The Great Yellow River's

Integrated River Basin Management For Keeping it's Healthy Life

Sun Feng, Yellow River Conservancy Commission
Istanbul, 2009 March.

Presentation outline

- Introduction
- Challenges
- Adaptive Measures
- Achievements

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INTERNATIONAL NETWORK OF BASIN ORGANIZATIONS

The Yellow River Basin

- **length:** 5,400 km
- **catchment area:** 790,000 km²
- **Flow:** 500 m³/s (Huayuankou)
- **inhabitants in ca.:** ca. 115 Mio.
- **political structure:** 9 provinces
- **drinking water for:** 100 Mio inhab.

- **sediment load:** average 1.6
  billions tons/yr; very high sediment accretion
  35 – 900 g /L SS
- **river is used for**
  hydropower
  cooling water
  drinking water
  irrigation
  waste water discharge

Yellow River Conservancy Commission (YRCC)

- State level River Basin Authority
- 40,000 Staff, in which 10,000 Engineers/Scientists
- 16 Departments and 17 Bureaus
- Water policy/Water administration
- Public works Management
- Engineering Consulting
- Civil Construction
- Hydraulic research
- Hydrology and Water quality

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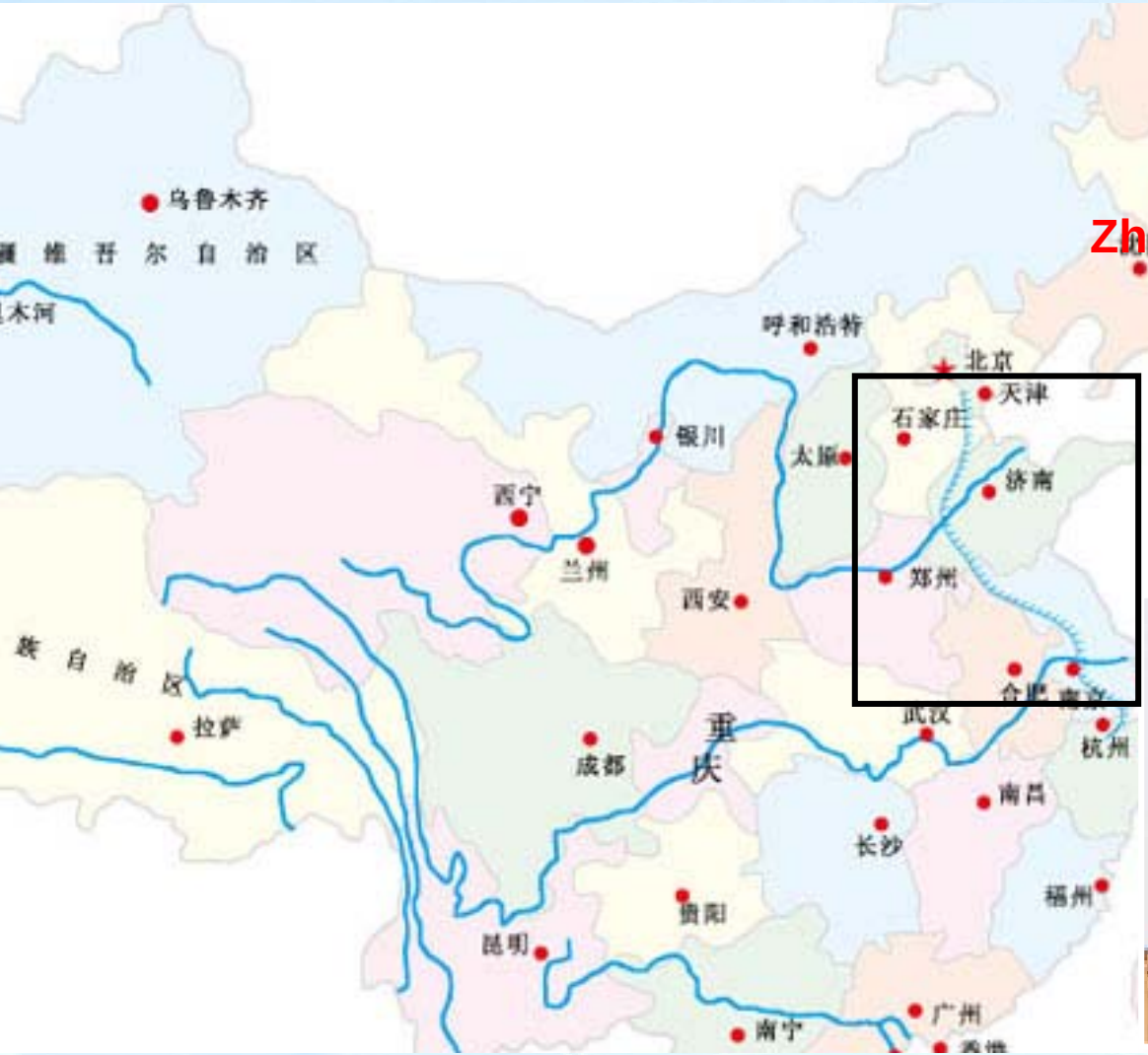
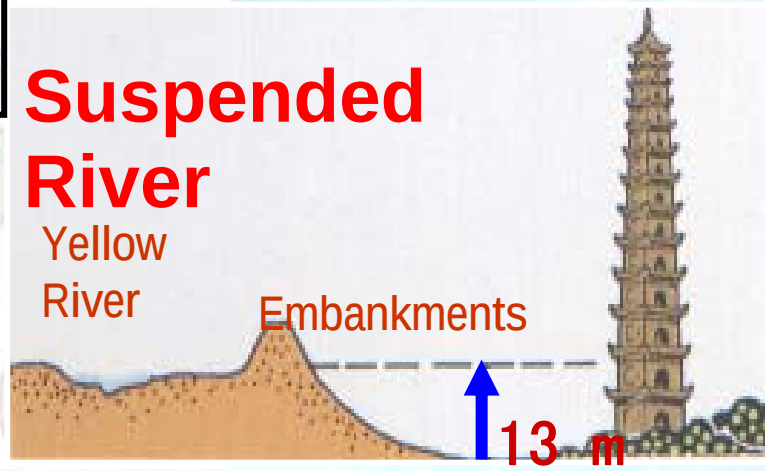
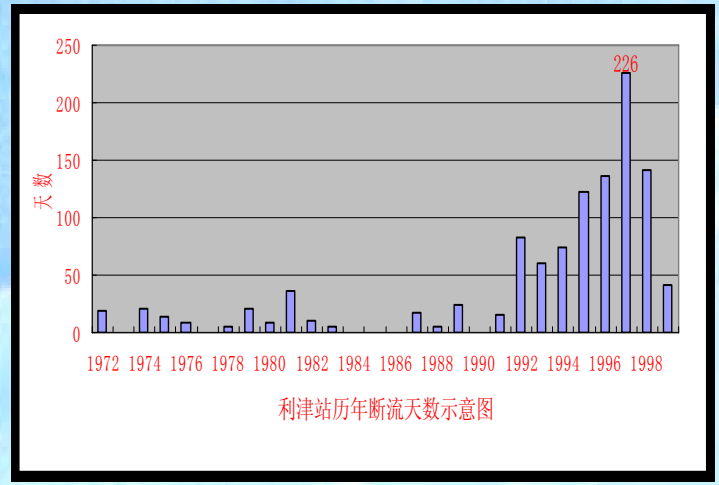
Challenges
--Flood Threat





