Impacts, adaptation and vulnerability:

Working Group II material

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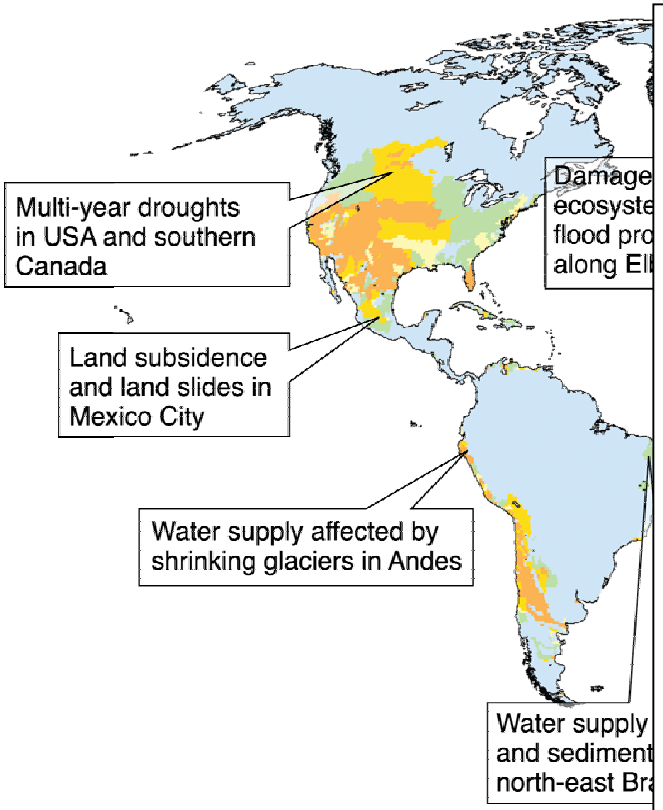
Baselines – Section 1



Economic emphasis

Global Integration | **Regional emphasis**

A1 storyline: World: market-oriented Economy: fastest per capita growth Population: 2050 peak, then decline Governance: strong regional interactions; income convergence Technology: three scenario groups: • **A1FI**: fossil intensive • **A1T**:non-fossil energy sources • **A1B**: balanced across all sources	**A2 storyline** World: differentiated Economy: regionally oriented; lowest per capita growth Population: continuously increasing Governance: Self-reliance with preservation of local identities Technology: slowest and most fragmented development
B1 storyline World: convergent Economy: service and information based; lower growth than A1 Population: same as A1 Governance: global solutions to economic, social and environmental sustainability Technology: clean and resource-efficient	**B2 storyline** World: local solutions Economy: intermediate growth Population: continuously increasing at lower rate than A2 Governance: local and regional solutions to environmental protection and social equity Technology: More rapid than A2; less rapid, more diverse than A1/B1

Environmental emphasis

Water stress indicator: withdrawal to availability ratio

no stress | low stress | mid stress | high stress | very high stress

0 | 0.1 | 0.2 | 0.4 | 0.8

No/low stress and per capita water availability <1,700m^3/yr

Water withdrawal: water used for irrigation, livestock, domestic and industrial purposes (2000)

Water availability: average annual water availability based on the 30-year period 1961-90

Technical Paper: "Climate Change and Water": www.ipcc.ch/meetings/session28/doc13.pdf

