ENVIRONMENTAL CONSIDERATIONS & SUSTAINABLE DEVELOPMENT IN A RIVER BASIN

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River obtains its sustenance from the environment .The quality of river water is linked with the quality of environment it has. Therefore it is necessary to ensure that the demand on the river environment does not exceed its present and future carrying capacity.

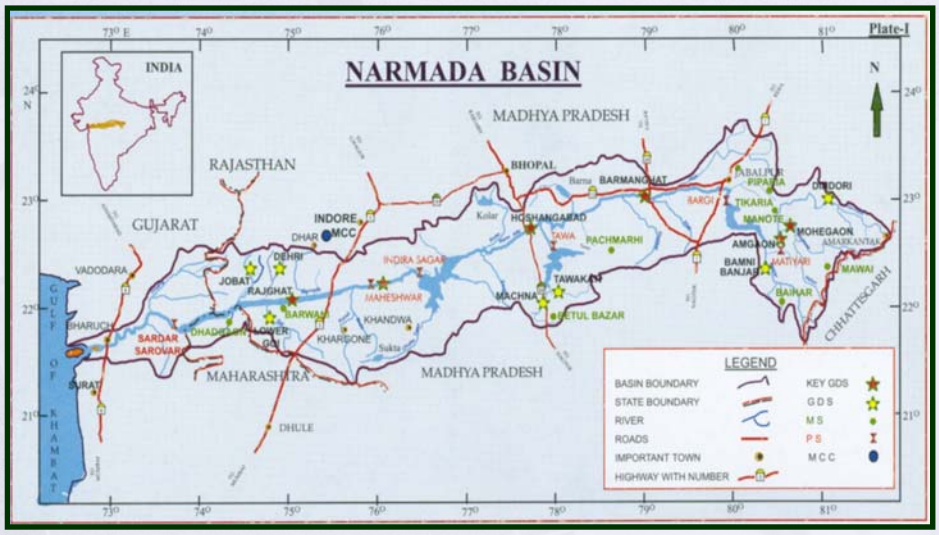
Water is fundamental to life on earth. For human populations and ecosystems to thrive, that water must be clean, it must stay clean and, most importantly, it must be accessible to all. The degradation of water quality in rivers, streams, lakes, and groundwater systems has a direct impact on ecosystems and human health. This state of affairs represents an unspeakable human tragedy, and is also major obstacle to development

.

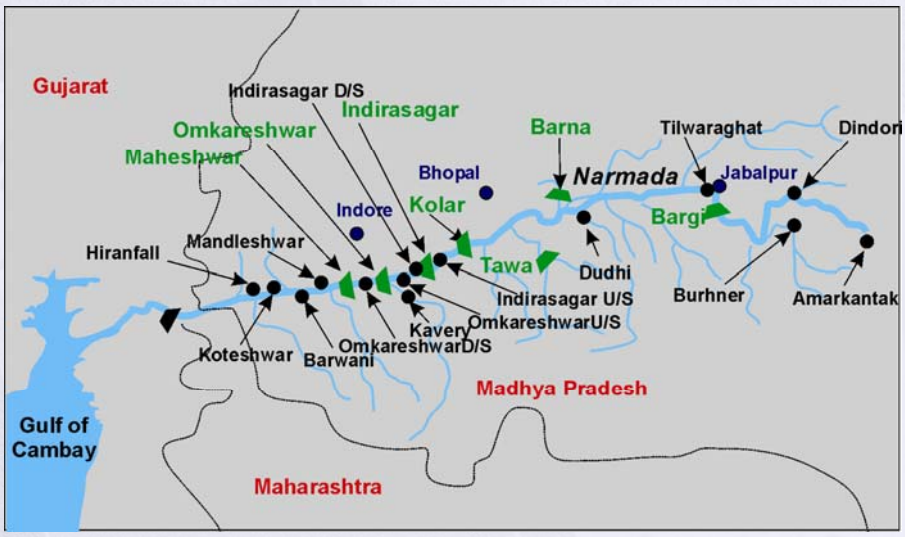
Irina Bokova
Director-General of UNESCO

Narmada Basin

Total Geographic Area	**98796Sq/km**
States covered	**four**
Area in Madhya Pradesh	**85859 Sq/km (86.16%)**
Total Length of the River	**1312 km**
River Course in M.P	**1079 km**
No. Of Districts in M.P	**23 Districts**
No. of Tributaries	**41**