Challenges
--Water Scarcity

- Climate Change
- Economic development
- Population growth
- Water scarcity



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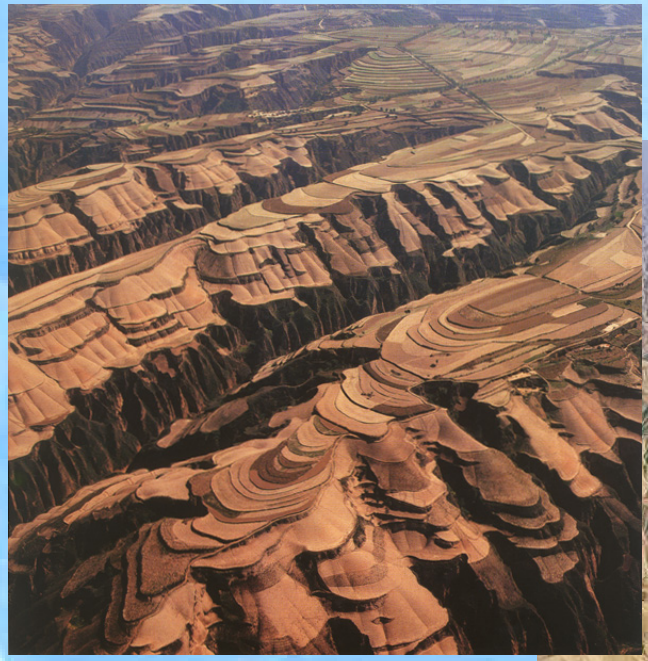
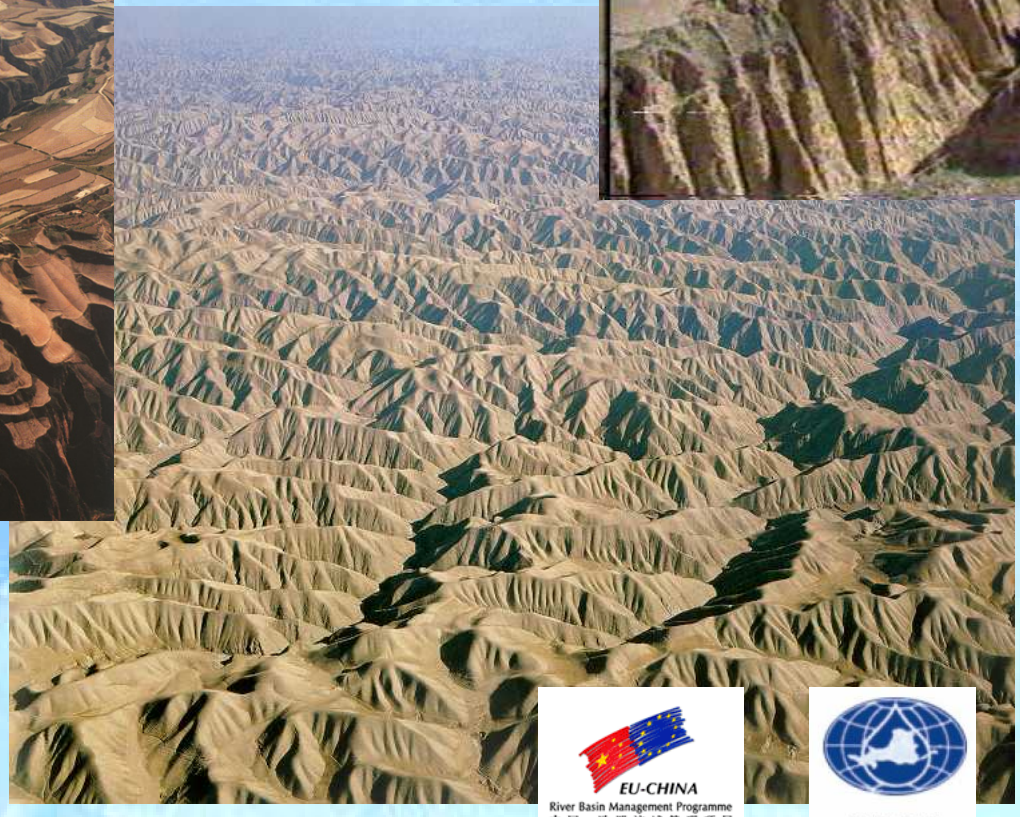
Challenges
--Soil Erosion





