

# Keep the Water Flowing



Gidi Azar • George Harris • Sim Blake • Andrew Fraser

# Water in Australia

Australia is the driest continent

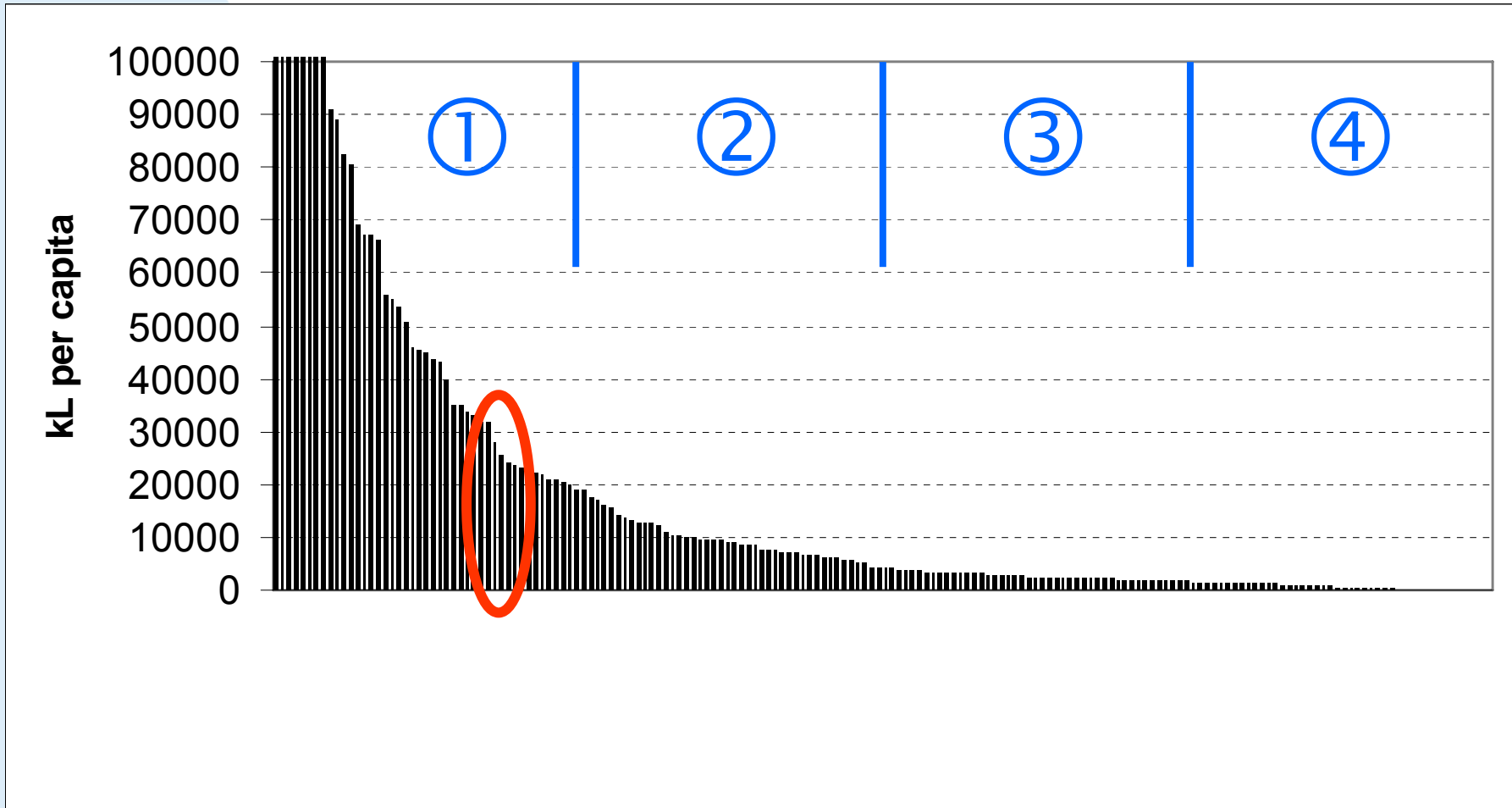


Second driest?

