Achieving water security and sustainability: avoiding hydro-centricity

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Montpellier University Doctoral School in Earth and Water Sciences
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The purpose

- to provide definitions of water security and sustainable water allocation and management.
- to show that there are very powerful economically invisible and politically silent processes that enable water scarce political economies to achieve security and sustainability.

Global process will be emphasised
and
it will be argued that
hydro-centricity is dangerous.

Reminder - types of science

	Empirical	Interpretive	Liberatory /participative/ people's science
Nature of knowledge	Objective 'truth' !!	Socially con-structed	Needs drive inquiry
Methods	Experimental	Interactive	Dialectic-who owns the questions?
Knowledge produced	Technical/ instrumental	Interpretive	Critical/spiritual

We need a language
to address the challenges
of initiating and managing reform

Some theory

Can we identify the main social solidarities?
Social structures
Who are the actors and how do they operate?
Actor networks

Cultural theory is helpful

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Modernity theory is helpful

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Discursive theory is very helpful

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Especially when interpreted via an awareness that constructed knowledge can easily overwhelm science based knowledge

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Sanctioned discourse v. Underlying fundamentals

The abstract v. The concrete (Marx)

The purpose of the session is to show how water security problems are being addressed:

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by recognising the politics that are central to water allocation and management

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by recognising that some major elements of the solution to water sector problems lie outside the water sector.

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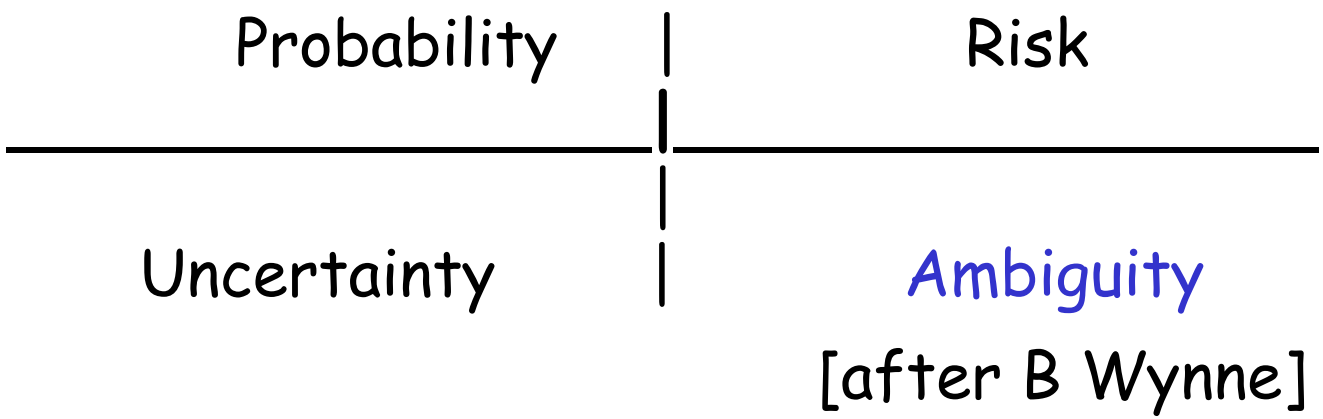
by recognising that some major elements of the solution to water sector problems lie outside the water sector.

The local watershed is important but the problemshed is usually more important

It also helps to know the issue we are addressing exists in the domain of risk or uncertainty?



[after B Wynne]

Five parts

1 Some theory
2 Essential concepts
3 The hydrocentric approach is dangerous
4 Social and political processes and adaptation
5 Conclusion

Part 1
Water security via a threefold synergy

Security
is achieved in the problemshed as well as in the watershed

There are
three invisible hydro-economic processes

that water short enable economies such as those of the MENA and southern African regions

where inexpensive water
is increasingly scarce

to be secure:

There are
three invisible hydro-economic processes
that enable water scarce economies to be secure:

1 Soil water in other catchments

It will be shown that there are
three invisible hydro-economic processes
that enable water scarce economies to be secure:

1 Soil water in other catchments

2 International trade in staple food commodities: virtual water

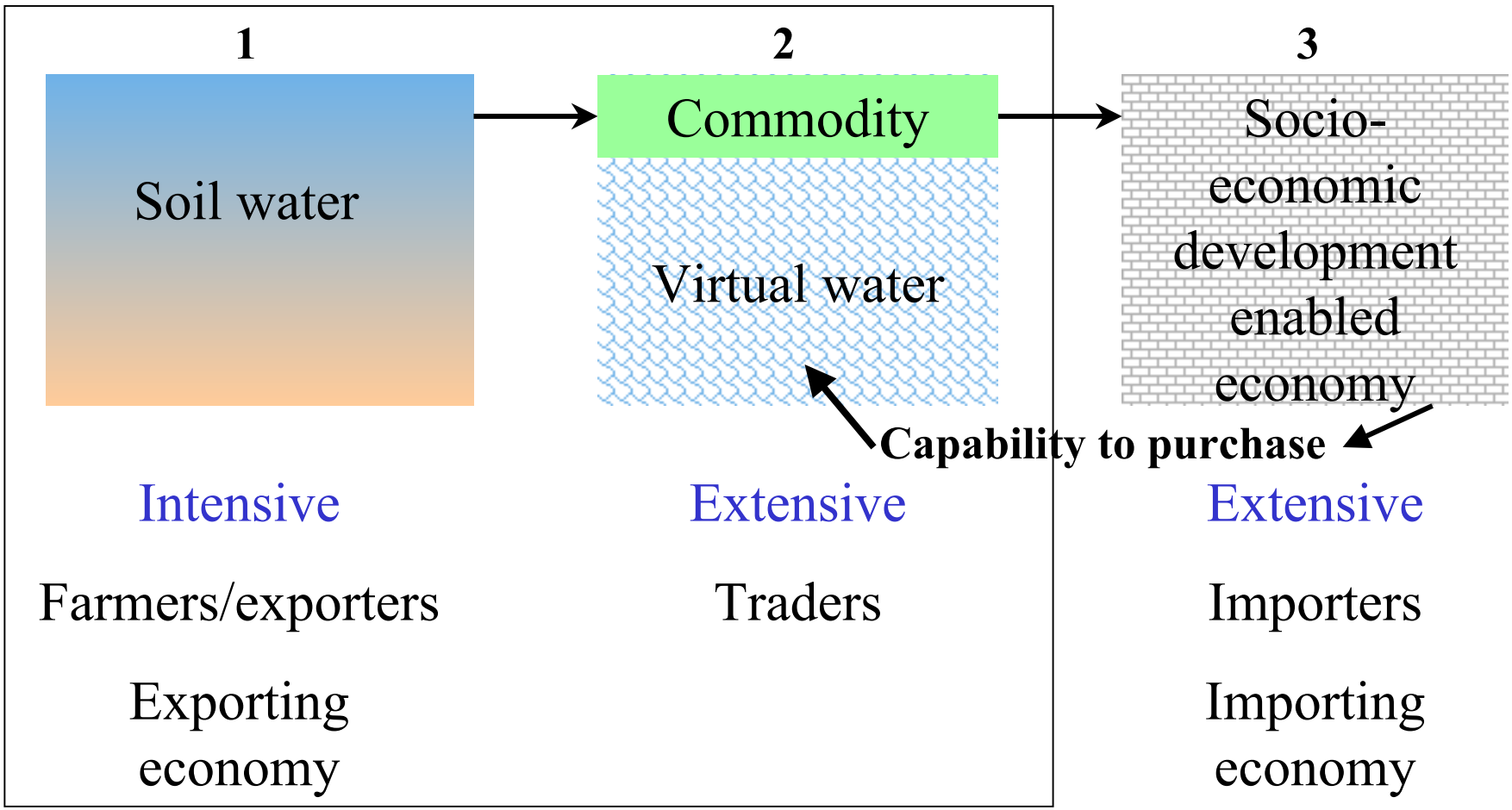
It will be shown that there are
three invisible hydro-economic processes
that enable water scarce economies to be secure:

1 Soil water in other catchments

2 International trade in staple food commodities: virtual water

3 Socio-economic development which enables politically feasible water re-allocation

The threefold synergy
- economically invisible & politically silent.
No water resources professionals or scientists here.



Part 2

Essential concepts

Some important concepts:

1 Types of water - freshwater & soil water

2 Big water and small water

3 Virtual water

4 Manufactured water - desal'

Types of water - real and virtual

What is virtual water?

It requires about 1000 m3 [tonnes] of water to produce a tonne of grain.

If the tonne of grain is conveyed to a freshwater and/or soil water short political economy or river basin,

then that economy is spared the economic, and more important the political, stress of mobilising about 1000 cubic metres of water.

Virtual water reduces the demand on local freshwater & soil water resources thereby:

alleviating impacts on the **local water** used to provide:

1 **ecological services**
2 **the security of the local economy**

Virtual water is a term, which is intensive it links water and food production It is also extensive in that it links water, food and trade.

