Water conflicts:Can Harvesting, storage and conservation reduce conflicts, particularly in the context of Climate change

Biksham Gujja
IITK,
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bgujja@wwfint.org

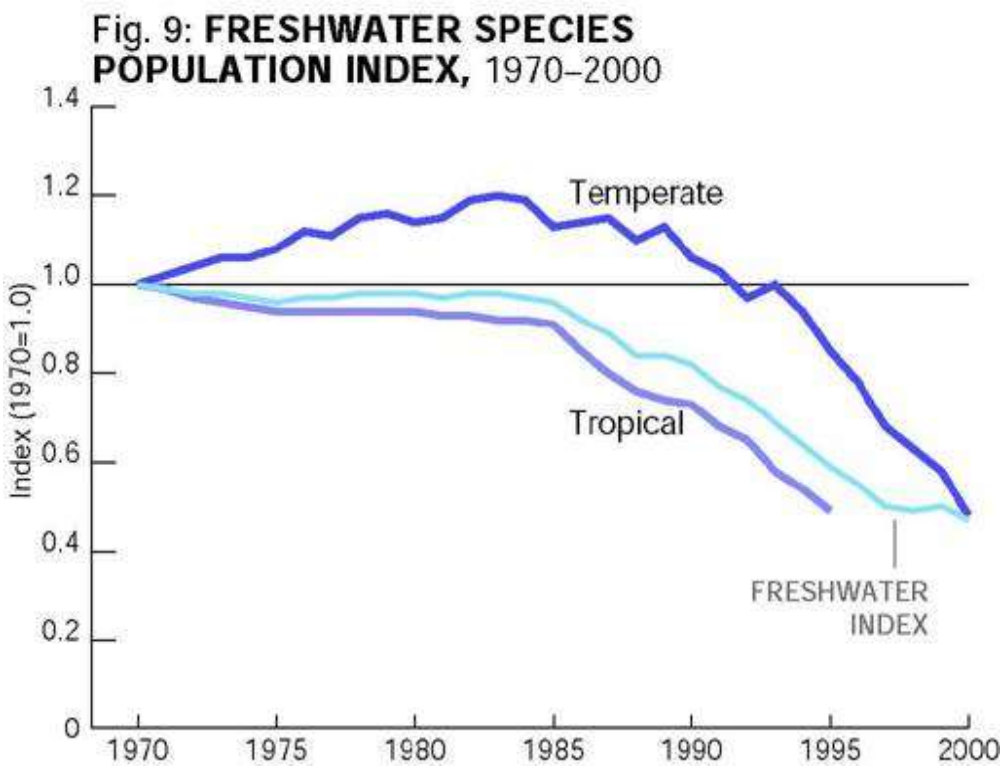
FORUM FOR POLICY DIALOGUE ON WATER CONFLICTS IN INDIA

‘we eat and wear, drink water and people fight for it’

Water increasingly limiting factor

Conflicts are inevitable

A biodiversity crisis:



WWF Living Planet Report 2004

- Losses over 50% since 1970, greater than forests and marine (~ 30%)
- Severe human impacts
- freshwater crisis in many countries

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Water Wars/conflicts

- Water wars- it was obsession for the world leaders, academics, policy makers…
- Google search
- 17,100,000 for water wars. -2007
- 220,000,000- Nov.2009,
- Water wars India-13,900,000
- 2,300,000 for water conflicts. now 9 m.
- This is not contest of War Vs conflict
- Water wars is fear, but never happened in recent history
- India- Pakistan- 3 wars, but Indus treaty functioning

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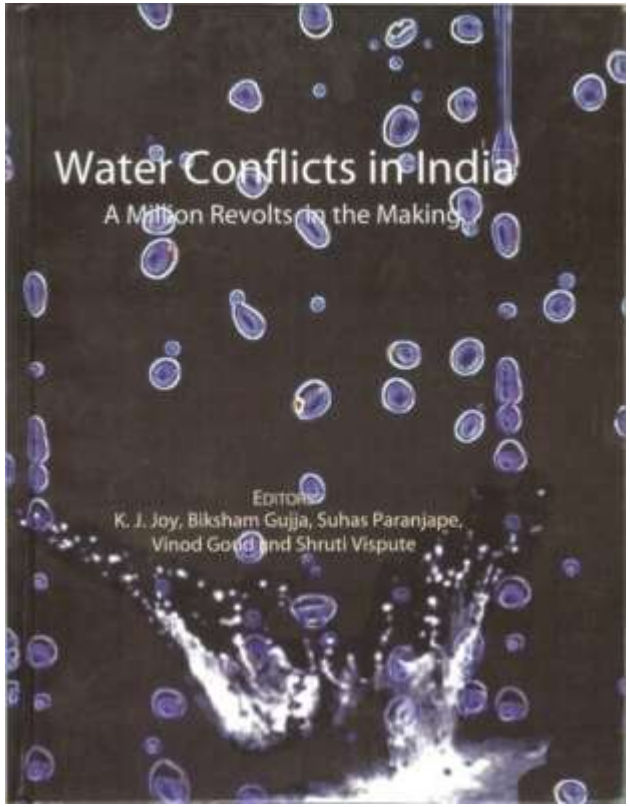
Water: Wars vs. conflicts



- Water wars: A Diversion?
- Kyoto, water Forum, war in Iraq, not on water
- India-Pakistan. Treaty worked during 3 wars and in Peace not perfect..but
- Middle east: Still oil wars
- Berlin WB meeting-discussion with Hadaddin

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Water conflicts..within a country

- Problematic, prolonged, entangled, increasing..
- Massive social, economic, ecological cost
- Lot of Time spent in (mis) managing
- Institutions are thriving these water conflicts
- Govt. Investing may actually creating conflicts

Water conflicts..Bad?

- Conflicts are not bad
- Some times conflicts lead to new and interesting solutions.
- All conflicts can not be resolved.
- Some conflicts have no , Votes-wild life, ecosystems...
- Some created with large investments. e.g. Polavaram, ILR??
- Some lack of investments.. Etc..