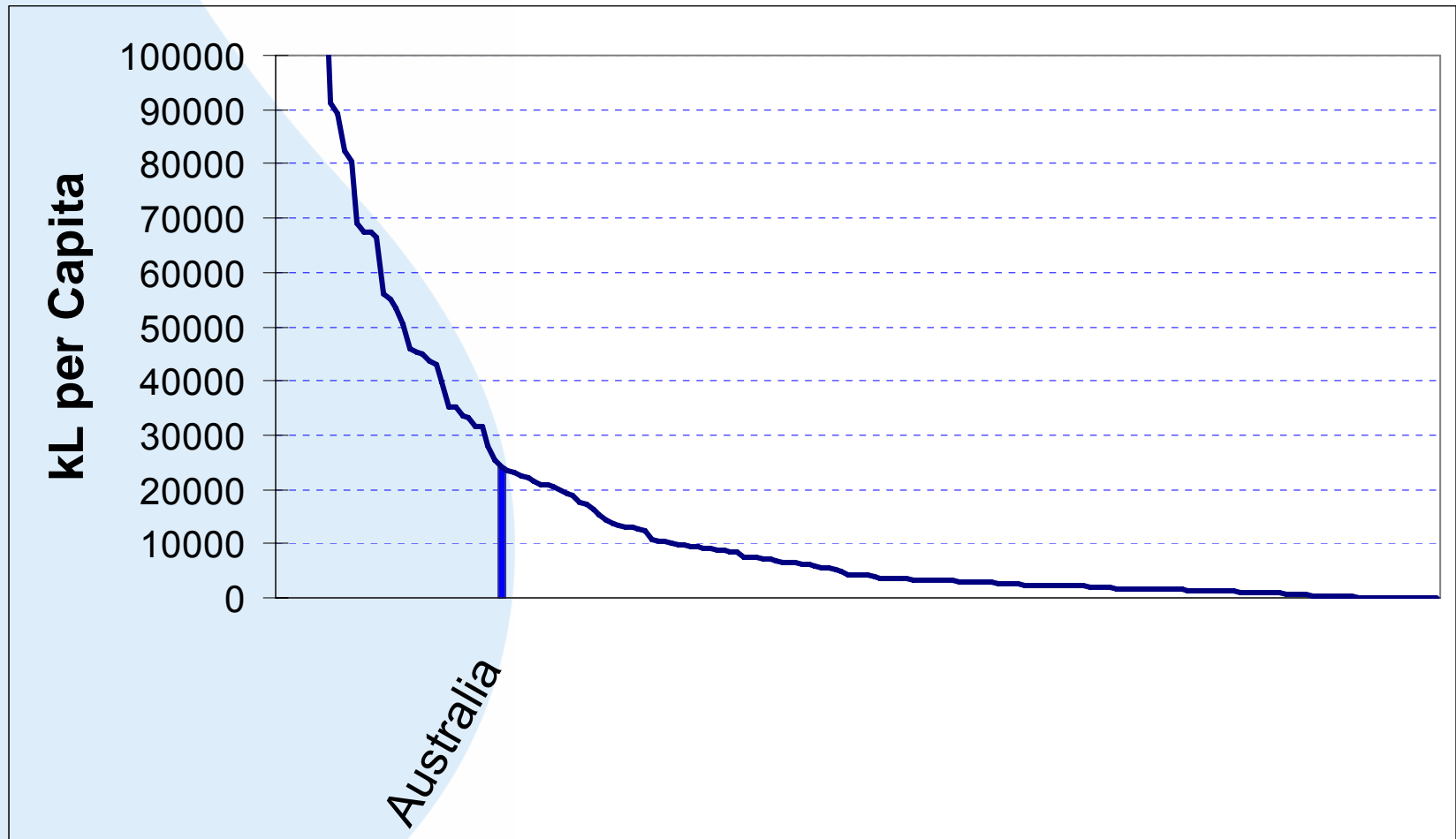
# HOW MUCH WATER DO WE HAVE



# Annual Renewable Water Resources