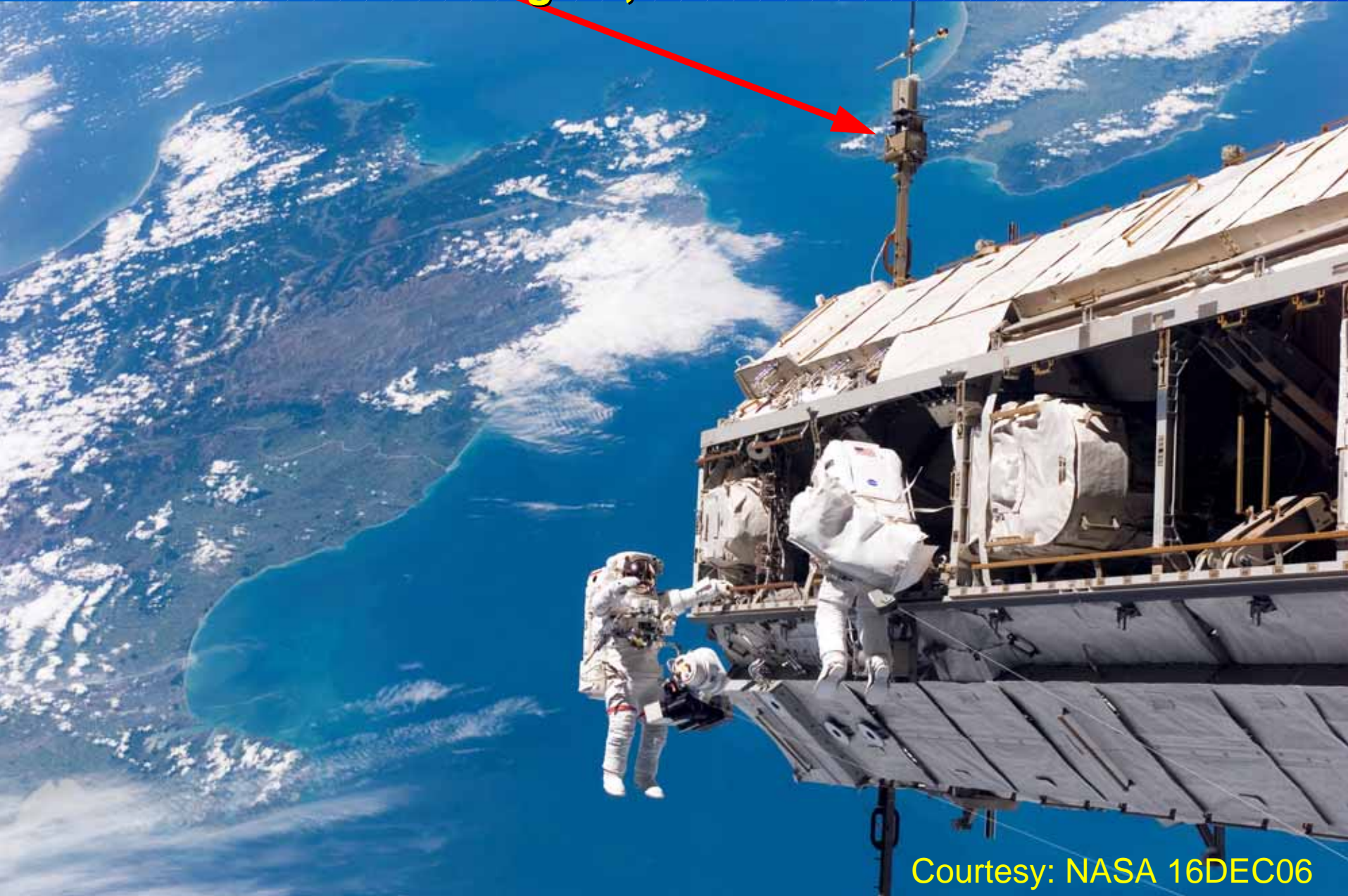