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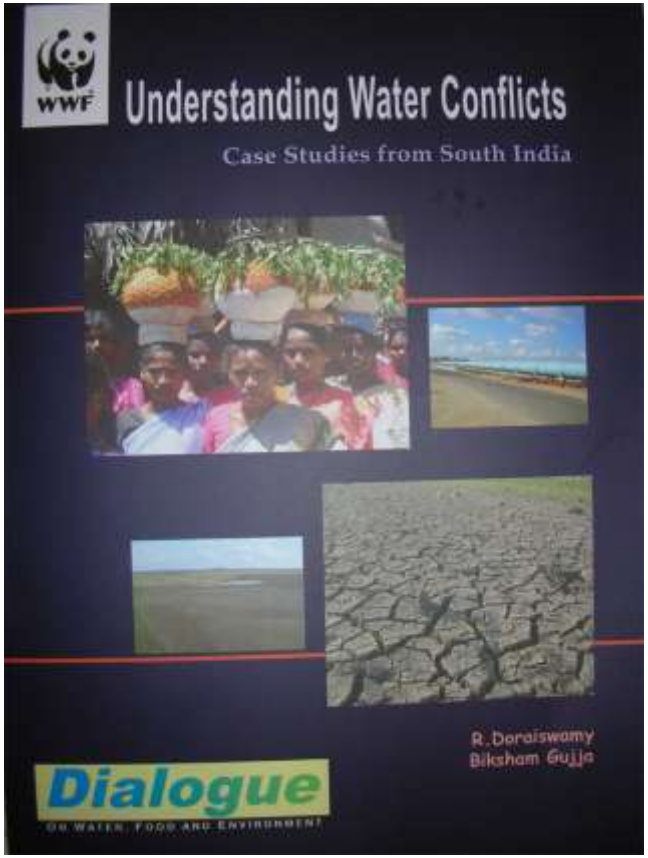
So, Dialogue requires first understanding the conflicts…



- First looked into available sources
- institutions working on the issue
- Individual cases only
- AP, then South India
- India level.

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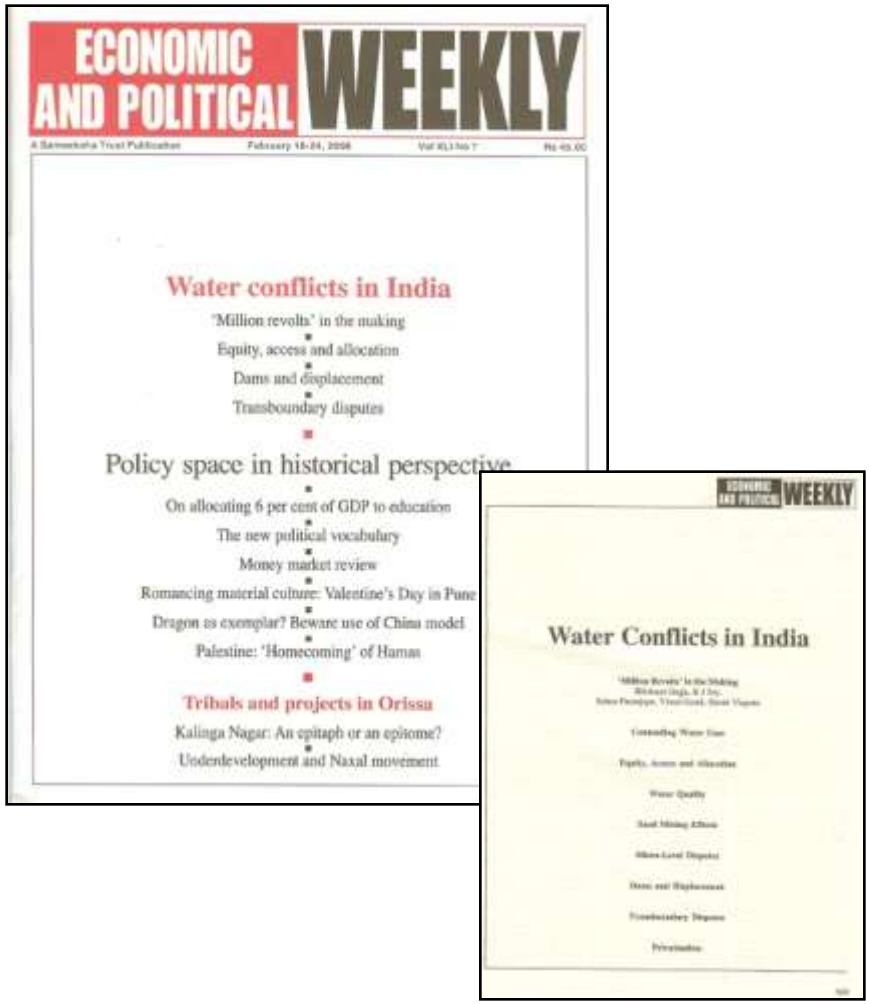
Publications...to flag the issue



- Good partnership
- Institutional set up
- Book
- Media response
- General support
- Lot of awareness
- Felt need

Some positive aspects...

- ILR- the mother of all solutions to all Indian problems, has become major conflict in itself-- so it is not going ahead. at least for now.
- Bhalgiar dam: Solution between India and Pakistan is much easy

Some not so positive...

- TN, Karna.ta dispute still on
- Mullaperyar is no where near to ‘pragmatic compromise’
- Polavaram: 300,000 people are going to be displaced still on agenda
- Water conflicts are still major source of revenue, votes and diversion of real solutions