Types of water

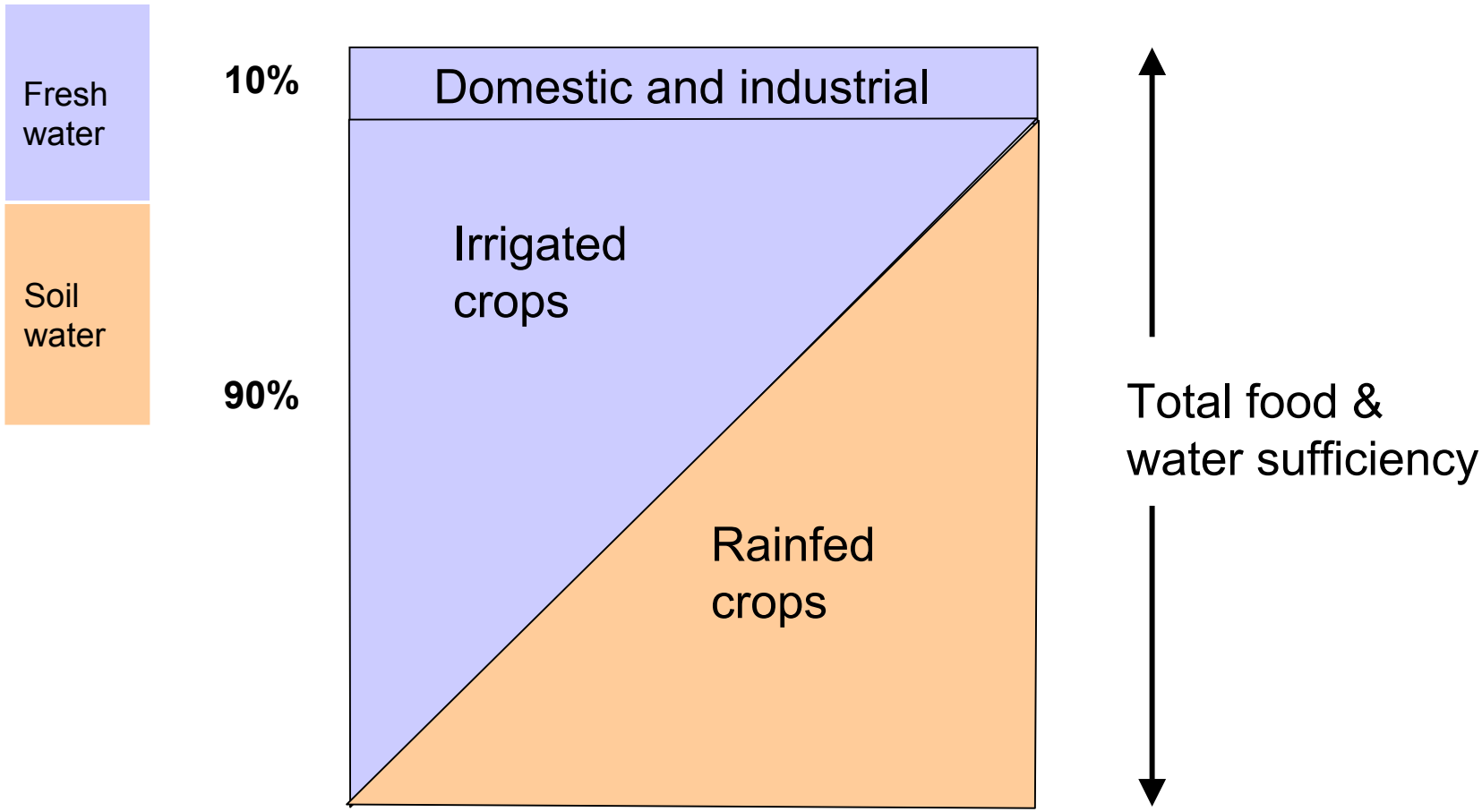
Fresh water

Soil water

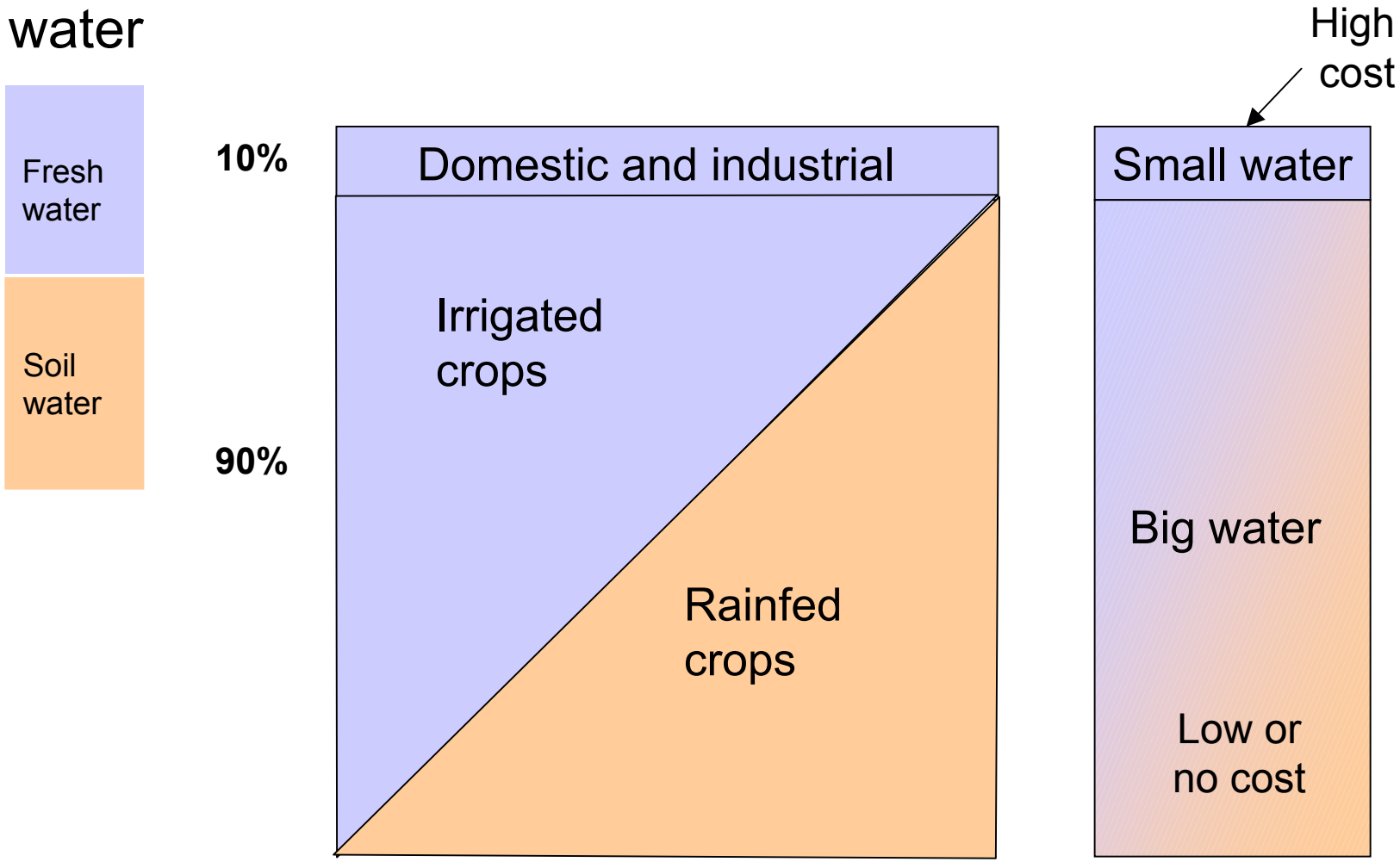
10%

Domestic and industrial

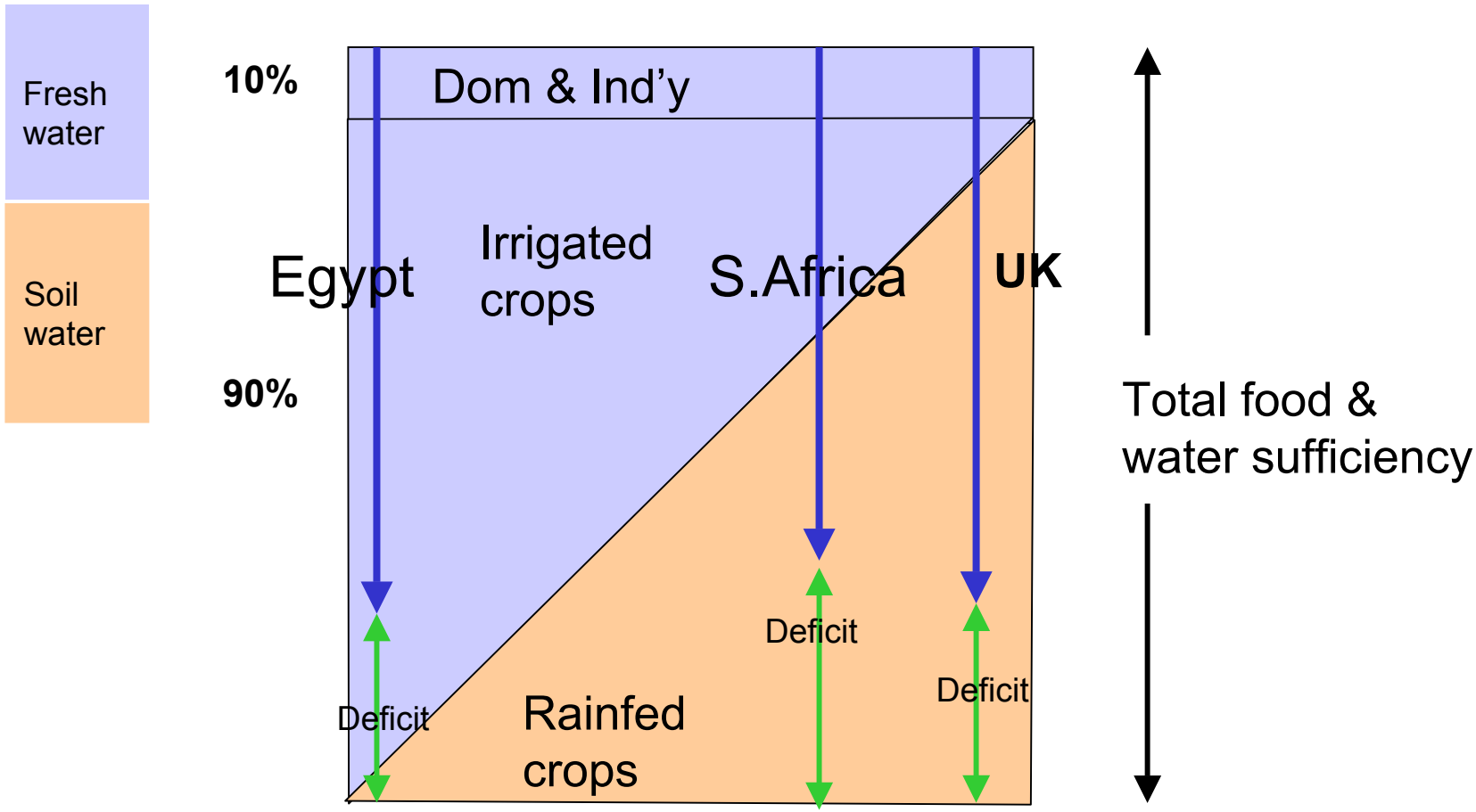
Types of water



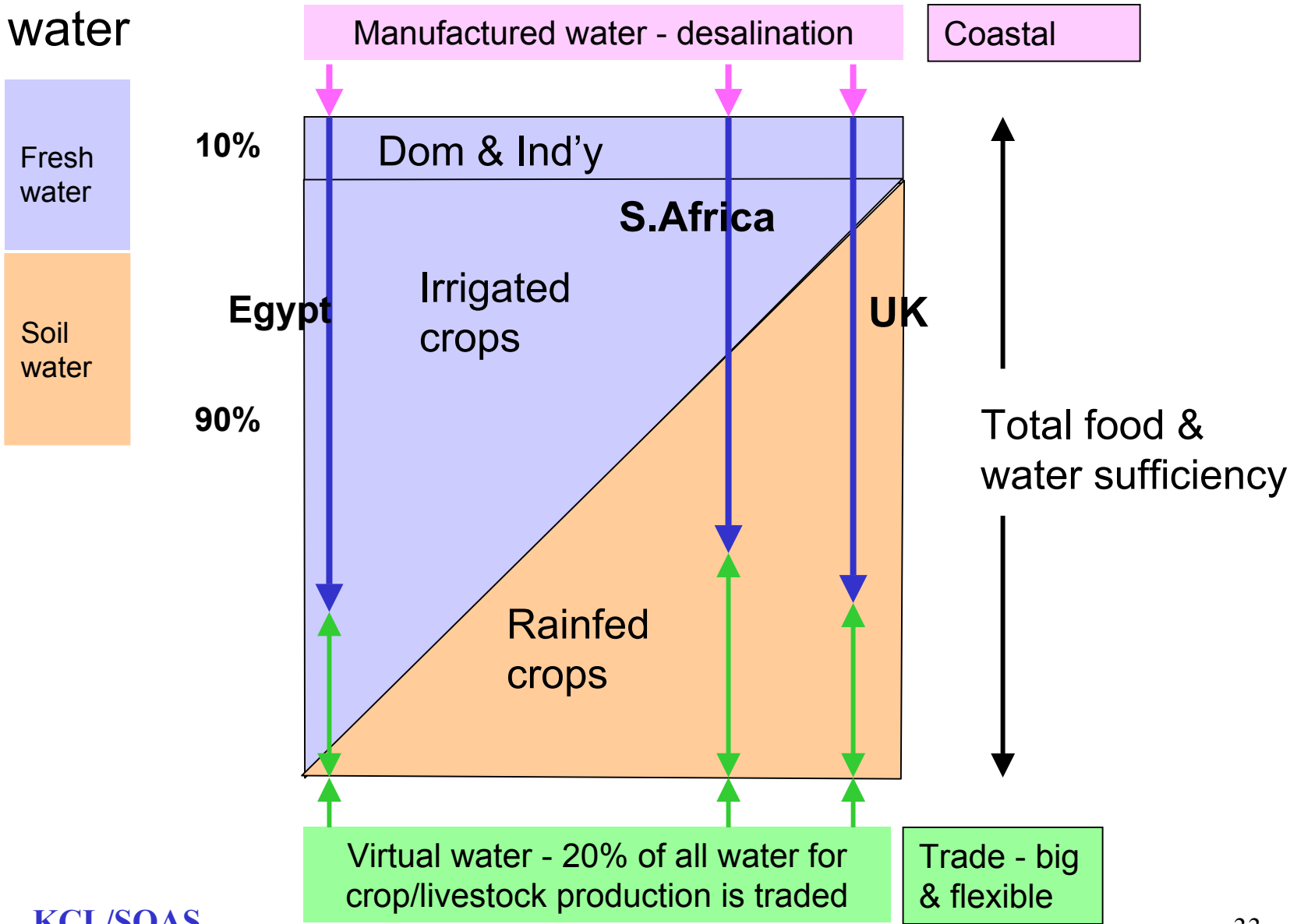
Types of water



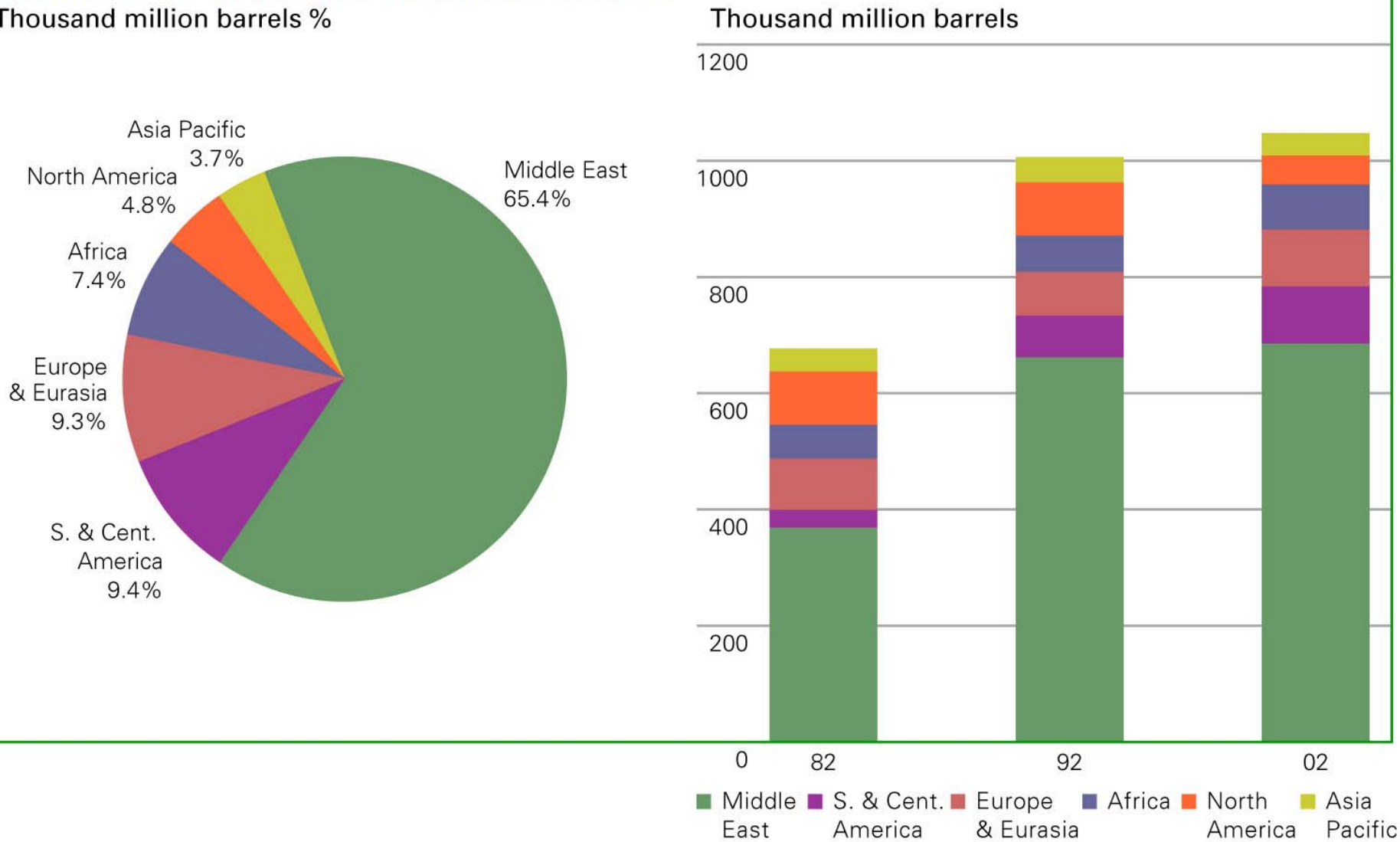
Types of water



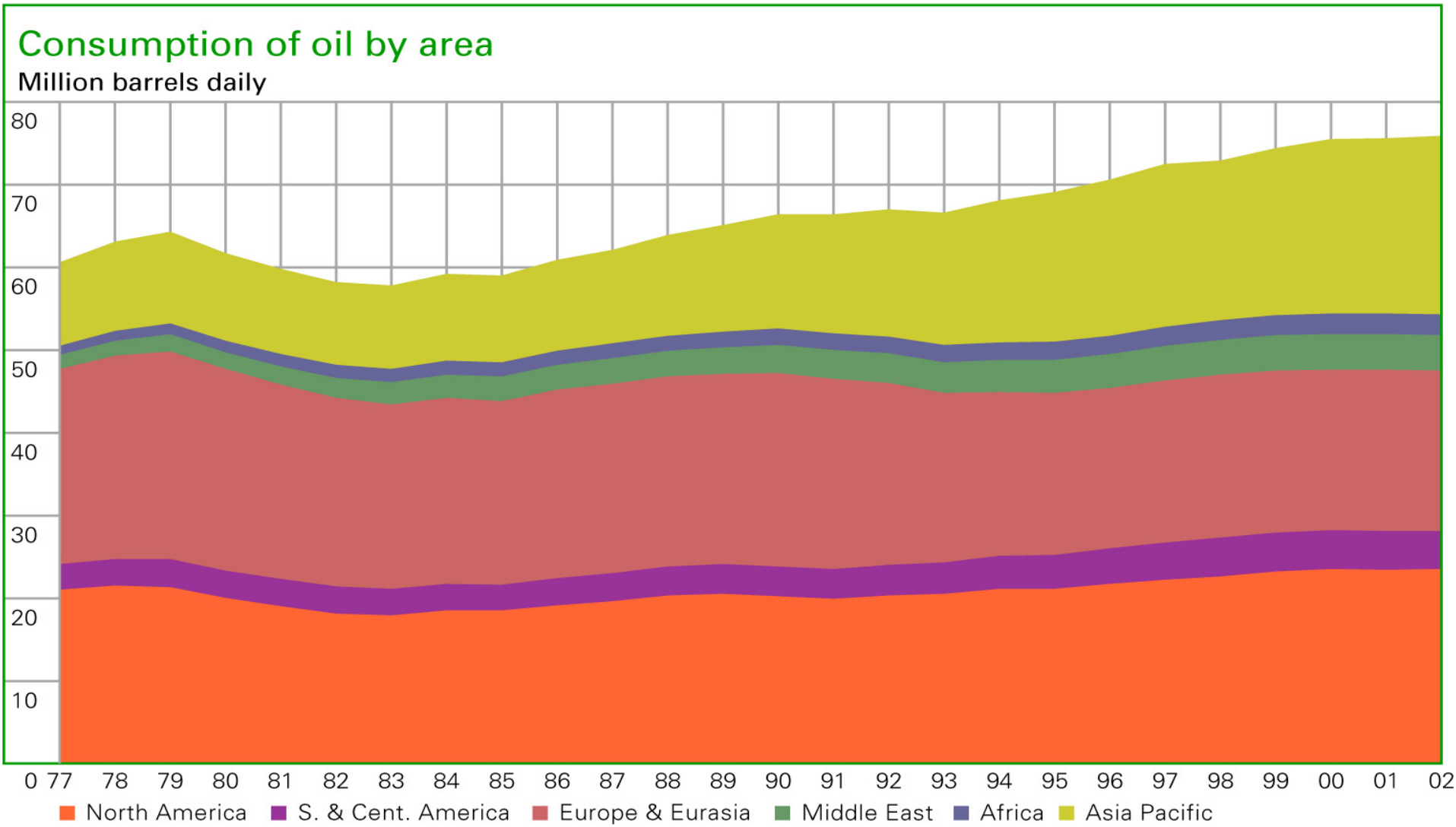
Types of water



Distribution of proved oil reserves 2002

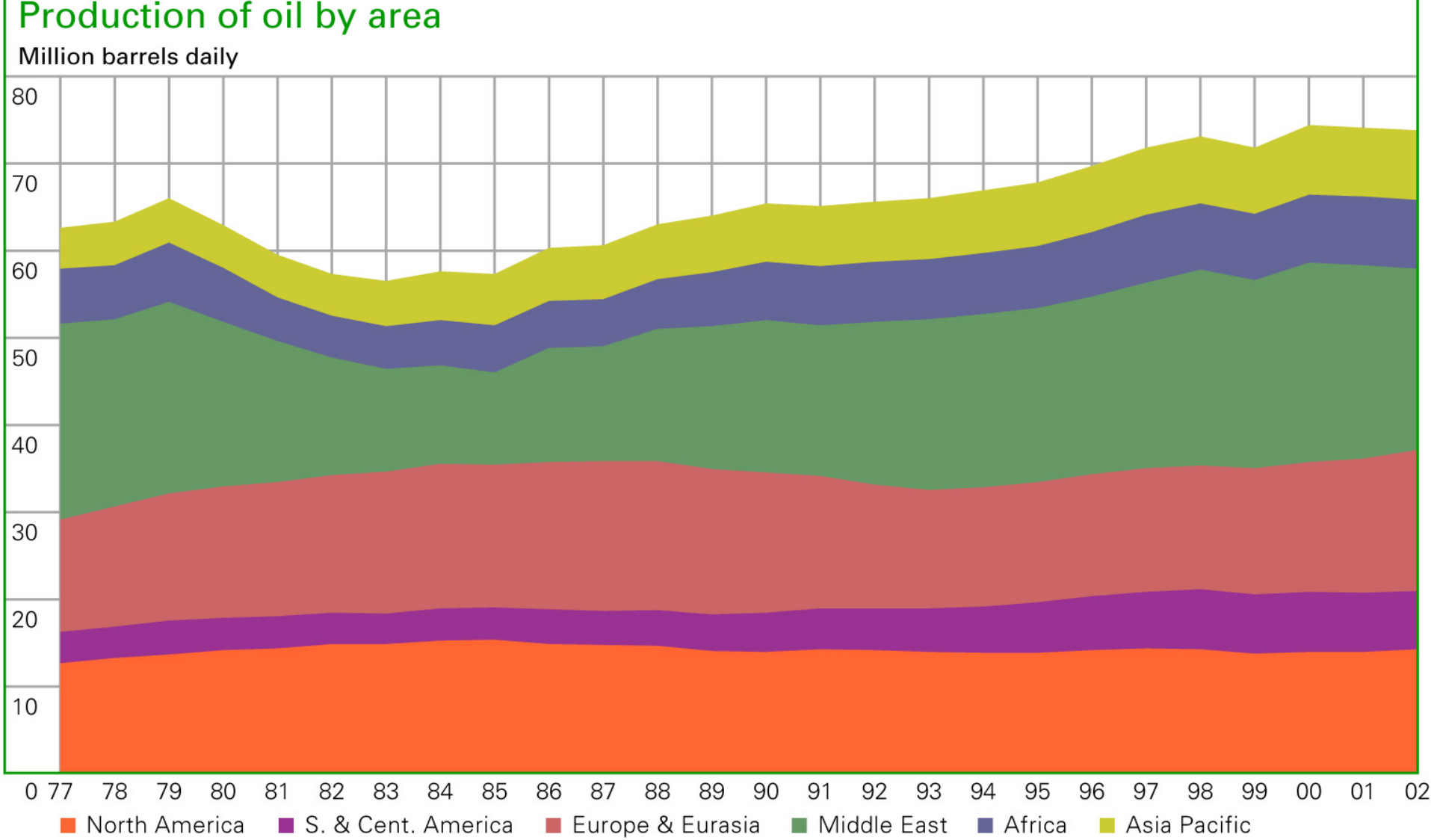


BP statistical review of world energy 2003



World oil consumption growth was weak in 2002, for the second year running, growing by less than 300,000 barrels per day. Asia was once again the engine of demand growth.

BP statistical review of world energy 2003



Oil production fell in 2002 for the second year running. A large drop in OPEC production outweighed strong growth in the Former Soviet Union and Non-OPEC.

BP statistical review of world energy 2003

Virtual water in international trade is unmatched in the volumes of water mobilised by long distance movement.

More important it is unmatched in its:

- flexibility of sourcing
- flexibility of the delivery of remedies

to distant regions enduring water deficits, including groundwater basins

Engineered local storage and distribution cannot match these qualities.

Types of water

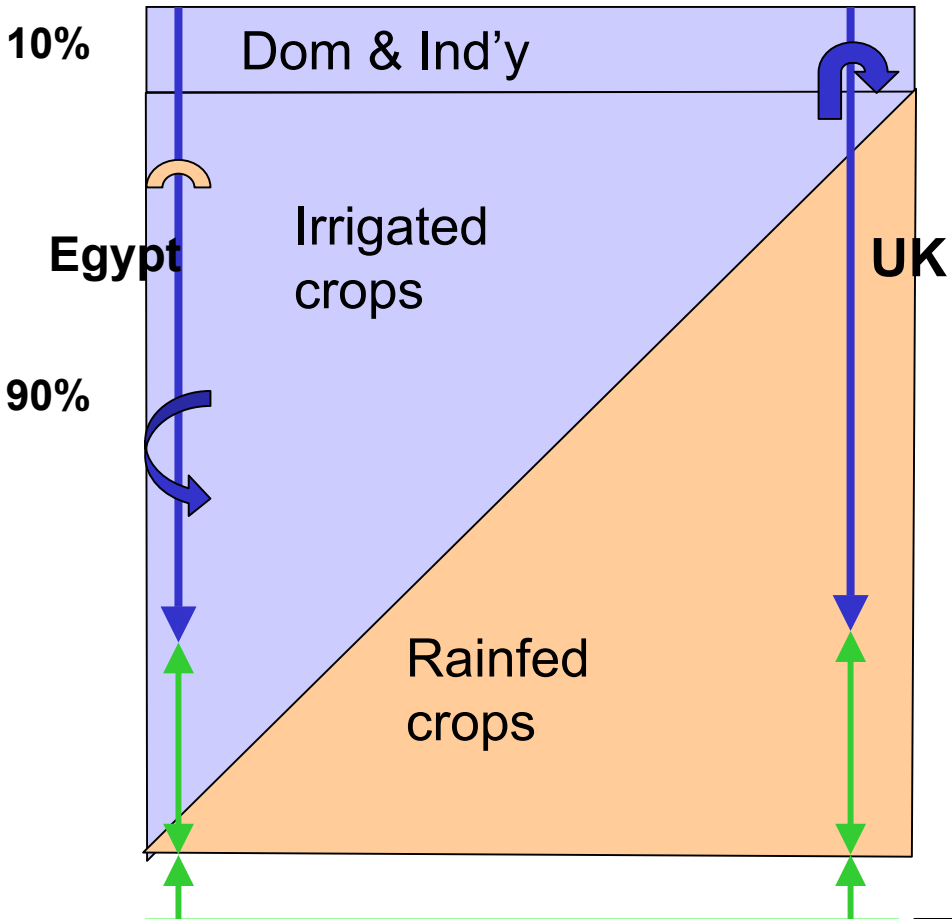
Compare LOCAL engineering solutions

Manufactured water - desalination

Coastal opt'n

Fresh water

Soil water



Total food & water sufficiency

Virtual water - 20% of all water for crop/livestock production is traded

Trade - big & flexible

Virtual water:

is economically invisible and politically silent

These qualities give it a very special role in water policy-making and reform

Political processes
constantly do difficult things
such as
constructing knowledge
which overwhelms science based
knowledge and economics.

They see off water re-allocation, water pricing - in other words demand management instruments.

The capacity of invisible processes such as virtual water to hide the real economy are taken up without a thought.

Other than an unacknowledged appreciation that they are politically costless.

Solution perspectives

Outsiders

Fundamentals via politically detached science

1 Virtual water

2 Allocative efficiency

3 Productive efficiency

MENA Insiders

Sanctioned discourse - politically determined

1 Prodiv' effic'y

No political price

2 Allocative efficiency

3 Virtual water

Identity challenge

Relevance to regulation, reforms and adaptation

Good ideas are subordinate to the more powerful old knowledge which drives political processes.

Like most underlying fundamentals identified by scientists and engineers awareness of virtual water is overwhelmed by the constructed knowledge of the actors in the political realm.

VW is an outsiders idea.

It is about economic fundamentals.

For insiders VW is apparently seriously destabilising socially and politically in regions such as the Middle East.

The deeply established MENA 'sanctioned discourse' has tended to reject the idea of VW. Not so in southern Africa?

