Policy or Peasants: Who Can Build the "Bridge over China's Troubled Waters?"

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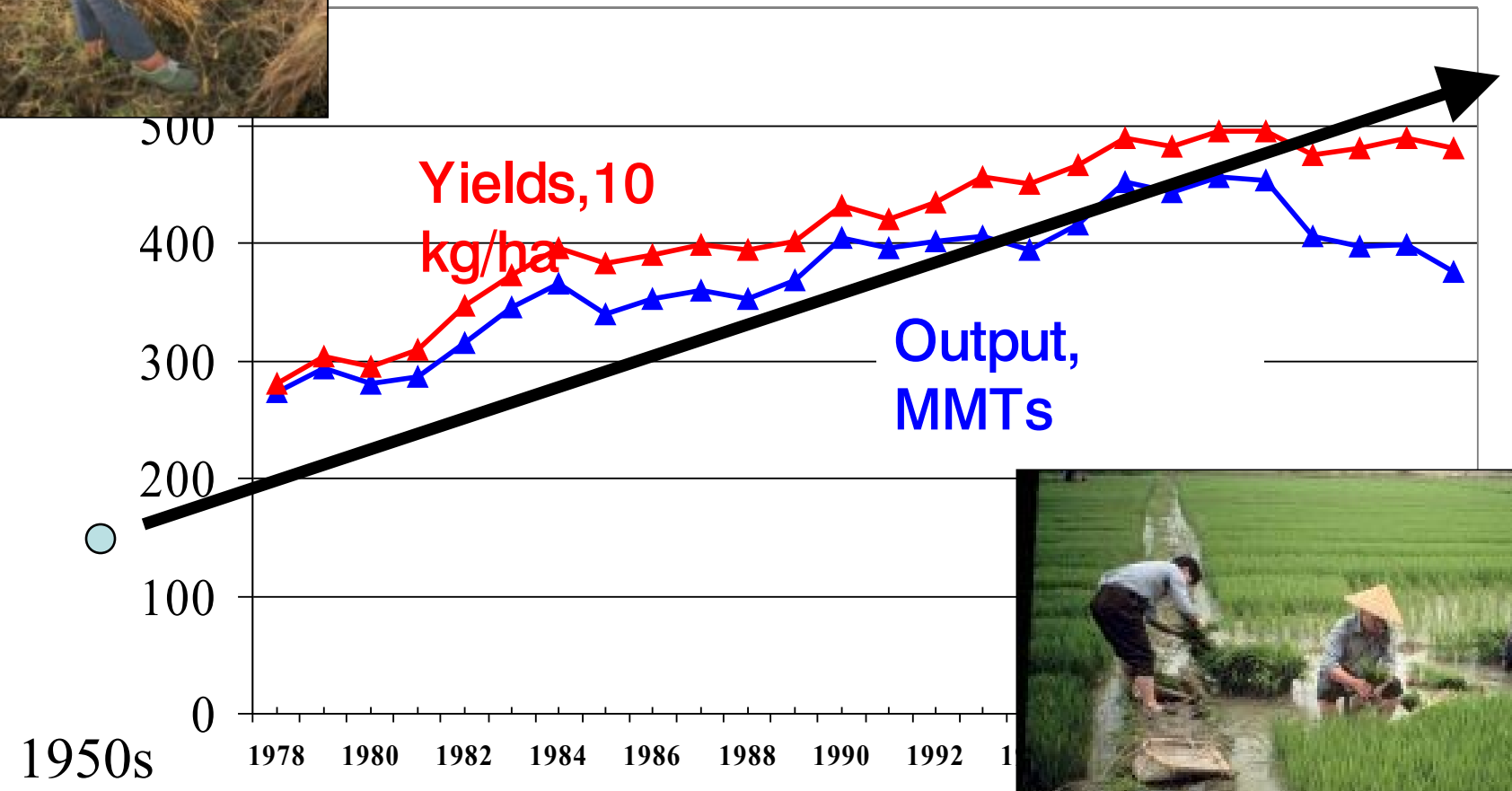
Grain production in China, 1950s – 2000s



Competition for Water

- More and more water being allocated to urban and industrial uses

- National policy:

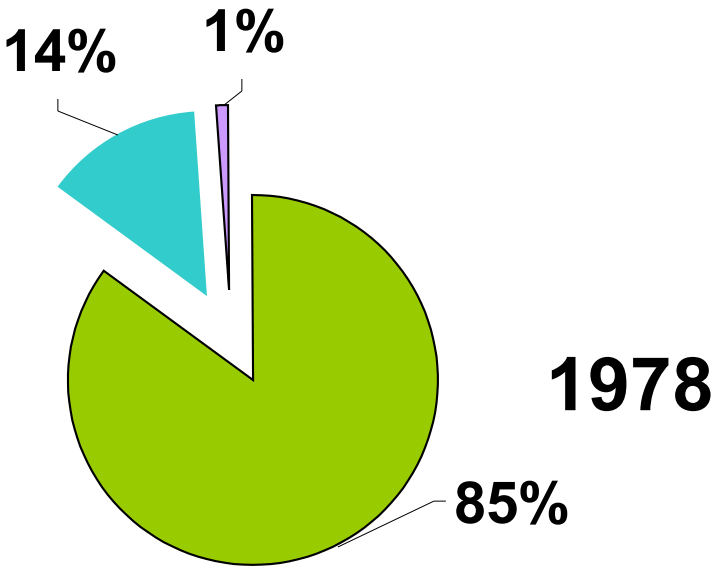
  <u>Water use priorities</u>

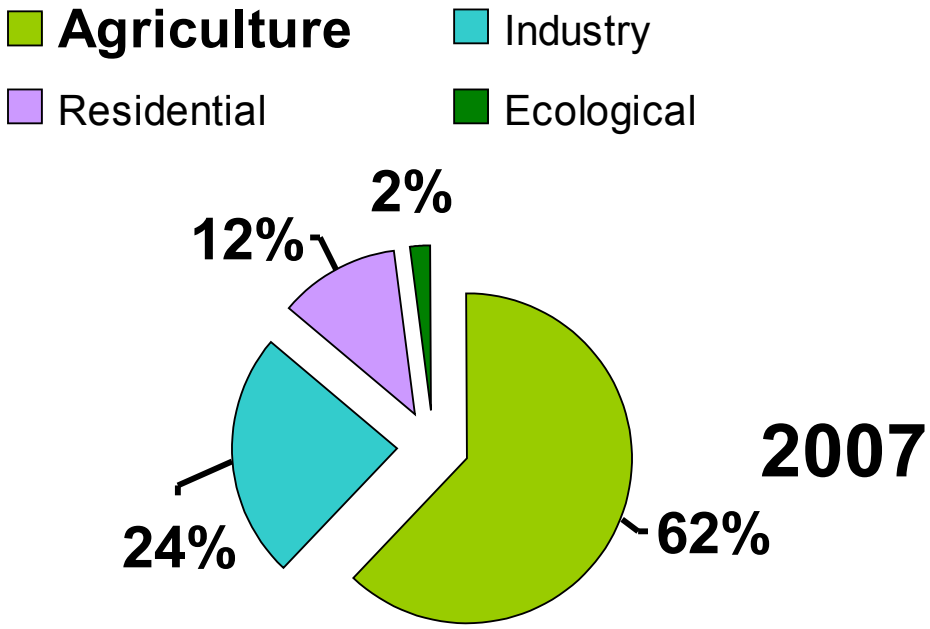
  Urban residential

  Industry

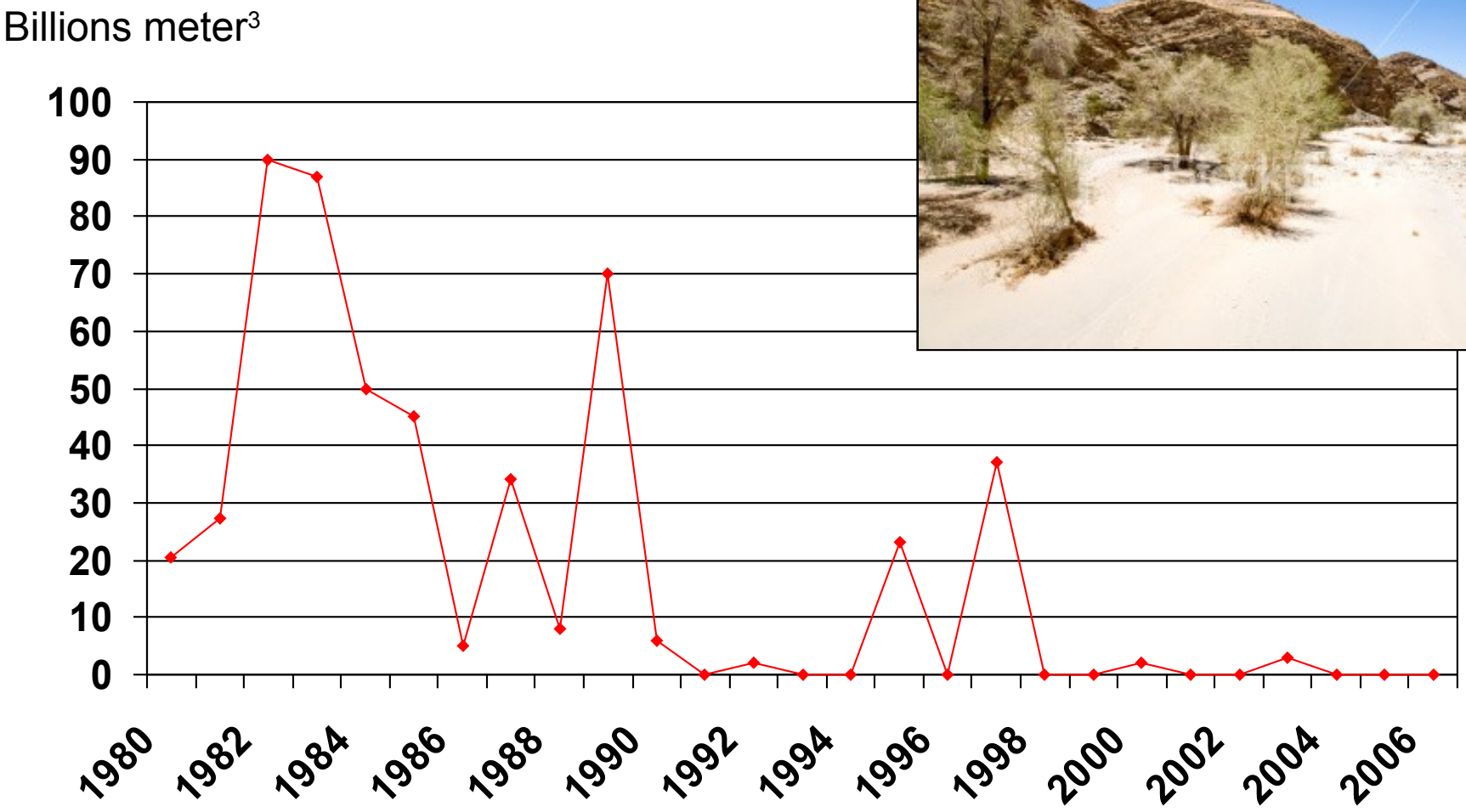
  Rural residential

  Irrigation

