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GLOBAL LEARNING AND EVIDENCE EXCHANGE
CLIMATE-SMART AGRICULTURE

DECEMBER 5–9, 2016 // SIEM REAP, CAMBODIA

Climate Smart Agricultural Water Management in South Asia

Alok K Sikka, International Water Management Institute

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SOUTH ASIA'S VULNERABILITY TO CLIMATE CHANGE

- IPCC AR5 observes **climate change** is already happening in SA and **impacts are being felt**
- Average annual **temperatures could rise by more than 2°C** and more rainfall likely at higher latitudes by mid 21st century
- **More likelihood of extreme rainfall events** related to monsoons
- Limited water availability, **floods and droughts**, **groundwater depletion**, predominant rainfed area, food and energy insecurity, small holders
- **Increased vulnerability** to water related risks—water and food shortages

Building **climate resilience through Agriculture water management is a major response**

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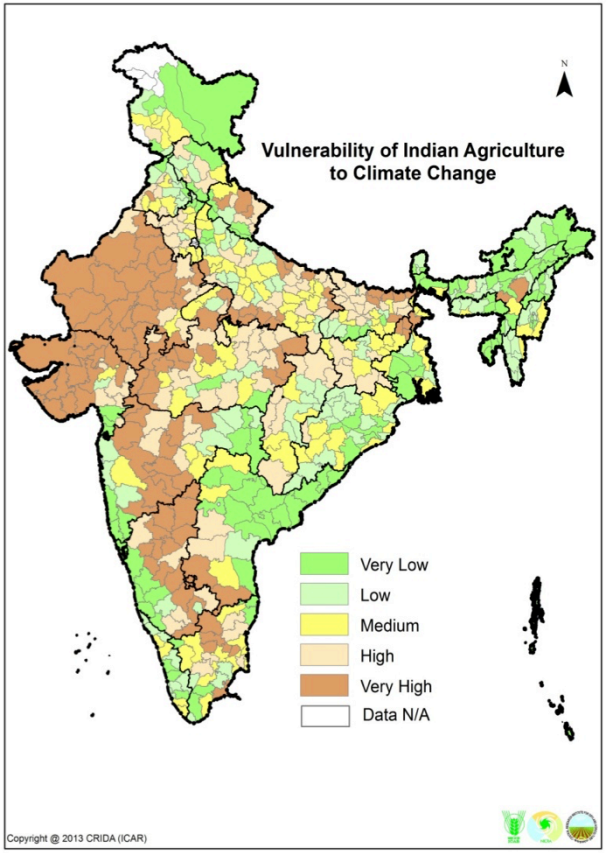
CLIMATE CHANGE AND SOUTH ASIAN AGRICULTURE

- South Asian **agriculture is more vulnerable to climate change** due to low adaptive capacity
  - **3% of the World's land**
  - **About 5% of annual renewable water resources**
  - **25% of the World's population**
- The **net cereal production** in South Asian countries is **projected to decline at least between 4 to 10%** by the end of this century
- **Agricultural water demand** in arid and semi-arid regions **estimated to increase by at least 10%** for temperature increase of 1°C



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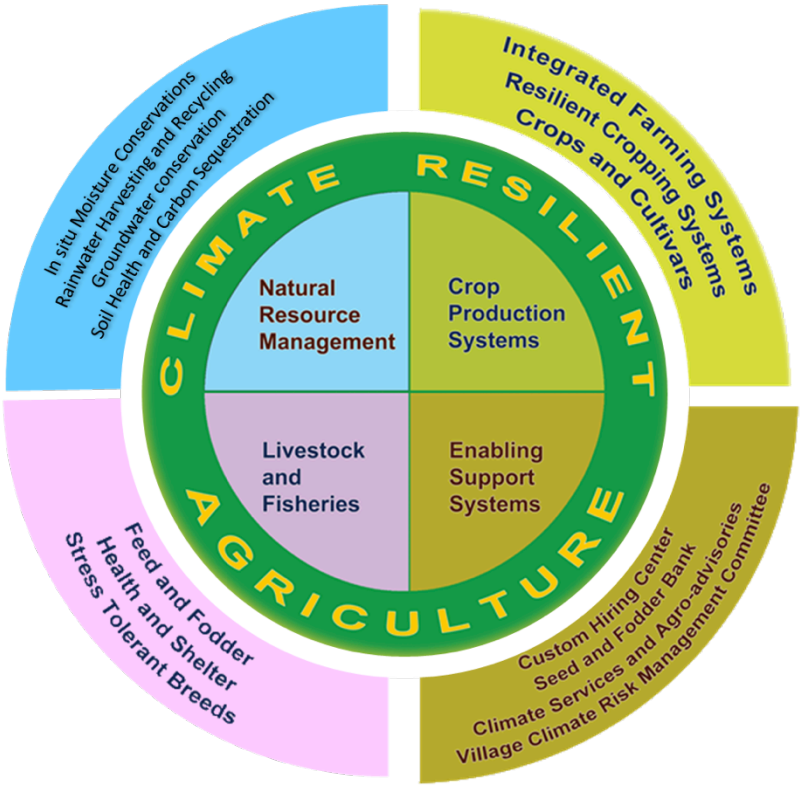
BUILDING RESILIENCE: KEY TO SUSTAINABILITY