Part 3

It will be emphasised that a hydro-centric approach,

including making the starting point the river-basin & the groundwater basin

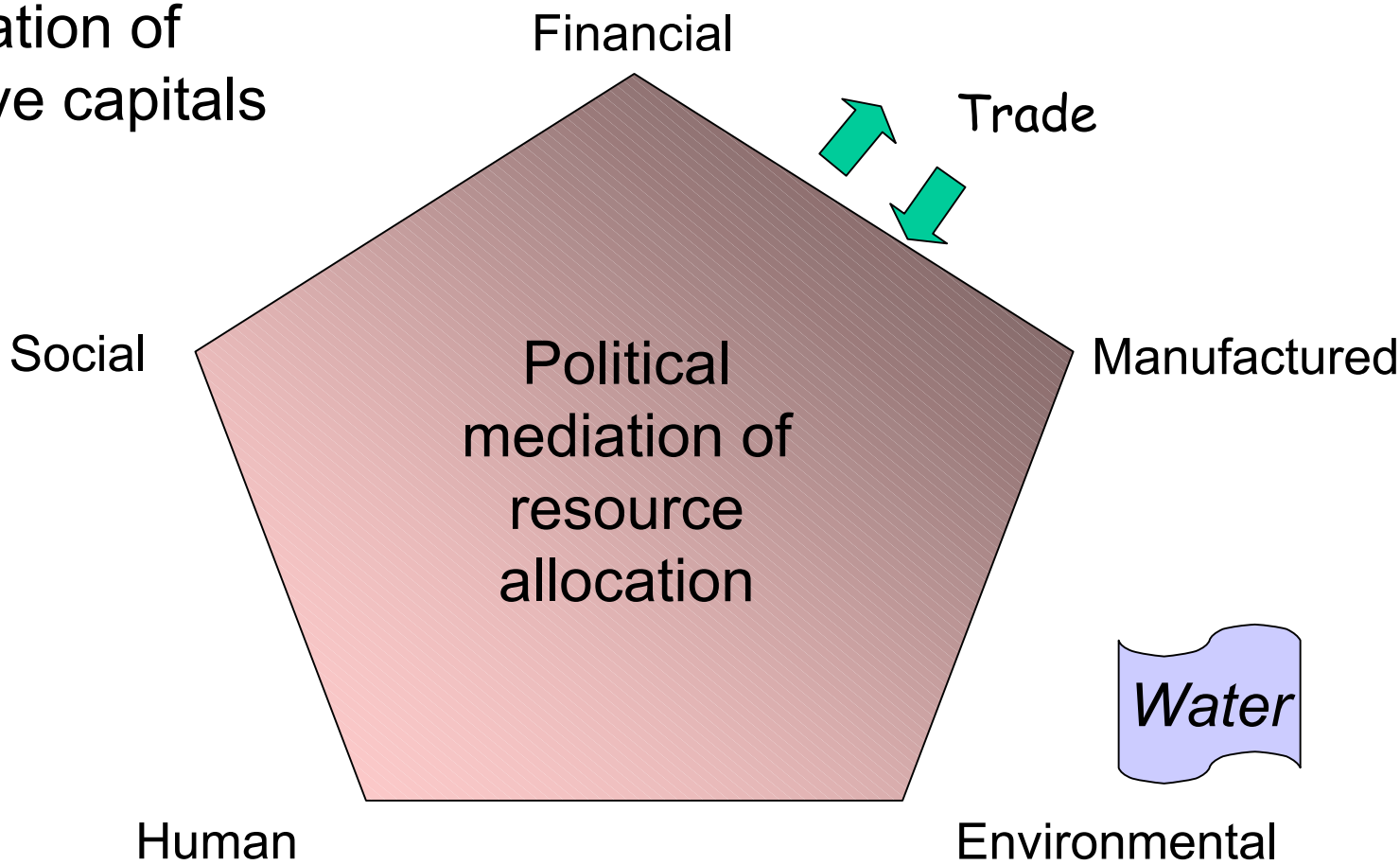
is unsafe.

Communities and political economies achieve security
[including water security]

by effectively combining their environmental (water), human, social, manufactured and financial capitals

via political processes.

The political mediation of the five capitals



Two orders of scarcity

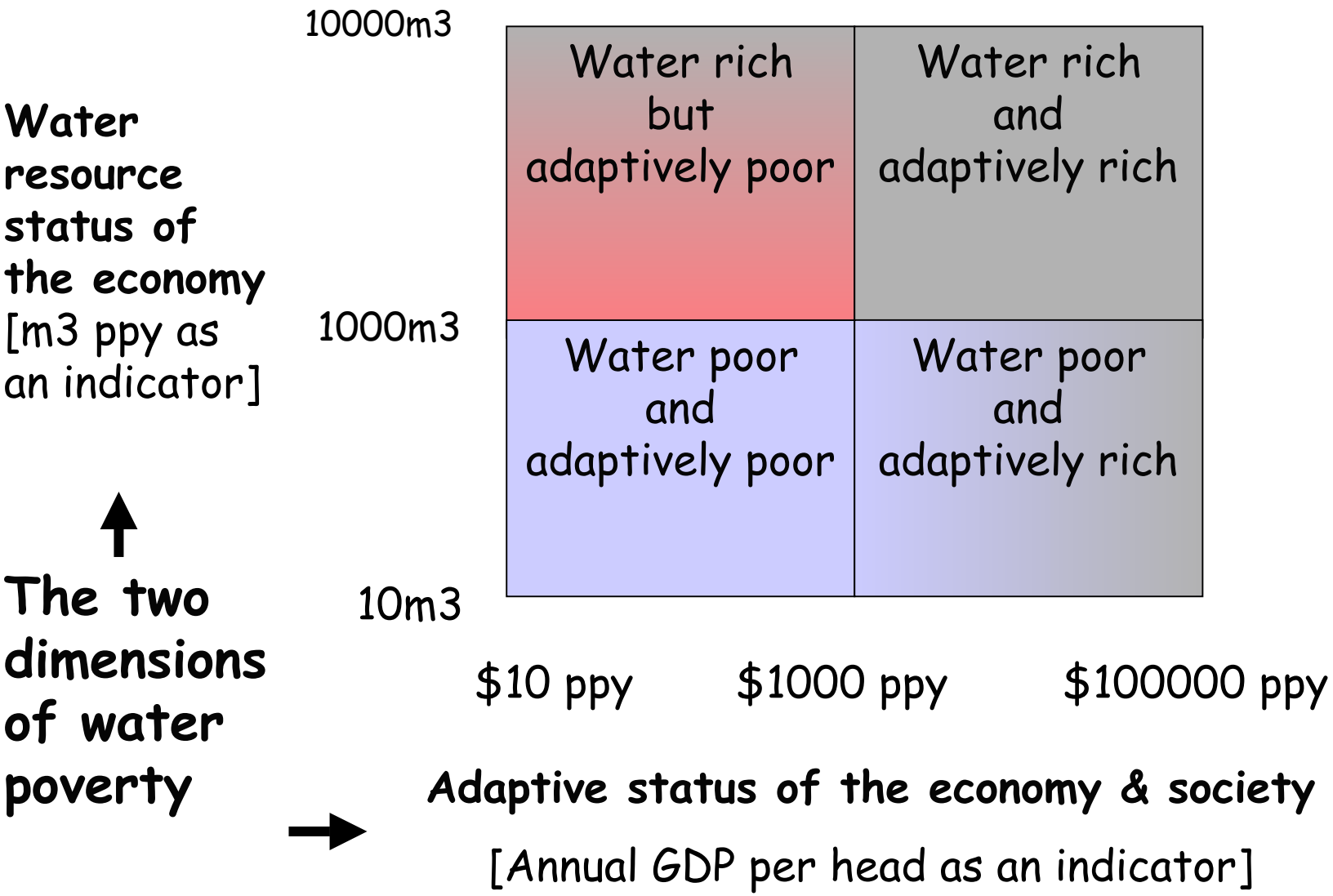
1 The water scarcity

2 The scarcity of adaptive capacity

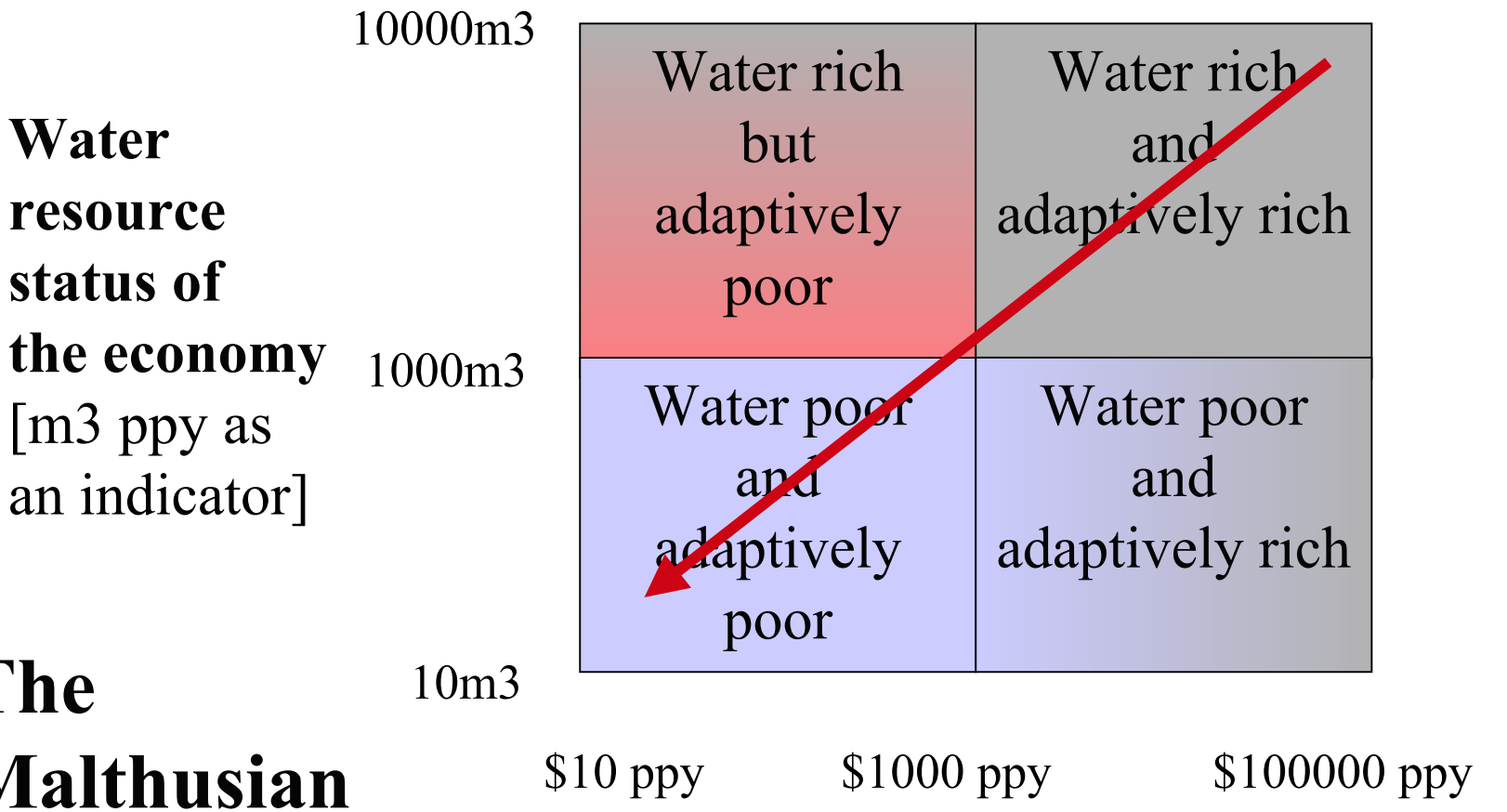
[Turton and Ohlsson 1999]

Coping with water scarcity

The second order scarcity is much more important than the scarcity of the water.

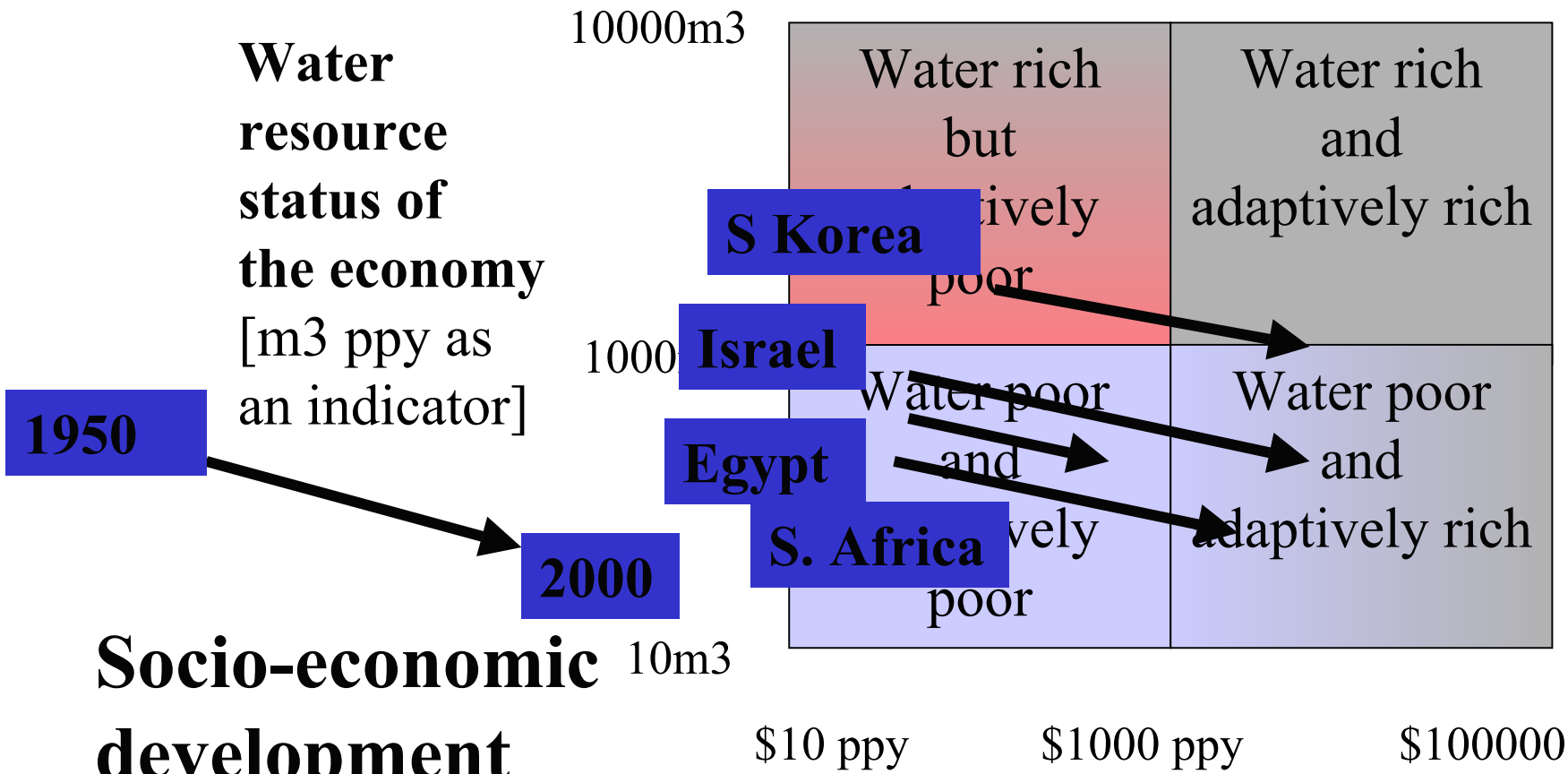

10000m3
Water rich but adaptively poor
Water rich and adaptively rich
Water resource status of the economy [m3 ppy as an indicator]
1000m3
Water poor and adaptively poor
Water poor and adaptively rich
10m3
The two dimensions of water poverty
$10 ppy
$1000 ppy
$100000 ppy
Adaptive status of the economy & society
[Annual GDP per head as an indicator]

The Malthusian relationship



Both the water status and the social adaptive capacity are dynamic.