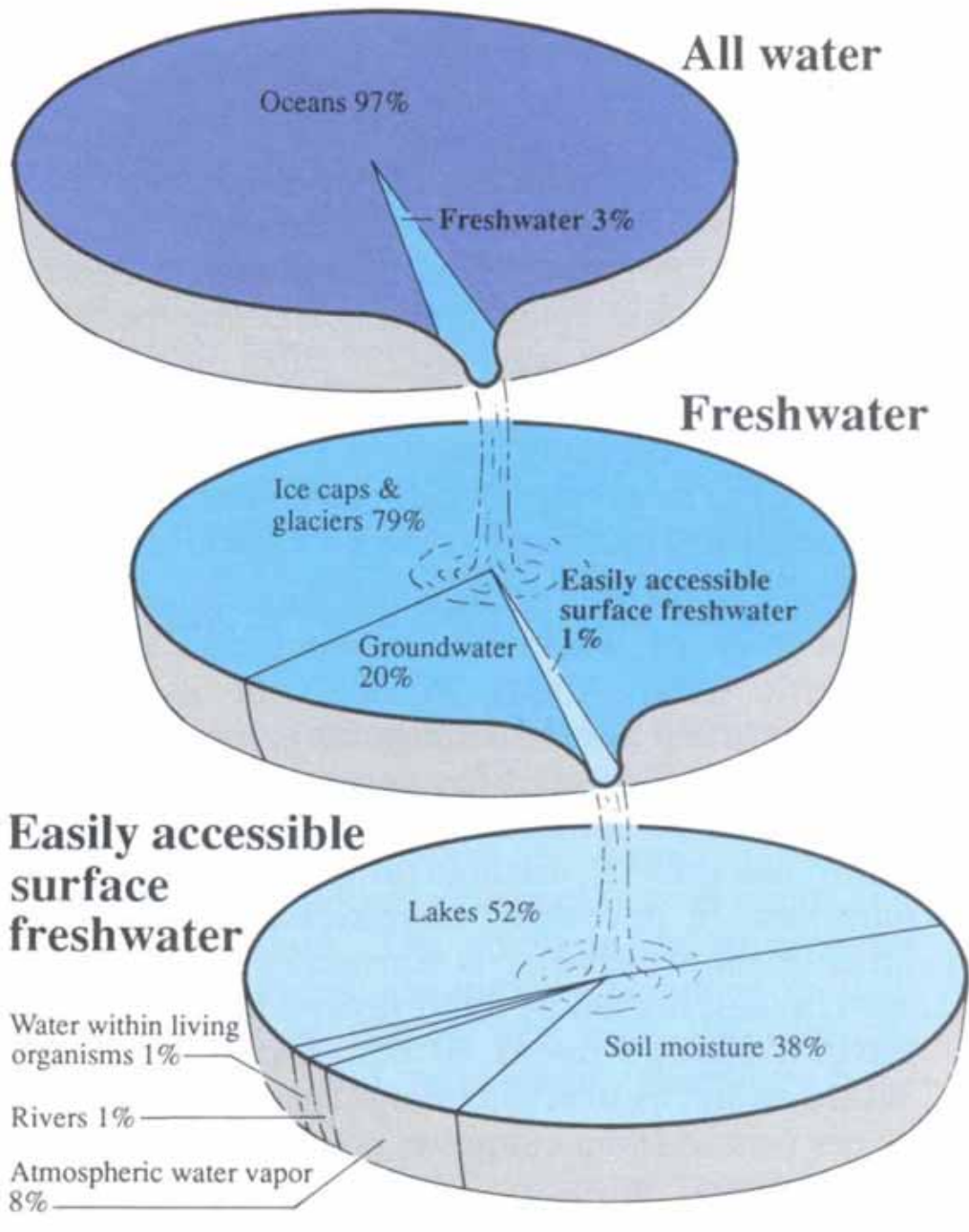


