Understanding Trade-offs and synergies
SDGs 1,2, 8, 17 and others

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Introduction

- Agri-food systems' links and interactions with the society, health systems, ecology and climate systems, economic and governance systems and science and innovation systems and generate synergies, externalities and trade-offs that extend beyond the system.
- Negative interactions could compromise efforts to achieve SDG targets.
- These are not easy tasks because the complexity of the links in food systems are often difficult to assess and manage.
- We need to improve our understanding of the following:
  - **Synergies, externalities and trade-offs.** Eradicating hunger and malnutrition will affect land, water, energy, biodiversity and climate, as food production generates greenhouse gas emissions. Promoting healthy diets will reduce overweight and obesity rates, which in turn will reduce food-related no communicable diseases and health expenses. It will also reduce emissions (FAO, 2020).
  - **Distributional effects.** Eliminating hunger and malnutrition, promoting healthy diets and reducing poverty will need to happen while addressing distributional challenges in terms of lack of productive assets and wealth, income inequality for families and individuals.
  - **Adequate and coherent policies to achieve all food systems' objectives.** The food systems approach will support estimating the costs of policies that can minimize negative externalities, trade-offs and inequalities, while maximizing synergies and positive externalities to help achieve the four objectives.
- There is a clear need to quantify synergies, externalities and trade-offs and to measure distributional effects emerging from normal operations and policy interventions.
- This evidence can support policy prioritization in ways that will strengthen positive links, minimize negative externalities and trade-offs, and promote inclusive food systems by reducing inequalities.

Modeling a Transformative Agenda

Where we are

Current Food Systems

- Choice of indicators
- Link with the data platform

How we get to . . .

Transformation Process

Choice of instruments

- Changing incentives through prices
- Changing income distribution

Where we want to be

Transformed Food Systems

Choice of targets and the objective function

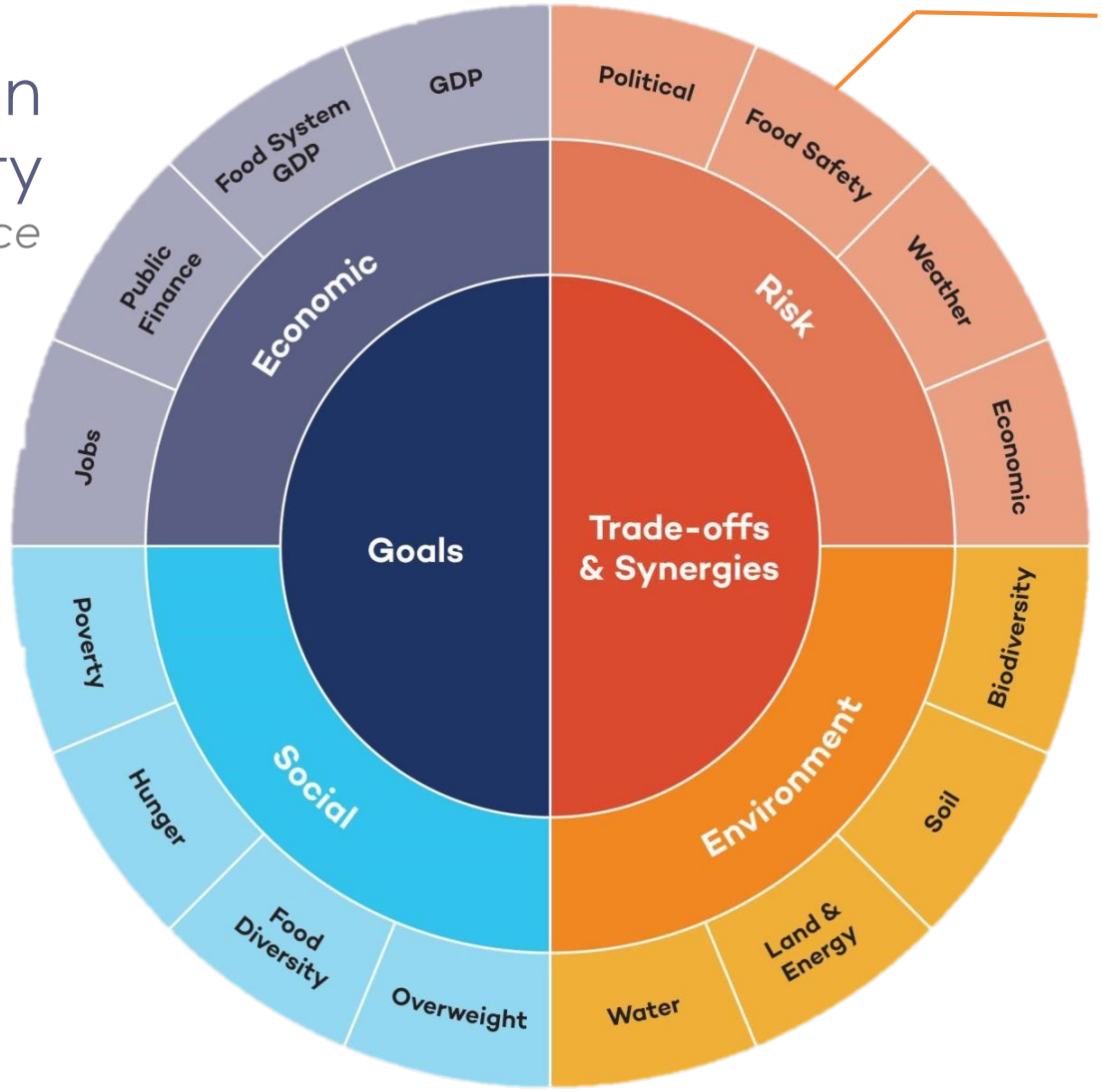
Quantification Framework for Food Systems