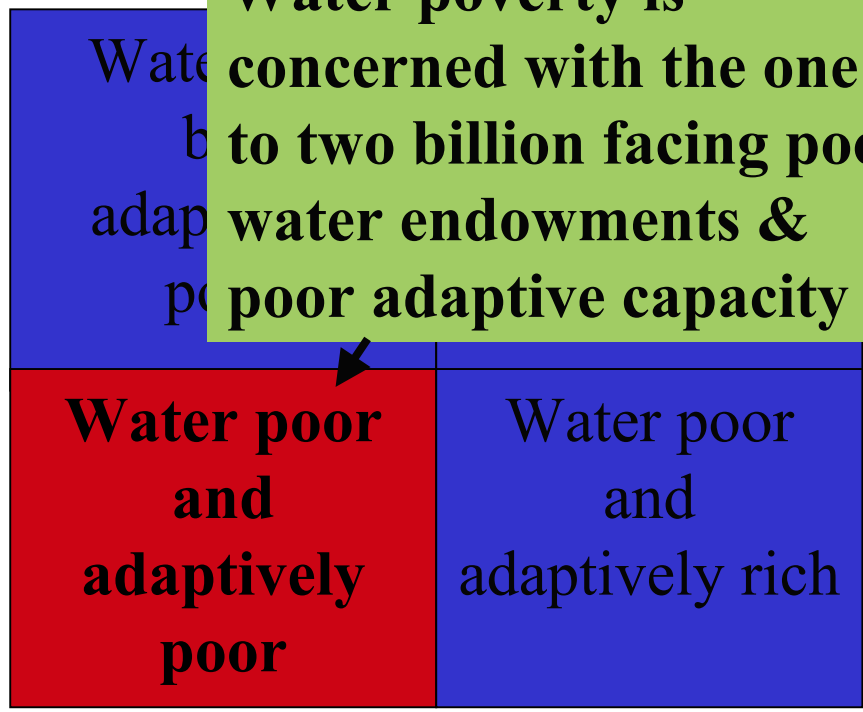
Communities and political economies have trajectories reflecting worsening local water resource availability – because of rising populations, and
improving economies – because of adaptive amelioration.



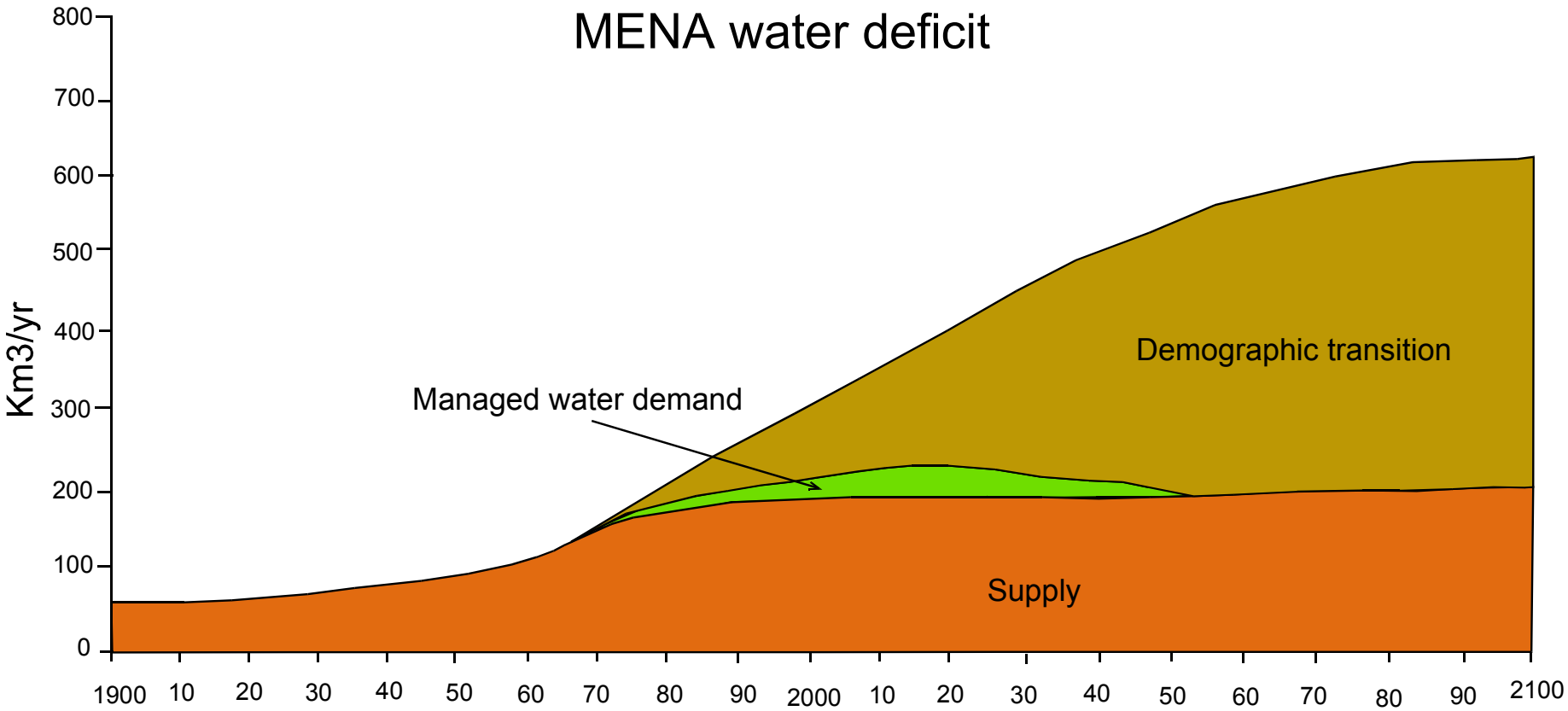
Socio-economic development not determined by water status

Water poverty is concerned with the one to two billion facing poor water endowments & poor adaptive capacity

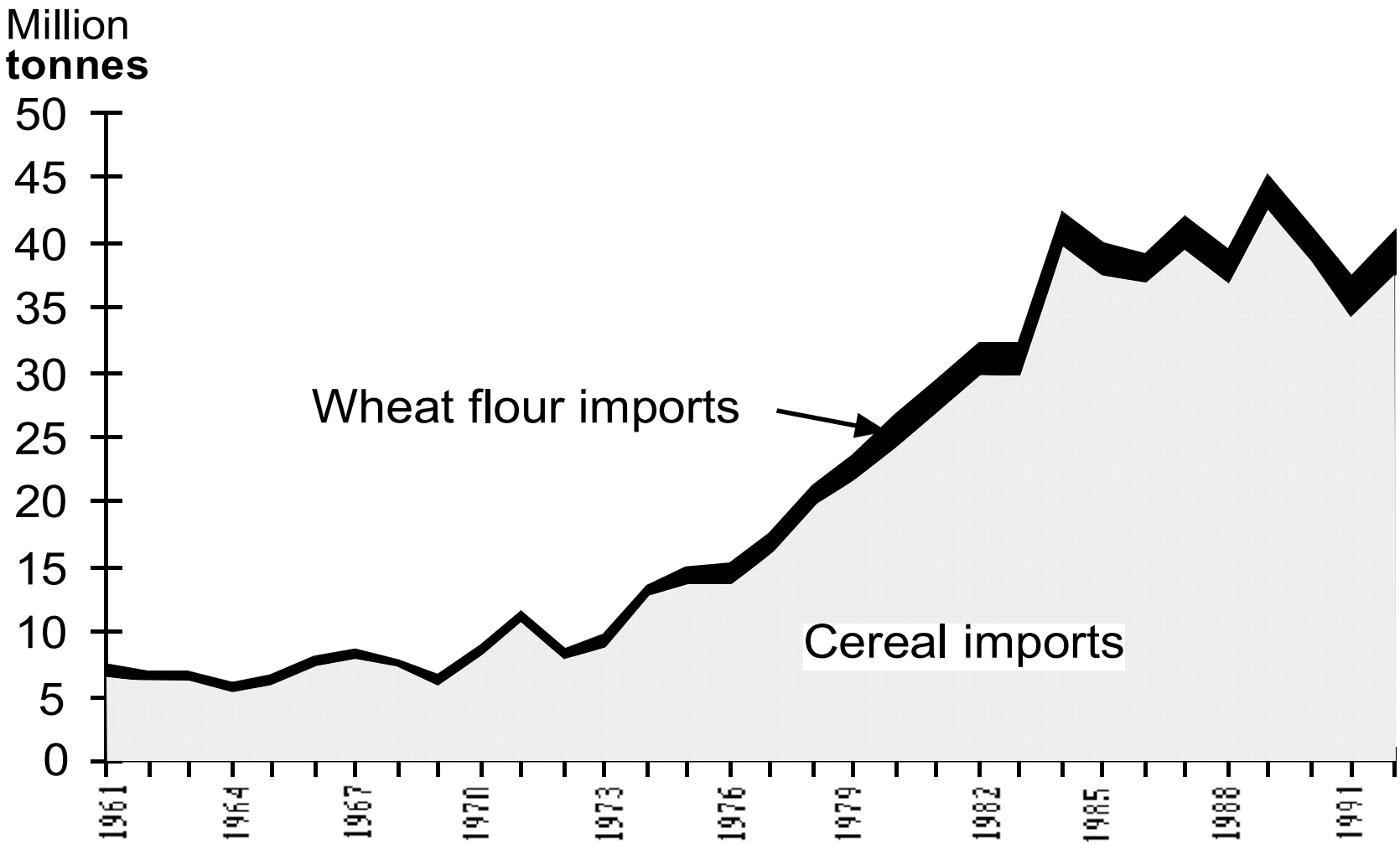
Water resource status of the economy [m3 ppy as an indicator]



The focus of WPI monitoring & evaluation

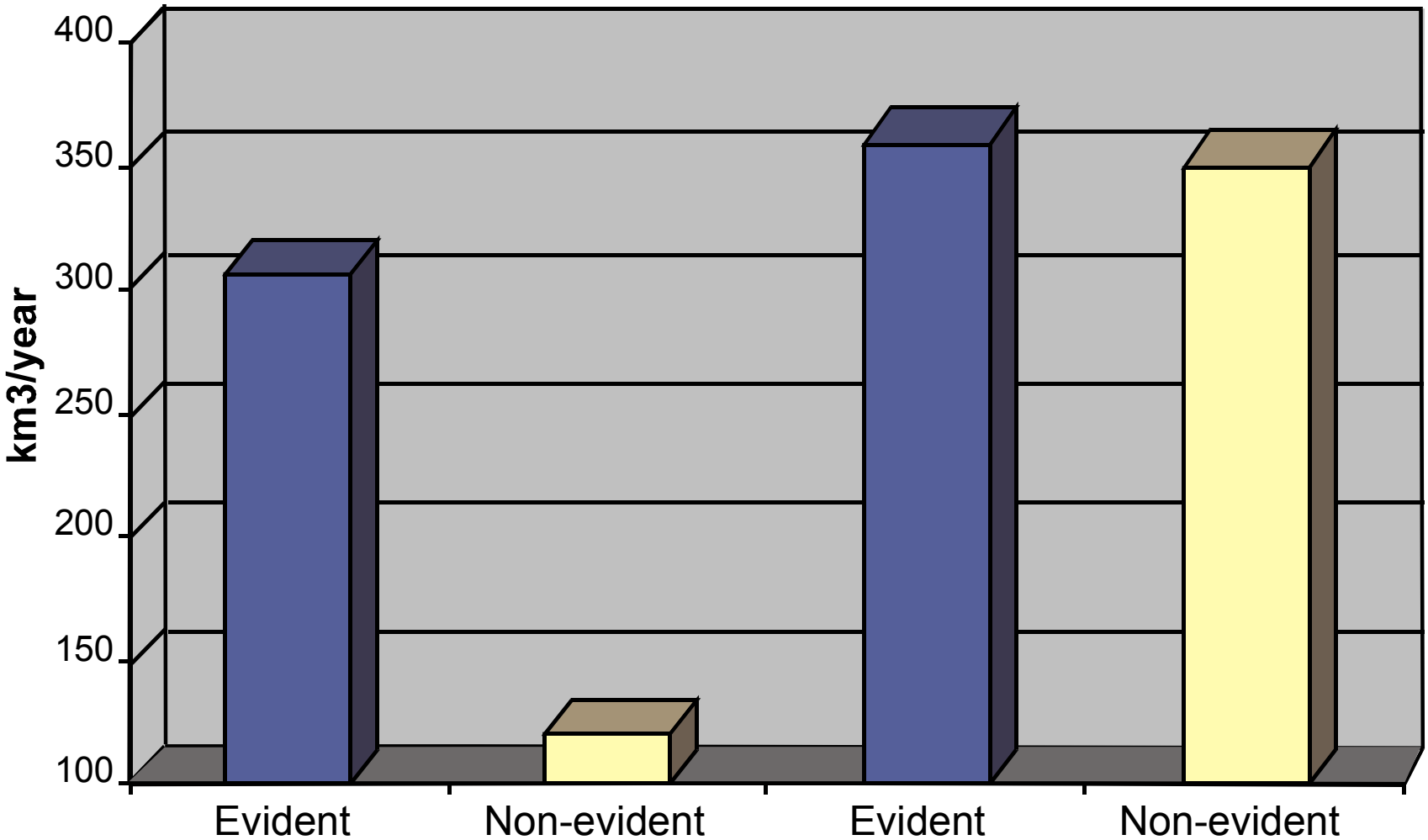

MENA water deficit
Km3/yr
800
700
600
500
400
300
200
100
0
Demographic transition
Managed water demand
Supply
1900
10
20
30
40
50
60
70
80
90
2000
10
20
30
40
50
60
70
80
90
2100

Middle East: cereal & wheat flour imports



Evident and non-evident MENA water: 1995 & 2050

Source: author's estimates based on UN demographic data & estimates of water availability



Virtual water enables the optimists and the pessimists to be credible but 'importing' it seriously distorts the perceptions of virtual water importing communities and political leaders.