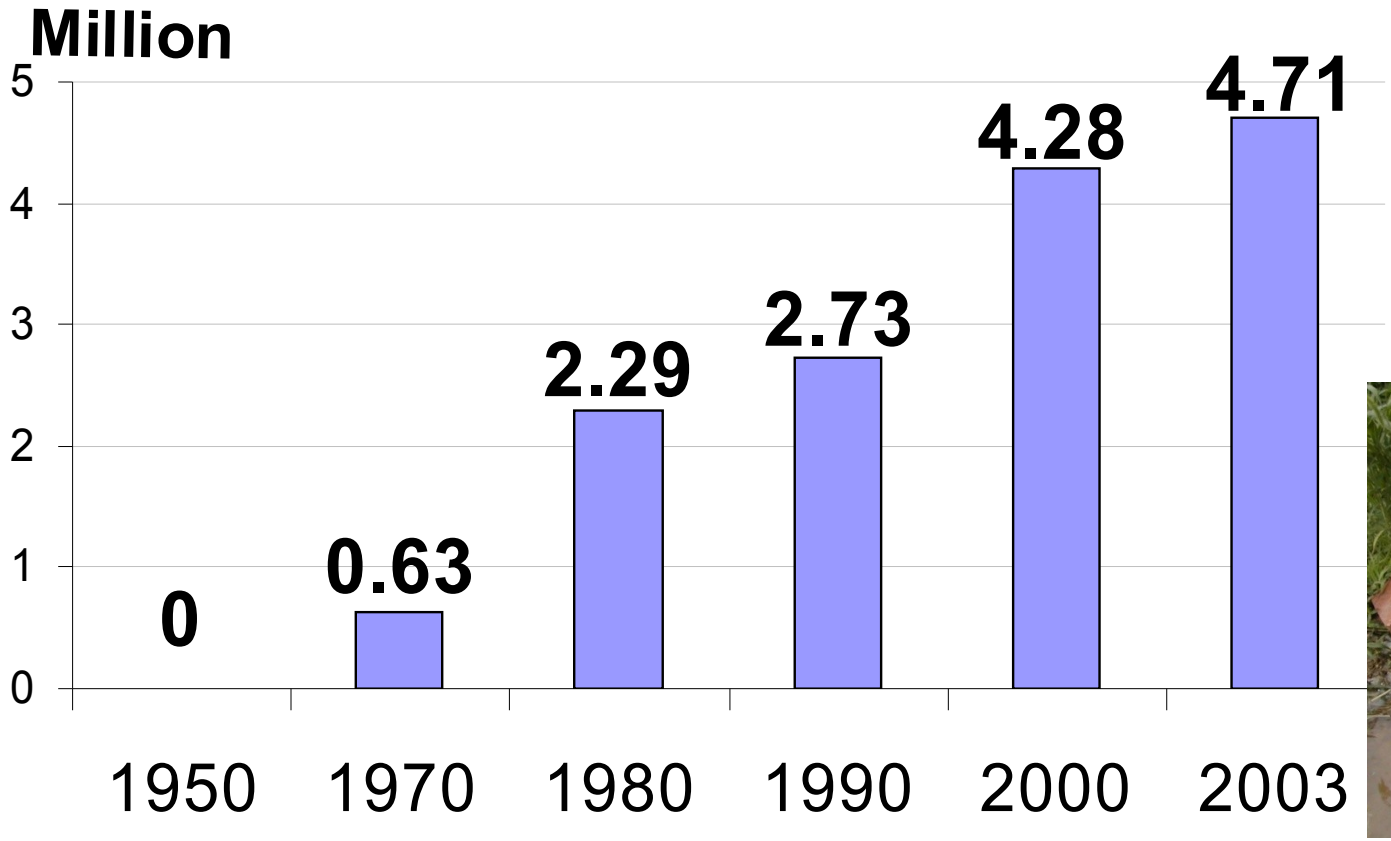




Hai River Basin Surface Water Flows – 1980 to 2006



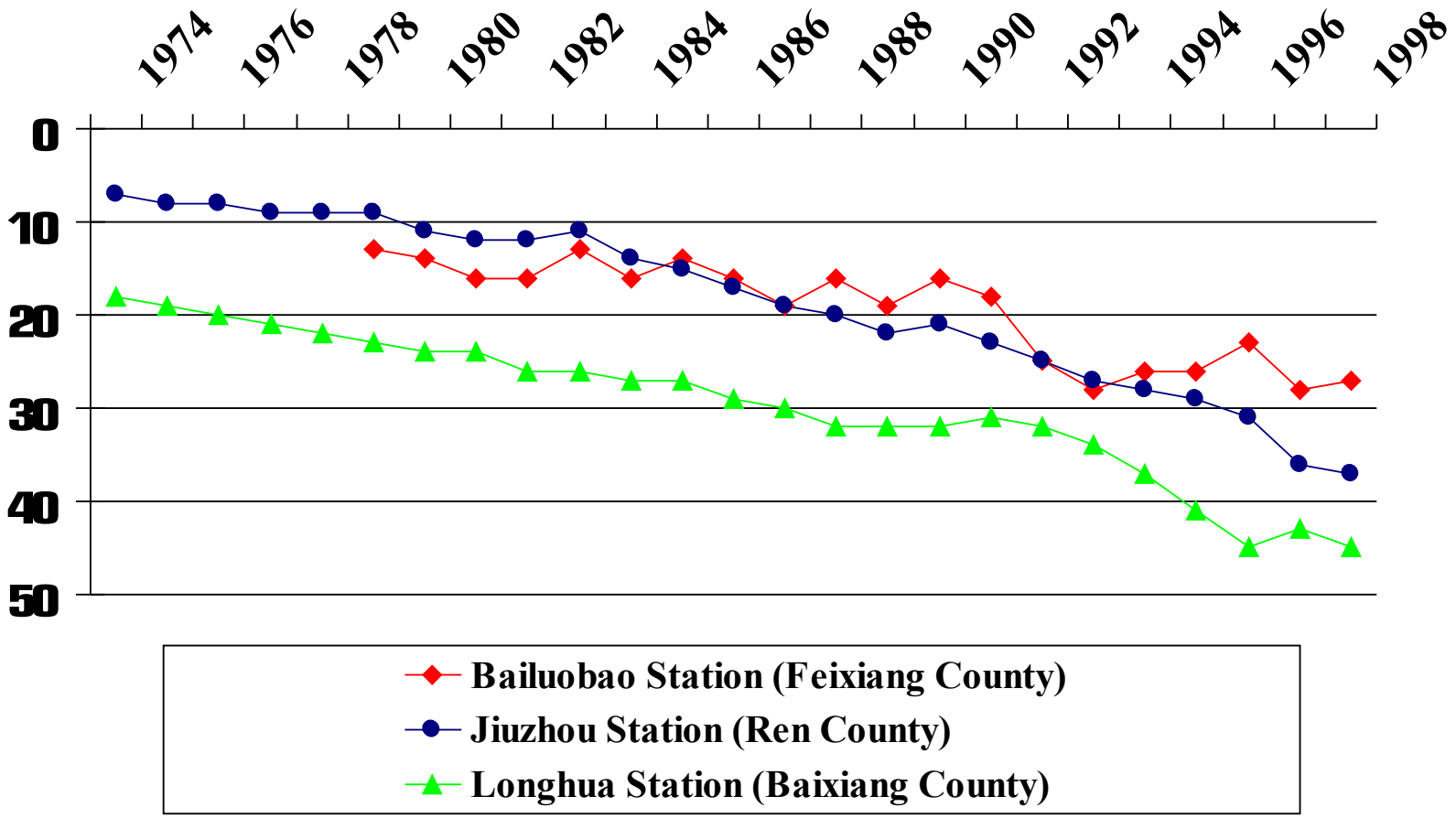
Increase of Tubewells in China



Increase of Groundwater Irrigation in north China, 2004

Crop	% of irrigated sown area from Groundwater
Rice	24
Wheat	72
Maize	70
Cotton	70
Field vegetables	67

North China:
Falling Groundwater Table



Is China Facing a Water Crisis?

- Some say yes. It could push China to “starve the world”.