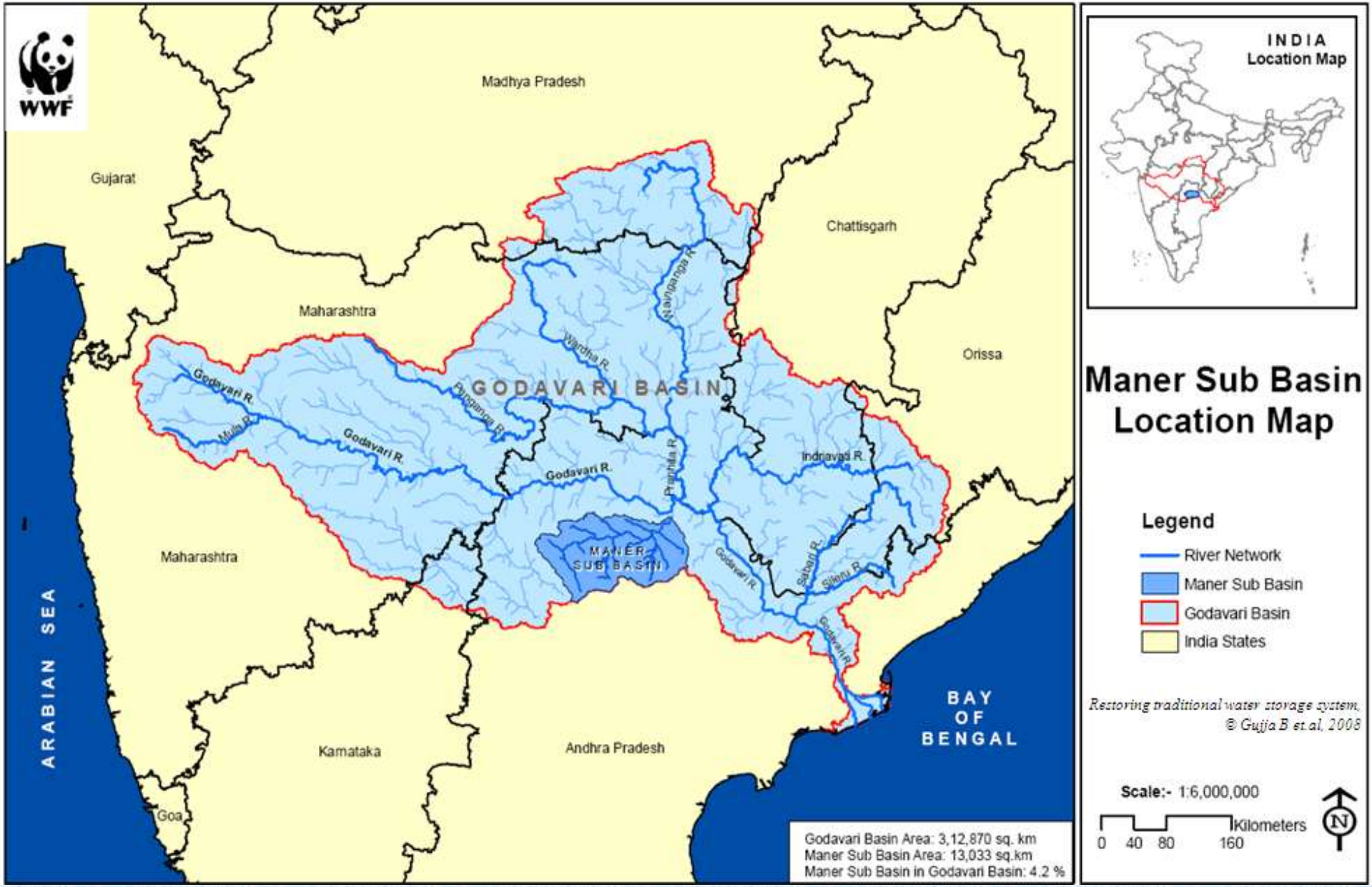
Addressing the root causes..

- 1. Demand management in agriculture- not how much water is used, or how many ha. irrigated, how many dams constructed, but how much is produced- so improving the productivity is the most important intervention- some options are there!-- SRI, SSI, proven

Options...2

- 2. **Policy interventions:** Difficult, but doable. e.g. incentives for saving water. water tradable permits, penalties for wastage, tax on pollution, Urban consumers paying the cost, commercial farms paying the real cost, restricting industry to extract in rural areas or trading with local communities

Demand management could reduce conflicts



- Maner sub-basin is in Andhra Pradesh state, a semi-arid region.
- Catchments lie between longitude 78° 13′ to 80° 2′ and latitude 17° 42′ to 18° 42′
- Area covering 13,033 sq.km or 1.3 million ha

Maner Sub-Basin

- Area – 13,033 sq.km
- 4.2 % of the Godavari basin
- Micro basins – 24

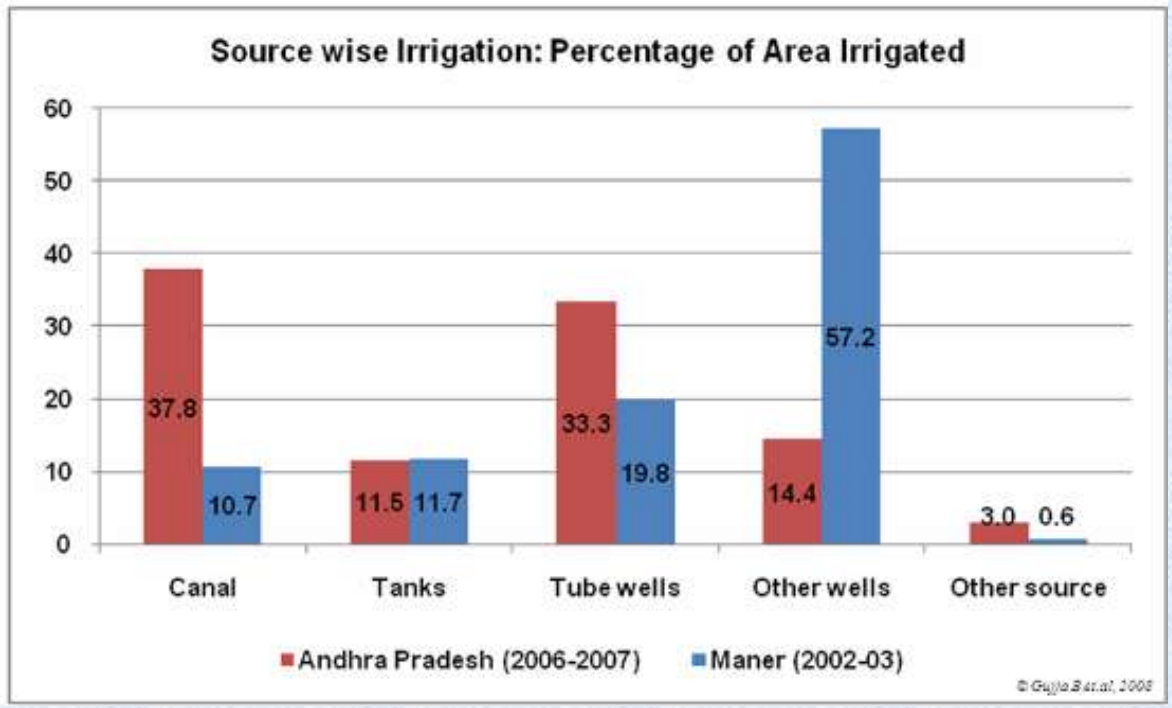
  (range from 169 sq.km to 1409 sq.km)
- Total no. of water structures (tanks) - 6,234
- Area of tanks - 588 sq.km – 4.5% of the basin area
- Total storage capacity
  - 1m : 588 mcm
  - 3m : 1764 mcm (464 cu.m/person)
  - 5m : 2940 mcm (773 cu.m/person)