Basic principles of the demand management economics of water and environmental security

More crop per drop [IWMI]

[productive/technical efficiency]

More jobs per drop

[allocative/economic efficiency]

More care per drop

[considering the environmental services of water]

More stake per drop

[inclusive fifth paradigm approach]

Part 4

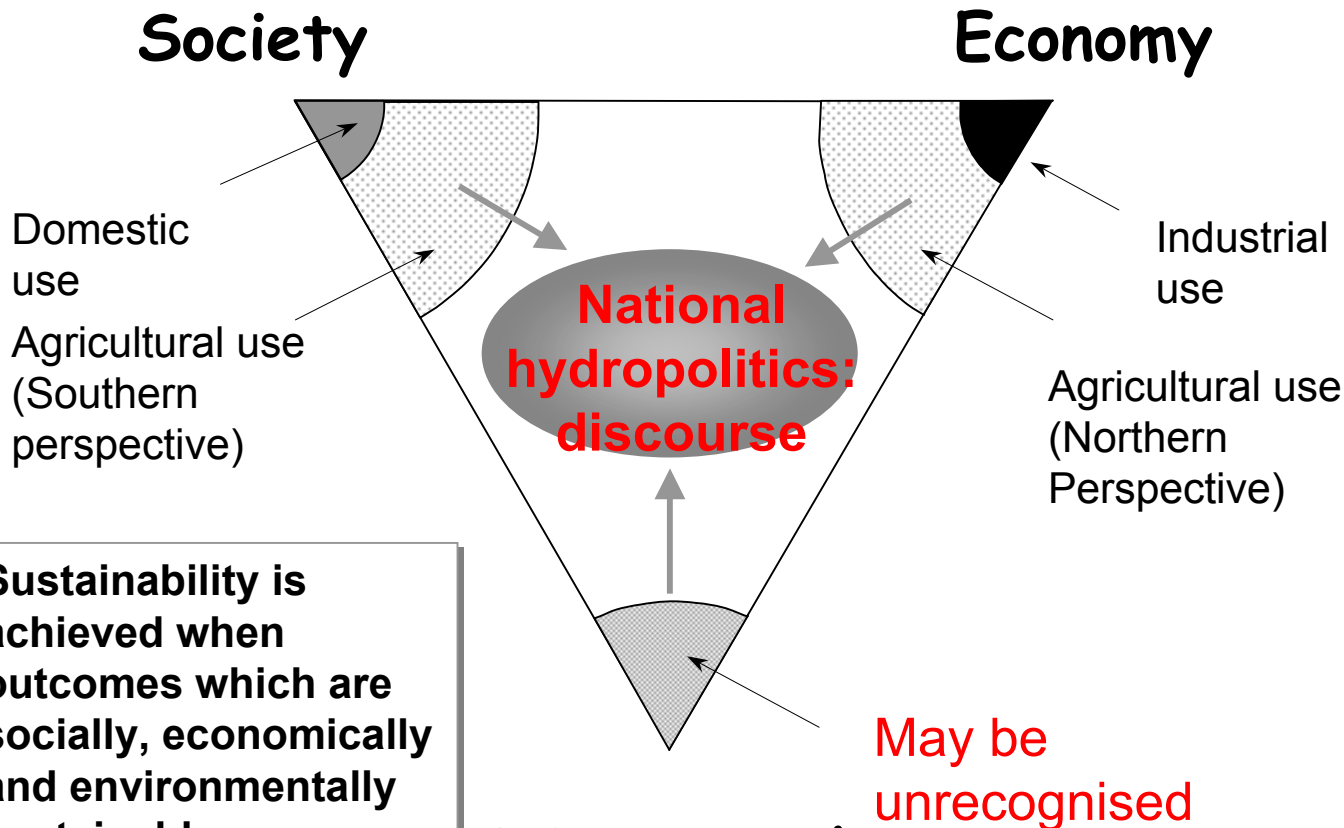
Some trends and helpful theory

Political economy/ecology

'Water flows uphill to money and power.' Reisner 1984

'Economics are fantasy: politics are real.' Reisner

Discursive politics & sustainability- contending knowledge & contending interests

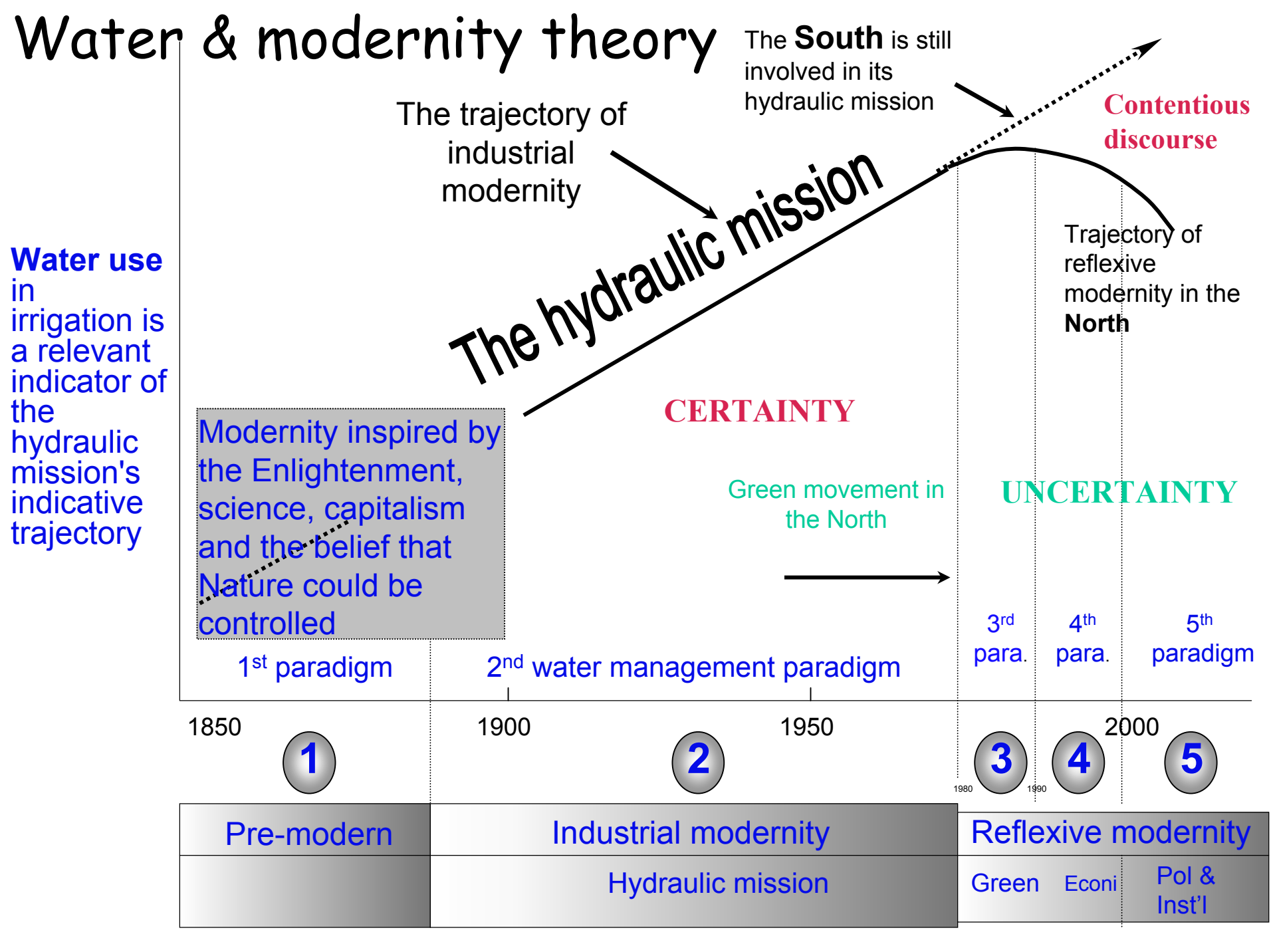


Sustainability is achieved when outcomes which are socially, economically and environmentally sustainable, are successfully contended.

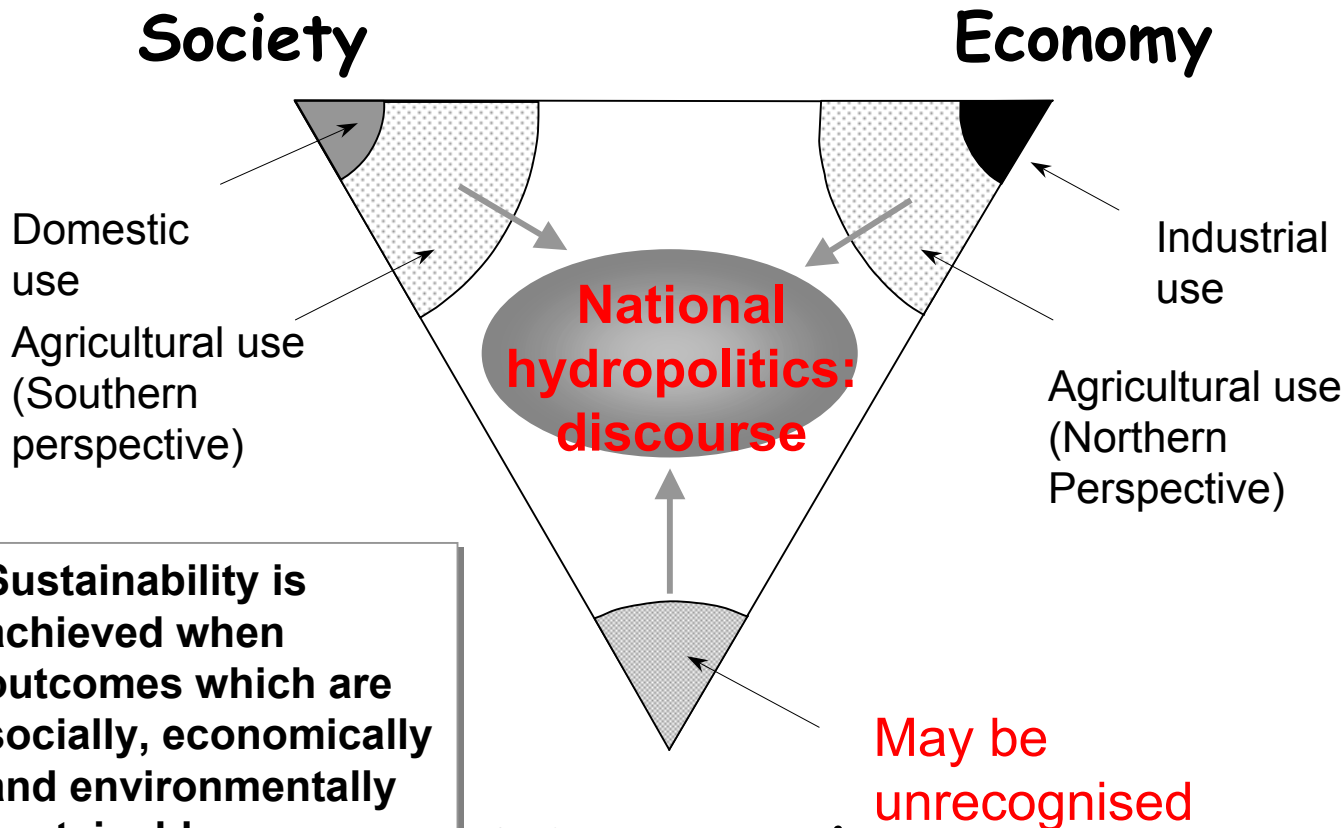
Theory

Cultural, social, political and environmental theory is of particular relevance to water policy studies.

Water & modernity theory

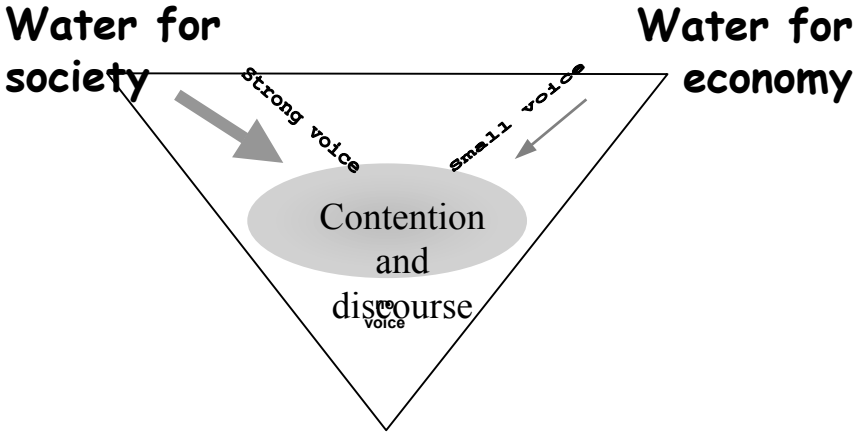


Water & sustainability theory has three dimensions - discursive consequences

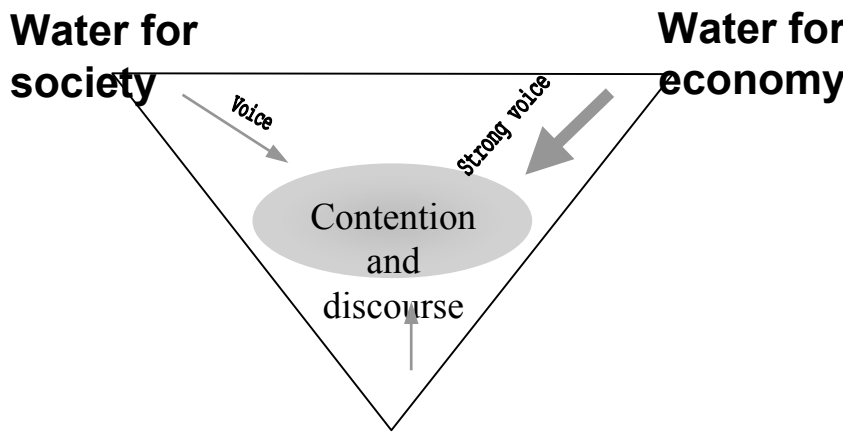


Sustainability is achieved when outcomes which are socially, economically and environmentally sustainable, are successfully contended.