Integrating AWM in climate resilient farming system

NIRCA (National Institute on Climate Resilient Agriculture, ICAR)

Three Pillars of CSA

Capacity of a system to adapt & grow in the face of **unforeseen changes** and **bounce back**

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SMART AWM INTERVENTIONS

- Building resilience by enhancing storage (in situ, surface and groundwater)
- Demand management-Improving irrigation efficiency and water productivity
- Laser land leveling, broad bed & furrow, zero-tillage & conservation agriculture
- Conjunctive use of good and poor quality GW / wastewater
- Crop diversification
- Policy, governance and institutions

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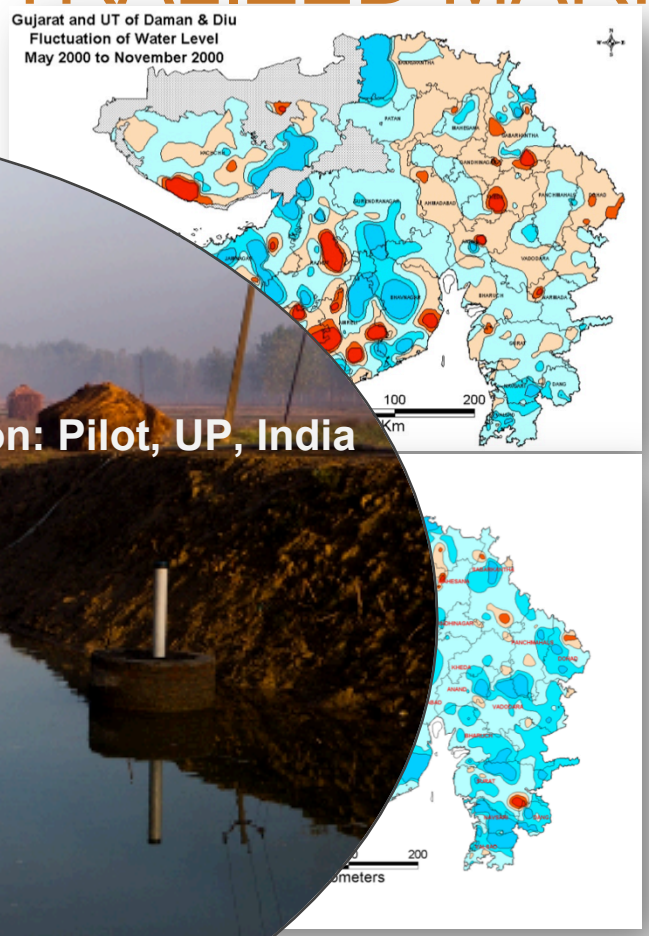
COMMUNITY-DRIVEN DECENTRALIZED MAR: BUILDING RESILIENCE



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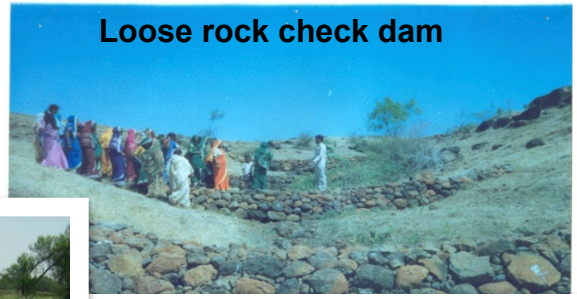
WATERSHED MANAGEMENT: A POLICY FRAMEWORK FOR ADAPTATION