Loess Plateau

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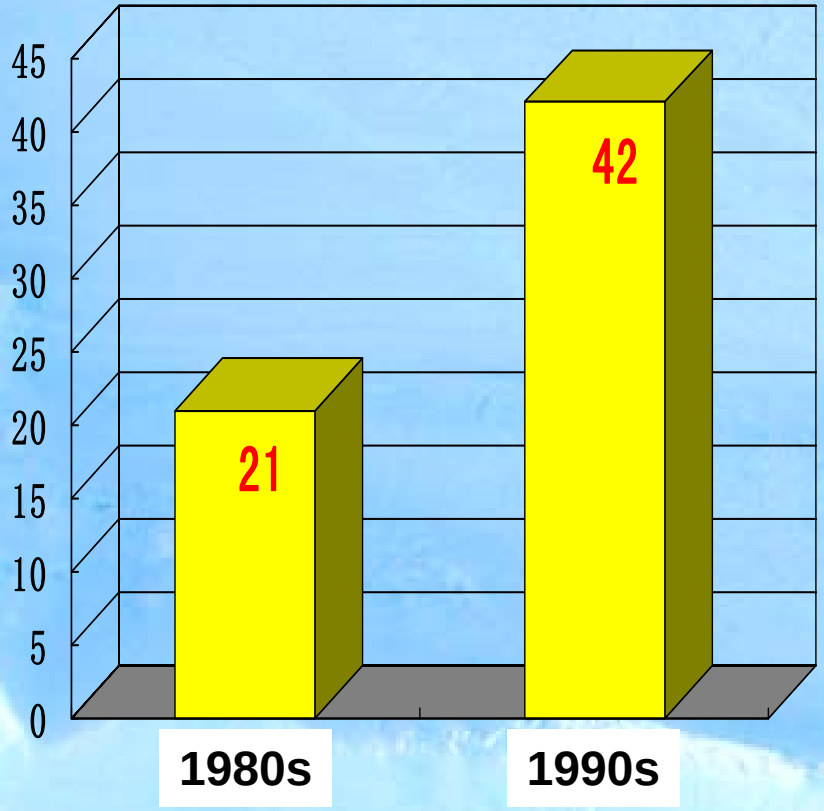
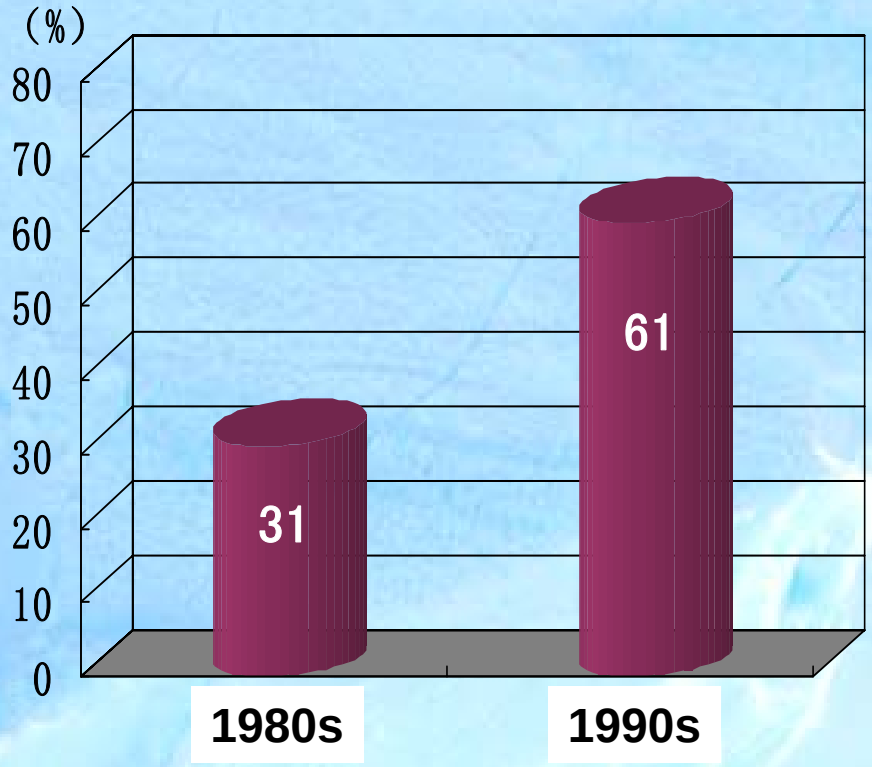
Challenges
--Water Pollution



