

Comparing the incomparable: Valuing water allocated to the environment

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Introduction

Valuing water used in the environment

- Who is interested and why bother?
- What are the difficulties?

The aim in this paper is to specify a method of determining the value of water used for the environment

Some definitions

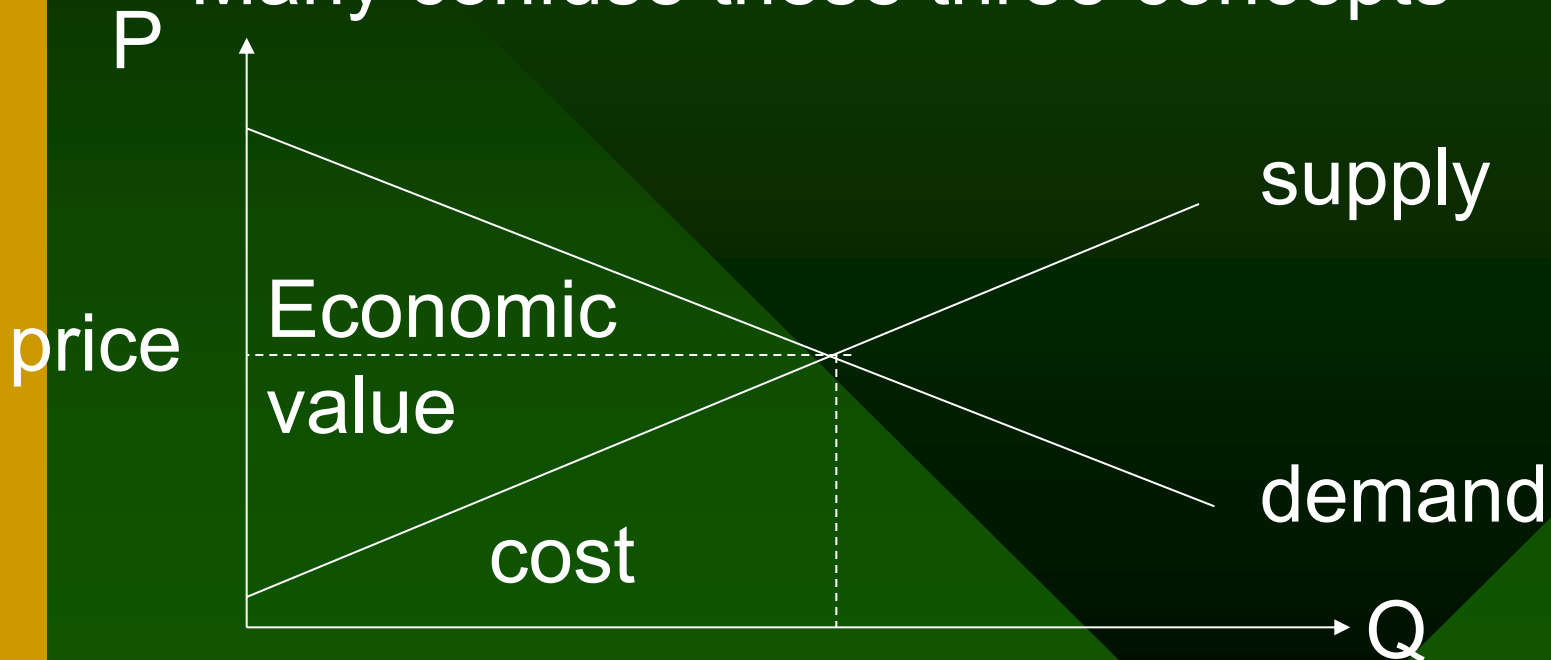
Value means different things to different people

- Intrinsic and extrinsic
- The relative nature of valuation
- Economic versus ecological values

