Tianjin, a newly-developed coastal megacity at enclosed Bohai Bay: development and challenge

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Highlight

• Coastal megacity – a complex of societal development
• Geographic significance
• A mirror of reflector to sustainability
• ICM
• What we are still missing???
Population distribution

Source: Gridded World Population
Megacity – Tianjin at enclosed Bohai Bay

Geographic advantage and disadvantage
Harbor city – enclosed bay
Extensive hinterland
Extensive coastline
Marian habitat and eco-service
Strong industrial base
Manpower
Population and city land

- Total population - 3 million by 1950, 10 million by 2004; ca. 12.5 million by now;
- 13.5 million by 2015 (ca. 5 million in new city);
- Population density: 796.25 people/km^2;
- Total megacity area - 4334.72 km^2;
- Newly-developed coastal city - 350 km^2;
- By 2020, total construction area - 1450 km^2 (downtown - 580 km^2);
Design and plan

Old city-downtown

Newly-developed Coastal zone

Hi-tech zone

Coastal economical development zone
Ca. 350 km^2
One axis to motivate 3-sectors
Bohai periphery – a gigantic forcing

- Cutting down 600,000 population in downtown to the new coastal city, by the year of 2015-2020
Coastal reclamation
WANG et al., 2010, CEAN TECHNOLOGY
Vol.29 . No.2

Km^2

2003 2004 2005 2006 2007 2008

2.51 2.45 12.14 12.40 45.75 57.82
Development and challenges

Hai Ho networks

- Nine rivers flowing down to Bohai, as a confluence of Hai Ho; mostly dying due to irrigation, and upstream damming (>9000)
- Hai Ho networks - the most importance nature water resources with an annual discharge of 21.2 x 10^9 m^3
- Saltwater intrusion
- Industrial pollution
Water shortage

- Underground water pumping – water level lowering to several tens of meters below ground surface

- Water diversion from the Yellow River to Tianjin (several thousands of millions of m$^3$, annually)

- Water resources: 160 m$^3$/person; about 2% of averaged one/person in the world, and 6% of China
Sea level rise – 2.5 mm/a

TM-based study by Han et al., 1994, Journal of ACTA, GEOGRAPHICA SINICA

China Ocean Administration, 2010
Desalinization

Zhang J.S (China Hai Ho Water conservancy Commission)
http://www.chinawater.net.cn/zt/07haixia/w071102-1-5.pdf

- Strong industrial base – Hi-tech and skills – supporting a mature desalinization system

- Bohai enclosed bay – a natural setting for industrial and economical development: long coast (>100 km), a easy way for accessing seawater intake, etc.;

- From 1998, 3000 barrel per month, ca. 3000 ton provided to market; Water quality similar to pure bottle water

- By 2010, 500,000 ton/day; production capacity 1.5 x 10^8 ton, which can nearly meet the demand for the newly-developed coastal zone (ca. 4.88 x 10^8 ton);
A better ICM needed
Policy modification and implementation
Thanks