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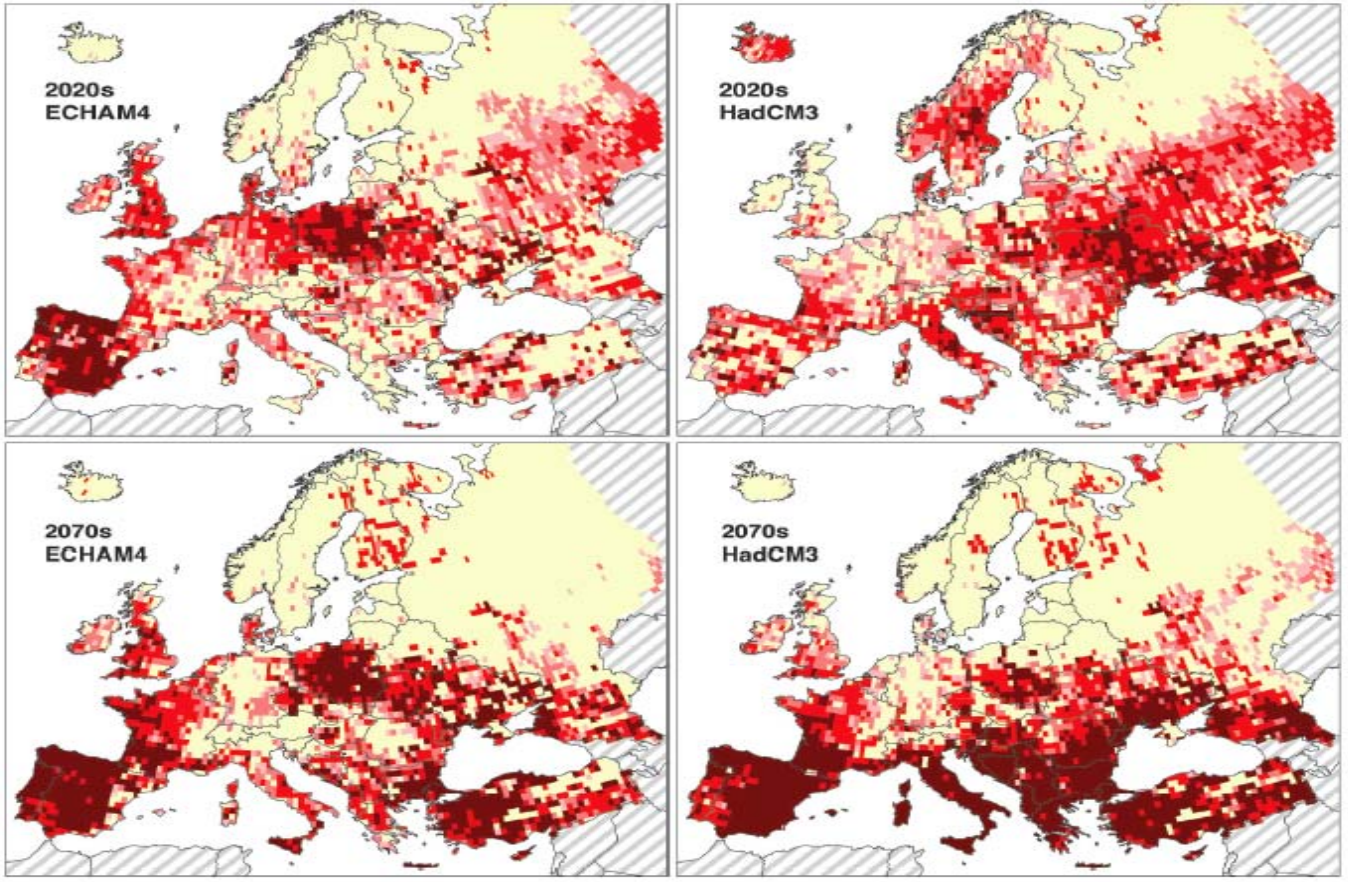
Extremes and their impacts

(Section 3)



