OPTIMAL WATER MANAGEMENT PRACTICES TO PRODUCE SUFFICIENT FOOD FOR AN URBANISING WORLD

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DEVELOPED COUNTRIES

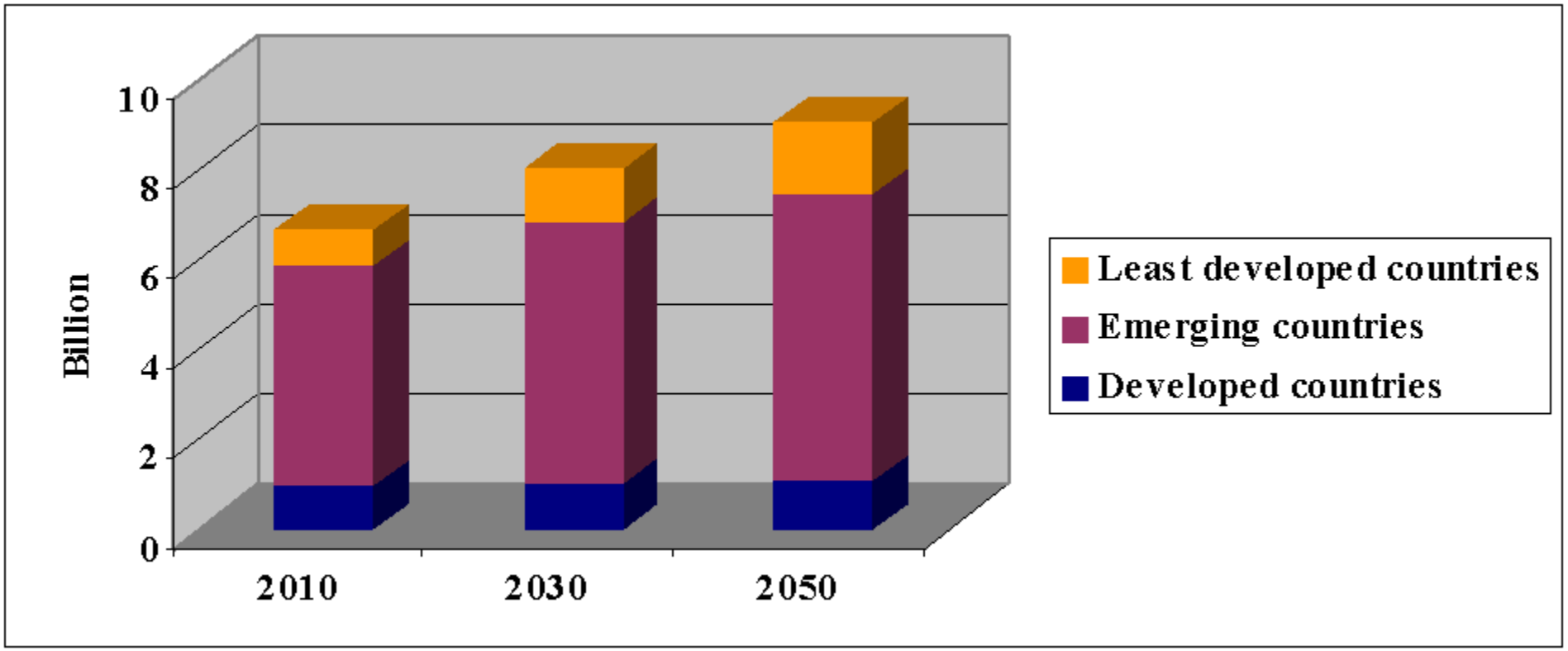
- **Western and Central Europe, North America, some countries in Central and South America, the larger countries in Oceania and some countries in Asia**
  - ***low agricultural share in GDP***
  - ***farmers represent only a small and declining proportion of the population (2-3%)***
  - ***productivity is about 500 times higher than that of small scale farmers in some emerging and most least developed countries***