**Dr Andrew Matthews, APN, Steering Committee Chair
Wellington, New Zealand**



Courtesy: NASA 16DEC06



**Water on Earth:
under-supply to
over supply**

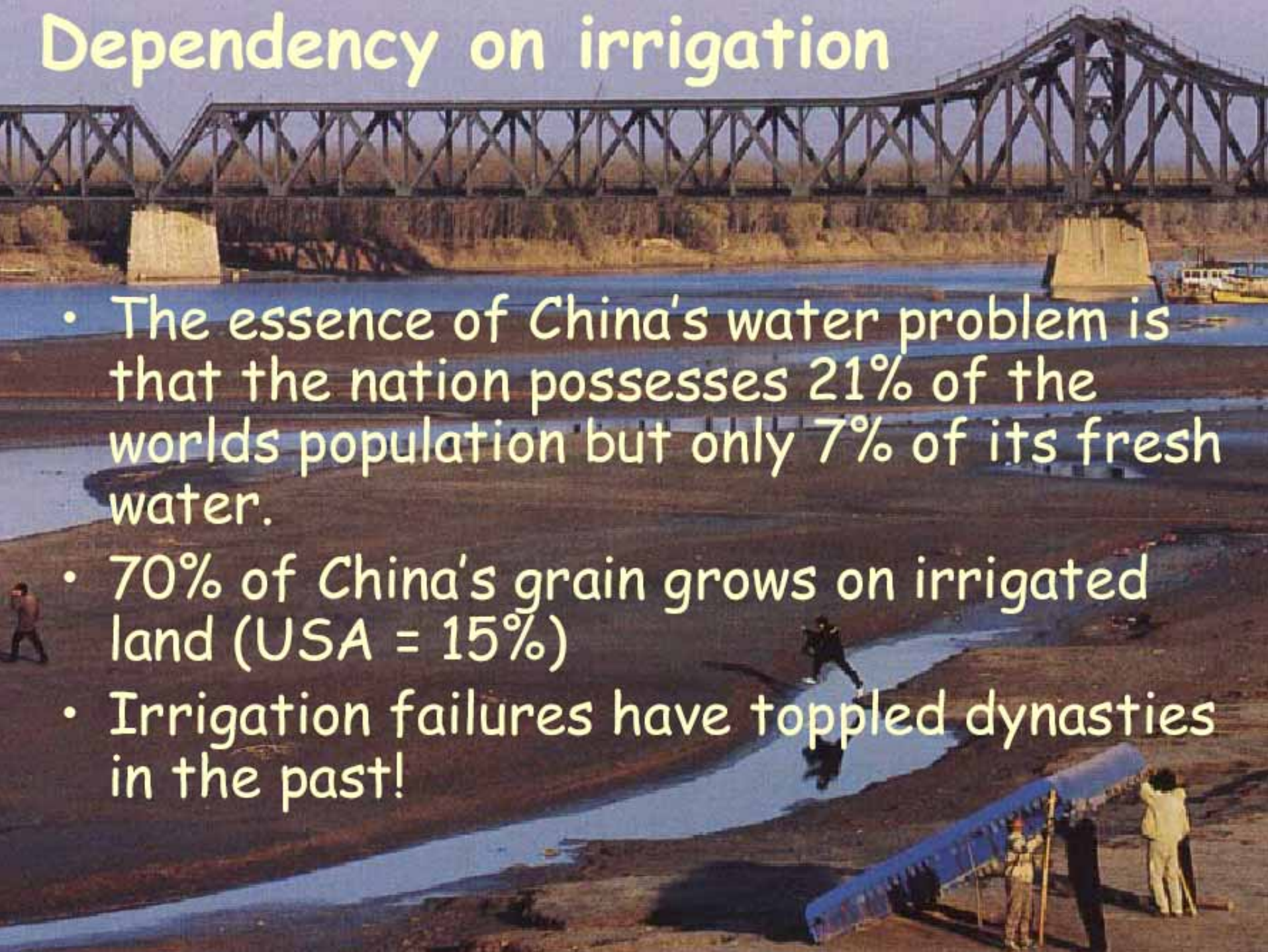
**We utilize at the most
0.000003% of the water
on the earth.**

The fresh water deficit is growing world wide

But..... it is the fast growing water deficit in China that is likely to affect the entire world through its impact on agriculture and thus food prices

- Between 1995 and 2000 China went from soybean self sufficiency to being the worlds largest buyer; 40% of supply
- China appears to have abandoned its policy of grain self sufficiency; people and industries will have priority for water!!