Food system as an economic activity

Impacts on jobs and finance

Impacts on human life

Impacts on inequalities and health



Extended concept:
One Health with zoonotic disease

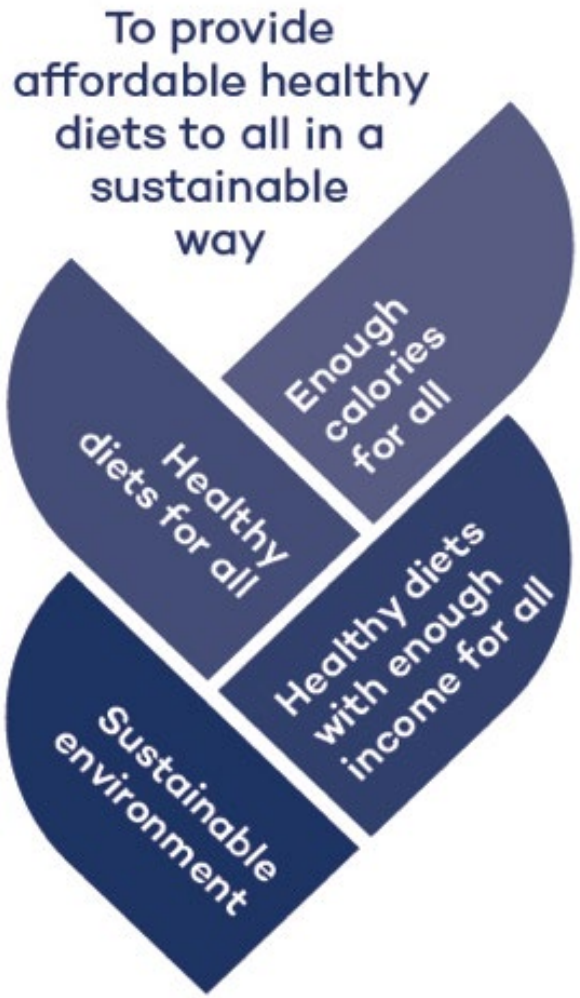
Assessing systemic risk

Impacts on resilience

Nature and climate

Impacts on the planet and the biosphere

What do we want an agri-food systems to achieve?