EMERGING COUNTRIES

- **most countries in Eastern Europe, in Central and South America and in Asia, including Russia, China, India and Indonesia, several countries in Africa**
  - ***growing economy driving farmers from their land to urban areas***
  - ***increasing demand, increase in production***
  - ***increase in farm sizes, mechanization***
  - ***higher-value crops to make a living on a relatively small plot***
  - ***part-time farming, in combination with a job in industry or service sector***

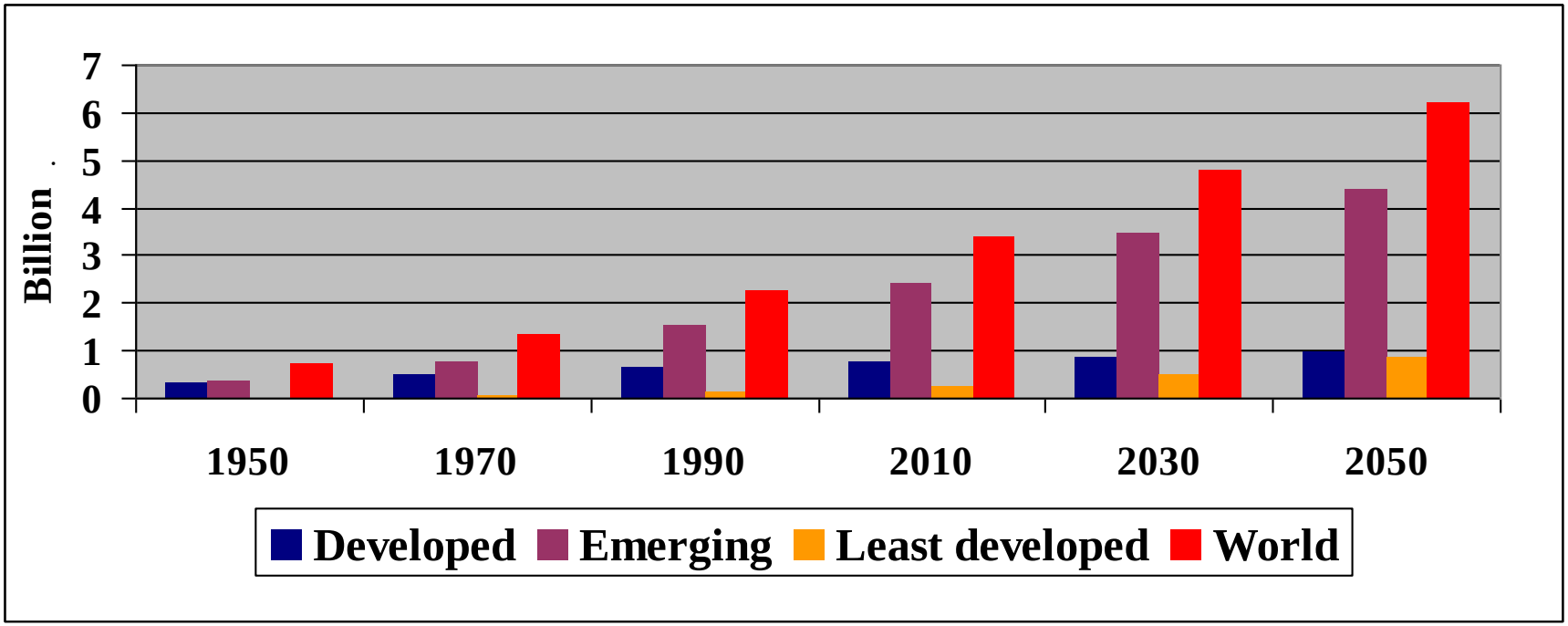
LEAST DEVELOPED COUNTRIES

- **most countries in Africa, several in Asia, one in Central America and most smaller countries in Oceania**
  - ***majority farmers (> 50%)***
  - ***low productivity***
  - ***lack of inputs and resources to increase productivity***
  - ***weak institutional capacity***