Dependency on irrigation



- The essence of China's water problem is that the nation possesses 21% of the world's population but only 7% of its fresh water.
- 70% of China's grain grows on irrigated land (USA = 15%)
- Irrigation failures have toppled dynasties in the past!

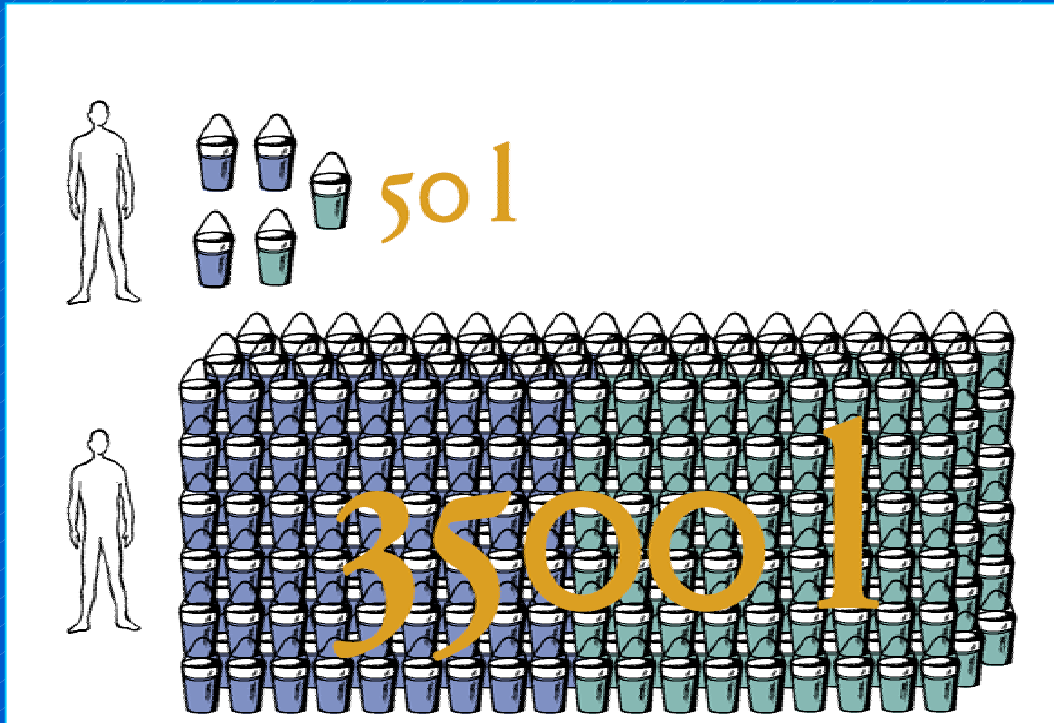
How Much Water do People Use?

	Litres of Water
Daily Drinking Water	2 – 5 litres use
Daily Household Use	20 – 500 litres use
1kg Grain	500 to 3,000 litres evapotranspiration (ET)
Vegetarian Diet	2,000 litres ET / day
Meat Diet	5,000 litres ET / day