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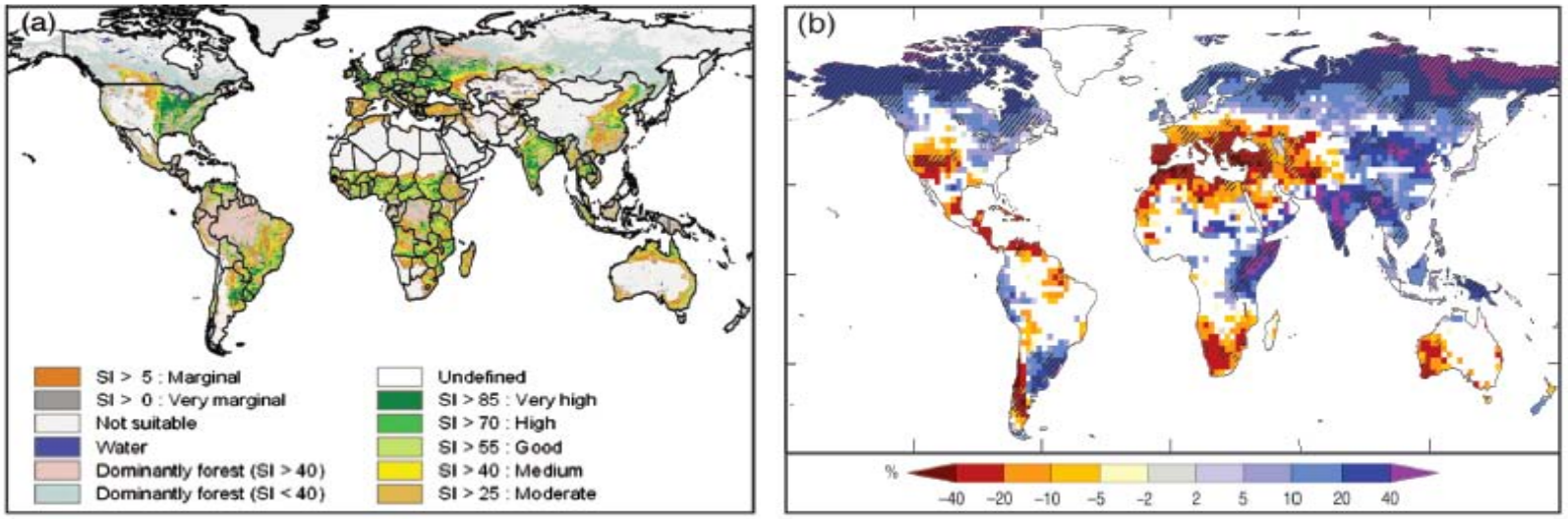
Phenomenon[a] and direction of trend	Likelihood of future trends based on projections for 21st century using SRES scenarios	Examples of major projected impacts by sector			
		Agriculture, forestry and ecosystems [4.4, 5.4]	Water resources [3.4]	Human health [8.2]	Industry, settlements and society [7.4]
Heavy precipitation events: frequency increases over most areas	Very likely	Damage to crops; soil erosion, inability to cultivate land due to waterlogging of soils	Adverse effects on quality of surface and groundwater; contamination of water supply; water scarcity may be relieved	Increased risk of deaths, injuries and infectious, respiratory and skin diseases	Disruption of settlements, commerce, transport and societies due to flooding; pressures on urban and rural infrastructures; loss of property
Area affected by drought increases	Likely	Land degradation, lower yields/crop damage and failure; increased livestock deaths; increased risk of wildfire	More widespread water stress	Increased risk of food and water shortage; increased risk of malnutrition; increased risk of water- and food-borne diseases	Water shortages for settlements, industry and societies; reduced hydropower generation potentials; potential for population migration
Intense tropical cyclone activity increases	Likely	Damage to crops; windthrow (uprooting) of trees; damage to coral reefs	Power outages causing disruption of public water supply	Increased risk of deaths, injuries, water- and food-borne diseases; post-traumatic stress disorders	Disruption by flood and high winds; withdrawal of risk coverage in vulnerable areas by private insurers; potential for population migrations; loss of property

Water resources in systems and sectors

(Section 4)

- Case studies:
  - Fisheries of the lower Mekong
  - Pastoralist coping strategies in northern Kenya/southern Ethiopia
  - Biotechnology in agriculture and forestry



