Fondazione Eni Enrico Mattei

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KEY CHALLENGES

Economic and social implications of droughts

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Outline (cont.)

Key challenges for

- Drought economics
- Social impacts of droughts
- Water Demand Management
  - Agriculture
  - Urban water use
  - Energy production

Economic Assessment of Disaster Losses

Existing guidance documents differ in terminology and conceptualisation of losses (ECLAC, NRC, BTE, Heinz Centre for Science …),

- Losses, damage, costs
- Direct, higher order losses (indirect, second-order, induced)
- Stocks vs flow losses

Social costs = total burden imposed by a disaster ≠ changes in GDP. Yet GDP is often reported

Ideally we want to value resource used or destroyed, determined at prices of their efficient allocation AND

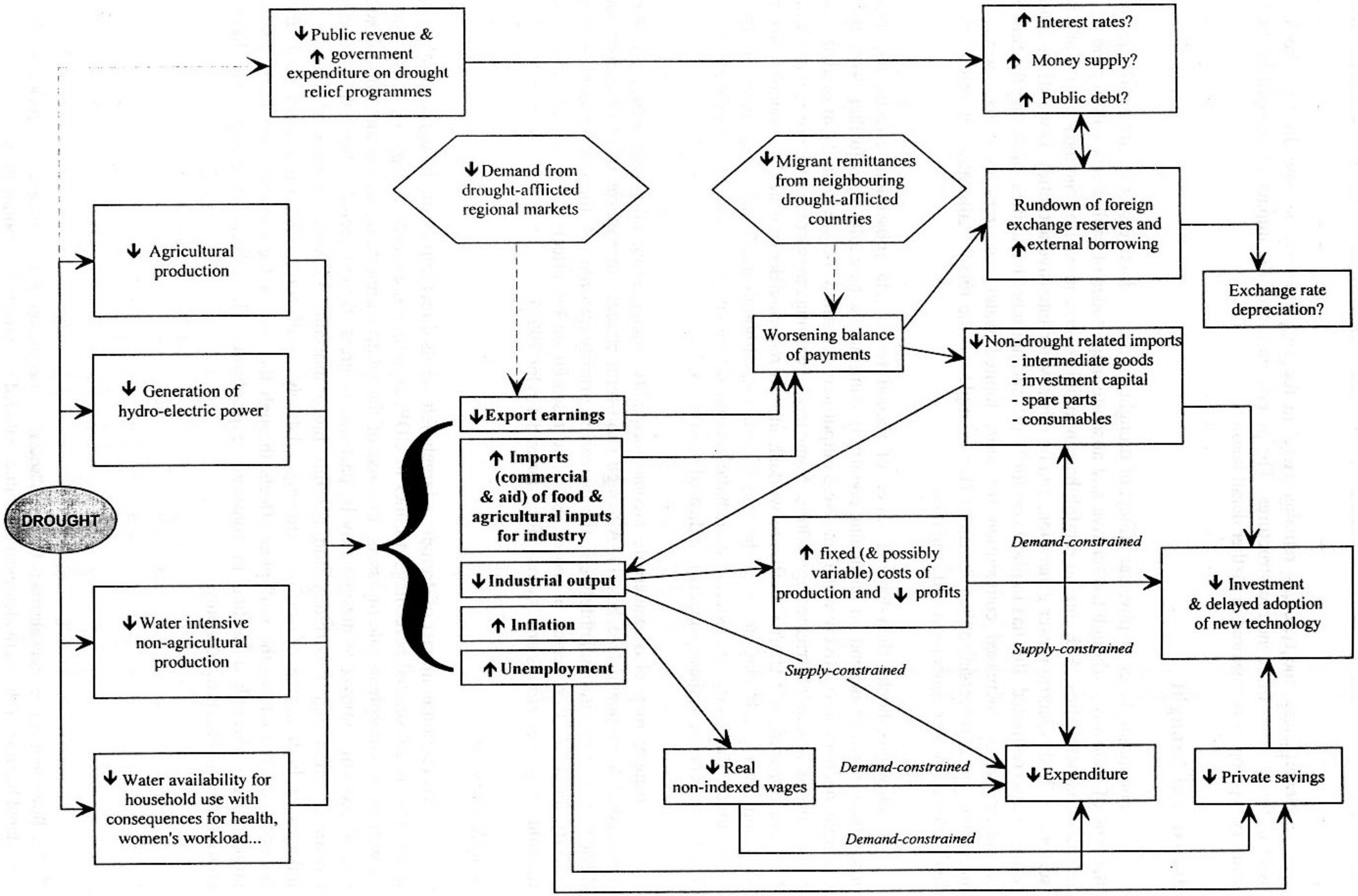
We also want to value loss of welfare, which results from lack of access to water.