- Others argue good policy can solve the problem

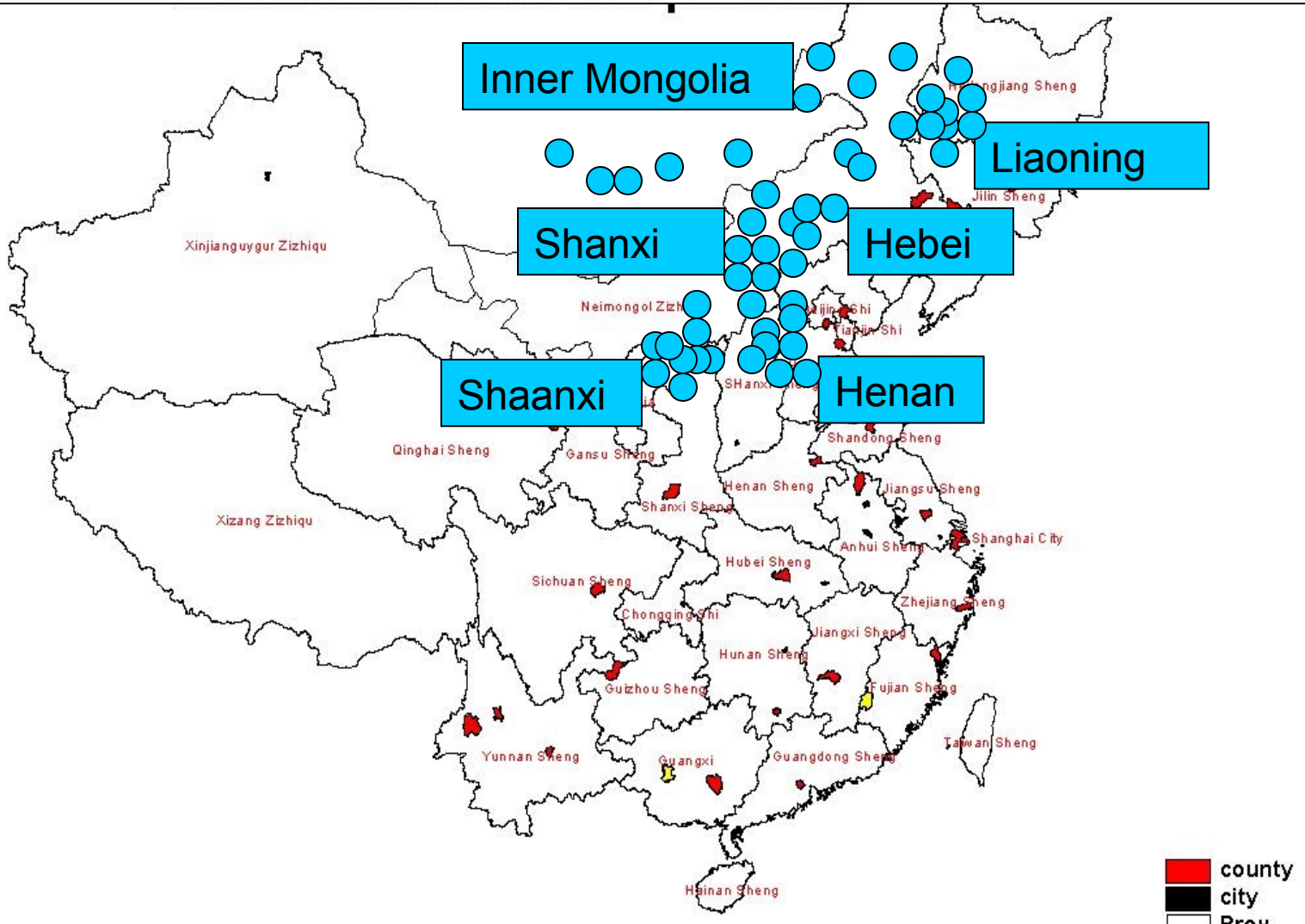
  [Sound policy bridges can be built over even the most troubled waters!]

- Who is right?
- Who is to blame? / What can be done?

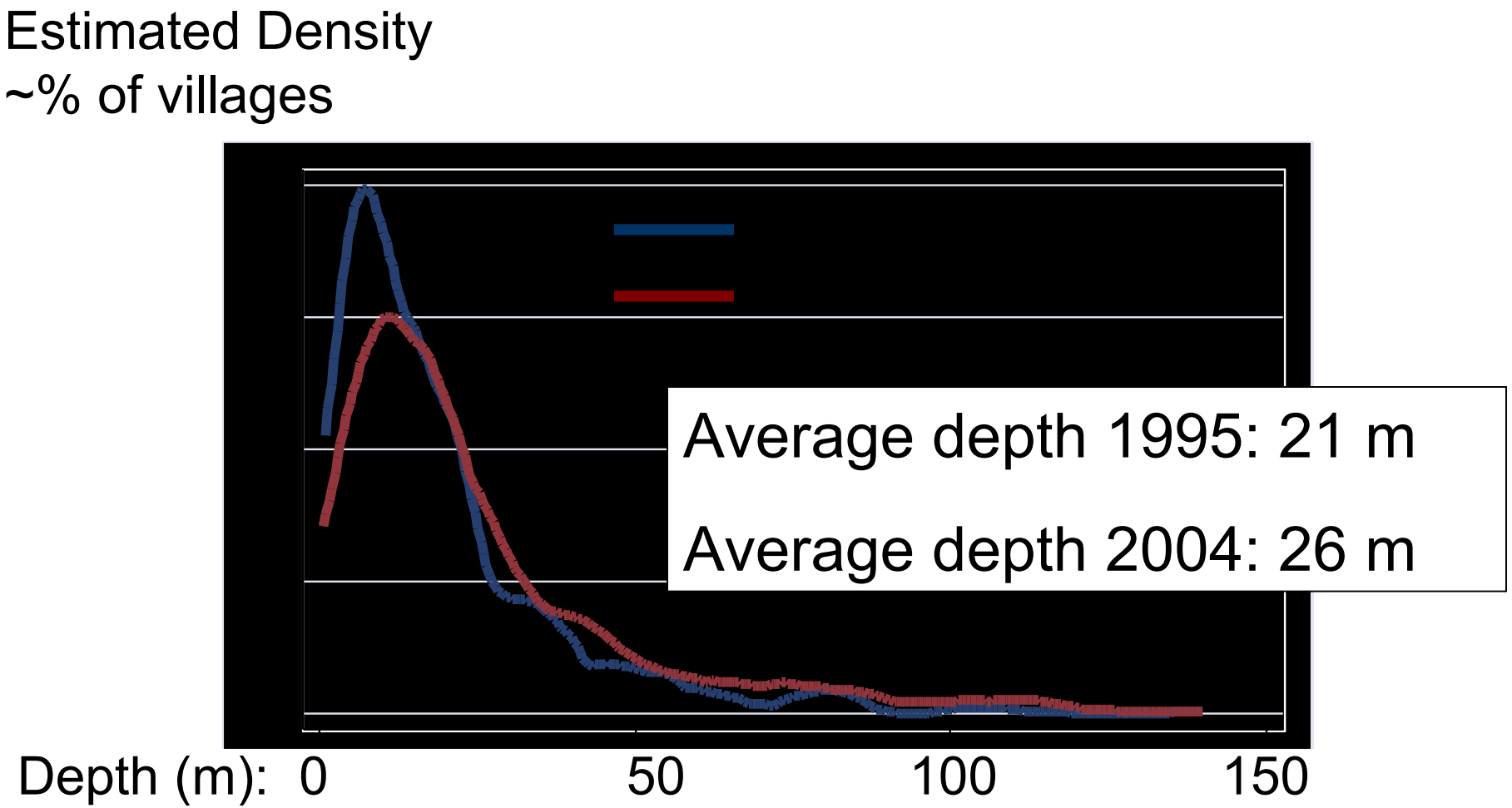
Data set – collected by CAS, Stanford University and UC Davis in 2005,