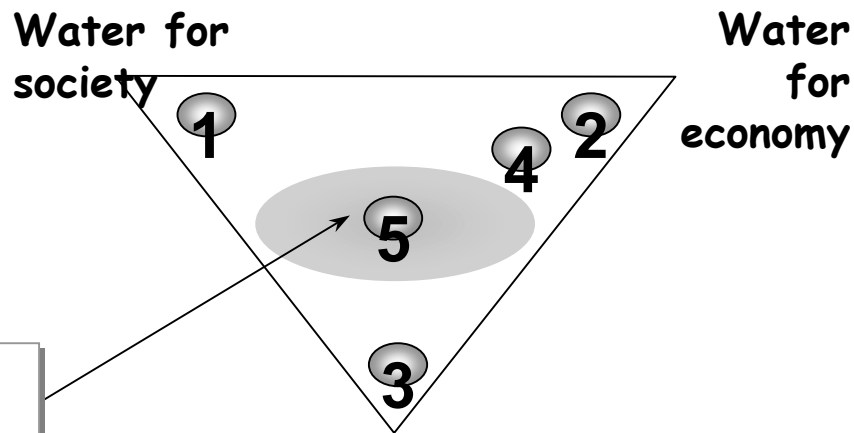
Southern insider's view of MENA water resources



Northern outsider's view of MENA water resources

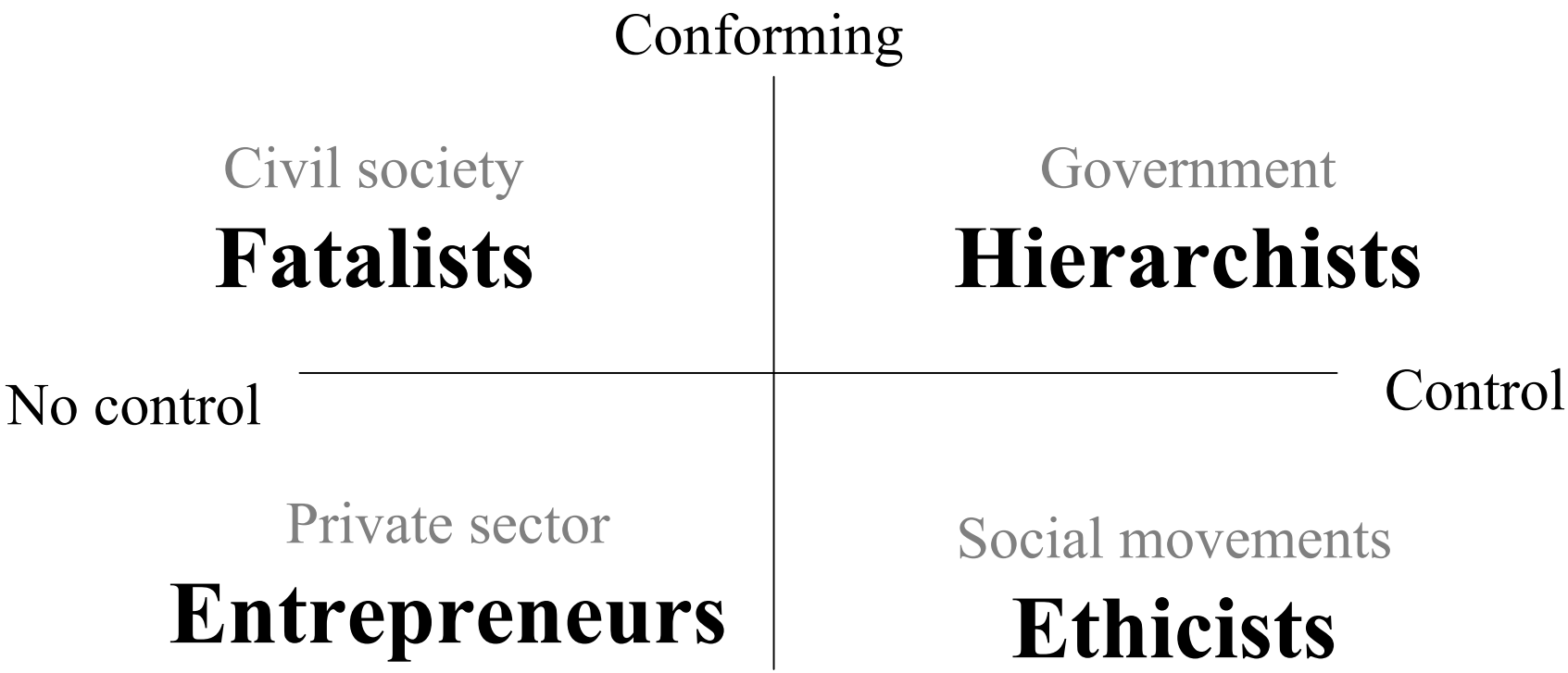


The five water management paradigms and the sustainability triangle concept



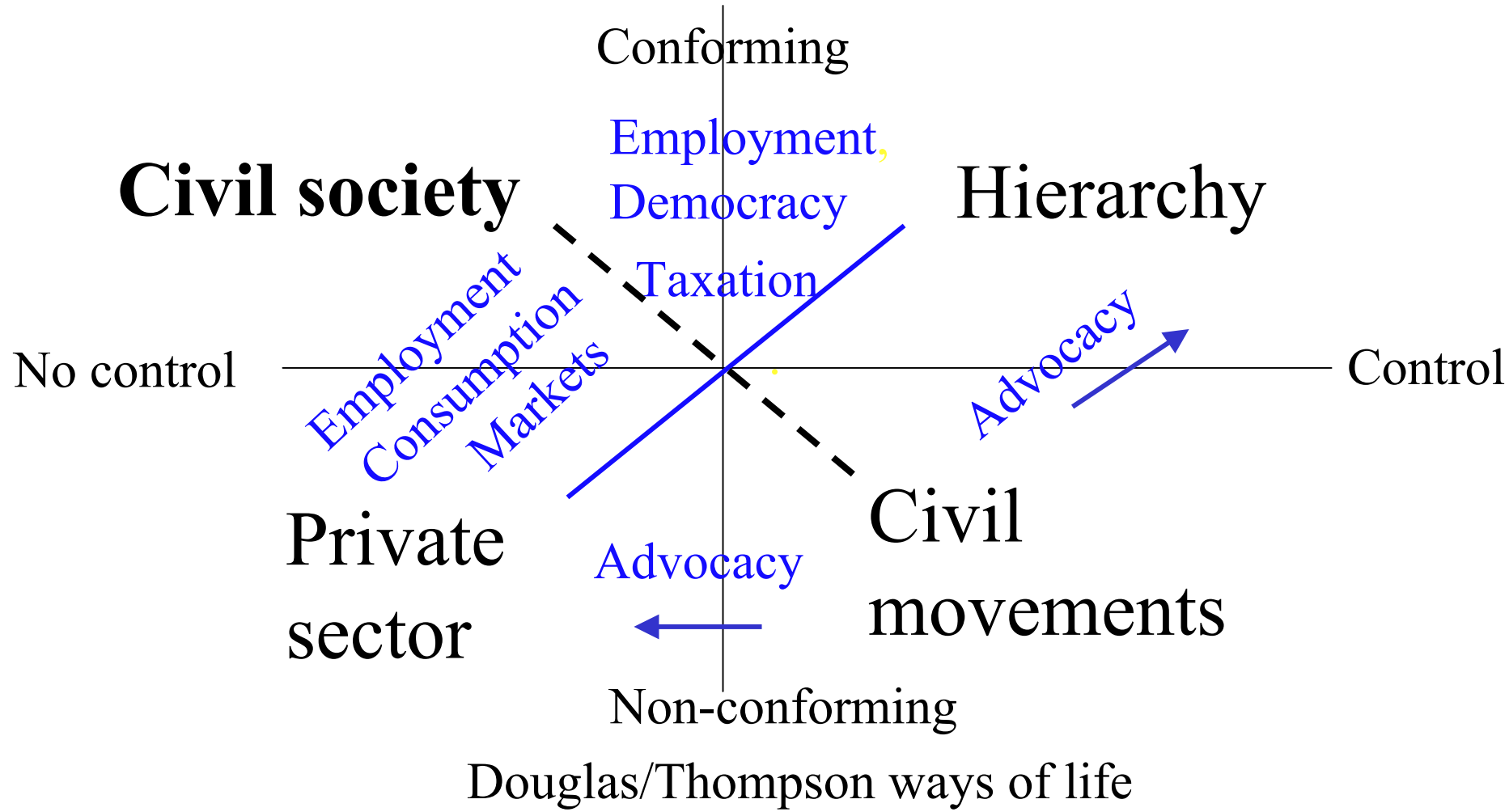
Water management has always been political. The fifth paradigm recognises it as such.

Cultural theory - Douglas et al.



Douglas/Thompson - 'ways of life'

Cultural theory - Douglas et al.



Douglas/Thompson - ‘ways of life’

The policy-making contribution of the three contributing social solidarities on for example 'risk'.

.??? Fatalists	**Risk managing** .gov Hierarchists
Risk taking .com Entrepreneurs	**Risk avoiding** .org Ethicists

Douglas/Thompson - 'ways of life'

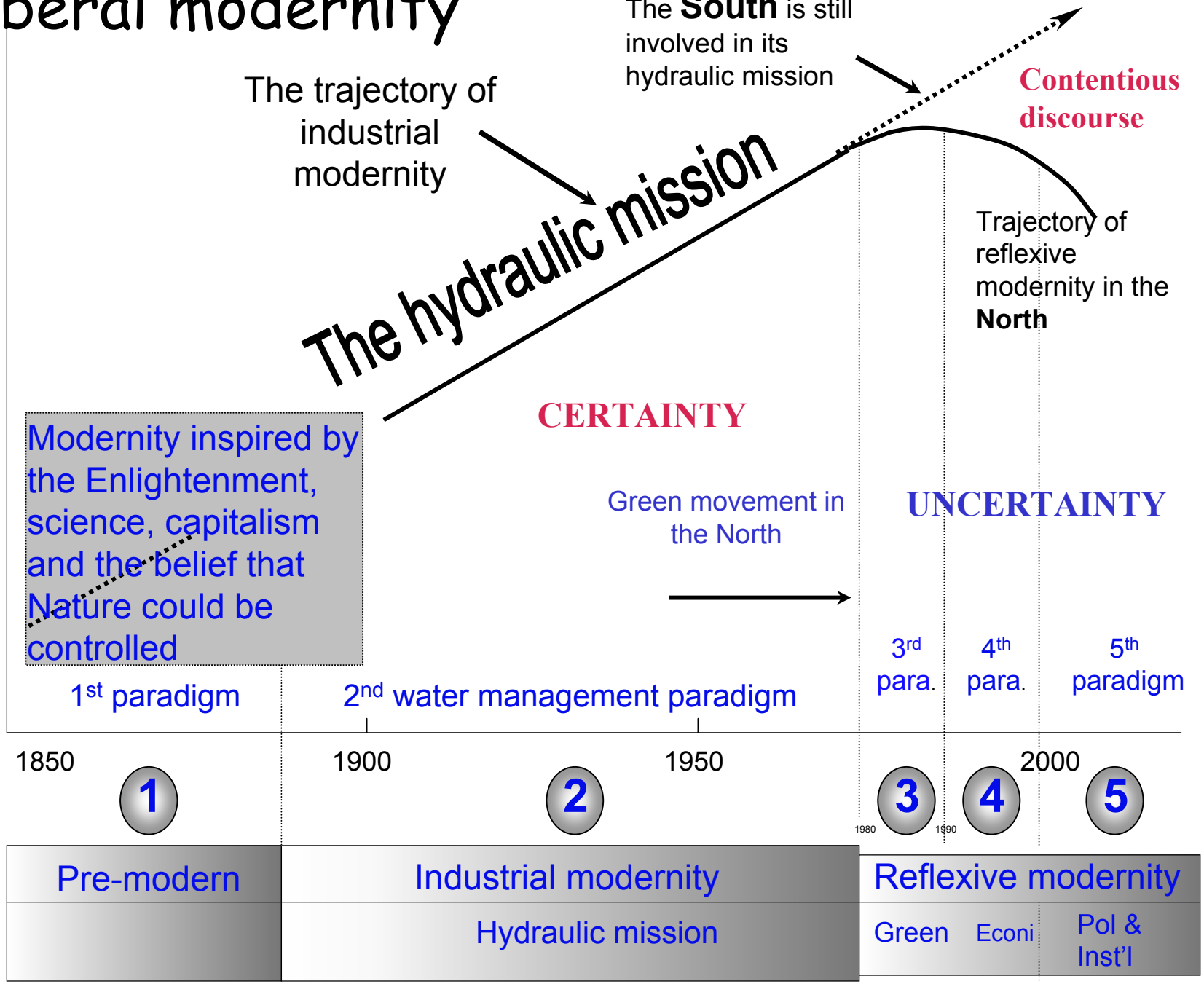
Mapping the five paradigms on to the social solidarities