Economic Assessment of Disaster Losses

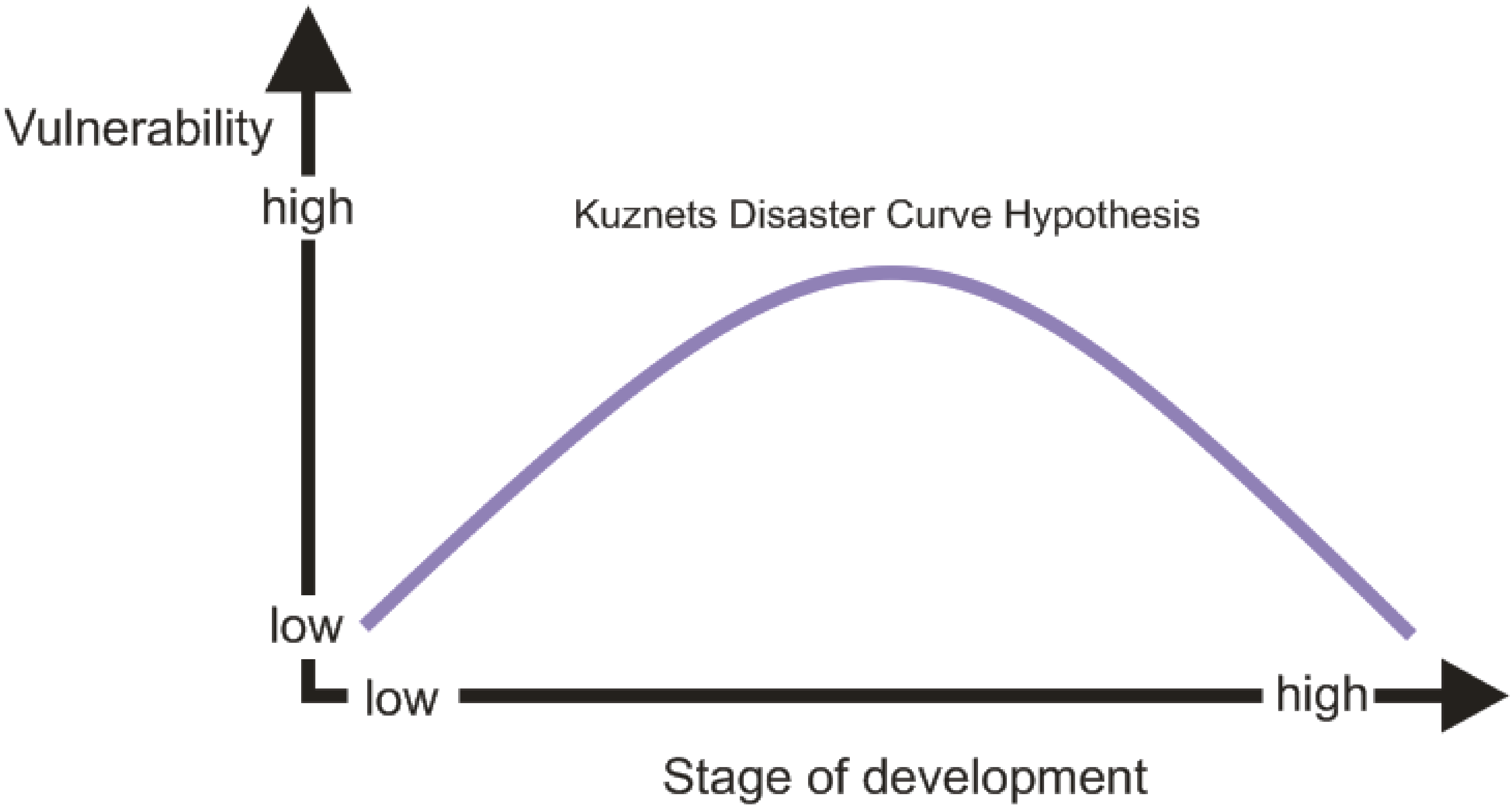
Some important perspectives:

- There are gainers and losers from droughts (e.g. Farms outside drought areas benefit from higher crop prices)
- The distributional impacts will depend on **POLICY ACTIONS.** Clearly restrictions will hurt those to whom they are applied. But providing from costly sources will impact on government budgets and eventually on taxpayers.
- To make the right policies governments need to know the costs and benefits to different parties.
- Too often this information is not available.

Wider Economic Perspectives on Drought



Vulnerability and Development



GDP Per Capita and Disasters

Statistical tests do **not** confirm a “Disaster Kuznets Curve”.