400 village; 50 counties, 6 provinces

National Representative of North China



Depth to groundwater in GW Using Villages



Although groundwater levels are falling, the nature of the fall varies across North China

Change in Average Water Level 1995-2004

- Increased **9%**
- No Change **26%**
- Decreased < 0.25 m/year **18%**

51%

- Decreasing 0.25 to 1.5 m/year **38%**
- Decreasing > 1.5 m/year **11%**

Where there is a problem, is there a response by the government?

Water Policies of MWR

- Wells drilled by permit only
- Regulation on well spacing
- Water extraction fee
- Moving towards pricing policy
- Irrigation management reform

Actual policy implementation: almost ZERO!

- Wells drilled by permit only — **Less than 10% of wells**
- Regulation on well spacing — **Less than 5% of villages**

- Water extraction fee — **Zero**
- Moving towards pricing policy — **Not very fast**
- Irrigation management reform — **Cannot be implemented effectively**

No wonder … how do you assume control over 7.6 million wells … an administrative impossibility

Is the government building the “bridges”?

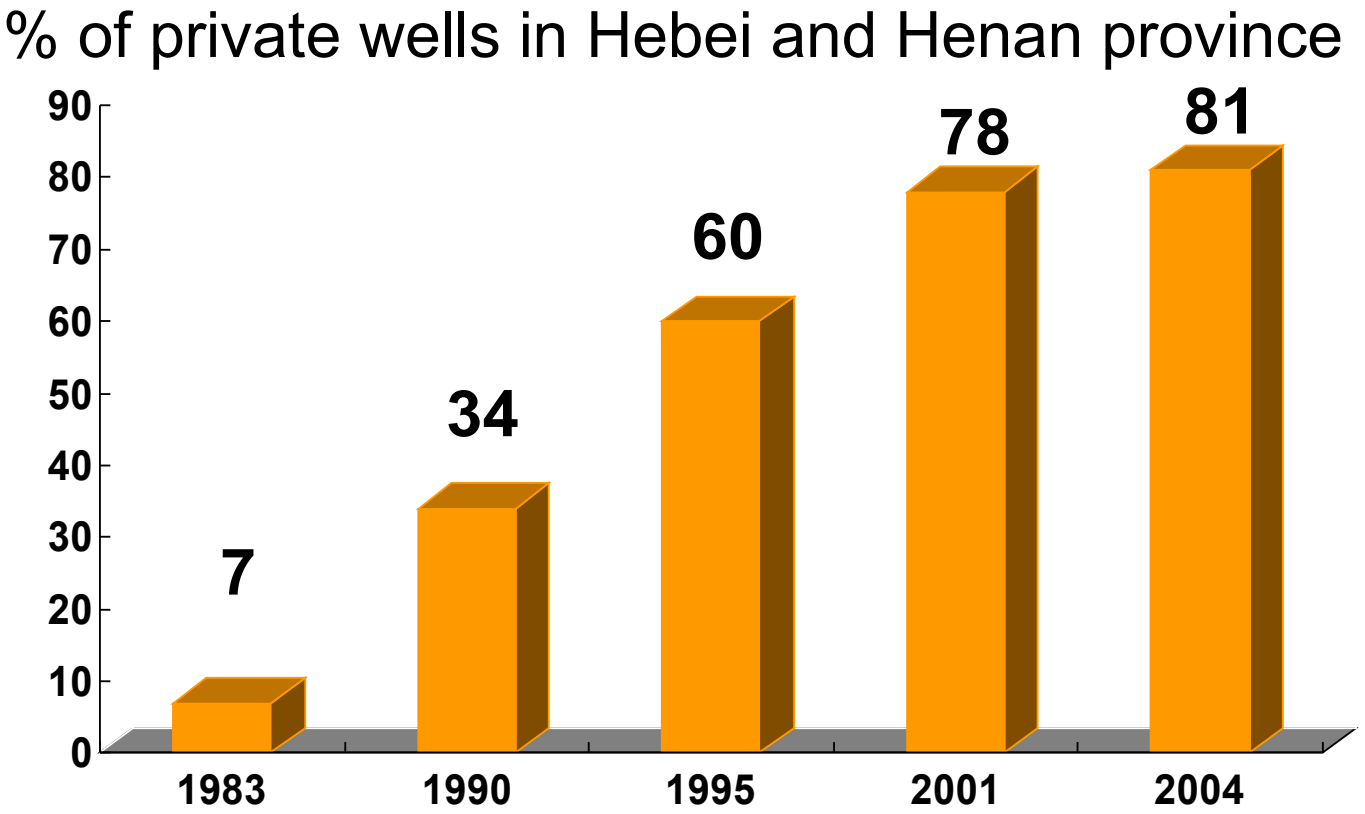
No … obviously!