Map showing various study sites of River Narmada



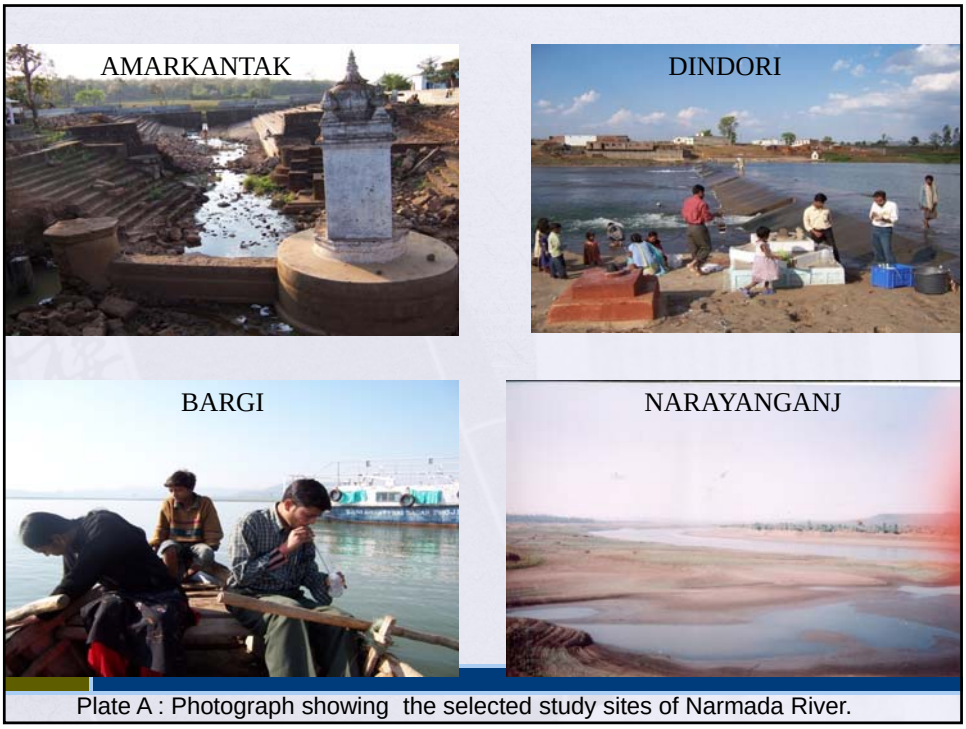
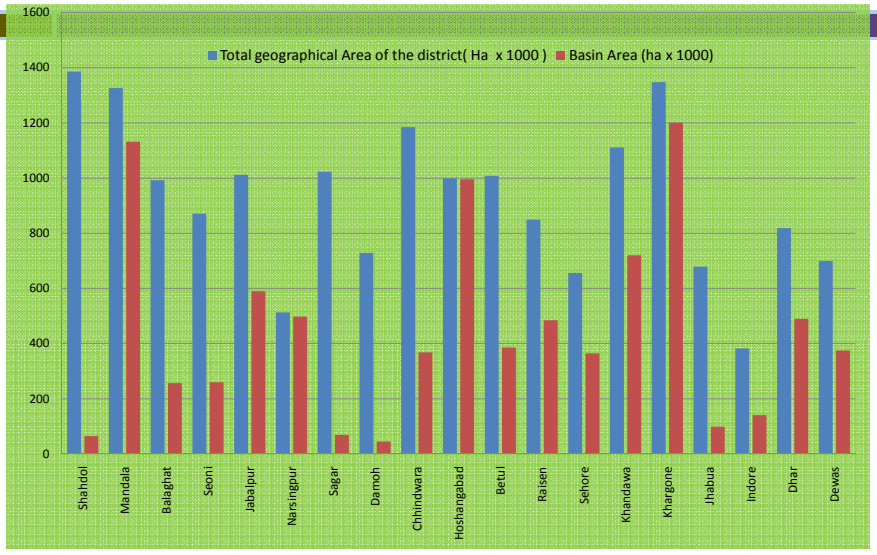