Current suitability for rain-fed crops

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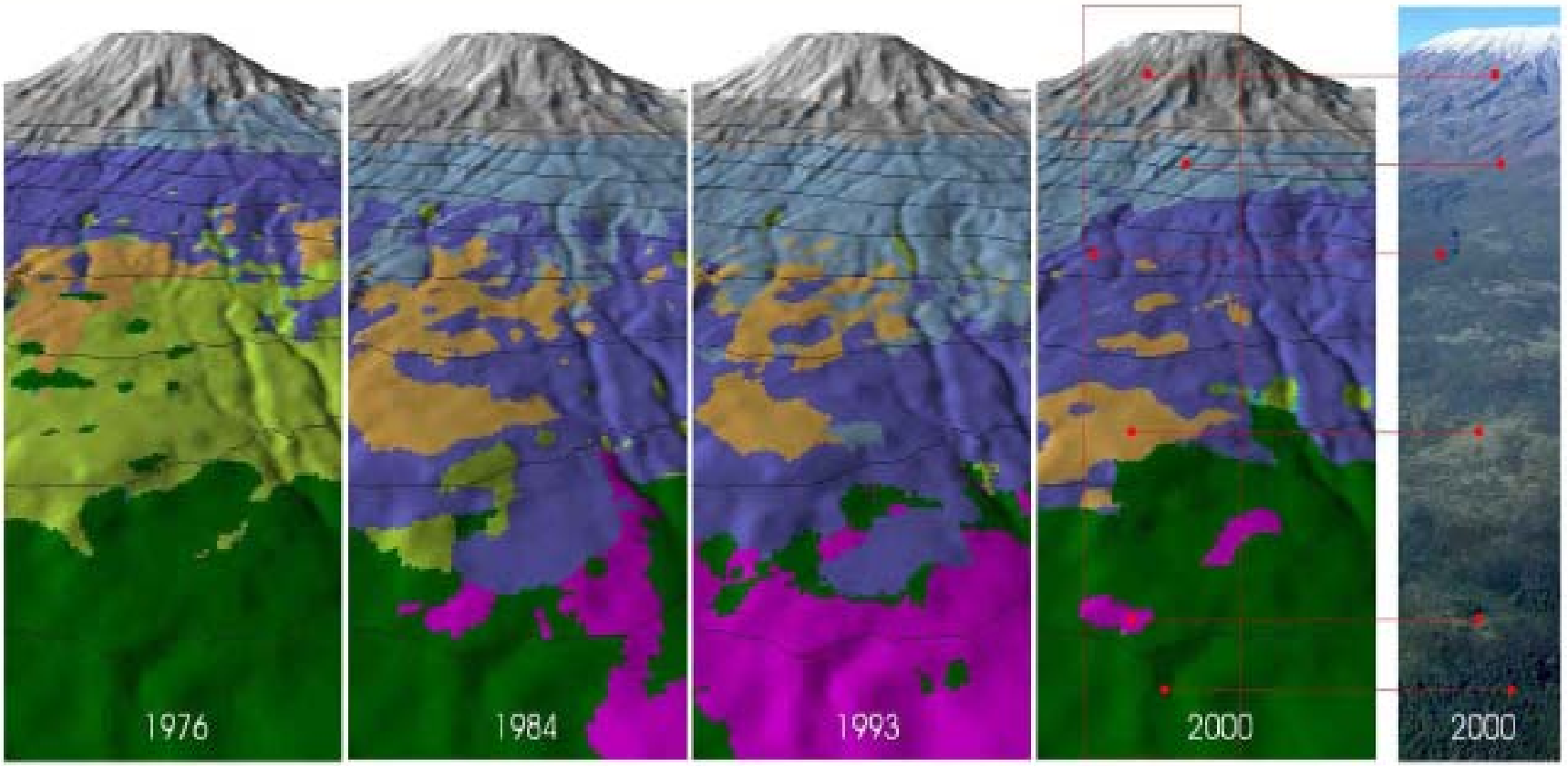

LEGEND

- Snow/Glacier
- Bare rock
- Helichrysum cushion vegetation
- Erica bush
- Grassland
- Erica forest
- Forest

Increased dryness and fire occurrence has lowered upper forest line and so affected water balance

