Crop Production in a changing climate of Krishna Basin –

Assessment of Water Availability for crop production in a changing climate – Preliminary Results for Krishna Basin

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OBJECTIVES

Sustainable Rice Production in Changing Climate

- Model Development for Krishna Basin

- Assessment of water availability in the basin
Catchment Area  : 2,65,835 Sq.km.
Rainfall        : 203 billion m³ (bcm)
                 : 784 mm
Average Runoff  : 65.5 bcm
Data Used

- **DEM** - SRTM 90 m
- **Landuse** - IRS AWIFS & GIAM
- **Soil** - NBSS&LUP, FAO
- **Climate** - IPRC, GFDL Data (1981-2000, 2021-2050)
Krishna River Basin Major & Minor Sub-Basins

Sub-Basins – 937
HRUs - 11901
Crop Sequence

- Paddy - Paddy
- Sugarcane
- Paddy - Maize
- Paddy - Cotton
- Paddy - Chili
- Paddy - Groundnut
- Paddy - Sunflower
- Paddy - Onions
Preliminary Results

• How much is the current irrigation demand with the existing cropping practices?
  – How much water is available in major reservoirs?

• How much will be the future irrigation demand with climate change with no change in current practices?
  – How much water will be available in major reservoirs?
Overall Average Annual Rainfall

Overall Average Annual PET
Summer Season Average Soil Water based on GFDL Base Data (1986 - 2000) Simulation

Average Soil Water (mm)
- 0 - 50
- 51 - 75
- 76 - 100
- 101 - 200
- 201 - 300
- 301 - 500
- 501 - 1340

Summer Season Average Soil Water based on GFDL Mid Century (2021 - 2050) Simulation

Average Soil Water (mm)
- 0 - 50
- 51 - 75
- 76 - 100
- 101 - 200
- 201 - 300
- 301 - 500
- 501 - 1347

Summer Season Average Water Yield based on GFDL Base Data (1986 - 2000) Simulation

Average Water Yield (mm)
- 0 - 3
- 4 - 6
- 7 - 8
- 9 - 10
- 11 - 12
- 13 - 15
- 16 - 23

Summer Season Average Water Yield based on GFDL Mid Century (2021 - 2050) Simulation

Average Water Yield (mm)
- 0 - 12
- 13 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 125
- 126 - 808
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<th>MC Rainfall</th>
<th>Percent Increase</th>
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<td>125.49</td>
<td>258.70</td>
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<td>42.25</td>
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Water Available at Major Reservoirs
Expected Outcomes

• What is the impact of alternative cropping practices?
  – Say if 10% or 20% or 30% of unirrigated area convert to a more/less water intensive crop (Rice/Sugarcane).

• What is the impact of more Reservoirs
  – Say 10% or 20% or 30%
Key Questions

• How could we manage if there is such magnitude of surplus water?
  – Reservoir Management
  – Infrastructure Management
  – Crop Management
• The Model development for Krishna Basin gave a thorough understanding about the Basin and the uncertainties involved in the Climate Models

• The results are preliminary; will be validated using near future climate projections.