Mainly non-consumptive use

Mainly consumptive use

Daily Water Requirements



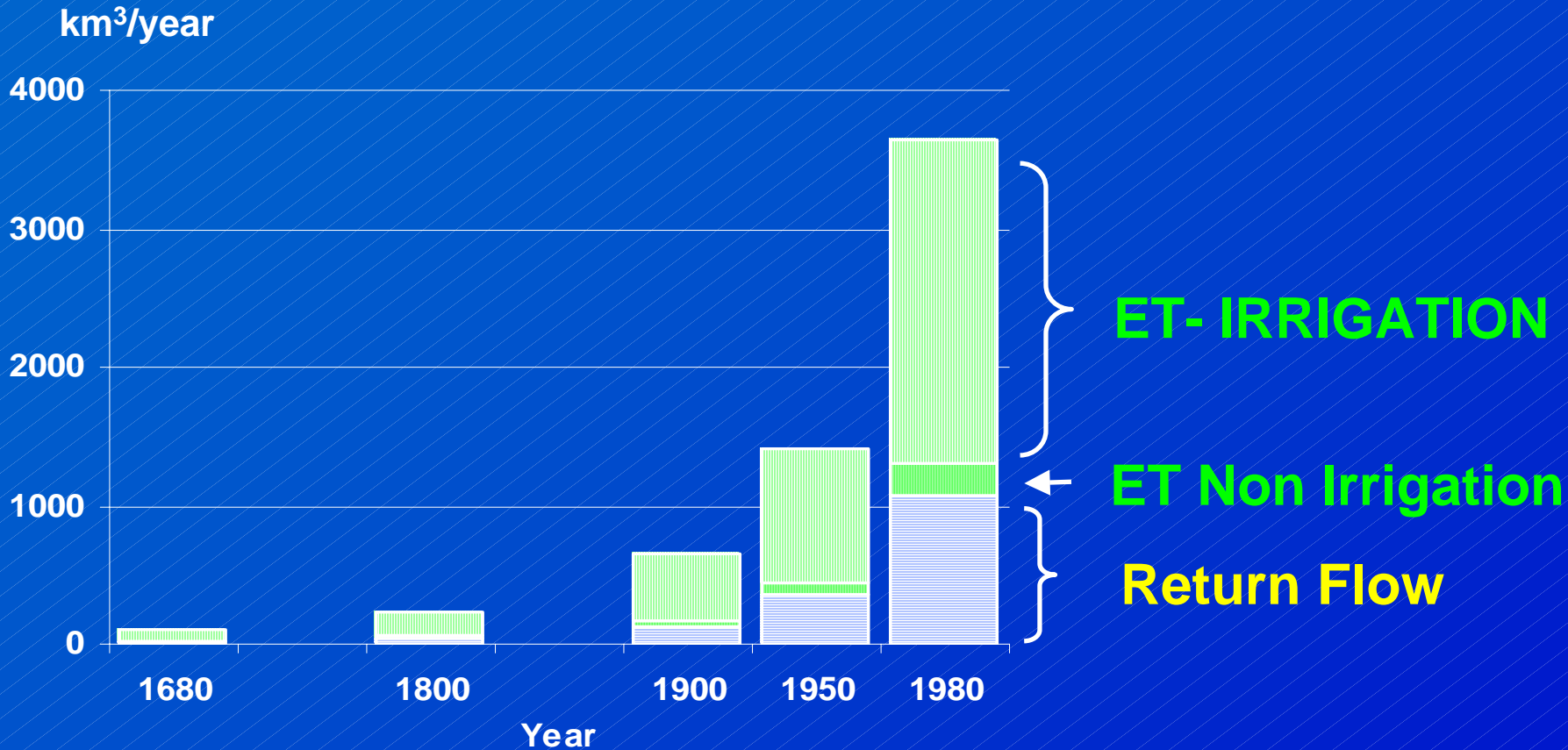
Basic human needs –
drinking & household
water

“Projected” food supply:
Up to 70 x basic human
needs

While we drink a few litres of water daily, we literally eat tons of water, an estimated 1.1 bill people do not have access to safe water supply.