per Person



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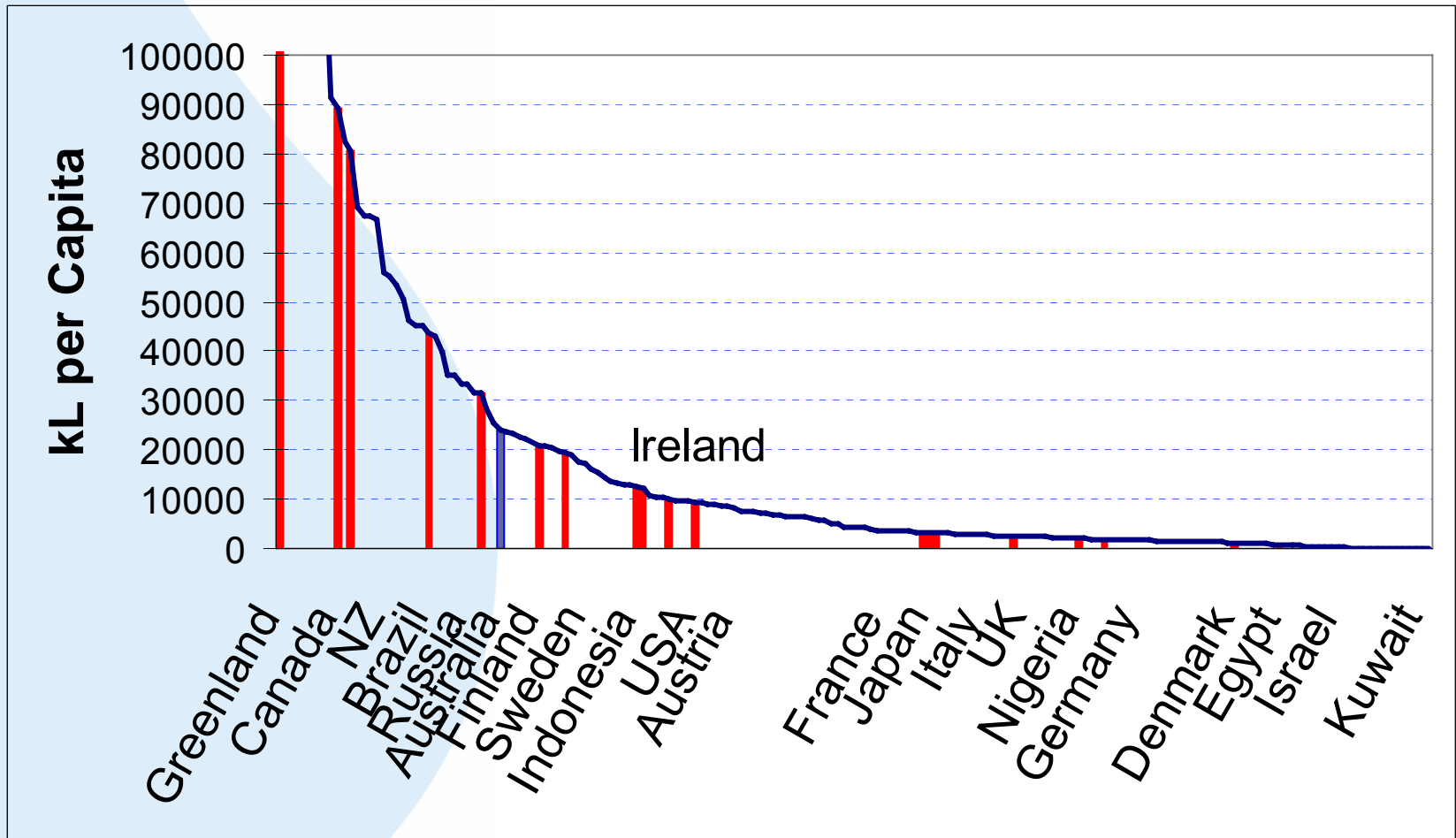