Waste Inflow (0.1 billion ton)



Poor Water quality

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Flood Threat

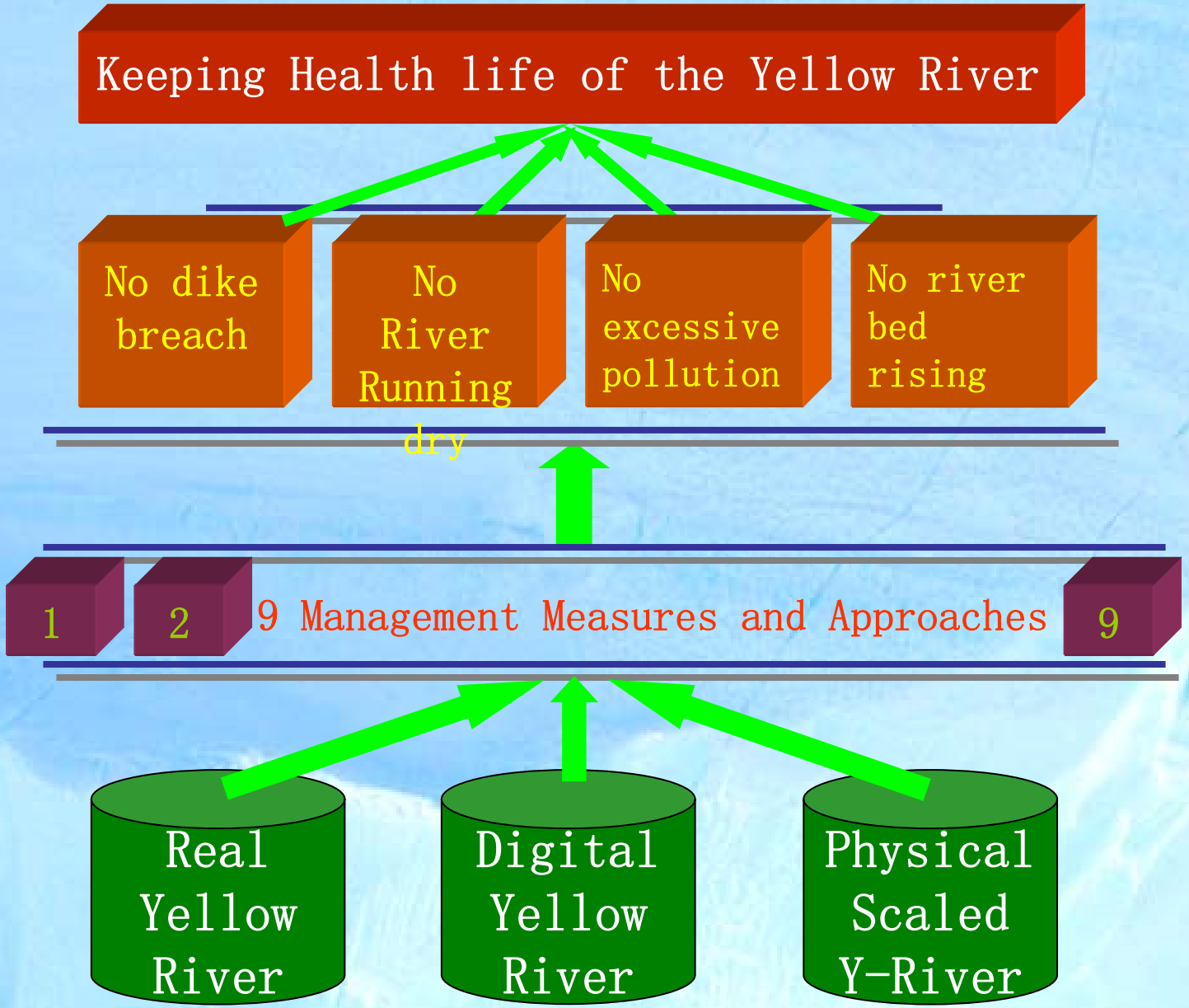
Water Shortage

Soil Erosion

Water Pollution

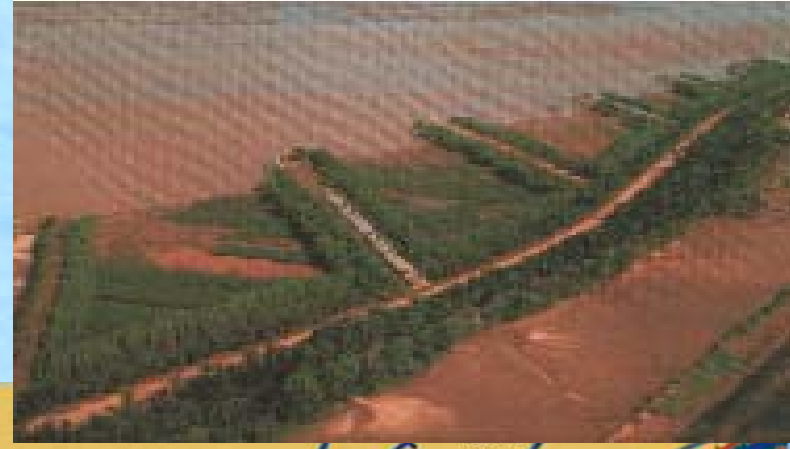
Wetland deterioration

Adaptive Measures--” 1493” Scheme



Flood Management

- Structure measures:1400 km Embankments
- Dam projects/ detention basin
- non-structural measures: flood forecasting and warning system



Integrated Water Allocation & Environmental Flow in Basin Scale

10 years for:
- River flow
- Ecological restoration
- Sediments transportation
- Water quality
- Equality of water use

Integrated Water Allocation & Environmental Flow

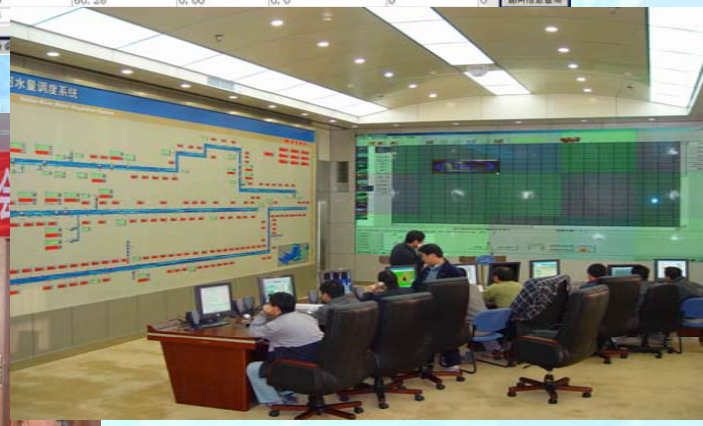
Legal Measures

- Yellow River Water Quota Allocation
- Yellow River Water Allocation Management Rules
- Yellow River Water Allocation Regulation
- Yellow River Basin Drought Alleviation Scheme

Public Consultation

Technical Measures

- Water Allocation Scheme
- Remote Control and Real Time Control
- Water Quality Monitoring