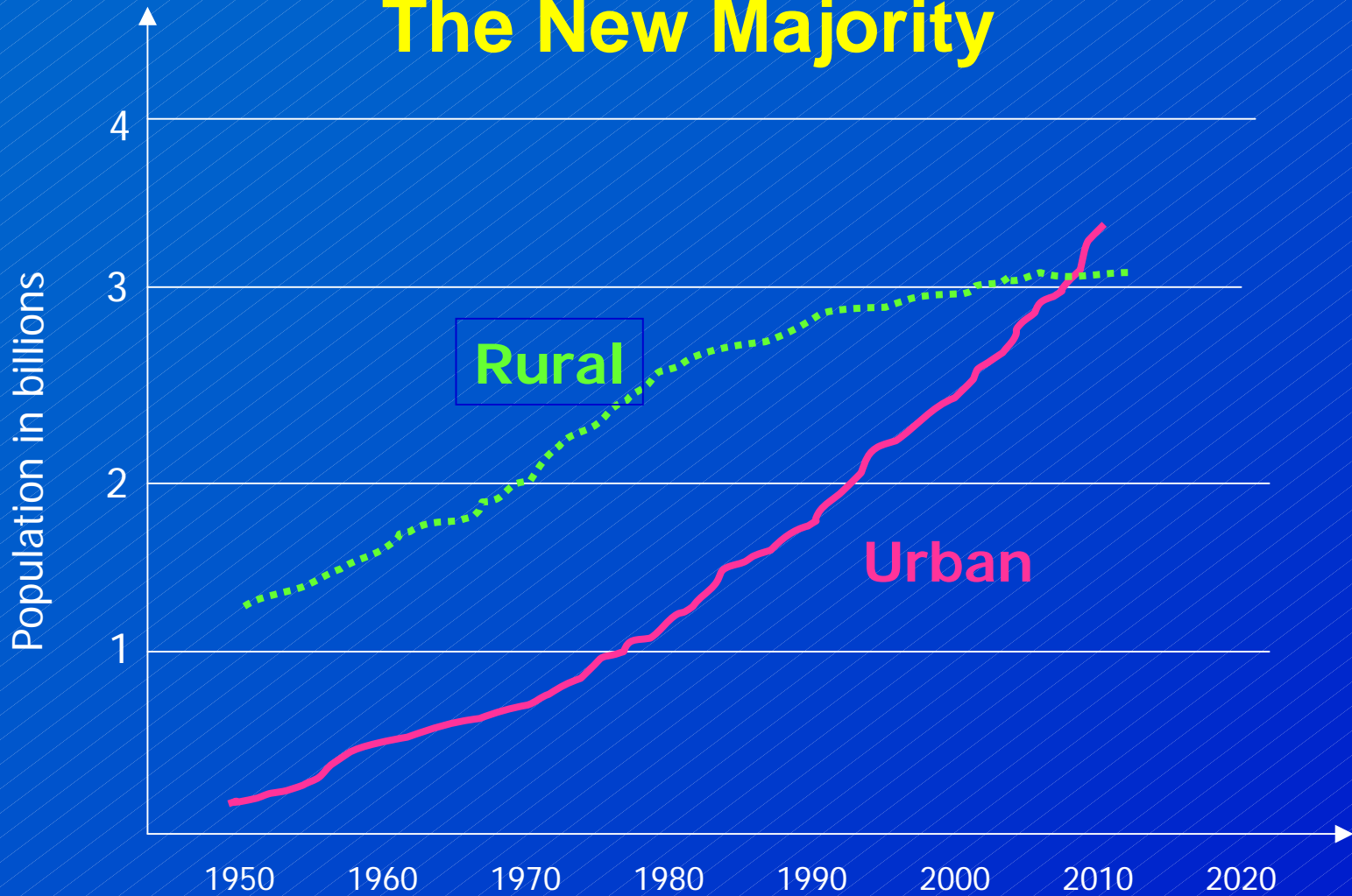
An estimated 2.6 bill people do not have access to basic sanitation, an estimated 850 million are undernourished, while more than 1 billion are overweight & obese.