Are policymakers a part of “troubling the waters?

YES: through their non-action

Is there a response by farmers?

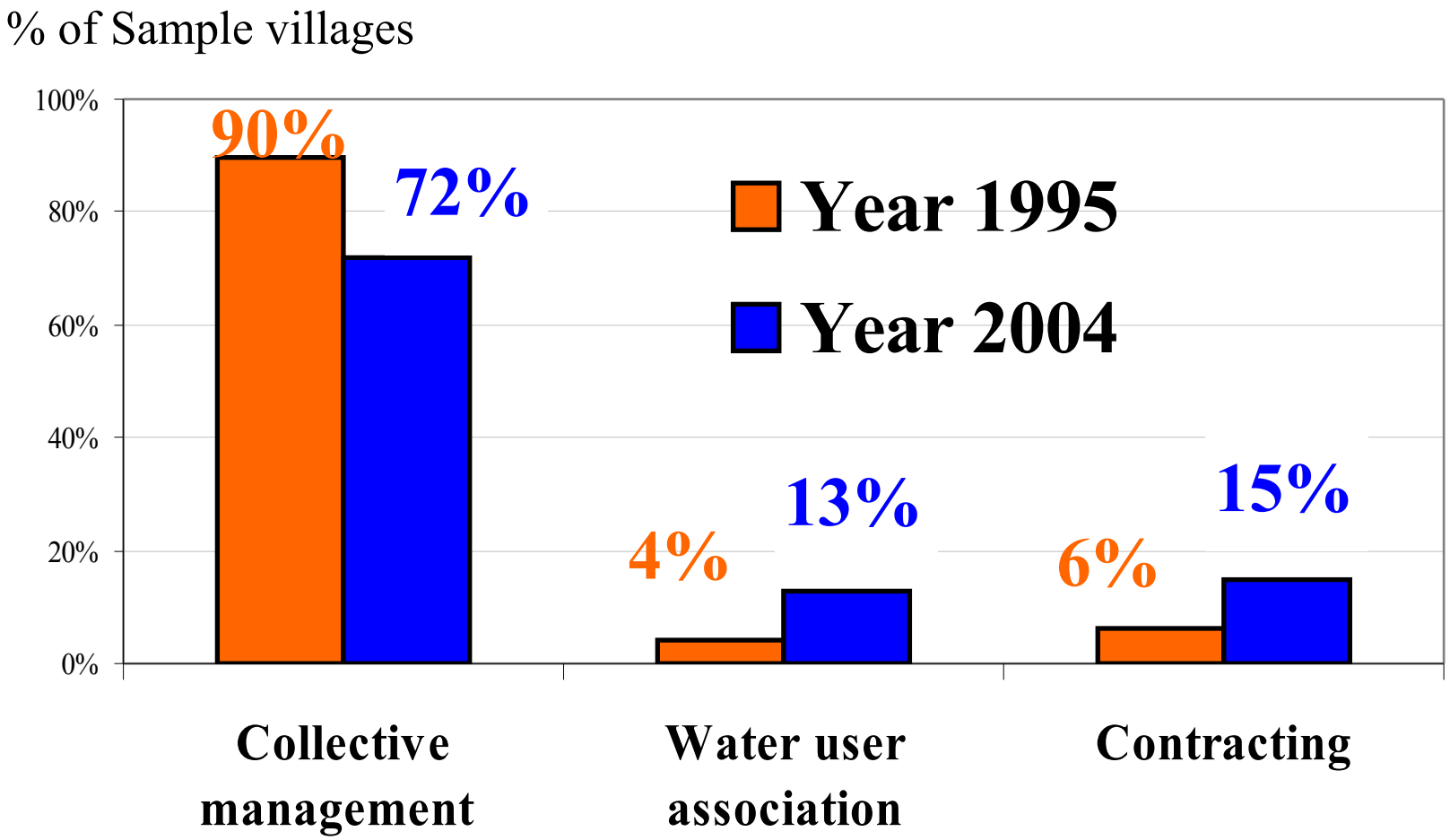
Rapid rise of Privatization of Wells



According to the six province survey in north China, 69% of wells are now owned by private individuals in 2004.

Privatization of wells does not lead to GW conservation

Changes in surface water managerial form



Not all WUA or Contracting provided with incentives to save water

Are farmers building the "bridges"?

No. No incentive to do so!

Are farmers a part of "troubling the waters?

Almost by definition: YES

BUT, is it their fault?

- Could it be that they are doing exactly what we should expect them to do – given the policy environment?
- Could it be that they would just as easily be part of the solution – given the right incentives?

