

Research shown

1. *Climate change impact is a big issue to water sustainable use in China due to existing or planning water projects and programming do not fully consider potential impact on climate change , particular on possibility of increasing extremely events (floods & droughts) .*

It is possible to increase probability of the most disbenefit for both low water in N & S for the WDPSN could be 2.6-8.2%



2. Basic research & adaptive management should be emphasized due to much water stress & uncertainty related to climate change:

- How to change *in the past* ?
- How to change *in the future*, particular to coming 20-50 years ?
- What's the *mechanism* for such changes ?
- How to *adapt* climate change & wisely manage water ?

3. Water vulnerability & improving Water Governance to changing environment will be priority issues for adaptive management.

Water Resource Vulnerability

- It could be linkaged with water stress indicator (**resilience**), $C(t)$ & **sensibility**, S .

- New study:

$$V(t) = \frac{S}{C(t)}$$

$$C(t) = f_1(r) \cdot f_2\left(1/\left(\frac{P}{Q} \cdot \frac{W_D}{P}\right)\right)$$

r – Use to availability ratio (%)

P/Q - water crowding (p / Million m^3 / yr)

W_D/P - per capita water use (m^3 /p yr)

Malin Falkenmark & Molden (2008) developed these indicators to show demand-driven water stress and population-driven water shortage.

Late, *Malin Falkenmark & Jun Xia* developed case study in China to address Water Security in watershort basins (2010)