Water Withdrawals: 1680 - 1980



1900 – 2000: water withdrawals increased about 2.5 times *faster* than population increase.

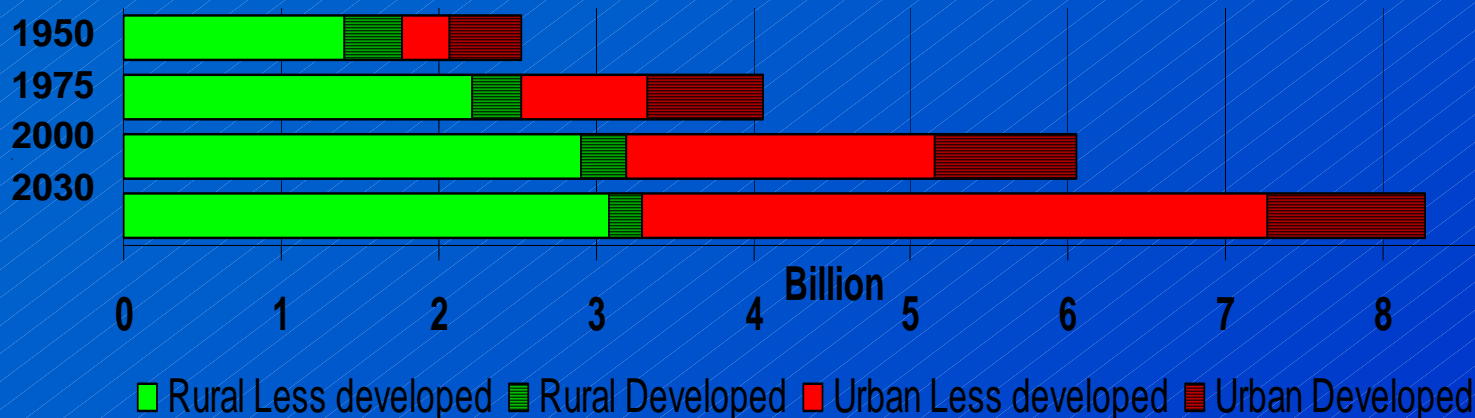
The New Majority



Source: UN, World Urbanization Prospects, the 1999 Revision

Urban expansion 1950 – 2030

Source: UN Popul Bureau



Additional urban population, 2000-2030, > 2 billion
but same or less number of farmers and farm workers

Urbanization & globalization → new preferences, alienation

Meat consumption in LDCs may increase by 100 mill tons+ 1995 – 2020

Water requirements: 15 tons/kg → 1,500 km³ (+ / -)

This means fierce competition for water!



Ground water withdrawals and dependence, South Asia

- from 1960 to 2000: went from $<10 \text{ km}^3$ to 200 km^3 pumped
- from 1970 – 2000: <1 mill wells to >20 mill wells
- Some wells 350m depth; 50-60,000 year old water
- huge investments, but uncertain yield