World population growth

URBAN


Billion
7
6
5
4
3
2
1
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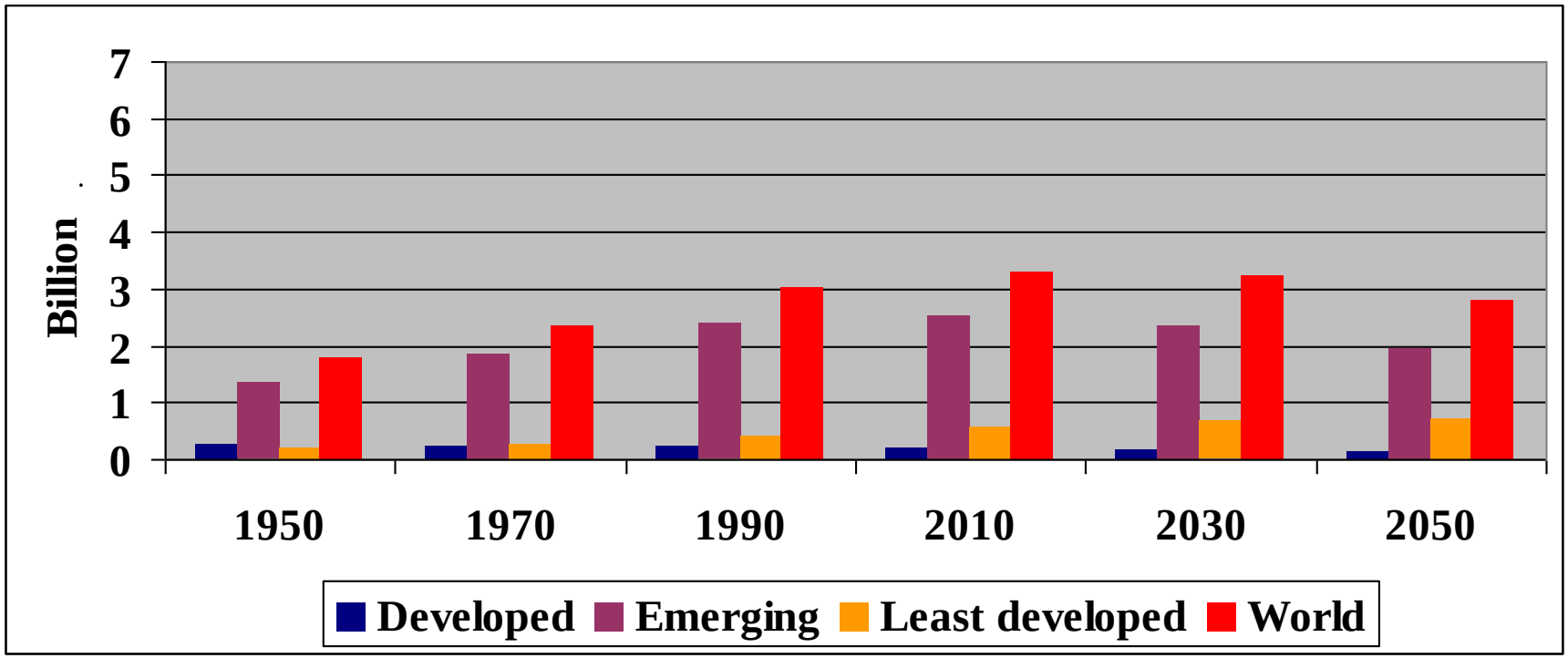
1950
1970
1990
2010
2030
2050
Developed
Emerging
Least developed
World