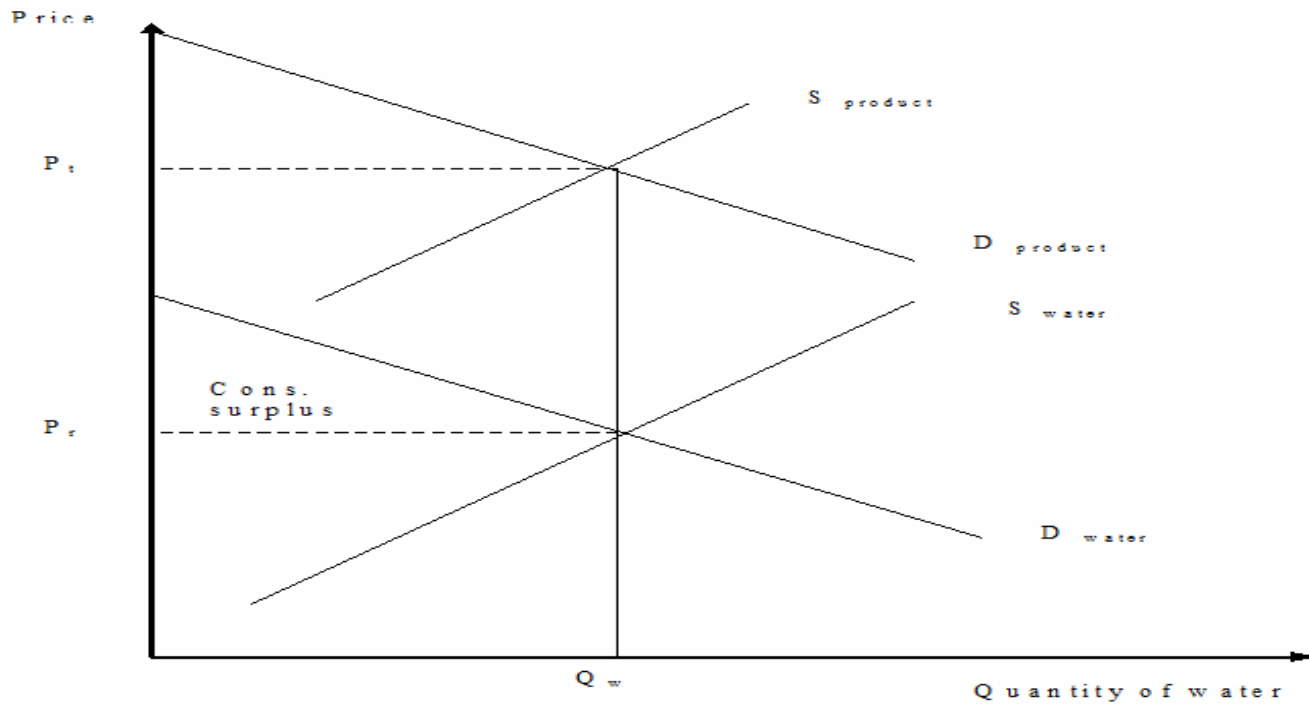
Value is taken to be the difference between what people are willing to pay for something and what they actually pay for something

The differences and relationships between value, cost and price ...

Many confuse these three concepts



Visualising value and its difficulties with respect to water...



What is required to estimate values

- Different users value water differently.
 - Human uses for a livelihood (domestic, industry, irrigation, hydropower, recreation, etc.)
 - Environment
- So for each you require the elasticity of demand for water, the quantities demanded and supplied, the (social) price and the costs of provision.

For livelihoods it can be done, with some certainty

Inductive (observed) versus deductive (logic determined) techniques.

The residual technique used in agriculture

The values differ with use. In the Krishna Basin (India) for instance, we found:

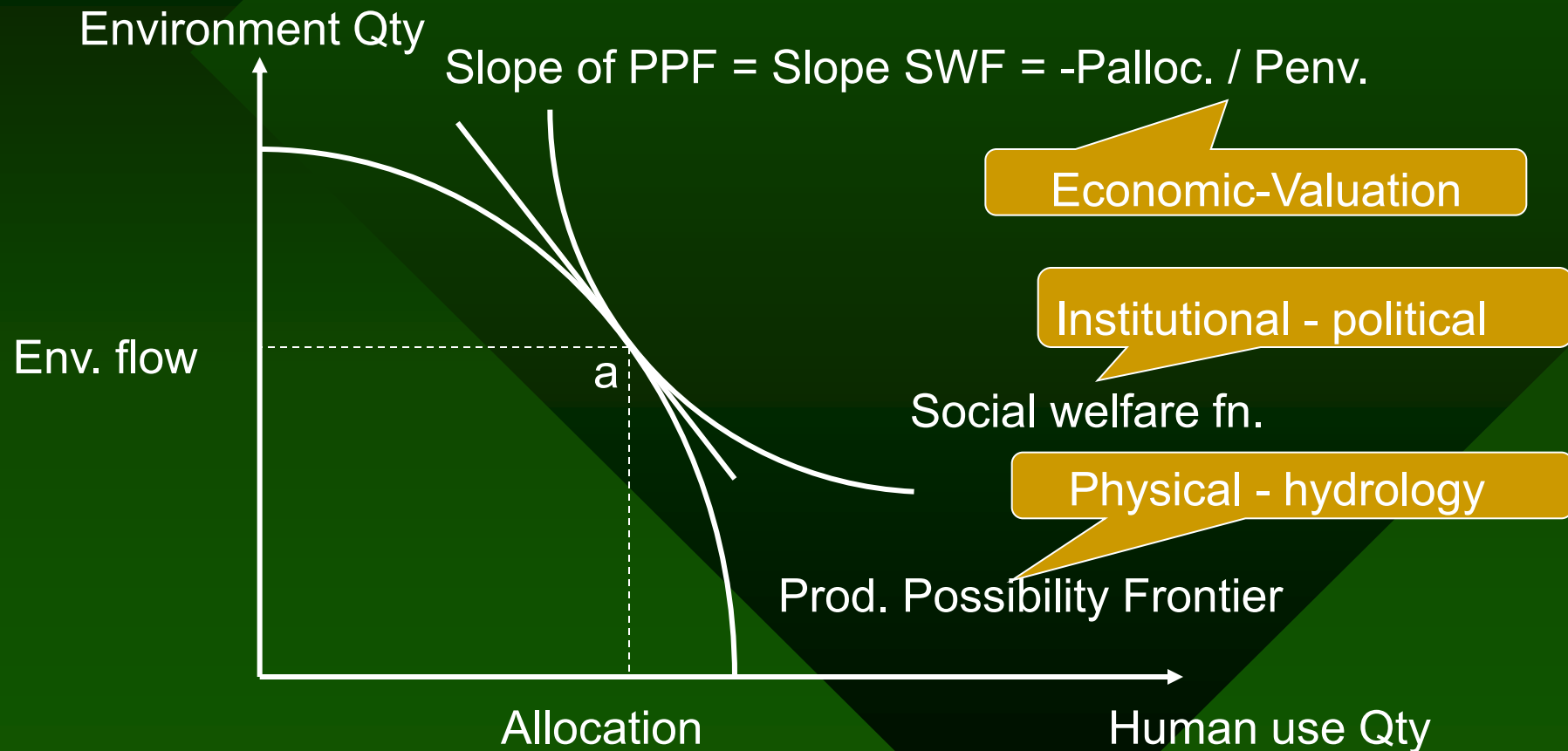
- Agriculture Rs. 2/m³
- Industry Rs. 10/m³
- Domestic Rs. 50/m³

Yet the environmental values are harder to determine

- The most common approach is to use contingent valuation-choice modelling
- The environment is seen as an intrinsic value, thus making it incomparable with other uses
- The relationship between water control and ecology is not well defined

But an alternative approach could be used ...