Source: World Resource Institute

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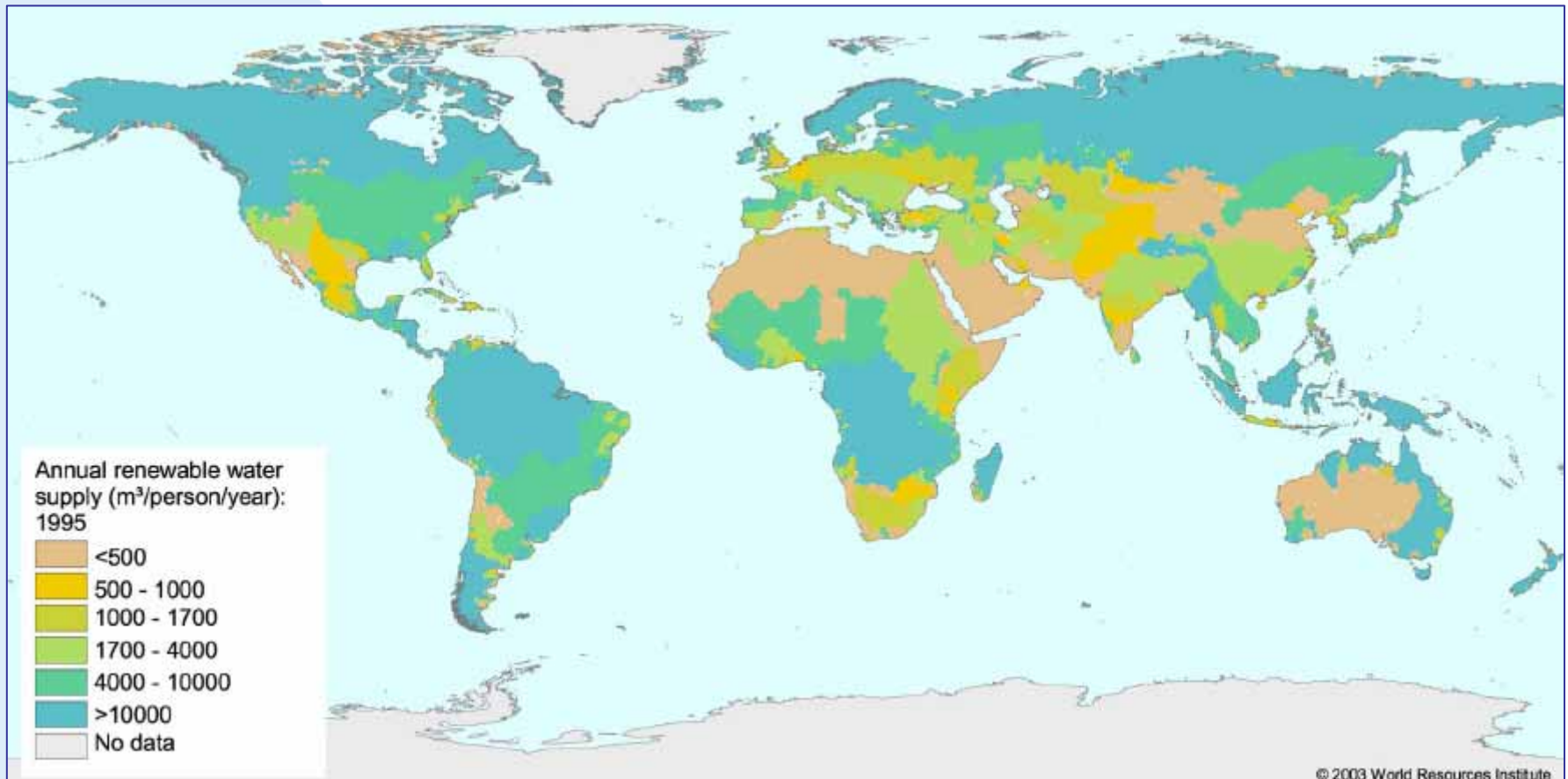