RURAL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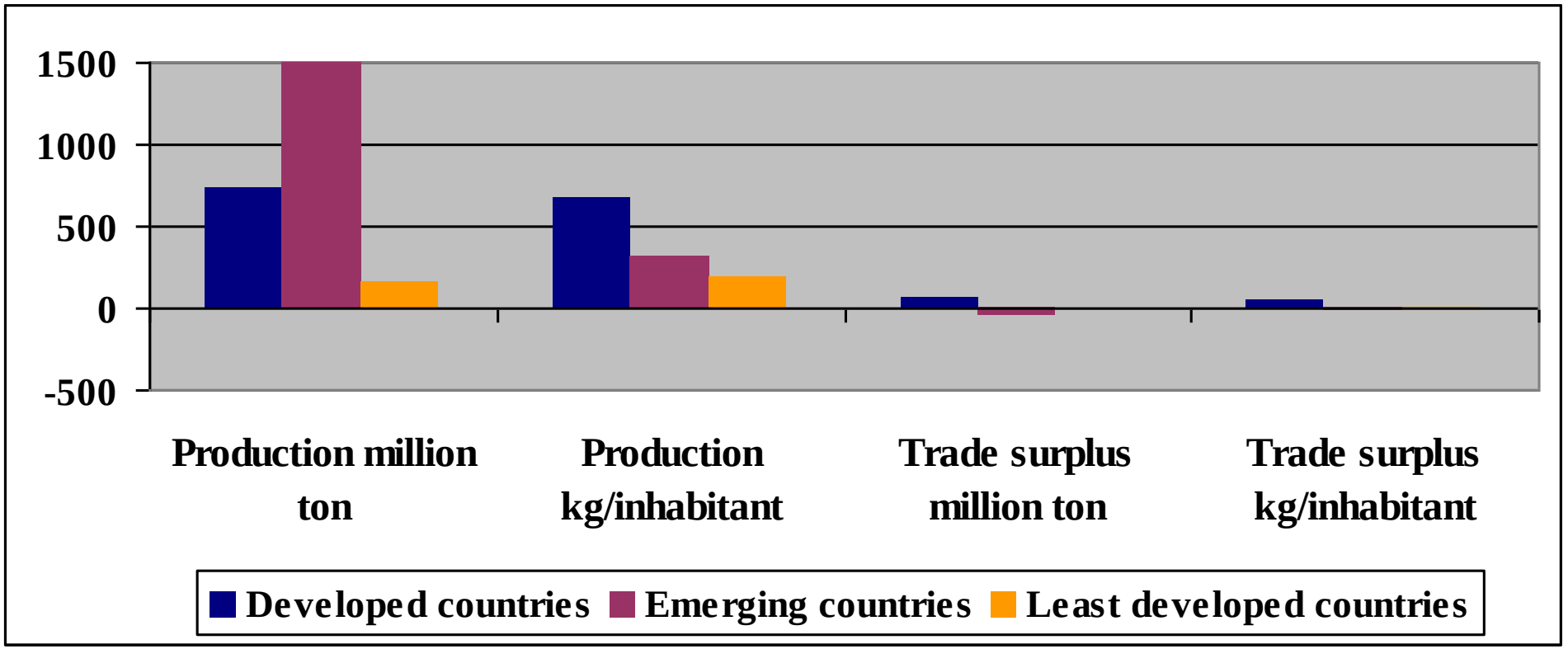
CEREAL PRODUCTION AND TRADE



WATER MANAGEMENT PRACTICES

- no system 1,100 million ha
- irrigation 210 million ha
- irrigation and drainage 60 million ha
- drainage 130 million ha

Type of country	%		
	No system	Irrigation	Drainage
Developed	67	11	22
Emerging	69	23	8
Least developed	87	12	2