How an economist views it



Determining the price of water in the environment

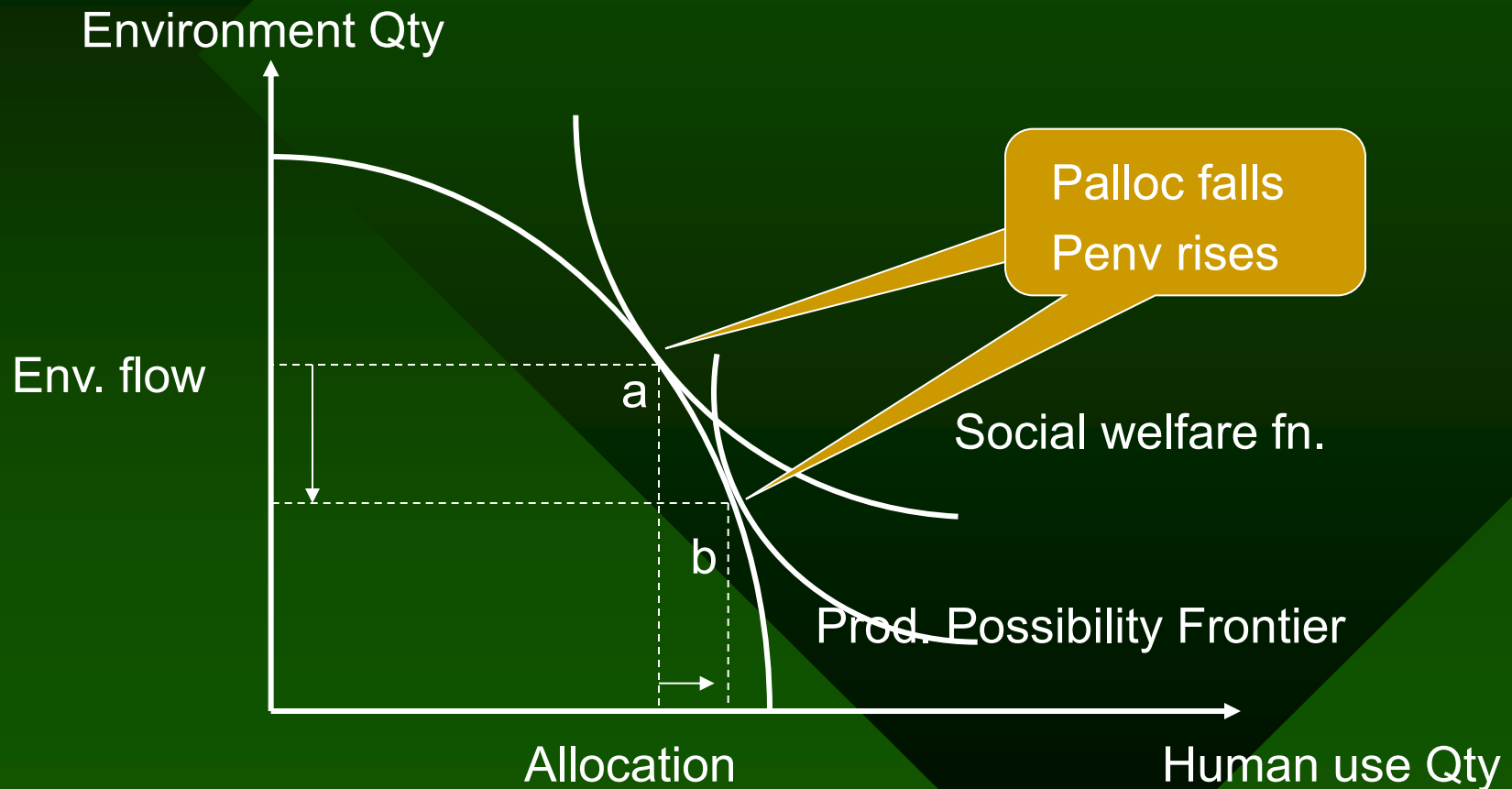
If Slope of PPF = $-P_{alloc.} / P_{env.}$