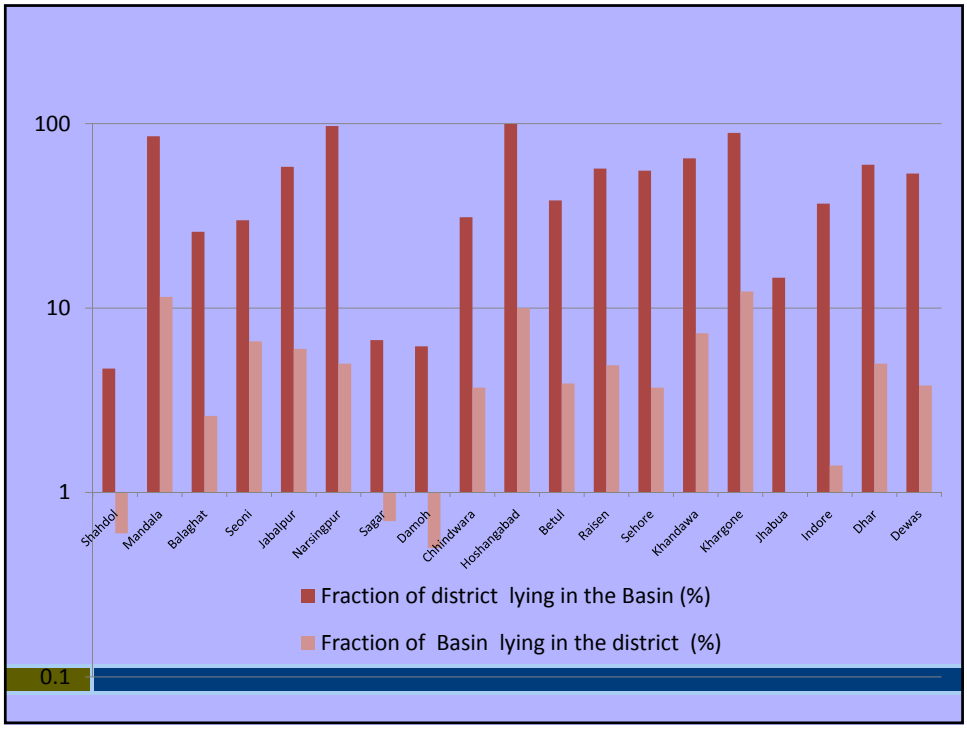
Plate A : Photograph showing the selected study sites of Narmada River.

POPULATION

BASIN POPULATION (MP)	12.7 MILLION
RURAL	84%
URBAN	16%
RURAL GROWTH RATE	5.49 – 44.09 %
URBAN GROWTH RATE	16.88 – 60.36 %
RATE OF URBANISATION	31.39 %