EXPECTATION

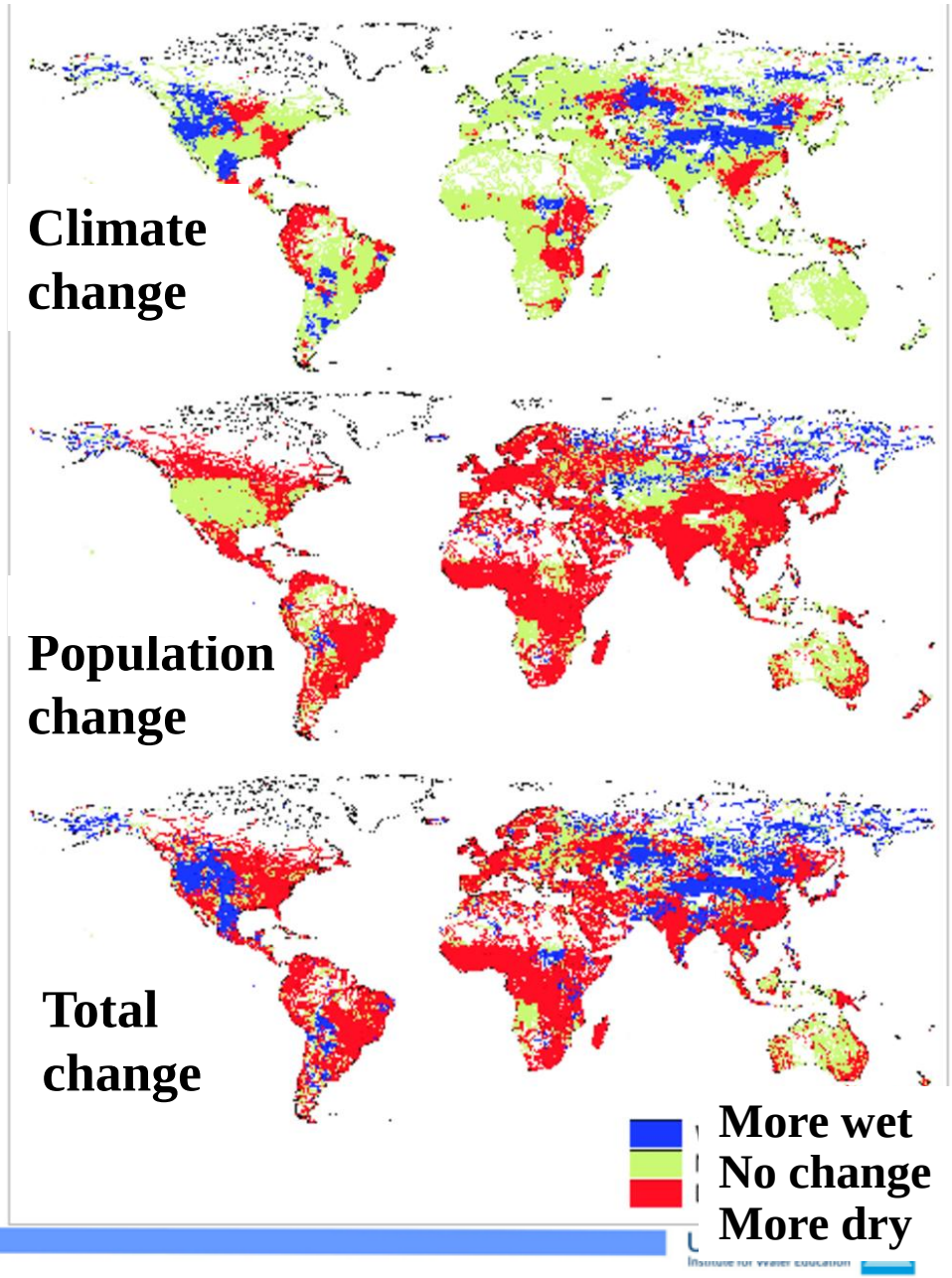
- **duplication in food production in 25 – 30 years**
- **80 - 90% from existing cultivated area**
  - ***higher yield per ha, double or triple cropping***
  - ***installation of irrigation and/or drainage systems in areas without a system***
  - ***modernization of existing irrigation and drainage systems***
  - ***installation of drainage in irrigated areas***
  - ***installation of irrigation in rainfed areas with drainage***
- **10 - 20% from land reclamation**

RELEVANT DATA TO ACHIEVE DUPLICATION IN FOOD PRODUCTION

	No system	Irrigation	Drainage (rainfed)
Area:			
▪ in million ha	1,100	270	130
▪ in % of total	73	18	9
Crop output in %:			
▪ present	45	40	15
▪ in 2025 (estimated)	30	50	20