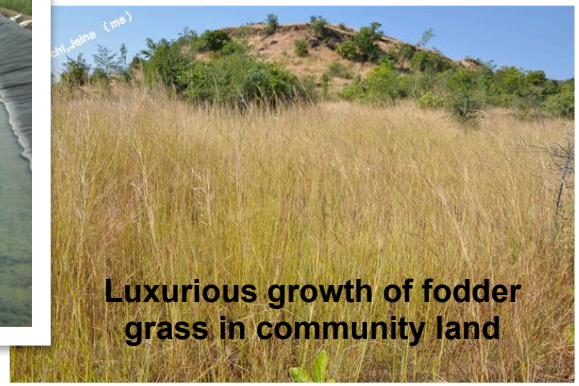
Participatory Integrated Watershed Management, an important concept for integrating AWM, Farming systems and institutions for CSA

Brought out difference in enhanced water availability, fodder and drinking water during 2012 -13 drought


Loose rock check dam

Rain Water harvesting dam

RKVY Pond with lining by farmer's own resources


Luxurious growth of fodder grass in community land

Farm diversification by a marginal farmer

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Kadwanchi Watershed, Jalna, Maharastra

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CLIMATE SMART AND REMUNERATIVE SOLAR IRRIGATION

SPaRC: Solar Power as a Remunerative Crop

An innovative concept which links a farmer's solar irrigation pump to the electricity grid presenting farmer with the choice to sell the surplus power

The opportunity

- India has 130,000 GW of installed pumping capacity in the form of electric & diesel tube wells
- Sustainable solar irrigation pumps with feed-in tariff for selling excess electricity to the grid

Installed Solar Pumps	Number
2009-10	1000
2015-16	35000
Till 2020	0.15 Mil+ Solar Pumps

Enhanced access to ground water for smallholders

Triple wins

- Reduction in greenhouse gas emissions
- Sustainable use of groundwater
- Water access & income to farmers

The result

- Launch of the world's first Solar Pump Irrigation Cooperative (SPICE)

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Water Policy Program CGIAR Research Program on Climate Change, Agriculture and Food Security CCAFS

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RESILIENCE IN FLOOD PRONE AREAS

Renovated drainage channel

- Protection to 500 ha to both *kharif* andsummer flood

***Swarna sub-1* variety**

- Submergence tolerant var.

Post-flood management practices

Soil health in problem soils

- Green manuring
- 15 farmers

***Gitesh* variety**

- Delayed planting

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Source: NICRA, ICAR

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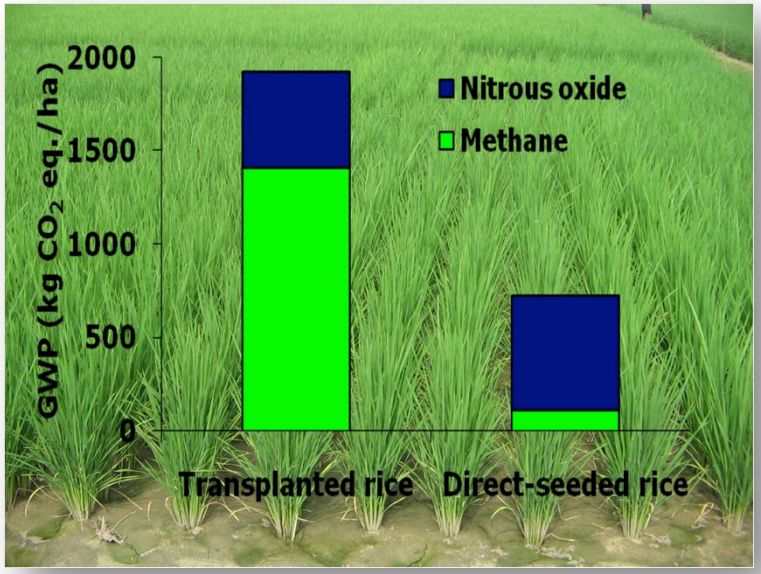
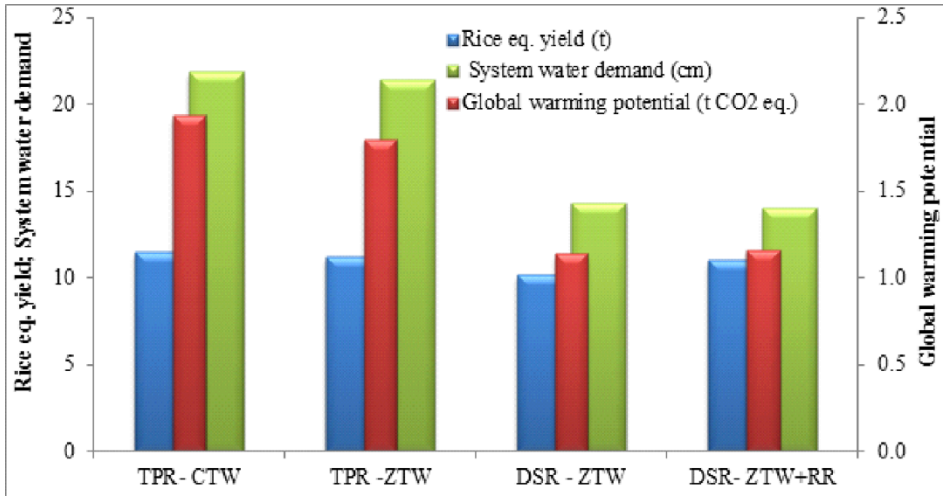
MITIGATION AS CO-BENEFITS OF ADAPTATION