DISTRIBUTION OF BASIN AREA IN DIFFERENT DISTRICTS



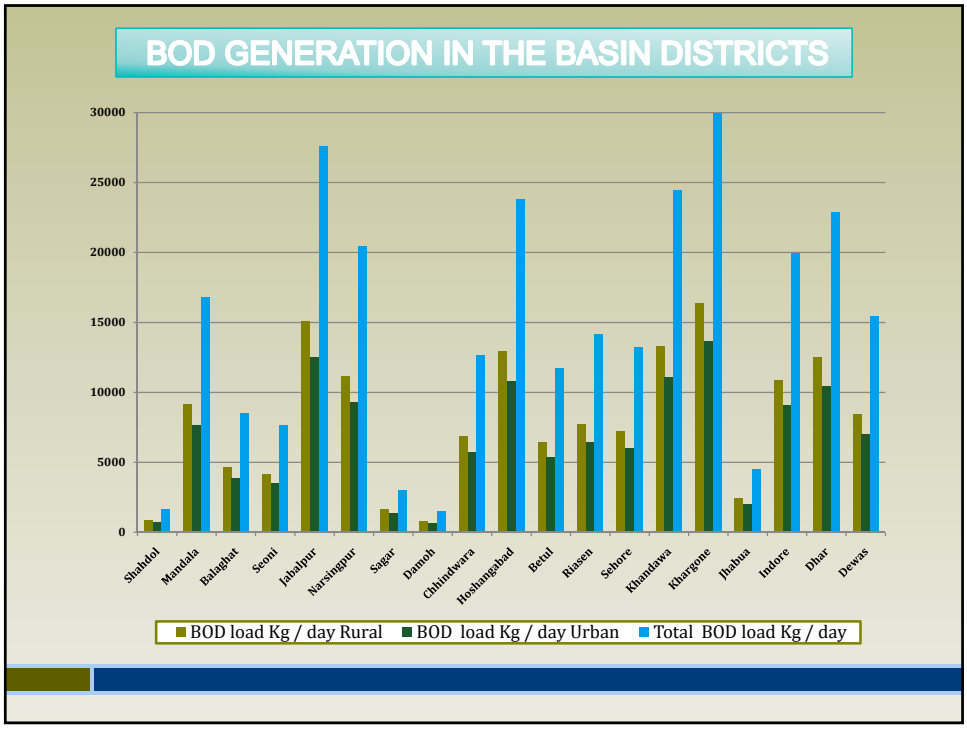


Growth in Basin Districts

Higher rate of development and growth occurring in the districts with comparatively smaller area of river basin:

Population growth rate:	21-60.3%
Population density:	186-663 /sq km
Rate of urbanisation:	31.39%
Industrial development	

Activities concentrating in certain districts only



BOD GENERATION FROM POPULATION

- **URBAN LOAD** — **127195 kg/day** (33%)
- **RURAL LOAD** — **152634 kg/day** (39.8%)
- **TOTAL IN THE BASIN** — **382628 kg/day**

POPULATION LOAD

URBAN POPULATION DECADAL GROWTH RATE IS HIGHER UPTO 60% AND LOWER IN RURAL AREAS

POINT ORIGIN WASTE WATER IN URBAN
NON POINT ORIGIN IN RURAL AREAS

TOTAL BOD DUE TO CATTLE POPULATION RELEASED IN THE RIVER BASIN HAS BEEN ESTIMATED TO BE 220154 kg/d REMAINS UN TREATED

HOSPITAL WATER CONSUMPTION IN THE BASIN4030400 l/d

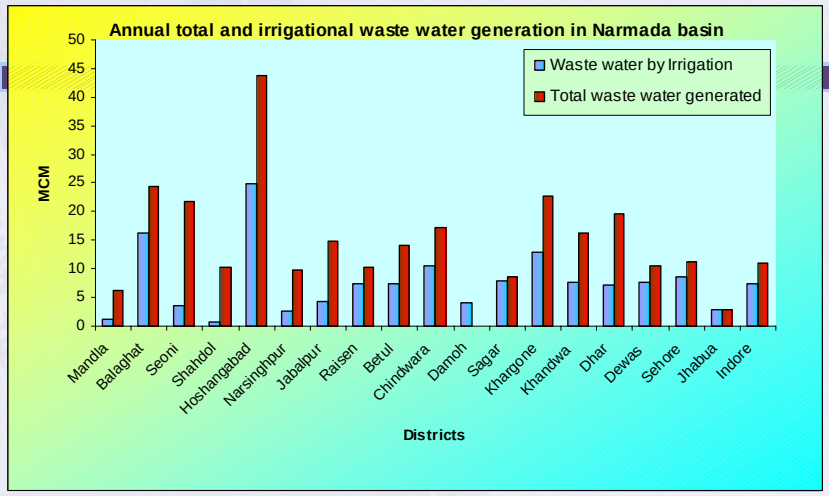
THE AVERAGE BOD VALUE OF THE RIVER HAS INCREASED FROM AVERAGE OF 2.3 mgl I N 1994 TO 5.4 mgl IN 2004-05