# Annual Renewable Water Resources per Person



Source: World Resource Institute

# Renewable Water Resources per Capita by River Basin

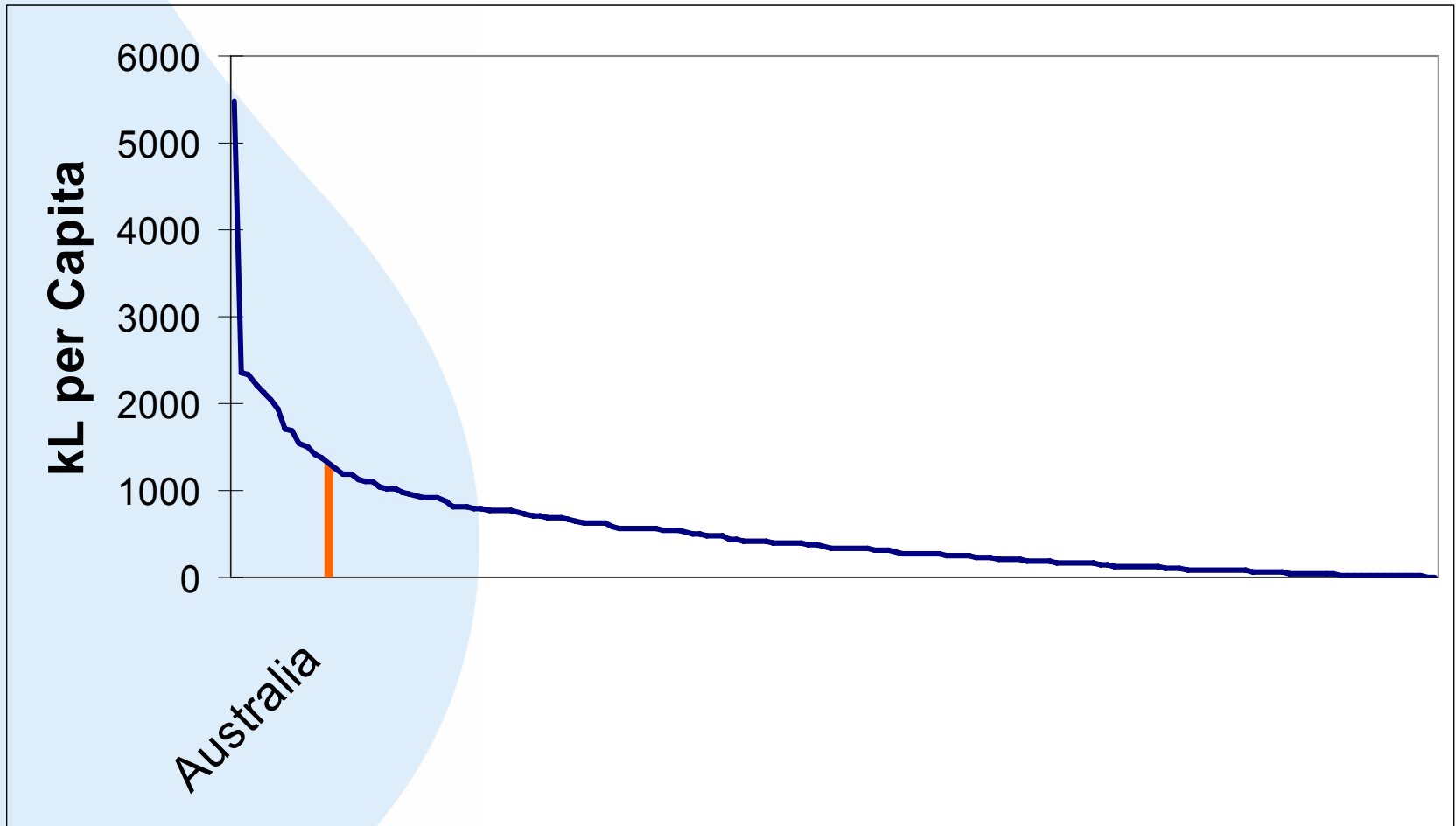


Source: Water Resources eAtlas

# HOW MUCH WATER DO WE USE



# Annual Water Withdrawals per Person



Source: World Resource Institute

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# How much water do we use?

Domestic Consumption  
kL/person/year

- NSW: ~80 kL a year (DWE)
- In Australia: No statistics
- Assume: 80-100 kL

# WHAT ABOUT EMBEDDED WATER



# Embedded Water

Known also as virtual water

The amount of water consumed in the production process of a product