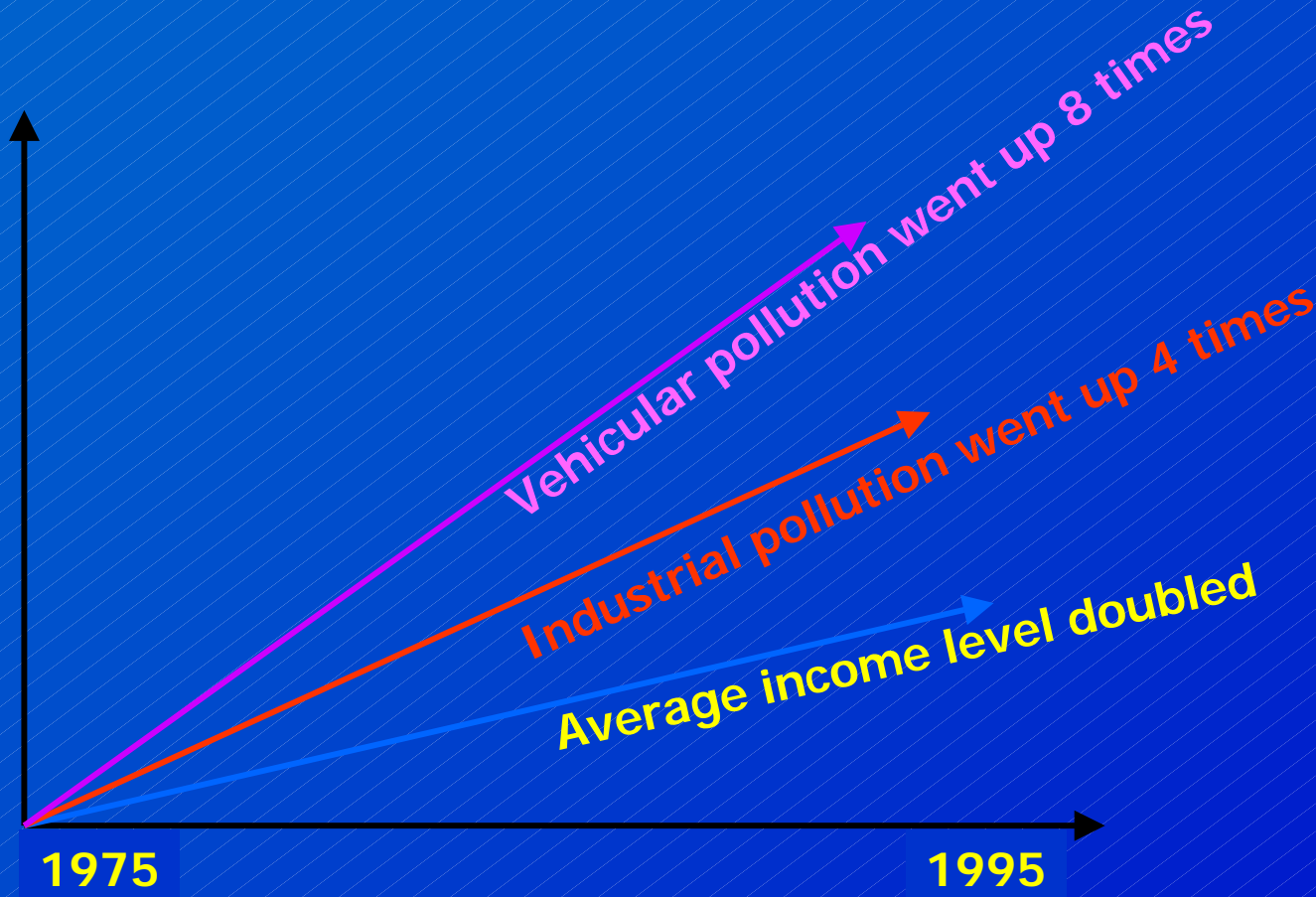
An unsustainable development; need to reduce by 70%!

- regulatory measures?
- changes in water use?
- structural changes in the economy?

Water for rural development or for expanding cities?



Environmental cost of wealth in Delhi



Future possibilities?

- Water productivity increases?
- Focus on rain as the resource?
- Inter-basin transfers?
- Biotechnologies?
 - Virtual water (i.e. trade)?
 - Contract farming?
 - Reduce losses (e.g. in food chain)?
 - Water demand Management & “management of consumption”?



(AFP PHOTO)



Thailand
Oct. 2006



Partnerships:

- in observations;
- in capacity development;
- in management and governance;
- in sustainable development options.

APN welcomes the opportunity in GEOSS to help with this endeavour!

A long, straight asphalt road stretches into the distance in a desert landscape. The road is flanked by dry, sandy terrain and sparse vegetation. In the background, there are low hills and a clear blue sky. The road has a dashed white line down the center and solid white lines on the edges. The text "Where is the road ahead?" is overlaid on the road.

Where is
the road ahead?

www.apn-gcr.org