- The GWP in DSR is 30-50% of transplanted rice with water and energy saving of 15-25% and 10-15%
- Alternate wetting and drying in rice reduced GWP by 25-30% of conventional rice with water saving of 25-30%

Direct-seeded rice (DSR) and zero-till wheat (ZTW) generally gave similar yield with less irrigation water and lower global warming potential.

INSTITUTIONAL AND POLICY INTERVENTIONS

- Institutionalize Local Climate Risk Management Committees
- Promote Custom Hiring Centres to
  - facilitate timely sowing operations in narrow windows of moisture availability
- Weather forecasts and ICT based climate services
- Convergence of climate-smart interventions

Source: NICRA

TAKE AWAY MESSAGES

- **Building resilience** through combination of water **supply augmentation** and **demand management**
- Demonstrate **evidence based solution and mainstream** innovative AWM through development programs **in a farming system mode**
- **Incentivize adoption** of climate smart AWM interventions
- Develop Local Area **climate risk and adaptation plans**
- Investment focus on **groundwater, solar irrigation, and ICT**
- **Internalize climate scenarios in design** and operation of water infrastructures
- **Strengthening of capacity** for adaptation and mitigation

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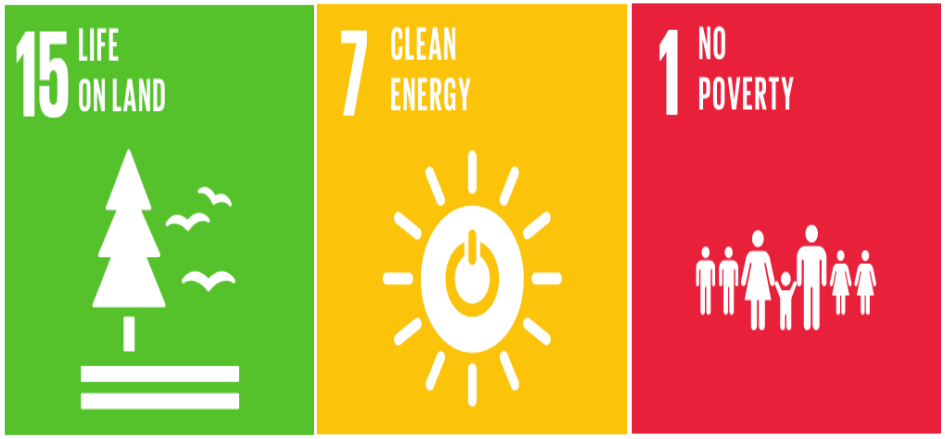
Thank you!

Build Resilience and Harmonize Synergies Between INDCs and SDGs

2.3 Doubling Agri Production
2.4 Resilient Agri products

13.1 Adaptive capacity to CC
13.2 Integrating CC measures
13.3 Capacity development on



15.1 Sustainable Eco-sys
15.3 Combat degradation

7.1 Access to renewable energy

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