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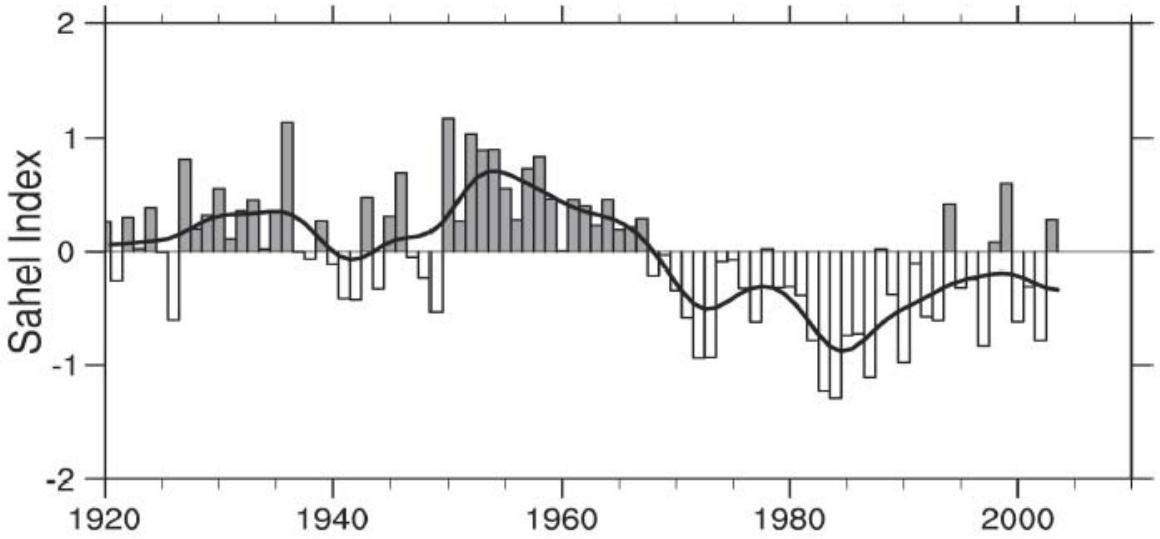