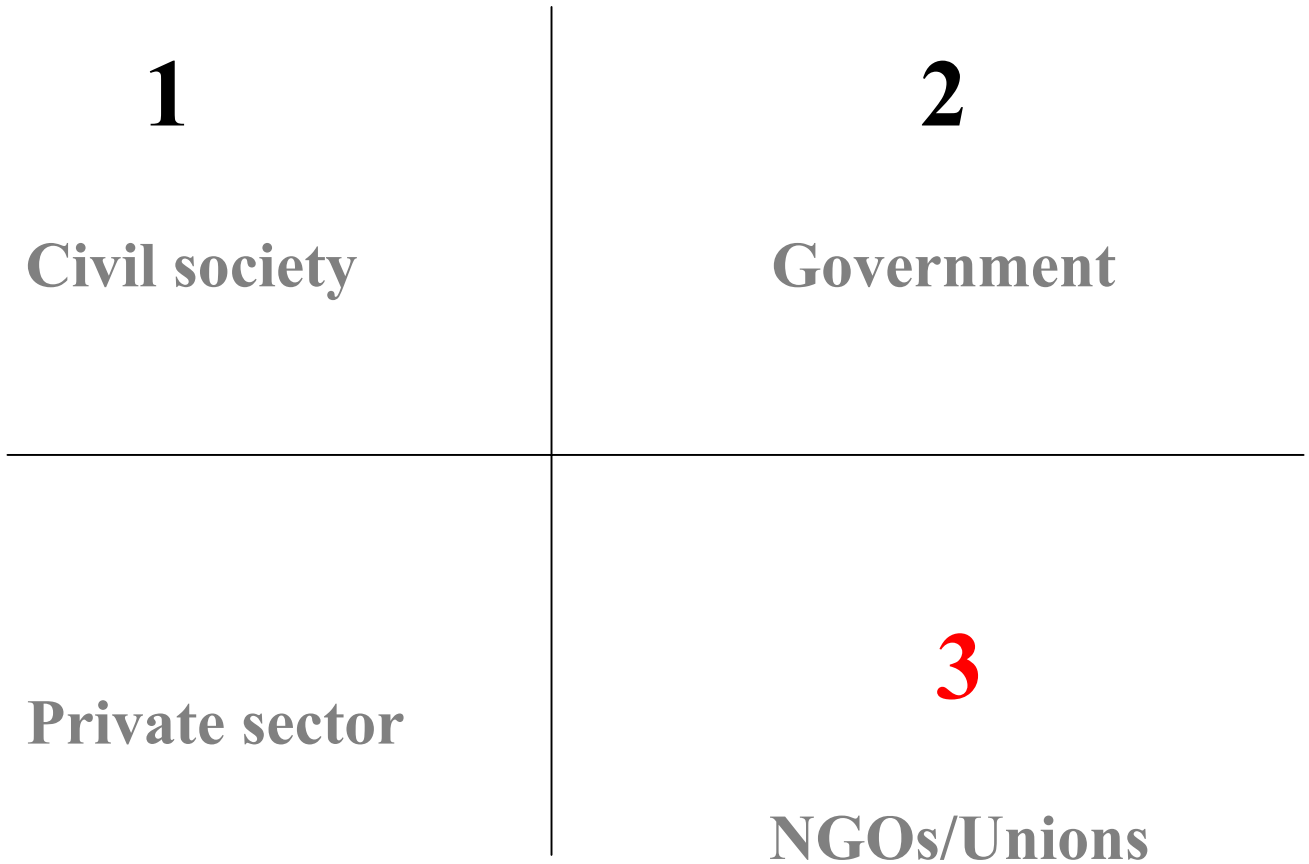
1 **Civil society**	**Government**
Private sector	**NGOs/Unions**

Douglas/Thompson - ‘ways of life’ & water reform paradigms

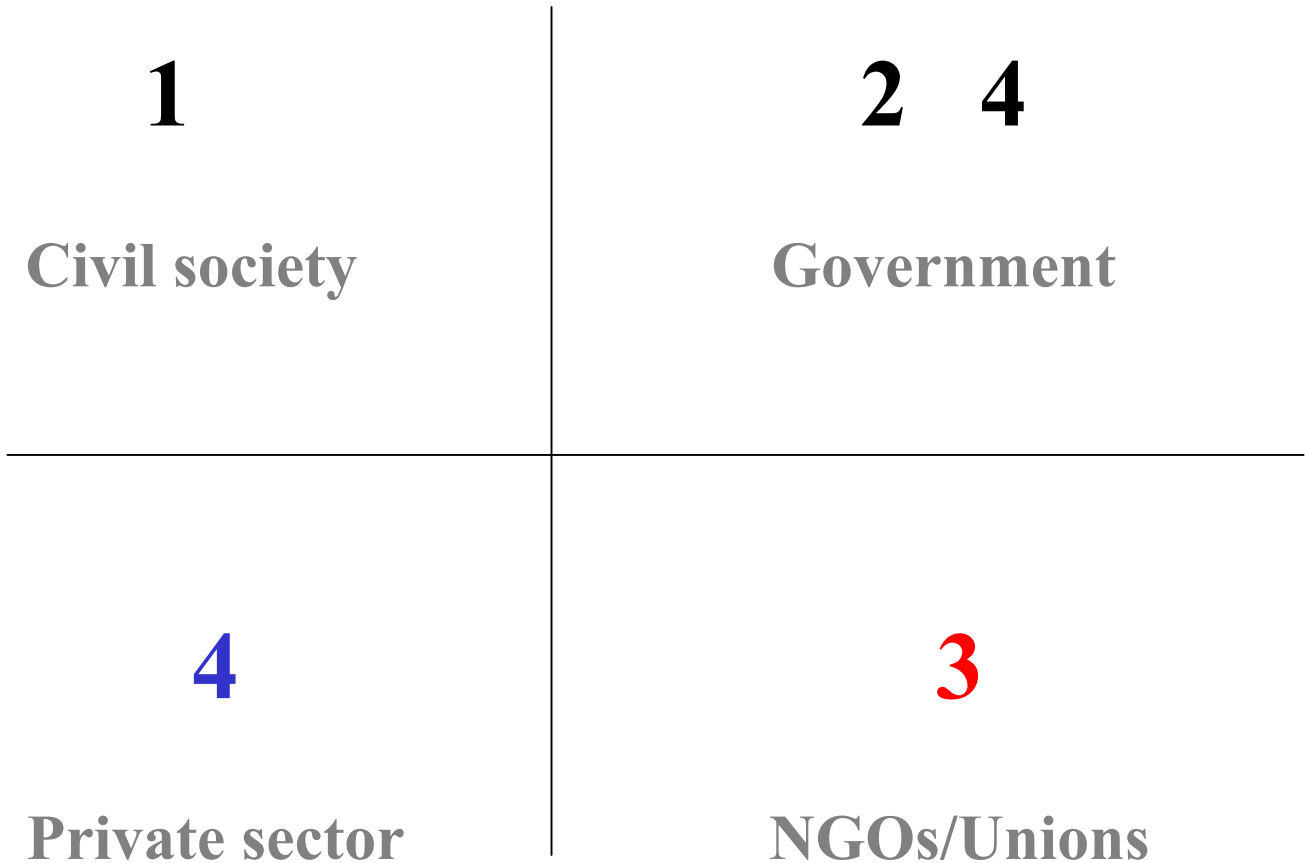
Neo-liberal modernity

Water use in irrigation is a relevant indicator of the hydraulic mission's indicative trajectory

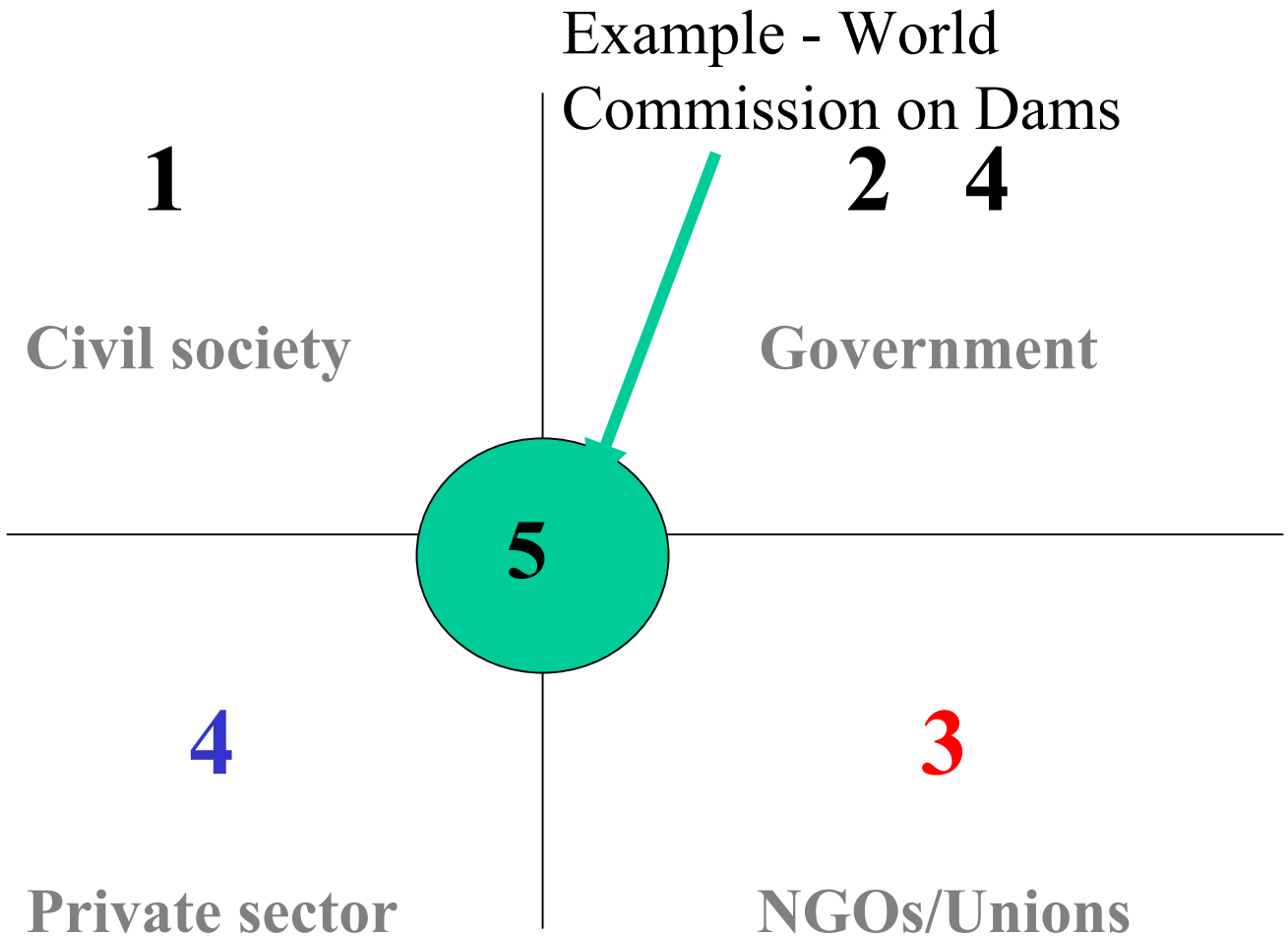




Douglas/Thompson - ‘ways of life’ & water reform paradigms



Douglas/Thompson - 'ways of life' & water reform paradigms



Douglas/Thompson - 'ways of life' & water reform paradigms

Politics

'Who gets what, when and how.'

Lasswell 1956

The 'who' is about politics;
the 'how' is about governance
Reform, regulation and adaptation
are governance issues

Political economy

'The second best works'

Lipsey 1956

Having the governance capacities
and
the economic diversity and strength

to implement the politically feasible

are key to achieving water security
and all other kinds of security.

Water, health, housing and education securities are linked.

In summary
Introducing reforms and regulation at the local and regional levels requires awareness of the what is economically and politically feasible.

Again beware hydro-centricity.
Adaptation is enabled by
economic diversity and strength
as well as by understanding the local situation.

A possible useful insight/message

More jobs per drop
Ensure enough water
'For everyone for ever'

Help us to understand the things that should be done - like WDM

And what can be done - the politics

and especially

To know the difference

Thank you

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Political stress reducing processes in the whole economy that impact water policy priorities and options and dwarf solutions within the water sector itself:

Political economy processes - supply solutions

1 Virtual water **ameliorates** water scarcity

2 Expand the economy - **more jobs enables access** to virtual water

3 Diversify the economy; **more jobs in water efficient sectors re-allocates water**

4 Re-negotiate the international trading environment
- **reduces** the negative impacts of **adverse terms of trade**

Social policy processes - demand solutions

5 Population policy - **reduces demand** or the rate of increase in demand

6 Nature of food consumption - e.g. healthy v. junk - **reduces demand**

Engineering and agronomy - supply solutions

7 Expand rainfed area & production - **reduces demand on freshwater**

8 Expand irrigated area - **expensive & environmentally stressful**

Engineering and agronomy - demand solutions

9 Improve irrigation efficiency - technical and economic/market and regulatory instruments - **reduce water demand**

10 Increase yields - **reduce water demand** with technical measures

11 Increase economic returns - and reduce water demands with **allocative efficiency measures**

11 Increase technical efficiency of water use in all sectors - **reduce water demand**

12 Increase proportion of water re-used - **improve water utilisation efficiency**

Conclusion

The water sector is subordinate to the political economies in which it operates.

Virtual water in the water, food and trade nexus is a spectacular remedy that dwarfs those available to those working in the water sector to ameliorate the big water challenge.

Economic diversification, economic growth, job creation, population policies, crop yield increases etc are other, silent, but very important processes

More crop per drop, more jobs per drop, more care per drop

Economics inspired

- technical/productive efficiency
- economic/allocative efficiency

Environment inspired

- sustainability