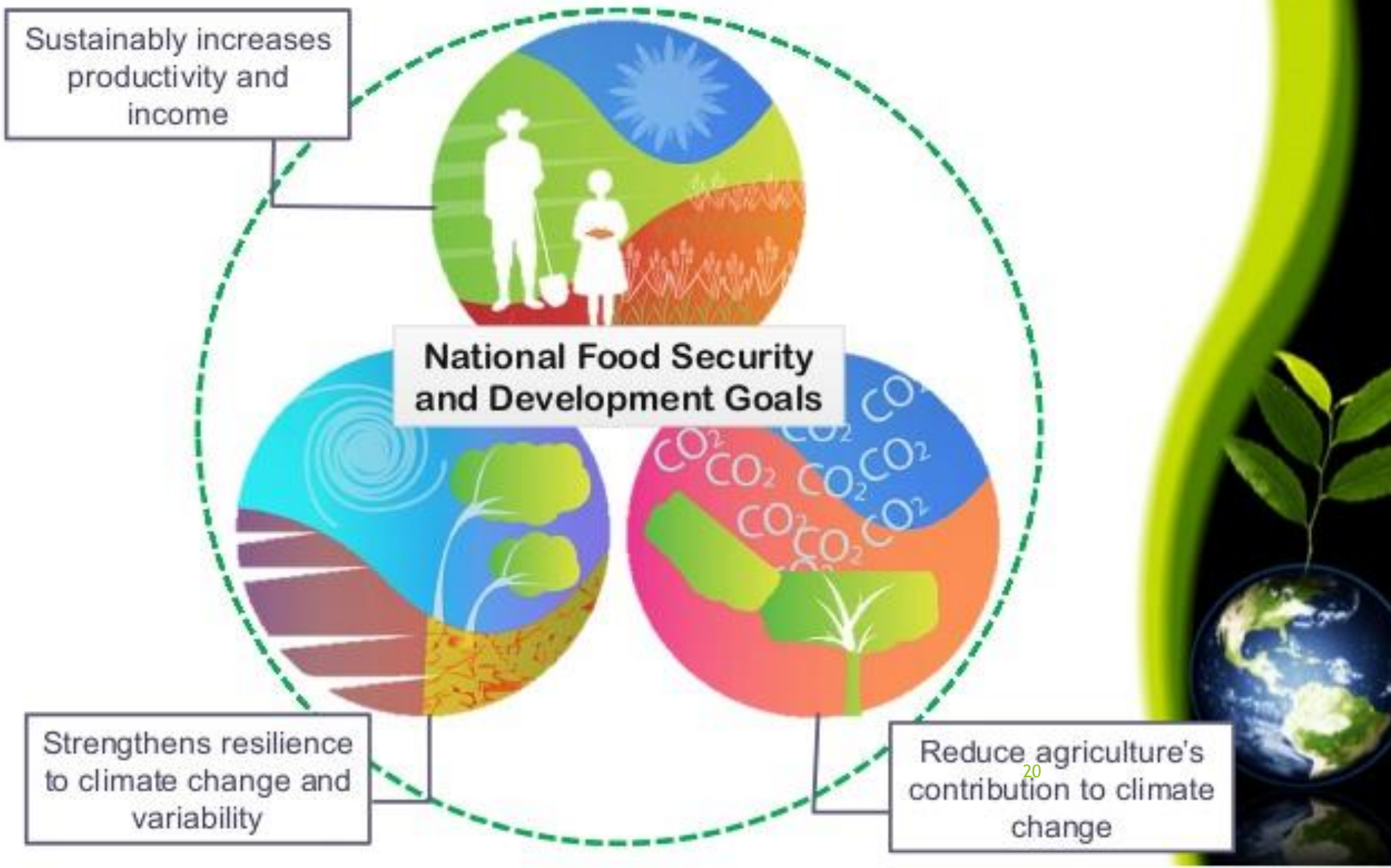


Thanks for your attention.....

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What is CSA?



Water-food-energy nexus ...