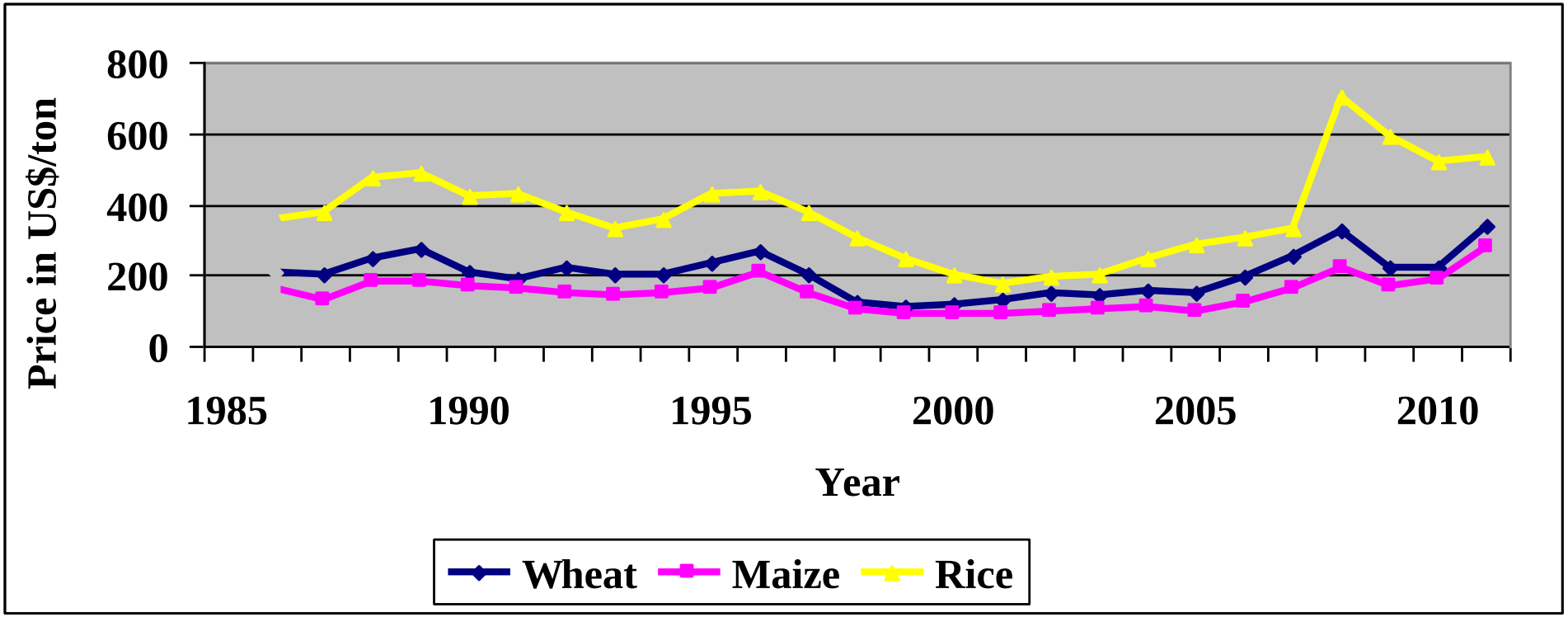
WATER STRESS CHANGES TO 2025

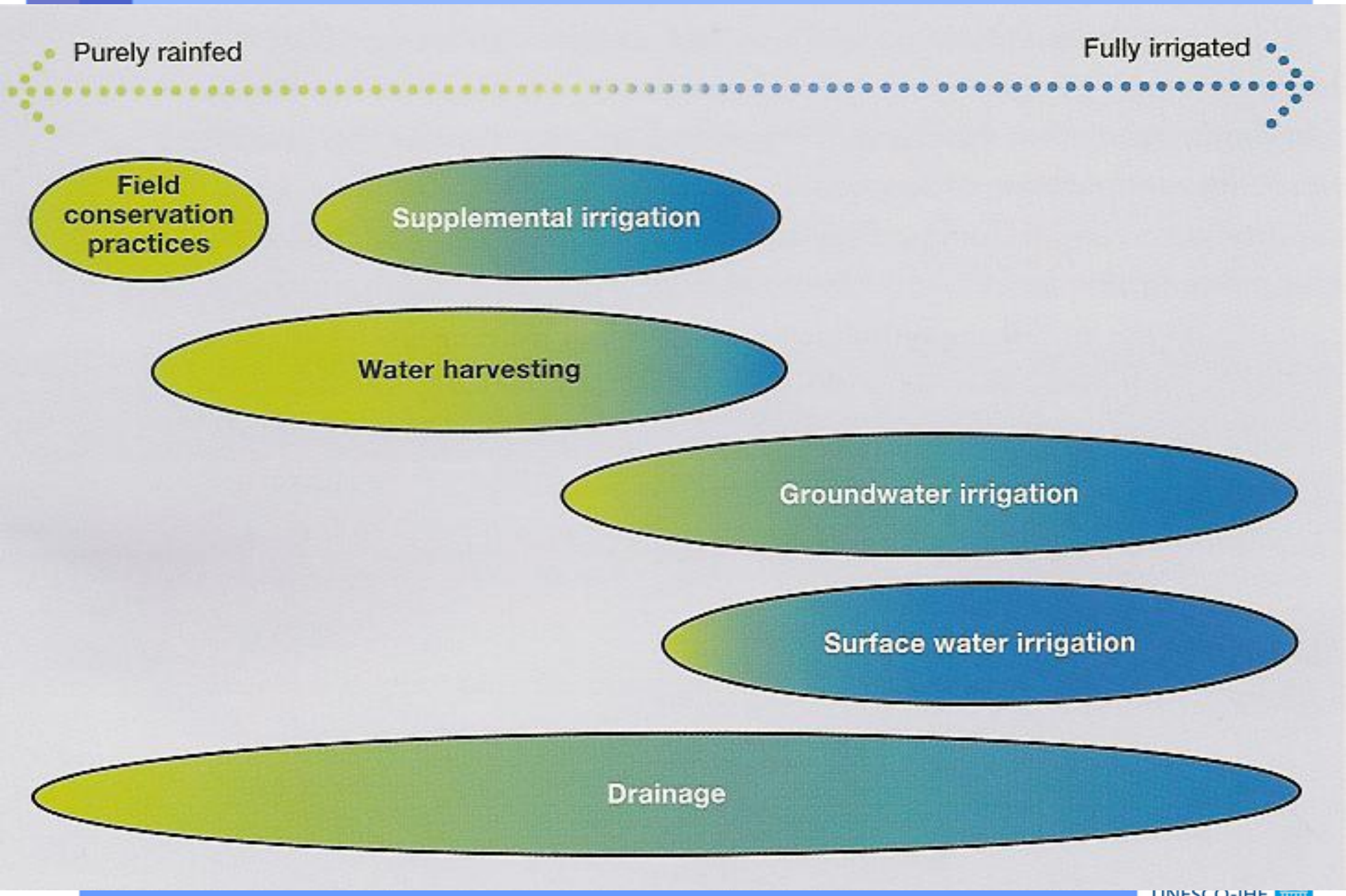
80% of future stress from population and development, *not* from climate change