Then $P_{env.} = -P_{alloc.} / \text{Slope of PPF}$

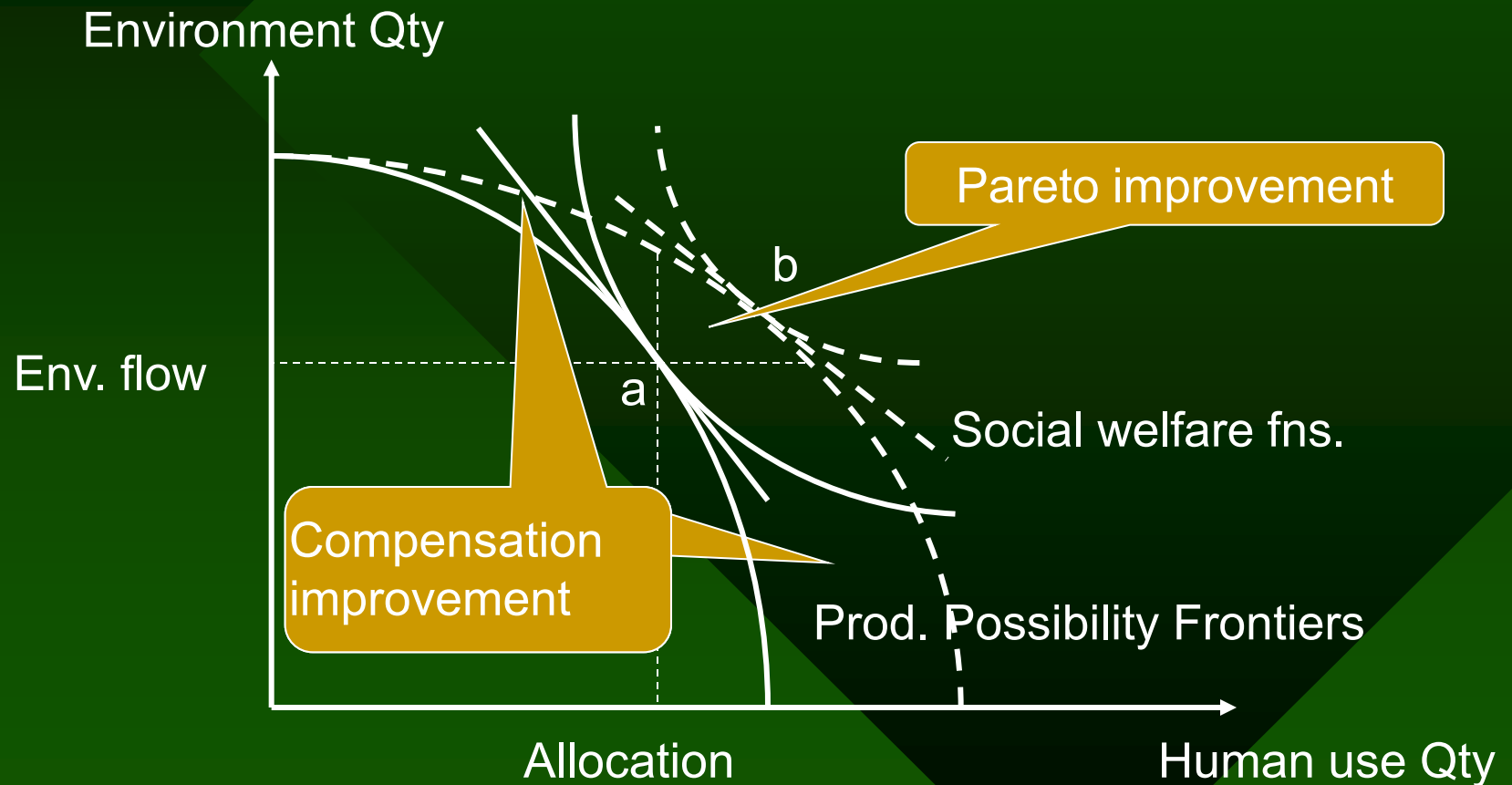
To obtain the total value of water to the environment, multiple its price ($P_{env.}$) by the quantity of environmental flow.

This only holds with perfectly competition.