Economic Measures

- Water Pricing & Water Marke
- Water Right Transfer

Sediment & Water Regulating

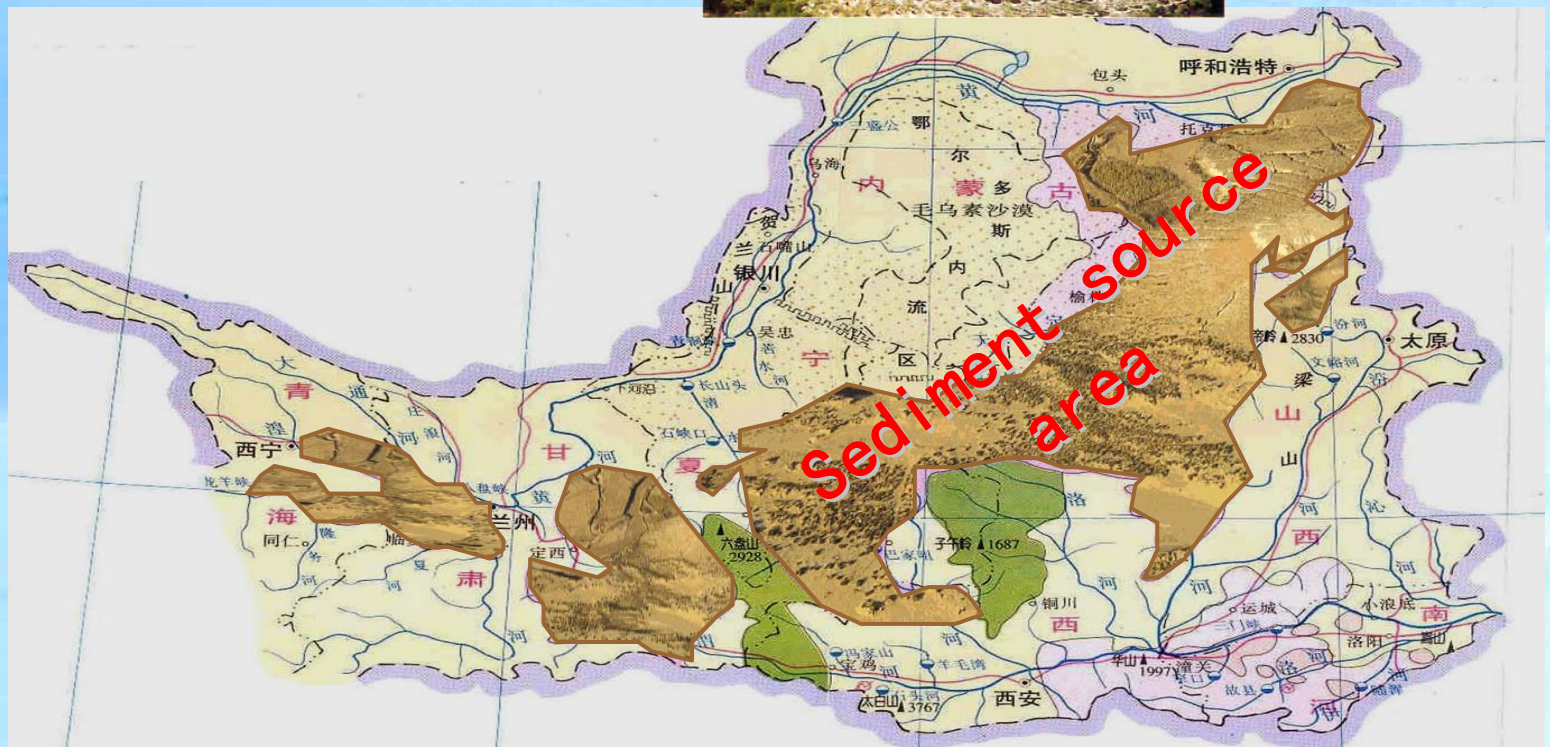
–Artificial Floods 2002-2008

- Flushing River Sediments
- Reservoirs Maintenance/protection from Siltation