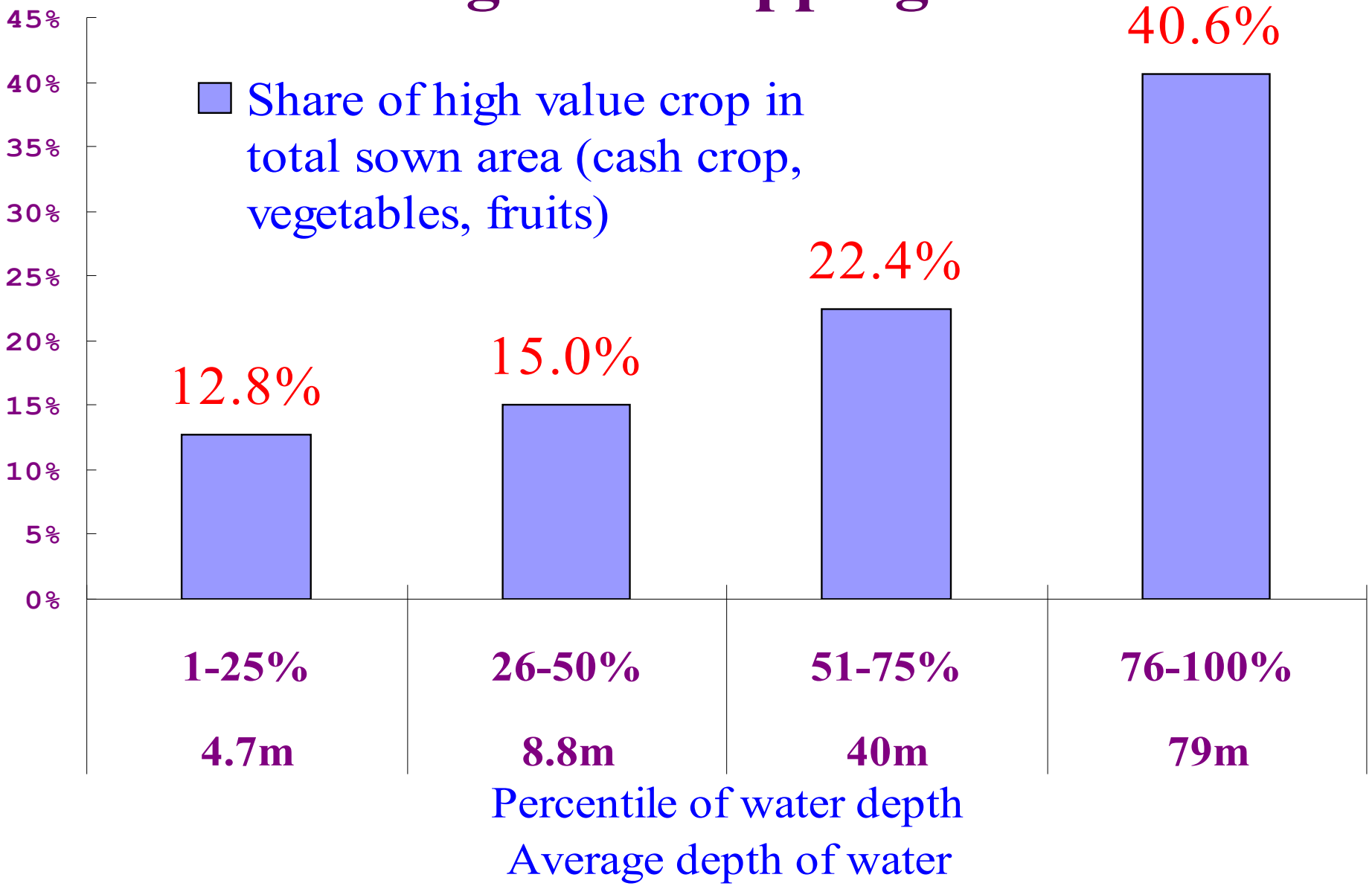
In fact, research has shown us the basis of some bridges

- Water pricing …
  - Do farmers respond to higher prices by using less water?
- Water saving technology …
  - Do farmers respond to higher prices by adopting water-saving technologies?

Farmers' response at the intensive margin: Reduction in water use per unit of land

Average water depth (m)	Average cost of water (yuan/m^3)	Average volume of water applied to wheat (m^3/mu)
4.4	0.096	513
6.7	0.084	306
24.6	0.201	257
77.5	0.414	150

Farmer's response at the extensive margin: Changes in cropping mix



Luancheng County
(relatively water-abundant area)

Cang County

(water-short area)

Would price policy work?

- If China raised the price of water (e.g., by taxing electricity / diesel fuel) ➔ would lead to sharp declines in demand ➔ lots of conservation, adoption of water saving technology.

- But, the incomes of farmers would suffer … need a complementary policy to give farmers a subsidy to offset higher costs …

Share of Sown Areas Adopting Water Saving Technologies in north China

	1995	2004
Traditional (pre 1949) Level Fields, Border/Furrow Irrigation	20%	25%
Household-based Plastic Sheeting, Surface Pipe, Drought Resistant Varieties, Retain Stubble / No Till	8%	21%
Community-based Underground Pipe, Lined Canals, Sprinklers	3%	7%

Implications for Development and Growth

- Reducing production of water-using crops
  - -Reduction in winter wheat
  - -Shift from wheat-maize systems to single season maize
  - -Probably from rice to maize

- Is this a problem? NO!
  - -Domestic demand is falling for food grains and rising for meats (and derived demand for maize)
  - -Supply response in international market will also dampen the impact of China's increase in imports on international

Implications for Development and Growth

- there is rising demand for fruits and vegetables in domestic and export markets
- although water intensive, high value ==> investment into greenhouses and water-saving technologies




China – like many developing countries – are ready to build bridges over troubled waters.

"If I knew a water policy worked and if I knew where an investment would have the most effect, I would allocate up to a quarter of my budget to this one activity!"

Du Ying, Director of the Agricultural Division, Development and Reform Commission, Beijing, August 30, 2004