# How much Virtual Water?

Litres of water per kg (or Litre) of product

COFFEE

COTTON

BEER

BEEF

EGGS

PAPER

# How much Virtual Water?

Litres of water per kg (or Litre) of product

**BEEF** 16,000

**COTTON** 8,000

**EGGS** 3,300

**PAPER** 2,000

**COFFEE** 1,100

**BEER** 300

# Embedded Water

Litre

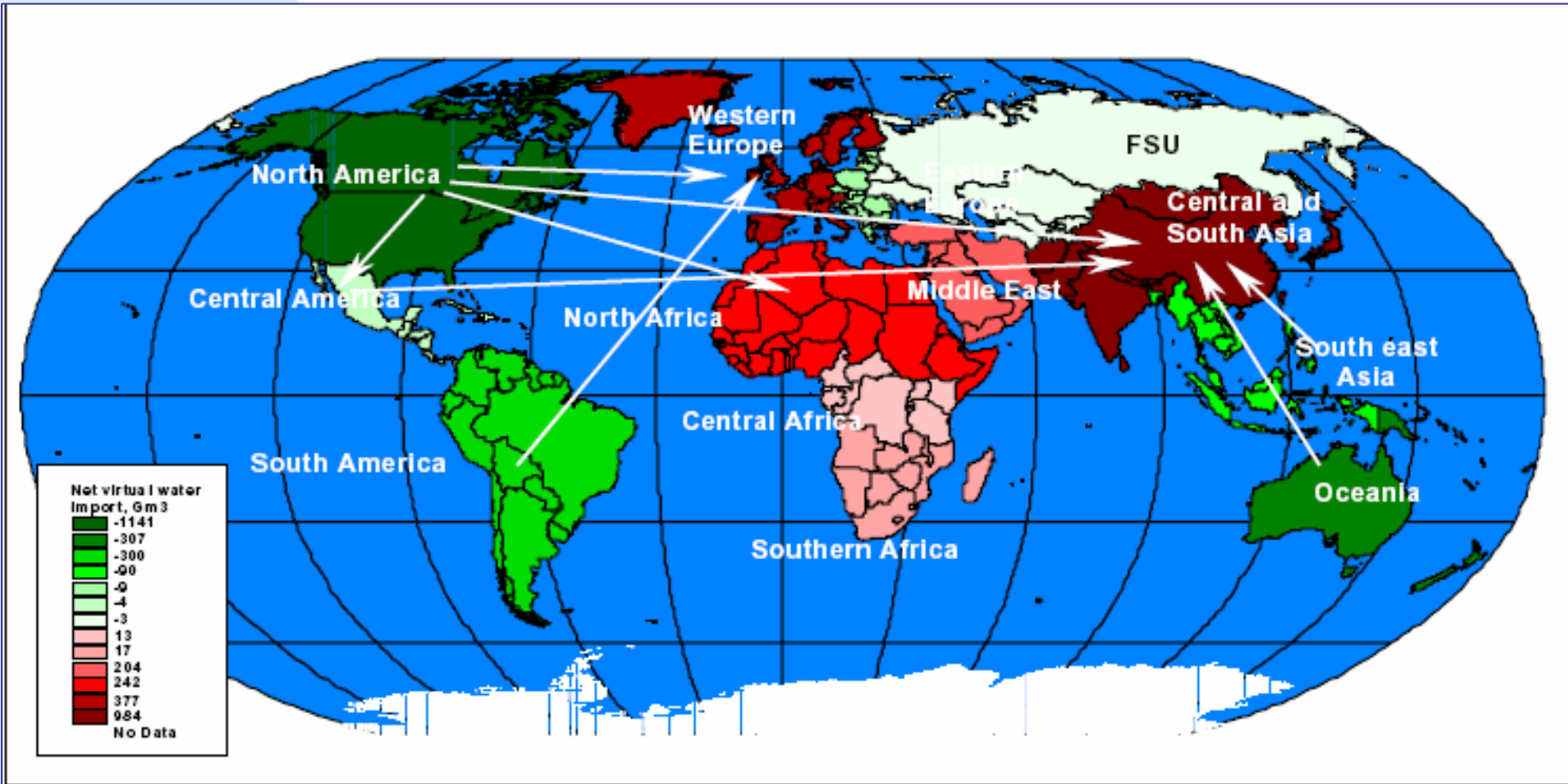
Family car	400,000	Glass of OJ	170
Schooner	100	Cotton T-shirt	2,000
1 kg rice	2,700	Small crisps	185
Slice of bread	40	Sheet of A4 paper	10
Slice of cheese	50	Glass of wine	120
Pair of shoes	8,000	Steak	4000
Hamburger	2,400	Pair of jeans	11,000
Cup of coffee	140	1 egg	130