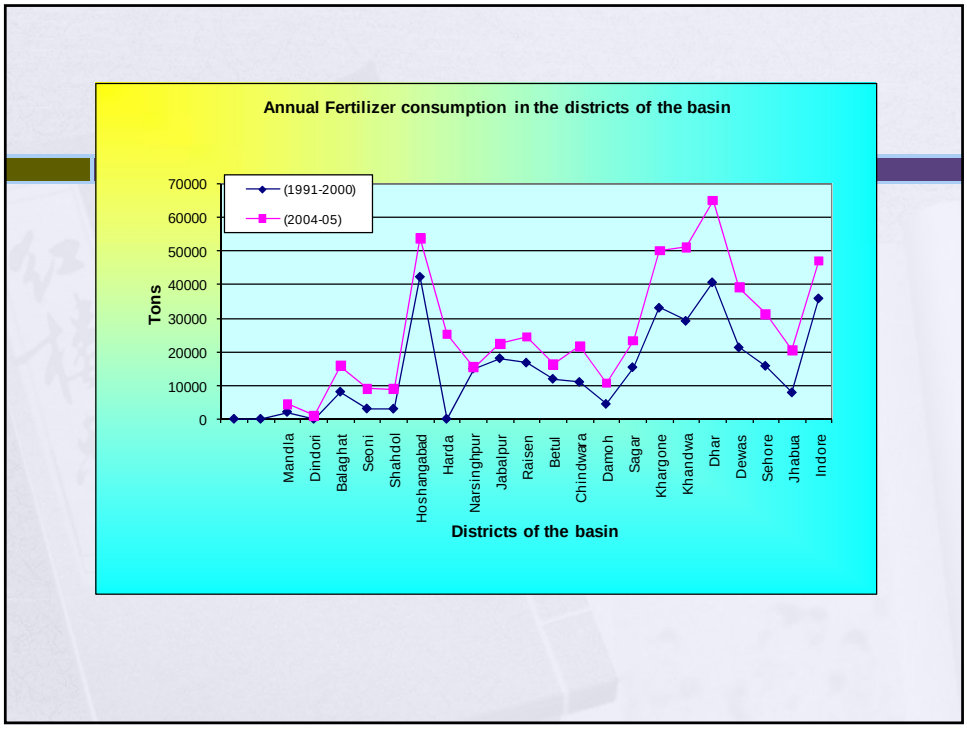
WASTE WATER GENERATION IN BASIN

TOTAL	**238.79 MCM**
INDUSTRIAL	**13.93 MCM**
SHARE OF INDUSTRIES IS	**5.83%**

BOD GENERATION FROM INDUSTRIES

- FROM INDUSTRIES — 18972.7 kg/day
- TOTAL IN THE BASIN — 382628 kg/day
- % OF INDUSTRIES — 4.95 %



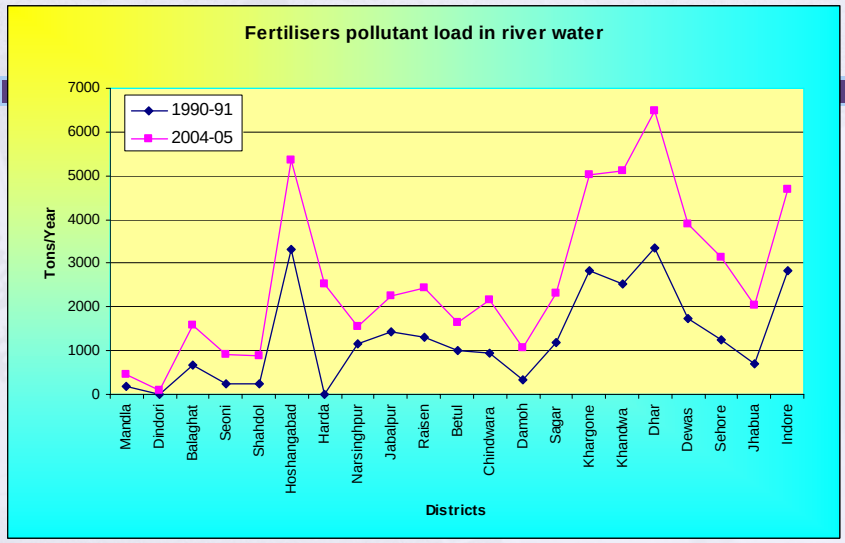


ANNUAL FERTILIZER CONSUMPTION IN THE BASIN

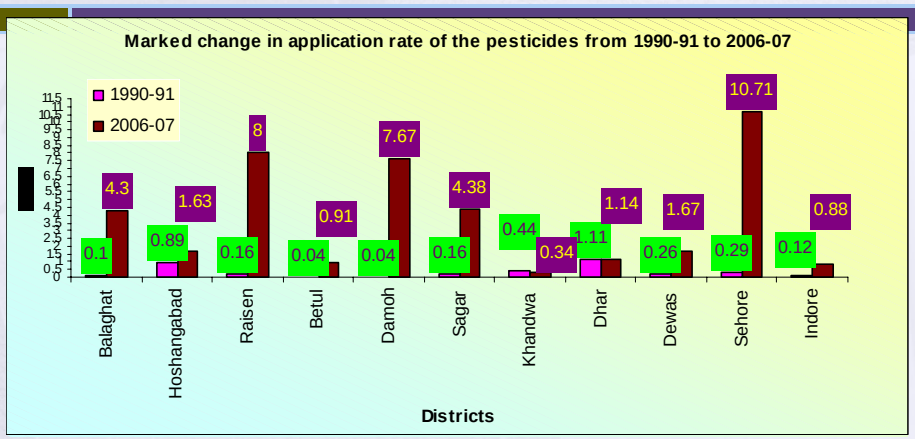
1990-91	3,35,541 TONS
2004-05	5,56,337 TONS
% INCREASE	: 40% (15 YRS)

POLLUTANT LOAD BY THE USE OF FERTILISERS

1990-91	:	27,258 TONS
2004-05	:	55,633 TONS
%INCREASE	:	51% (15 YRS)



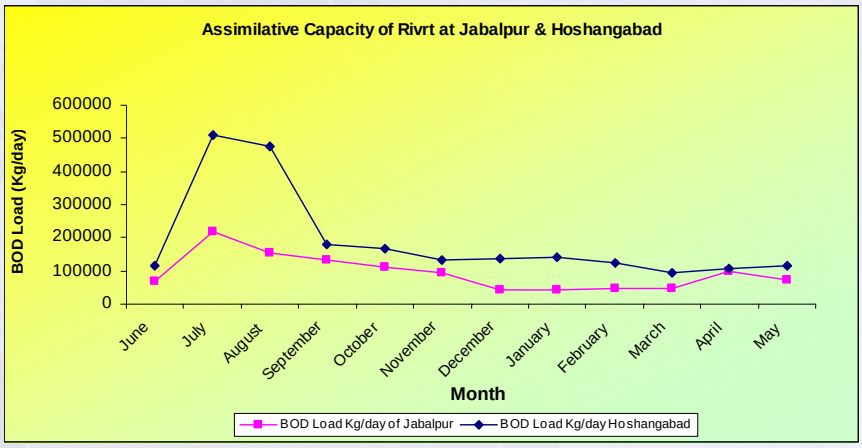
PESTICIDES APPLICATION RATE IN THE RIVER BASIN DISTRICTS



ASSIMILATIVE CAPACITY OF RIVER AT URBAN AGGLOMERATION

	JABALPUR	HOSHANGABAD
BOD load Kg/day	43000 - 217866	94241 - 511362
Distance considered	115 km>	71 km>
Water discharge	9.37km^3 yr^{-1}	23.82 km^3 yr^{-1}

ASSIMILATIVE CAPACITY OF THE RIVER



POLLUTION PRESSURE

- ABSENCE OF SEWERAGE SYSTEM FOR COLLECTION AND TREATMENT OF SEWAGE
- SEWAGE/WASTE WATER FLOWS THROUGH NATURAL DRAINAGE CONVERTED INTO CITY WASTE WATER DRAINAGE JOINS RIVER.
- SEPTIC TANK PROVISION FOR LIMITED POPULATION
- ABSENCE OF MEDICAL WASTE TREATMENT FACILITY IN MOST OF THE DISTRICTS.
- CITY DEVELOPMENT PLANS DO NOT INDICATE FUTURE DEVELOPMENT/TECHNOLOGY OPTIONS