But a negative linear relationship is statistically significant with climatological, geophysical, and hydrological events.

The link between loss of capital and income needs a more refined analysis, in which different kinds of capital are treated differently. These are human, social, natural and physical

There is some indication that it is not physical capital loss that is critical. Rose et al, indicate losses are mainly human, with business displacement also being important. In poor countries natural capital losses are also likely to be important.

Estimates of Costs of Drought

Direct and indirect costs

Indirect costs based on I-O and CGE models.

- I-O may overestimate costs, CGE models may underestimate them

Drought is considered to affect around 25% of GDP in developed countries – more in developing countries.

In the US 10 droughts between 1980 and 2003 had costs ranging from $1 to $60 billion. Average annual costs estimated at $6’8 billion per drought.

Estimates of Costs of Drought

In Australia 2002 drought resulted in loss of GDP of 1.6% and 2006/2007 drought in loss of GDP of around one percent.

In Europe, the only existing large-scale study is based on a survey conducted by the Directorate General (DG) Environment in 2006-2007. The economic impacts of droughts for the past 30 years has been estimated to top 100 billion Eur. In the most recent years the annual costs climbed to over €6.2 billion or 0.1% of EU15 GDP.

The 2006/7 Barcelona Drought: Some Key Findings

This drought was one of the most severe of the last century, affecting the so-called Ter-Llobregat system which serves the Metropolitan area of Barcelona where most of the population is concentrated (approximately 5.5 million people).

The total losses are estimated in €1,660 million (for a one year period), almost 1% of the Catalonian GDP.

Of these the direct costs were estimated at about €540 million and the indirect costs at about €360 million. The rest is made up of non-market welfare losses, rising from the decline the ecological status of the river and the loss of welfare from the restrictions in water supply to households.

These non-market welfare losses are often not accounted in studies of drought and yet, as this study shows, they can be of considerable importance.

Droughts Compared With Other Disasters

Estimates of losses from different disasters by Okuyama and Sahin (2009) show that in a sample of 184 disasters over the last 47 years droughts have had the lowest damages in aggregate terms, both direct and indirect.

In total the greatest losses came from geophysical disasters (earthquakes, with 40% of the total), followed by hydrological (floods 25%) and meteorological (storms 25%). Climatological disasters (principally droughts) accounted for only 10% of all damages. It is also interesting to note that meteorological disasters have the largest impact multiplier (2.02), followed by geophysical (1.88), hydrological (1.80), and climatological (1.78).

Key challenges: drought economics

Accurate and systematic collection of data. Common conceptualisation of losses. A comprehensive and coherent guidance.

Accurate tracing of higher-order and intangible impacts, cumulative effects of series of droughts, and effectiveness of drought recovery measures. Uncertainty assessment of drought-related losses.

Role of economic resilience in amplifying and attenuating the impacts of droughts.

Social impacts of droughts

Effects of droughts impinge on almost any aspect of individual and social life, including nutrition, education, life satisfaction and wellbeing, social cohesion and order, relationships, population displacement, and public safety.

Social impacts assessment are qualitative and patchy. Common set of Indicators and proxies allowing a comparison of social hardship across communities. Better understanding of the impacts of drought across social groups.

Role of social resilience, social capital, and quality of governance in attenuating the impacts. Attribution of observed social changes to natural disasters/droughts.

Water Demand and - Supply Management

Global data set of water use is patchy and inaccurate. Concept of ‘efficiency’ should take into account only consumed water, not available for downstream users

Coherent framework for assessing the various WDM and WSM options. Better understanding of the preconditions under which the different measures/policies perform best or satisfactorily.

Estimation of future water demands of key water-use sectors.

Agriculture

Seasonal and medium-term forecasts.

Deficit irrigation. Plant resistance to droughts. Water-saving agronomic practices. Effectiveness of water conservation measures.

Cumulative impacts of economic transformation on agriculture and rural communities. Impact of biofuel policies on food prices, farmers' choices and water demand. In Europe, reforms of Common Agricultural Policy. Integrated drought and flood risk management.

Intersectoral water transfers and agreements, particularly between agriculture and urban use.

Urban water use

Full account of costs and benefits of water conservation instruments, both regulatory and economic ones.

Welfare losses of compulsory restrictions. Responses to price incentives.

Cumulative effects of policy mix.

Health risk of grey-water reuse.

Energy

Water – Energy nexus: water footprint of energy production and energy demand for water provision.

Future projections of water and energy demand. Expected changes to river flows and hydropower potential.

Alternative ways for cooling and extraction of energy-resource.

Thank you for your attention