# How Much Water We Really Use?

Litres per day

- Water Consumption per person: **280**
- Virtual Water Consumption in diet:
  - USA style (mainly beef): 5400
  - Beef / Poultry: 4800
  - Vegetarian: 2600
  - Starvation: 1000

# Virtual Water Movement



# 10 Top Virtual Water Exporters

('000 GL/year)	Export	Import	Net
Australia	73	9	64
Canada	95	35	60
USA	229	176	53
Argentina	51	6	45
Brazil	68	23	45
Ivory Coast	35	2	33
Thailand	43	15	28
India	43	17	25
Ghana	20	2	18
Ukraine	21	4	17

Source: UNESCO/IHE 2004

# What is the Conclusion?

- Australia is not short of water, for its population
- More water is used by people as embedded water, than water coming through the tap
- Australia's economic wealth is dependent on exporting virtual water

# So what do we do?

Manage water as a valuable renewable resource.

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Manage water as a **valuable renewable resource**.

- Plan - integrate resources and users
- Recycle – implement advanced treatment
- Use water wisely - improve efficiency in irrigation, industry and urban

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# Keeping the Water Flowing



# IRWR

Per Capita Internal Renewable Water Resources is the average annual volume of water generated within a country's borders on a per person basis. It is comprised of the average annual flow of rivers and the recharge of groundwater (aquifers) generated from endogenous (internal) precipitation. Natural incoming flows originating outside a country's borders are not included in the total. Even though IRWR measures a combination of surface and groundwater resources, it is typically less than the sum of the two because of overlap--water resources that are counted with both surface and groundwater (see the Methodology section for a more complete description of overlap).

# The origin of the concept of Virtual Water

The concept of Virtual Water was coined in London in about late 1994 some years after finding that the term 'embedded water' did not have much impact. The idea is derived from Israeli analysis by Gideon Fishelson et al in the late 1980s which pointed out that exporting Israeli water in water intensive crops did not make much sense.