SEWAGE GENERATION AND TREATMENT IN CLASS I CITIES AND CLASS II TOWNS (2001 POPULATION BASIS)

City category & population	Number of cities	Sewage generation, MLD	Installed sewage treatment capacity, MLD	Total capacity gap
All the above Class I cities together	441	26164	6047(23.1 %)	20117 (76.9%)
Class II towns having 0.5 to 1 lac population	489	2965	200 (4.8%)	2822 (95.2%)

Source: CPCB

Assimilative capacity of the river

H BAD HAS HIGH ASSIMILATIVE CAPACITY DUE TO
- HILL RANGES ON TWO SIDES
- THICK FOREST IN THE BASIN
- CAUSES PERENNIAL WATER FLOW

JABALPUR/EAST REGION ASSIMILATIVE CAPACITY IS LOWER
- CLOSE TO RIVER ORIGIN: SMALLER BASIN AREA
- NO THICK FOREST IN BASIN
- WATER DISCHARGE IS LOWER

WESTERN REGON BASIN WATER DISCHARGE IS POOR
ASSIMILATIVE CAPACITY IS LOWER
- HAS FLAT AREA,
- AGRICULTUER LAND USE,
- NO FOREST IN THE BASIN,
- DAMS CONSTRUCTED ON TRIBUTARIES AND MAIN RIVER

- ASSIMILATIVE CAPACITY TO BE ESTIMATED BASED ON WATER DISCHARGE RATE IN THE RIVER AND THE DEVELOPMENT ACCORDINGLY DONE WITH RESPECT TO:
  - POPULATION
  - INDUSTRIES
  - AGRICULTURE (THE INNOCENT CULPRIT)

ISSUES OF BASIN ENVIRONMENT

AREA OF THE RIVER BASIN FALLS IN SEVERAL ADMINISTRATIVE DISTRICTS/UNITS

DISTRICT AREA MAY HAVE MORE THAN ONE RIVER BASIN

LAND USE OF THE UNITS GREATLY INFLUENCES THE RIVER ECOLGY/ENVIRONMENTAL QAULITY

- WATER QUALITY
- BIODIVERSITY
- BIOPRODUCTIVITY
- HUMAN HEALTH/SOCIAL IMPACTS

ADMINISTRATIVE UNITS ARE ENTITY FOR PLANNING & DEVELOPMENT: ENVIRONMENTAL PRESSURE CONCENTATED AT ONE PLACE, IMPACT THE RIVER ENVIRONMENTAL QUALITY

PRESENT DISTRICT DVELOPMENT PLANS DO NOT PREDICT POSSIBLE ENVIRONMENTAL PRESSURE EMANATING FROM THE DEVELOPMENT OF BASIN DSITRICTS.

SITUATION CAN BE AVERTED BY ADOPTING ALTERNATIVE APPROACH FOR DEVELOPMENT PLANNING

OTHER RIVER BASIN AREAS IN THE DISRICT MAY BE EXPLORED FOR DEVELOPMENT

CARRYING CAPACITY OF THESE BASIN AREAS IN THE DISTRICT SHOULD BE DETERMINED WITH REPECT TO DEVELOPMENT (POPULATION,INDUSTRIES ETC)

THIS ASSESSMENT OF THE DISTRICT BASIN AREA TO PRECEED ITS DEVELOPMENTAL PLANNING

DISTRICT DEVELOPMENT PLAN TO INDICATE CLEAR ENVIRONMENTAL OBJECTIVES ALSO

THE TOTAL WASTE WATER/BOD LOAD NOT TO EXCEED THE RIVER ASSIMILATIVE CAPACITY

DEVELOPMENT PROGRAMMES MAY BE DIVERTED/CONSIDERED FOR OTHER BASIN AREAS OF THE SAME DISTRICT OR

DIVERTED TO ANOTHER DISRICT WHICH PERMITS/ASSIMILATE THE ADDITIONAL POLLUTION LOAD

DEVELOPMENT PLANING TO BE DONE AT DISTRICT BASIN LEVEL THAN AT ADMINISTRATIVE AREA LEVEL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महोत्सव
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