- Flood Plain and Wetlands Restoration
- Improve River Morphology and Reduce Flood Risk

Soil Erosion Control & Watershed Rehabilitation

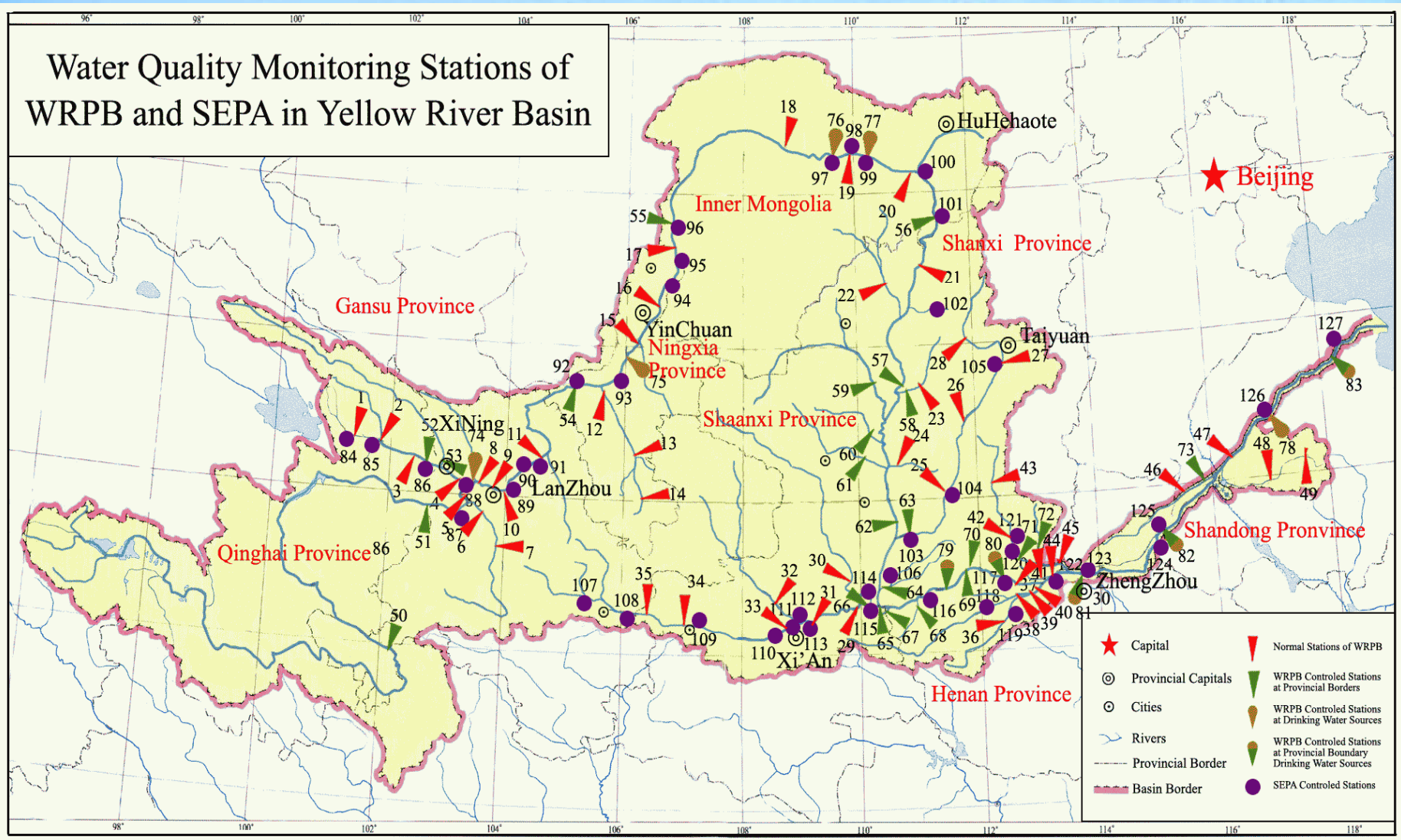
- Structure measures
- Vegetative measures
- Erosion Monitoring