INCREASE IN FARM SIZE
Food affordable for urban people

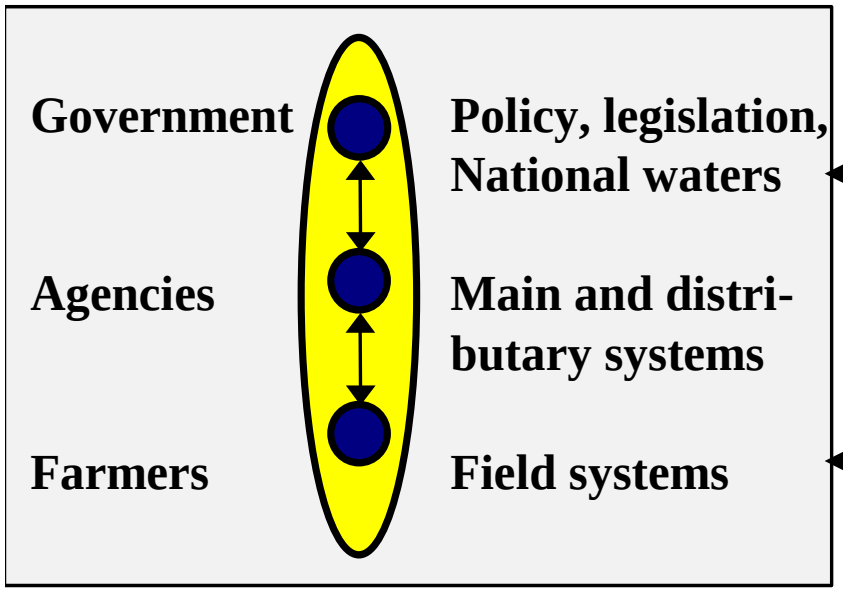
WORLD MARKET PRICES OVER THE LAST 16 YEARS




Purely rainfed
Fully irrigated
Field conservation practices
Supplemental irrigation
Water harvesting
Groundwater irrigation
Surface water irrigation
Drainage

ACTORS IN AGRICULTURAL WATER MANAGEMENT

RESPONSIBLE



CONTRIBUTING

- Consultants
- Contractors, manufacturers
- Universities, schools
- Research institutes
- Banks, donors
- NGO's, Int. org.
- Farmers associations

MODERNIZATION, OPERATION AND MAINTENANCE

MODERNIZATION	OPERATION AND MAINTENANCE
Policy and legislation **Projects of National importance** ***Funding by Government*** **Gov. budget and loans from dev. banks**	**Policy and legislation** **National waters and major structures** ***Funding by Government*** **Recurrent budget**
Main and distriburary systems ***Funding by Government and farmers*** ***Based on an agreed sharing of costs*** **Gov. budget, loans, farmers**	**Main and distributary systems** ***Funding by farmers*** ***May be Government subsidy*** **Farmers money, recurrent gov. budget**
Field systems ***Funding or by their labour*** ***May be with Government subsidy*** **Gov. budget, loans priv. banks, farmers**	**Field systems** ***Funding or by their labour*** **Their own money or labour** **May be loans from private banks**

PROBLEMS IN HUMID TROPICAL ZONE

- **sufficient food for an increasing and urbanising population at affordable prices**
- **inadequate water management**
- **lack of effective water use at river basin level**
- **requirement of institutional changes towards a larger stakeholder involvement**
- **inadequate flood control**

CHALLENGES IN THE HUMID TROPICAL ZONE

- **produce sufficient food for increasing and urbanising population, with improving standards of living**
- **increase in farm sizes or cultivation of special crops**
- **improve water management – especially irrigation and drainage – in order to achieve higher yields per ha, double, or even triple cropping**
- **optimise water use at river basin level among competing demands between sectors – water management, hydropower, drinking water supply - and among riparian States**
- **cooperation in river basin planning**

PROBLEMS IN THE TEMPERATE HUMID ZONE

- **to cope with changes from mono to multiple land use**
- **insufficient attention to food security issues**
- **problems with diffuse pollution**
- **urban and environment domination in decision making**

CHALLENGES IN THE TEMPERATE HUMID ZONES

- **relatively limited challenges**
- **optimisation in water management and flood protection**
- **control of pollution and implementation of an ecosystem approach**

PROBLEMS IN THE ARID AND SEMI ARID ZONES

- **insufficient food for an increasing and urbanising population at affordable prices**
- **achieve adequate water management – especially irrigation and drainage for groundwater table and salinity control – in order to achieve higher yields per ha**
- **lack of effective water use at river basin level**
- **mining of water resources**

CHALLENGES ARID AND SEMI-ARID ZONES

- **produce sufficient food for increasing and urbanising population, with improving standards of living**
- **increase in sustainable irrigated agriculture and reuse of low quality water**
- **improve water management – especially irrigation and drainage for groundwater table and salinity control – in order to achieve higher yields per ha**
- **optimise water use at river basin level among sectors and among riparian States**
- **reduce/prevent mining of groundwater resources**
- **cooperation in river basin planning**

A nation that fails to plan intelligently for the development and protection of its precious waters will be condemned to wither because of its short-sightedness. The hard lessons of history are clear, written on the deserted sands and ruins of once proud civilizations.

Lyndon B. Johnson
Former President USA

Thank you

for your attention