Irrigation Pattern

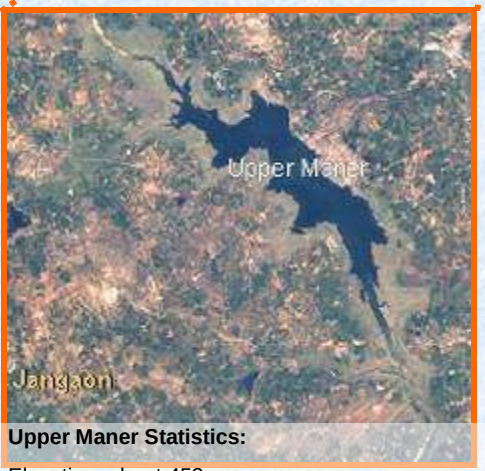
Almost 90% of the irrigated area within the Maner sub-basin is through ground water, rainwater harvesting etc.

Total water use for irrigation- 2000 m.cu.m-

Rice crop- 70% of water used in agriculture.



Landsat imagery

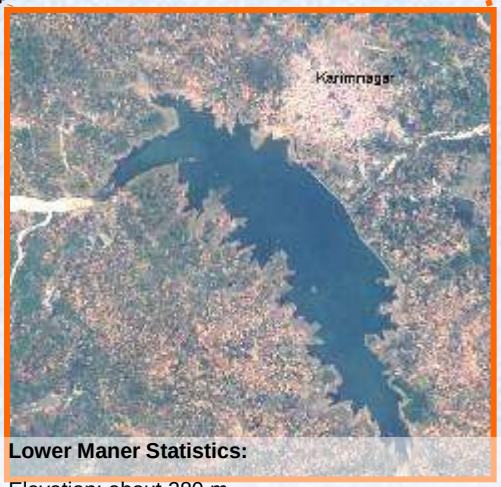


Upper Maner Statistics:

Elevation: about 453 m

Area: about 11.6 sq.km

Water storage capacity by 3 m depth: 35 MCM



Lower Maner Statistics:

Elevation: about 280 m

Area: about 58 sq.km

Water storage capacity by 3 m depth: 175 MCM

Ramappa Cheruvu Statistics:

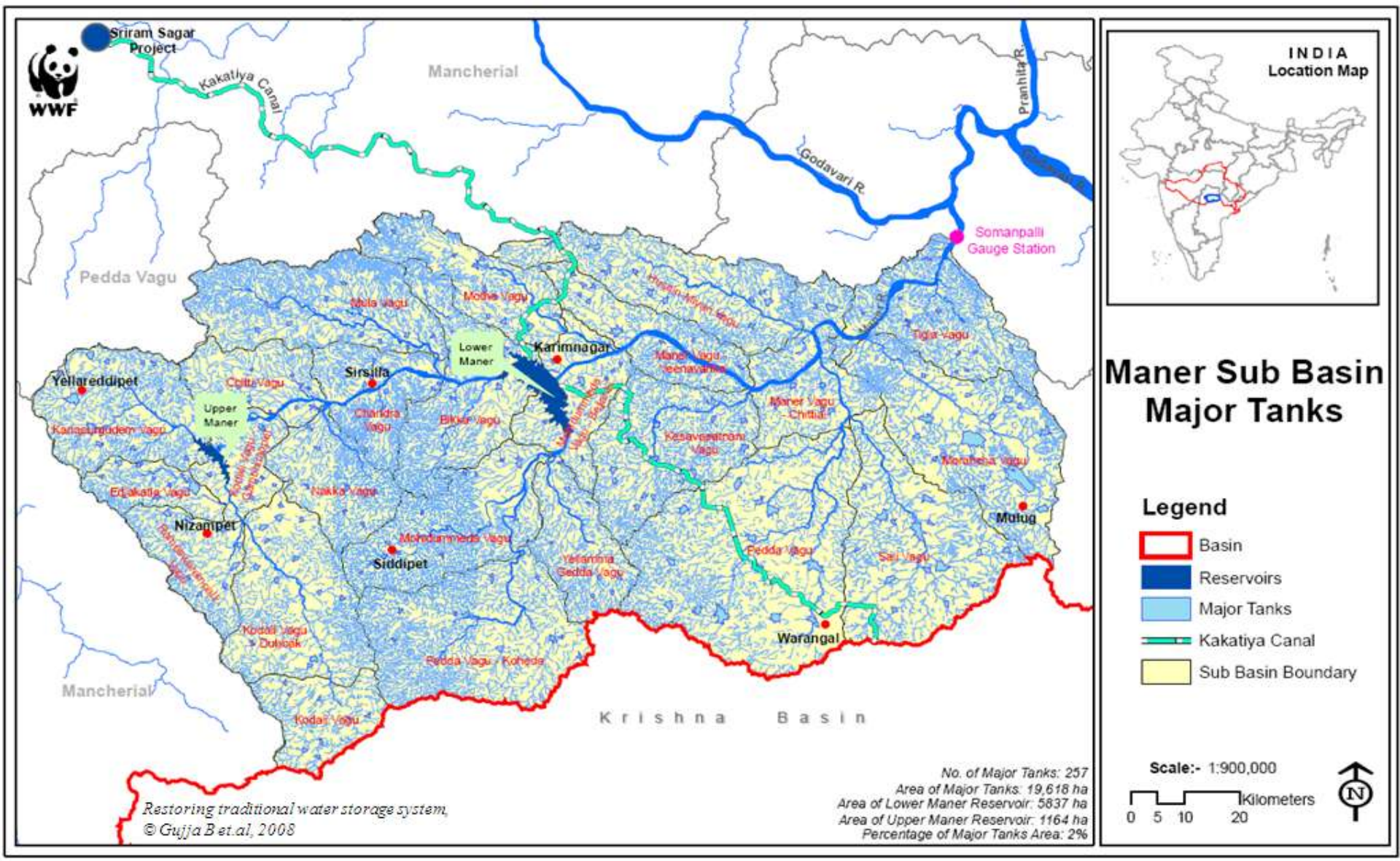
Elevation: about 211 m

Area: about 12 sq.km

Water storage capacity by 3 m depth: 36 MCM

Ramappa Cheruvu

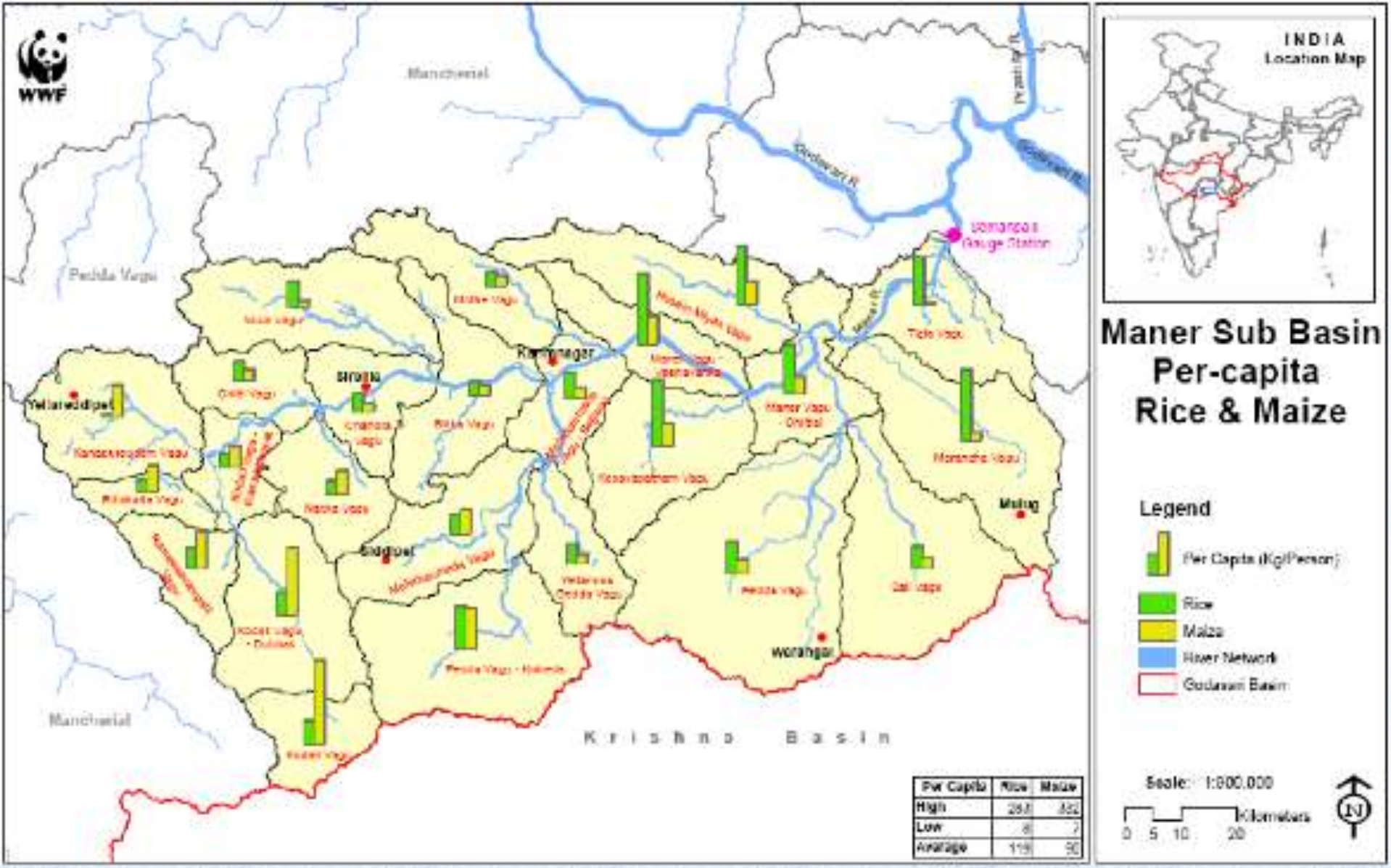
- Built in 1120 AD
- 1,200 hectares area



- The sub-basin area is about 4.2 per cent of the Godavari basin
- The mean annual rainfall ranges normally varies between 629 to 1391 mm
- Long-term data show variation as extreme as 479 to 1595 mm

Agriculture- The main source

- 38 % in agriculture
- 40% no land but depend on agriculture
- 45 % of sub basin area, is used for agriculture
- of that 56% is irrigated
- 10% of sub basin area, is forest
- Six people per hectare of cultivated area
- 12 people per hectare of area irrigated
- Less than 1000 sq.m of irrigated land per person!!