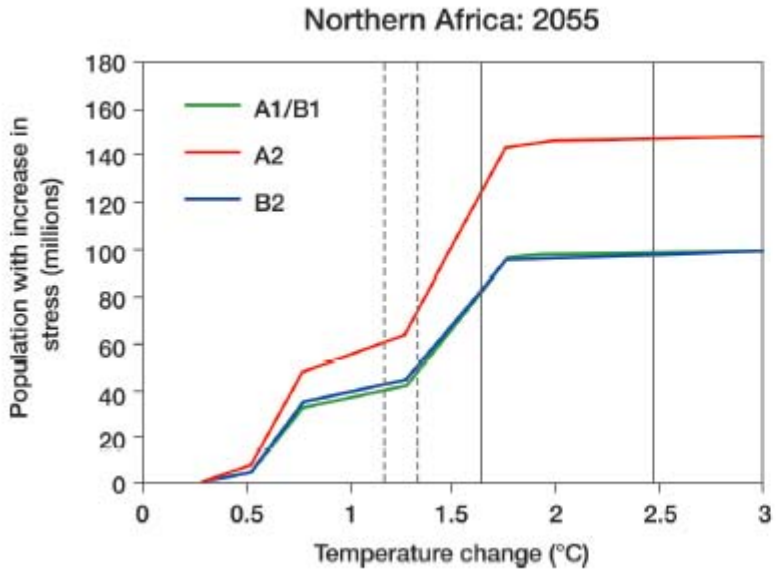

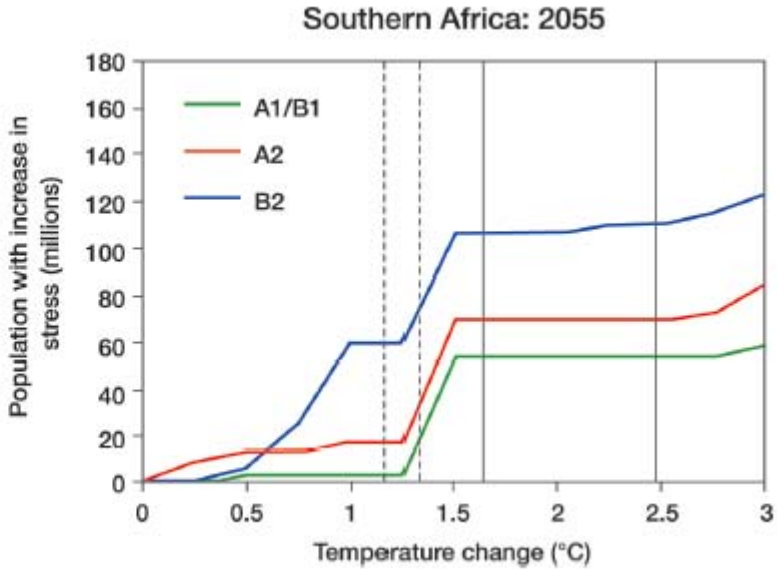

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Government	Strategy	Investment	Source
Australia	Drought aid payments to rural communities	US$0.7 billion from 2001 to 2006	Drought Review Panel, 2004; DAFF, 2006b
Australia	National Water Initiative, supported by the Australian Water Fund	US$1.5 billion from 2004 to 2009	DAFF, 2006a
Australia	Murray-Darling Basin Water Agreement	US$0.4 billion from 2004 to 2009	DPMC, 2004
Victoria	Melbourne's Eastern Treatment Plant to supply recycled water	US$225 million by 2012	Melbourne Water, 2006
Victoria	New pipeline from Bendigo to Ballarat, water recycling, interconnections between dams, reducing channel seepage, conservation measures	US$153 million by 2015	Premier of Victoria, 2006
Victoria	Wimmera Mallee pipeline replacing open irrigation channels	US$376 million by 2010	Vic DSE, 2006
NSW	NSW Water Savings Fund supports projects which save or recycle water in Sydney	US$98 million for Round 3, plus more than US$25 million to 68 other projects	DEUS, 2006
Queensland (Qld)	Qld Water Plan 2005 to 2010 to improve water-use efficiency and quality, recycling, drought preparedness, new water pricing	Includes US$182 million for water infrastructure in south-east Qld, and US$302 million to other infrastructure programmes	Queensland Government, 2005
South Australia	Water Proofing Adelaide project is a blueprint for the management, conservation and development of Adelaide's water resources to 2025	N/A	Government of South Australia, 2005
Western Australia (WA)	State Water Strategy (2003) and State Water Plan (proposed) WA Water Corporation doubled supply from 1996 to 2006	US$500 million spent by WA Water Corporation from 1996 to 2006, plus US$290 million for the Perth desalination plant	Government of Western Australia, 2003, 2006; Water Corporation, 2006

Section 6: Mitigation aspects

- Contribution from WGIII
- Two key tables on:
  - the influence of sector-specific mitigation options on water quality, quantity and level
  - the influence of water management on sectoral GHG emissions

Water aspect	Energy	Buildings	Industry	Agriculture	Forests	Waste
Quality						
Chemical/ biological	CCS[1] [?] Bio-fuels[2] [+/-] Geothermal energy[5] [-] Unconventional oil[13] [-]		CCS[1] [?] Wastewater treatment[12] [-] Biomass electricity[3] [-/?]	Land-use change and management [7] [+/-] Cropland management (water)[8] [+/-]	Afforestation (sinks)[10] [+]	Solid waste management; Wastewater treatment[12] [+/-]
Temperature	Biomass electricity[3] [+]			Cropland management (reduced tillage) [9] [+/-]		
Quantity						
Availability/ demand	Hydropower[4] [+/-] Unconventional oil[13] [-] Geothermal energy[5] [-]	Energy use in buildings[6] [+/-]		Land-use change and management [7] [+/-] Cropland management (water)[8] [-]	Afforestation [10] [+/-] Avoided/ reduced deforestation [11] [+]	Wastewater treatment[12] [+]
Flow/runoff/ recharge	Bio-fuels[2] [+/-] Hydropower [4] [+/-]			Cropland management (reduced tillage) [9] [+]		
Water level						
Surface water	Hydropower [4] [+/-]			Land-use change and management [7] [+/-]		
Groundwater	Geothermal energy[5] [-]			Land-use change and management [7] [+/-]	Afforestation[10] [-]	

Sector	Quality		Quantity		Water level	
	Chemical/ biological	Temperature	Average demand	Soil moisture	Surface water	Ground water
Energy		Geothermal energy[7] [+]	Hydro dams[1] [+/-] Irrigation[2] [-] Geothermal energy[7] [+] Desalinisation[6] [-]		Hydro dams [1] [+/-]	
Agriculture			Hydro dams[1] [-]	Irrigation[2] [+/-] Residue return[3] [+]		Drainage of cropland[4] [+/-]
Waste	Wastewater treatment[5] [+/-]					

A valuable resource because:

- A compact and integrated publication focussed on water and climate change
- Summarising and synthesising the latest results from all Working Groups on Climate Change and Water
- Targeted at policymakers, science community, NGOs and the media
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