Sediment traps



Water Resources protection

Regulation



Achievements

60 years Flood Security

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Achievements

- Ecosystem protection in the headstream

Achievements (Con.)

Water and Soil Conservation in the middle Loess Plateau

Loess PLateau

Riverine Wetlands

Riverine wetlands

wetland on floodplain varies with the changes of the drying up situation, the total area of the natural river channel wetland in the lower reaches approximate 800km2

Wetlands in floodplain

Increased Biodiversity

Four typical wetland area changes before and after flow management

Image date	960531	971009	980505	000502	010331	040414
Reed	4.82	5.33	4.33	4.45	4.67	4.41
Shrubbery	0.26	0.36	0.19	0.52	0.36	1.31
Reservoir	1.32	1.57	1.59	2.09	2.39	2.36
Artificial saltmarsh	8.67	9.82	9.84	10.23	9.74	12.42

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Yellow River Delta

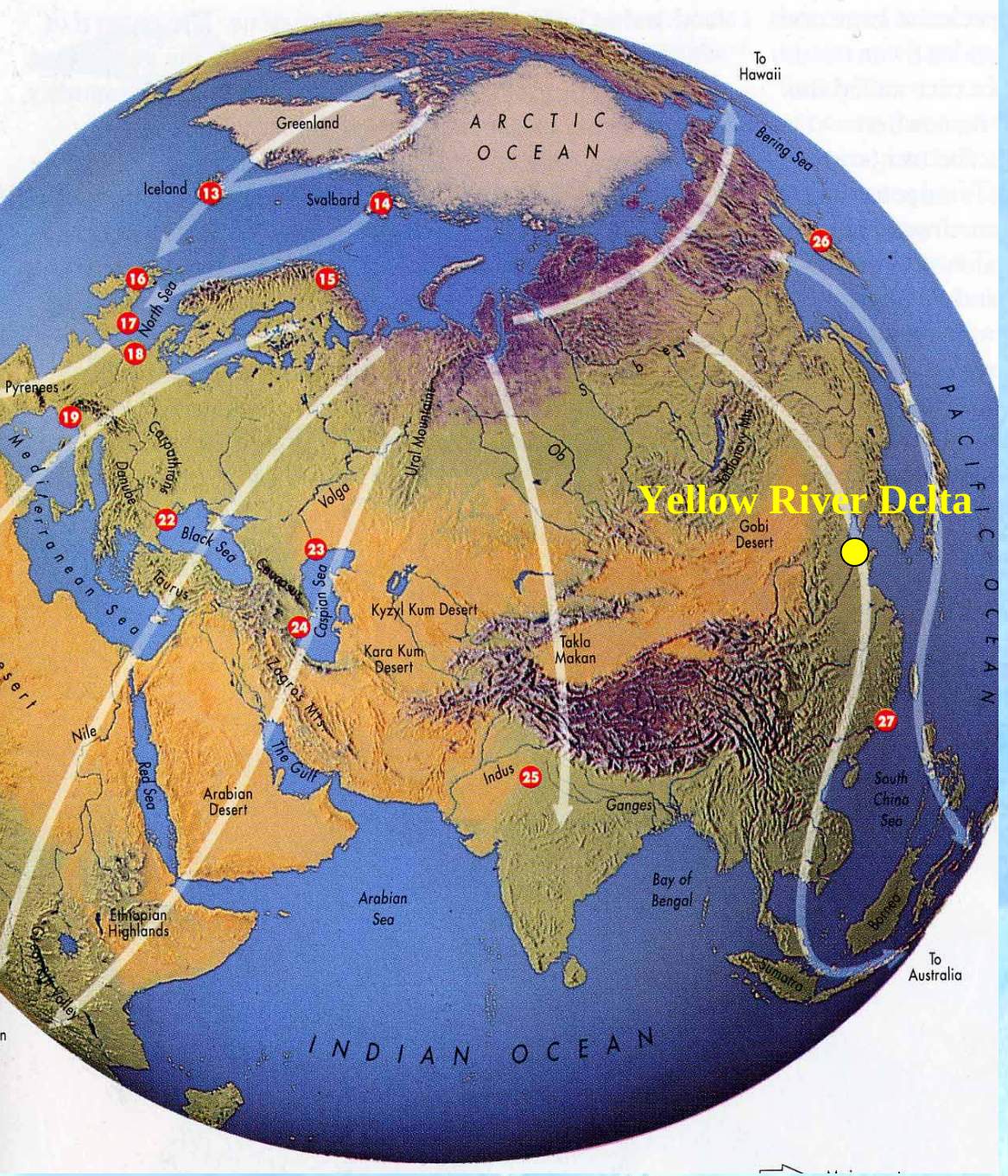
- Biodiversity increased
  - Rare fishes reappeared, saury, bronze grudge etc.
  - New habitats for birds