Using the approach- Changing the allocations

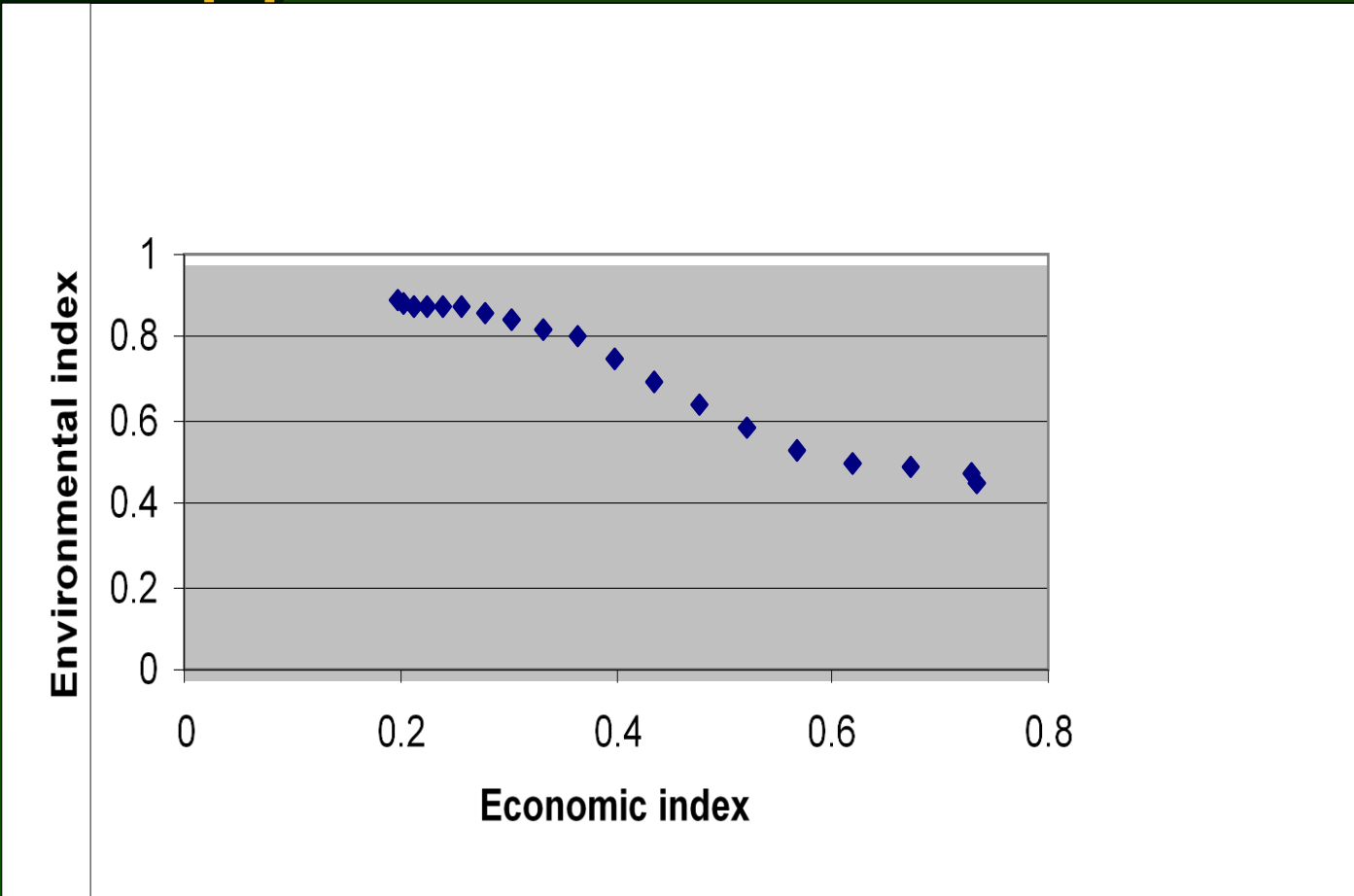


Using the approach – A technical improvement



The Trade-off between economic and environmental indicators (Wei 2007)

An application from China



Interpreting the results

- The marginal rate of transformation from a 10 per cent increase in total agricultural returns would lead to a 15.3 per cent decrease in environmental indicators, and *vice versa*,
- The marginal rate of transformation varies along the curve, from -5.5 to 6.7, (with only one element being positive).

Key lessons

The need to value water

Comparability of values across uses is required if policy decisions are to be made

Valuation is difficult ...

... but not impossible

Future directions

The need to understand the *eco-hydrological* relationship first

Refining the valuation processes

Understanding the socio-political process, (especially land use).

Thank You

Making choices in the absence of values
is not wise

Economics has a role to play as it is the
study of choice, yet problems exist.