Per Capita	Rice	Maize
High	264	432
Low	6	7
Average	119	90

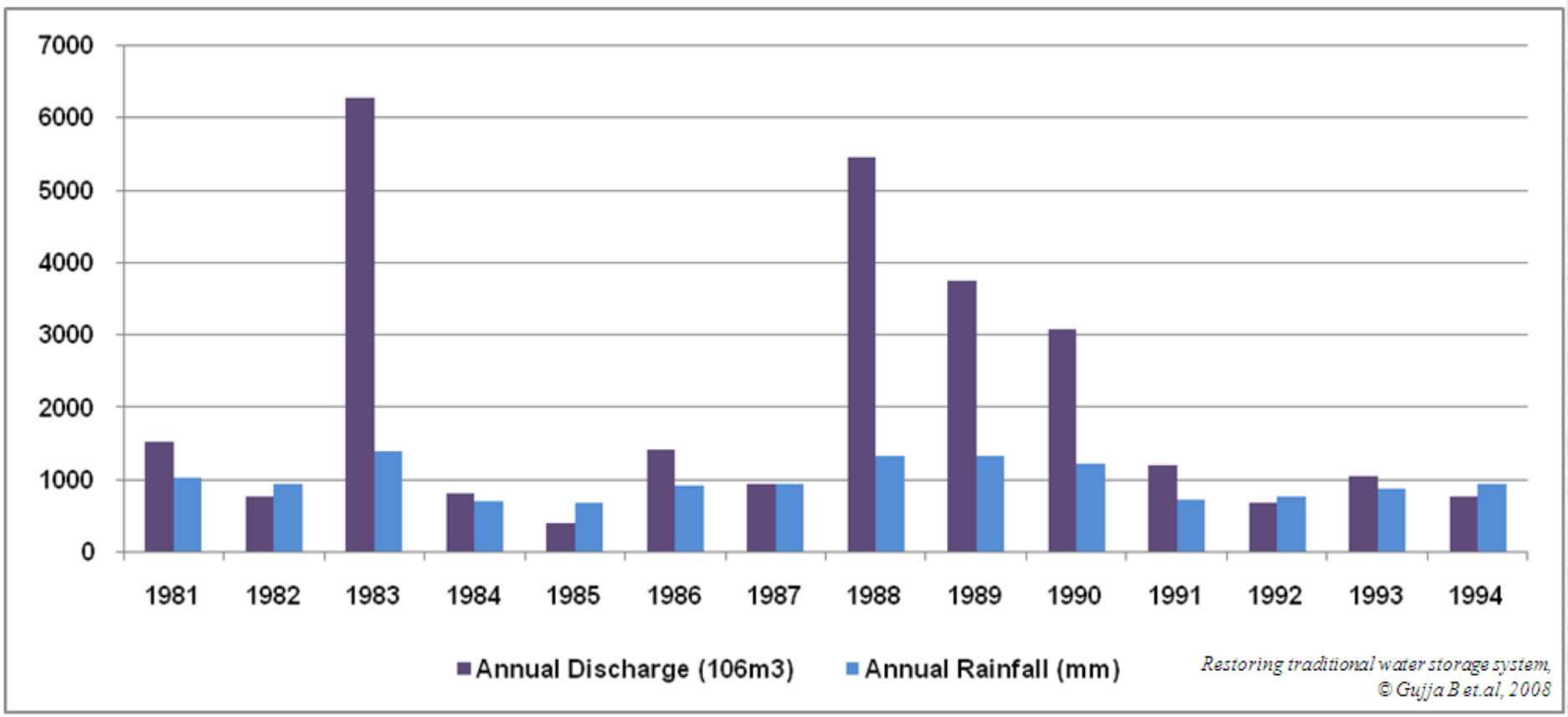
Water use

- Irrigation - 2000 mcm (four crops-1800?)
- This is about 17 % of the total rainwater into the basin
- Per-capita basis this is about 426 cu.m per person (2006)
- India per-capita total water consumption is estimated to be around 470 cu.m per person in 2006
- By 2050, the population 45% increase to 5.5 million,
- With estimation to the national level projects of increase in per-capita water consumption to 735 cu.m, the total water requirement in Maner basin would be around 4000 million cu.m.
- 60 % of water use is for one single crop Rice

Rainfall: the source of water..

- Rainfall is scarce and erratic
- A 100-year average 886 mm.
- 1920 and 1972 -dry years, 517 mm and 598 mm.
- highest average rainfall was in 1983 at 1386 mm.
- Rainfall variation - 320 % in the basin
- Most of the it in the monsoon (June-October)

Variation in annual discharge and rainfall over the Maner basin



Restoring traditional water storage system,
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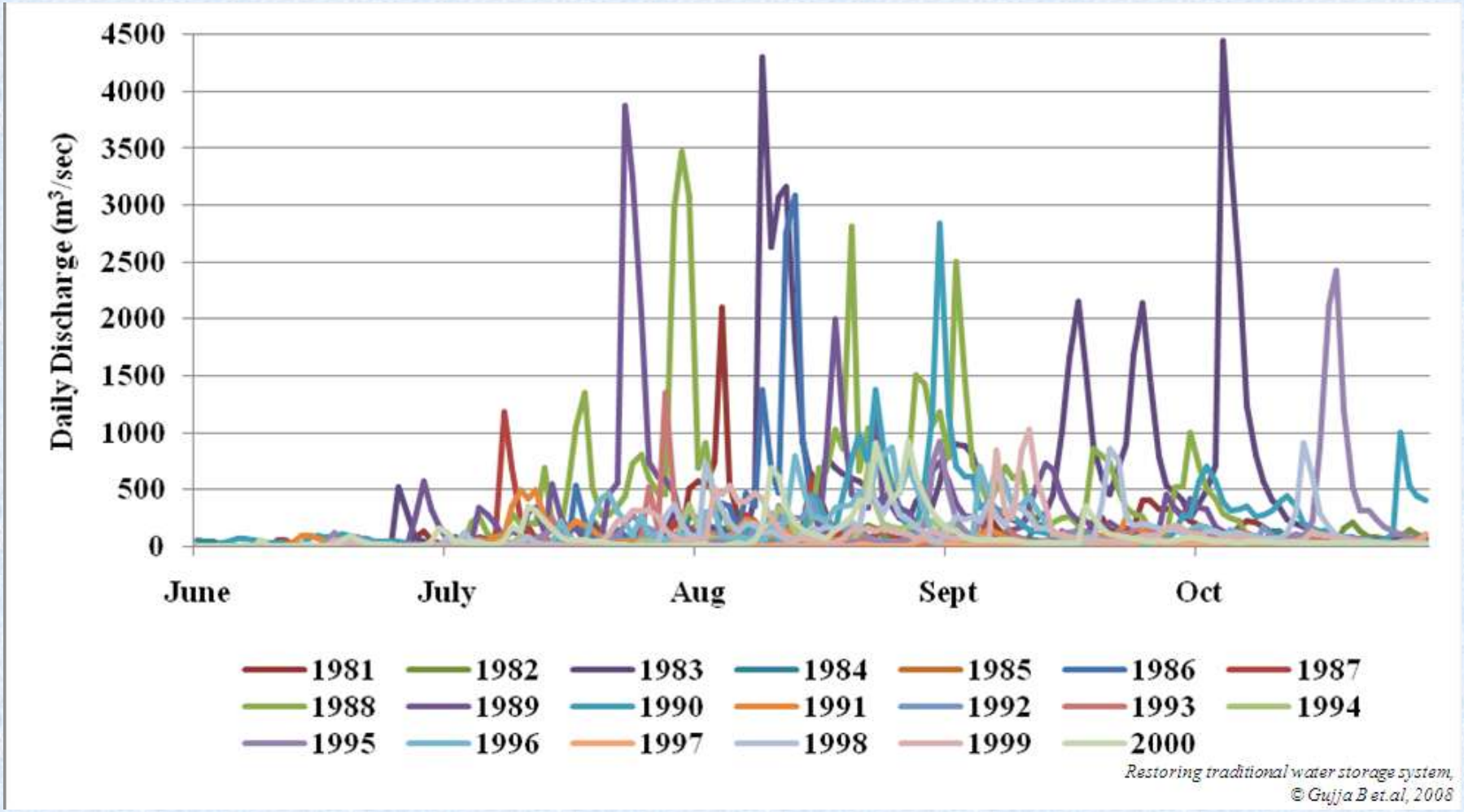
Daily discharge during monsoon period at Somanpalli gauging station (1981-2000)