    from 187 species in1992 to 283 species in 2004
  - More Rare wild animals , 459 kinds found in the reserve, nearly doubled
  - Wetlands vegetation increased

Eastern Egret

鸟类迁徙路线

Migration routes in Eurasia



白天鹅 山东东营广南水库 2003.2

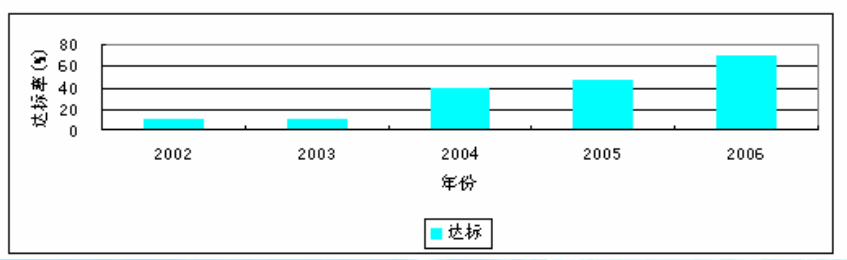
Delta wetland

Achievements (Con.)

Water Quality & Water Quantity

- Continuous river flow restored
  - in 1997, zero flow at Lijin Station, 226 days
  - In 1999, integrated water allocation for the mainstream, since then, 10 consecutive years of no drying up

- Water quality improved
- Water quality trends of mainstream of the Yellow River in 2002-2006



Achievements (Con.)

- Groundwater Recharge
  - In Sept. 2003, The Baotu spring of Jinan, started spraying firstly after it stopped Mar. 30 1976.
  - the water transfer from the Yellow River to Qingdao Project.
  - supply ground water along the route, reduces the settlement of funnel areas along the transfer route and that of Qingdao city, and effectively reduces the sea water intruding to Qingdao, reverses the passive situation caused by water shortage to the opening-up and economic development of Qingdao

Achievements (Con.)

Social-Economic Sustainability

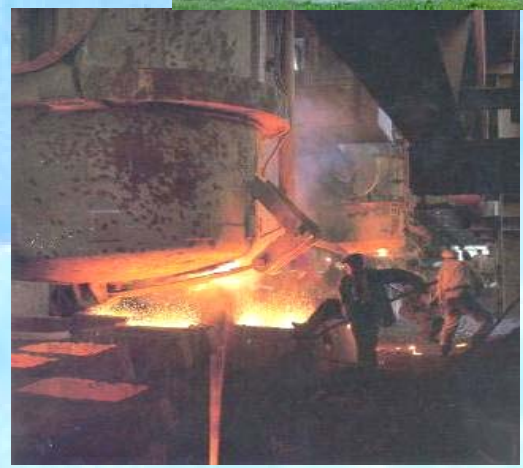
- Equality of water use
- Water saving
  - Water use efficiency

    In 1997, water used was 560 m3 for 10thousand RMB GDP,

    in 2003, 309 m3, up 45%
  - Water used fall down

    Inner Mongolia, 6.491billion m3, down to 5.952 billion m3

    Shan Dong, 8.745 billion m3, down to 6.625 billion m3
- Economic boost
  - Basin GDP Increase average 30.9 billion RMB/year



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Harmonious & Healthy

Acknowledgements