Restoring traditional water storage system,
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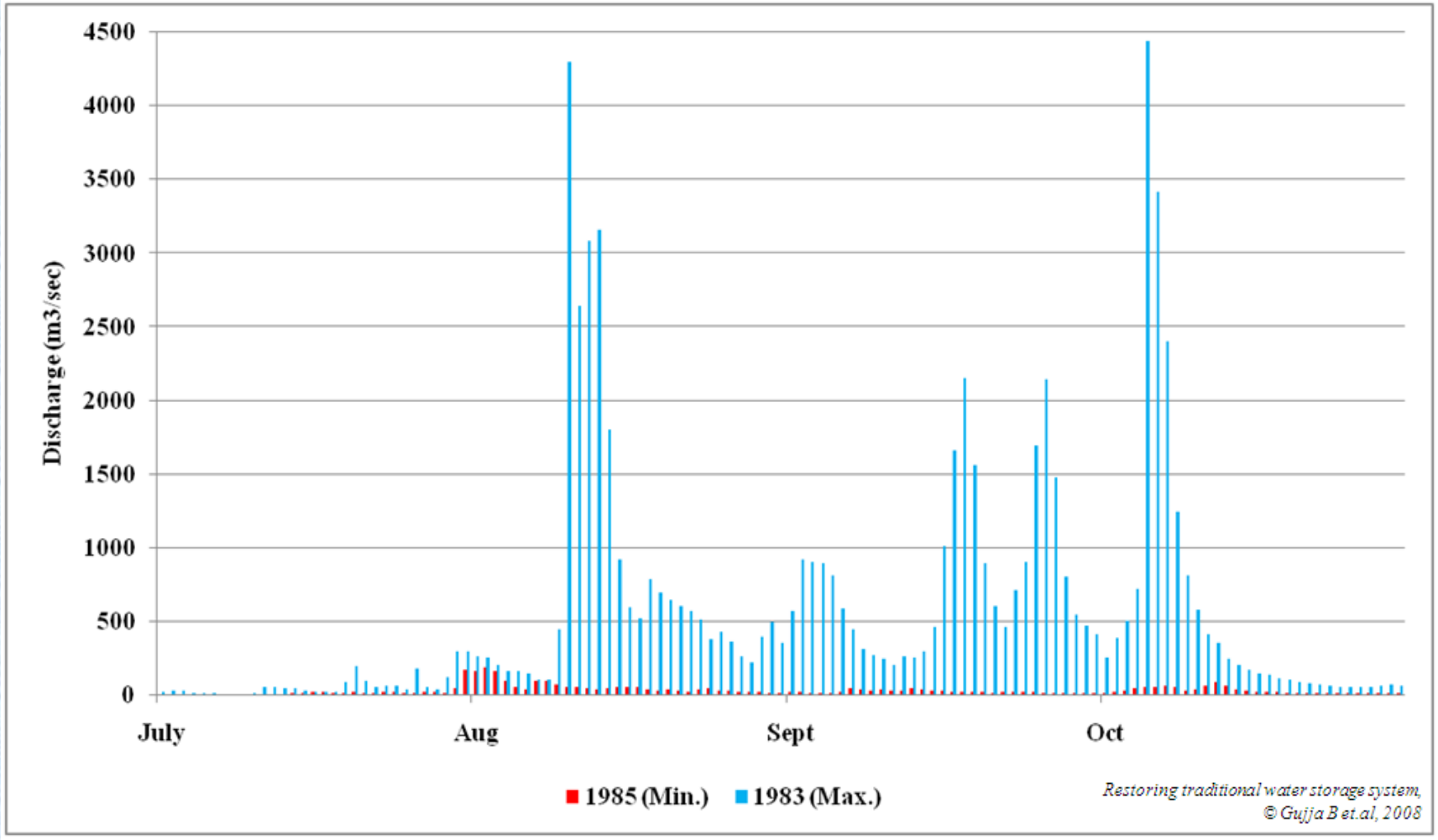
Daily discharge during maximum and minimum discharge year (1981-2000)



Is it possible to meet the demand by restoring the existing structures?

Main objectives:

- Tangible benefits cultivation and fisheries
- Indirect benefits, such as increased:
  - fodder production
  - organic manure production
  - silt amendments to improve soil in agricultural fields
  - domestic water
- Social
  - New employment
  - Decreasing migration to cities
  - **Resolving water conflicts**
- National
  - Avoiding large-scale water infrastructure projects
- Ecological

Tanks many values: Cultural, Spiritual, economic, ecological ..

- Drinking water for human and livestock
- Socio-cultural value, temples
- Washing, meeting place, public spaces
- Aquaculture
- Bird nesting
- Water for livestock, wild life
- Groundwater recharge
- Preventing soil erosion and floods
- Tank bed cultivation etc..

Tanks: source of life

SALI VAGU PROJECT,

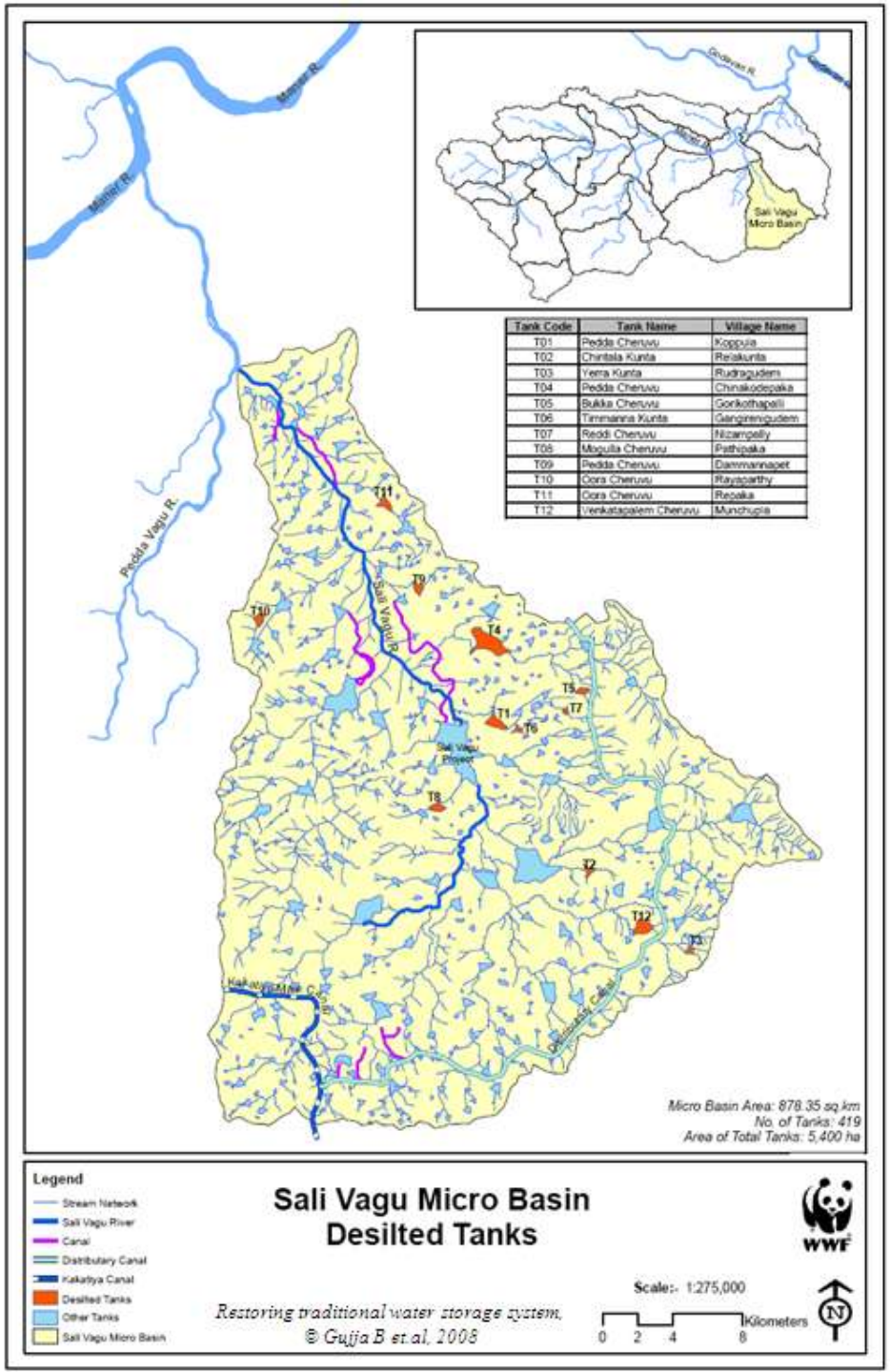
PEDDAKODEPAK(V) PARKAL Tq. WARANGAL DIST.

COST OF THE SCHEME : Rs. 40.[illegible] LAKHS.
PROPOSED AYACUT : 3[illegible] ACRES
LOCATION — [illegible]
CATCHMENT AREA — STREET. TO G. [illegible] SQ.MILE
INTERCEPTED 146.00
COMBINED. 196.00 SQ.MILES.
NATURE OF C.A. = 1/3 GOOD AND 2/3 AVERAGE.
RAIN GUAGE STATION AT PARKAL Tq. WARANGAL DISTRICT.
AVERAGE MONSOON RAINFALL 37.06"
YIELD :- TOTAL YIELD 780.0 M.C.F.T.
UTILIABLE YIELD 611.00 M.C.FT. CAPACITY 58[illegible]69 M.C.F.T.
MAXIMUM FLOOD DISCHARGE 7[illegible],300 CUSECS.
BUND :- LENGTH OF THE BUND FROM CH. 2-40 TO CH. 54-40.
MAXIMUM HEIGHT OF THE BUND IS 47.50 OR 14.33 MTs
STANDARDS :- SILL LEVEL = 696.50
F. R. L. = 712.00
M. W. L. = 717.00
T. B. L. = 44.00
TOP WIDTH OF BUND = 2'-0" FEET.
LENGTH OF DAM = 5240 FEET.
SLUICE :- WELL TYPE SLUICE OF SIZE 2'-6" x 5' CATCH CC 6.00.
WITH SILL LEVEL 694.50 (FRONT) & 96.50 (REAR)
WEIR :- W.C.WEIR 360 FEET LONG FROM CH. 54-40 TO CH. 58.00
WITH CREST LEVEL 711.00
2) [illegible] SHUTTERED FROM CH. 5-00 TO CH. 6.00
WITH CREST LEVEL 711.00
3) W.C.WEIR 600 FEET LONG FROM CH. [illegible] TO CH. 50
WITH CREST LEVEL 712.00

— IRRIGATION CHANNELS :—

MAIN CHANNEL :- THE LENGTH OF CHANNEL IS 31-00 CHAINS
AYACUT 124 ACRES NO. OF SLUICES = 2 NOS.
L.B. CHANNEL :- THE LENGTH OF CHANNEL IS 141 CHAINS.
AYACUT 737 ACRES NO. OF SLUICES = 14 NOS
R.B. CHANNEL :- THE LENGTH OF CHANNEL IS 340 CHAINS
AYACUT 2167 ACRES NO. OF SLUICES = 22 NOS.
VILLAGES BENEFITTED — 1) PEDDAKODEPAK 2) KOPPAL
3) CHINNAKODEPAK 4) CHINNAPUR 5) [illegible]NNA ETC. PARKAL.
WORK STARTED 1960 WORK COMPLETED 1964

Pipeline construction progress
under GLIS Project
Near Salivagu project



Tank Code	Tank Name	Village Name
T01	Pedda Cheruvu	Koppula
T02	Chintala Kunta	Relakunta
T03	Yerra Kunta	Rudragudem
T04	Pedda Cheruvu	Chinakodepaka
T05	Bukka Cheruvu	Gorlkothapalli
T06	Timmanna Kunta	Gangireyigudem
T07	Reddi Cheruvu	Nizampelly
T08	Moguila Cheruvu	Pathipaka
T09	Pedda Cheruvu	Dammannapet
T10	Oora Cheruvu	Rayaparthy
T11	Oora Cheruvu	Regalka
T12	Venkatapalem Cheruvu	Munchupia

The challenges

- Can increased water demand be met by managing water at the sub-basin level?
- Is it possible to take the climate change factor into consideration in estimating demand and making provisions to meet such increased demand?
- What other options are available for improving agricultural productivity?
- Is it possible to meet the water demand while improving terrestrial and aquatic ecosystem health?
- What would be the costs of meeting the demand locally?

Conclusion..

It is possible to manage water demand and also manage the variability of rainfall due to climate change by investing in traditional structures. This is the most effective way of addressing the climate induced variability by taking actions where it matters.

This way water conflicts could be reduced..

Publications

Publications

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Or just dial- 1916