The objective function 4 components for transformed food systems	Targets and Indicators
Sufficient calories for all	Calories availability per capital per household (consistent with PoU) above minimal energy requirement
Healthy diets for all	• Share of population we can afford a healthy diet (consistent with SOFI 2020) • Regionalized diet structure by food group
Adequate incomes for all to access healthy diets	As previously, but includes a set of income-oriented instrument (see next slide)
Sustainable environment	• Carbon credit for agriculture, based on NDC • Water constraint for agriculture • Land Use constraint for Biodiversity

Trade-off and synergies in the SDG space

Trade-offs ☹ and/or synergies 😊)	SDGs
Water ☹	SDG 6: Clean Water and Sanitation, SDG 14: Life Below Water
Energy ☹	SDG 8
Land ☹	GOAL 15: Life on Land
Biodiversity ☹	SDG 14 and 15
Emissions ☹	GOAL 13: Climate Action
Inequalities 😊	SDG 1: No poverty, SDG 8: Decent Work and Economic Growth, SDG 10: Reduced Inequality
Health From ☹ to 😊	SDG 3: Good Health and Well-being
Gender 😊	SDG 5 5: Gender Equality

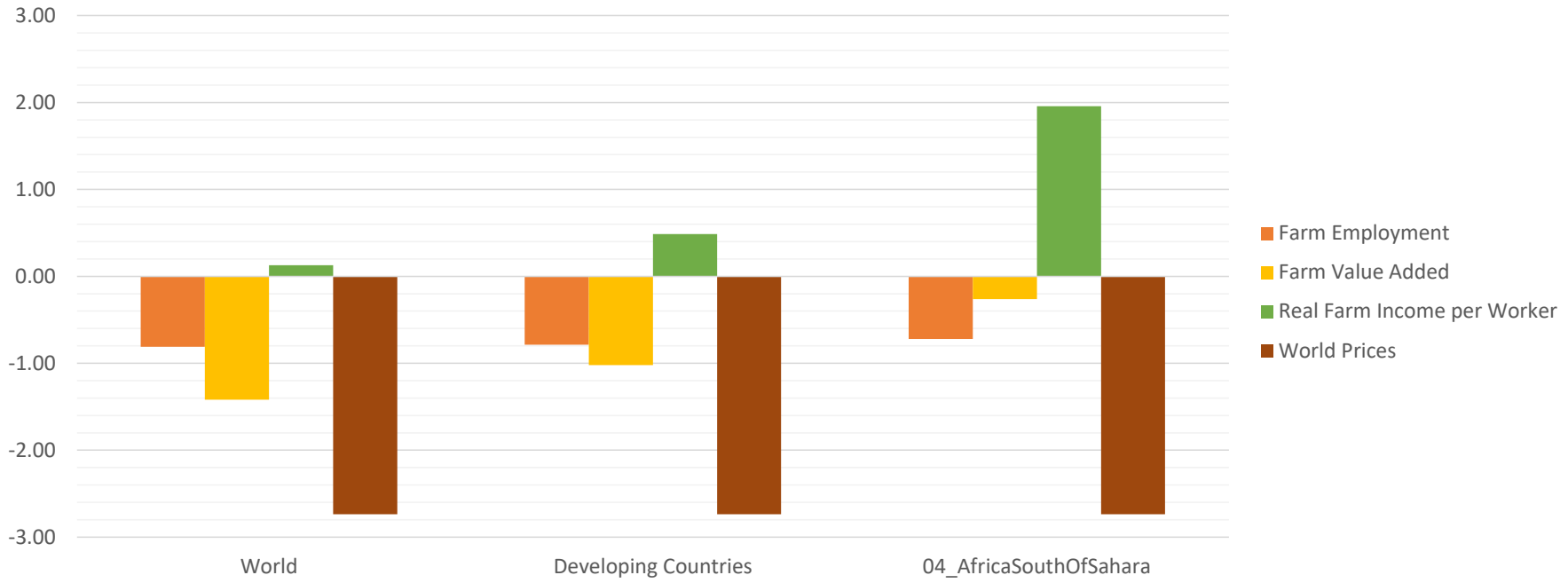
Post-Harvest Losses

Laborde & Torero -> See previous presentation by Maximo

Illustration on **agricultural sector** indicators:

Less losses, more supply, lower prices and will free labor force

But volume effects will still benefit African farmers

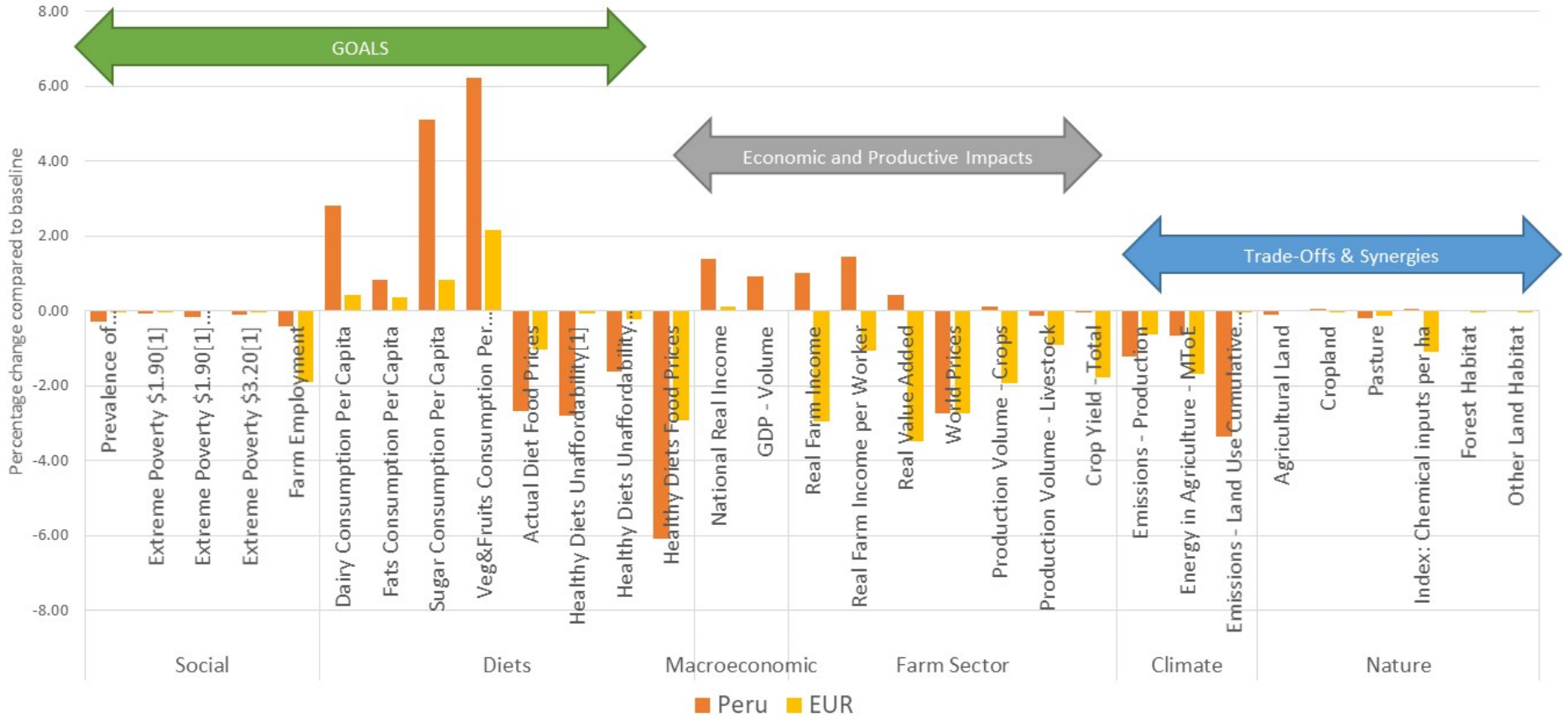


Source: MIRAGRODEP simulations, Laborde and Torero (2021)

Main Scenario: reducing PHL by 50%

Country level analysis show various interactions between goals, market responses and trade-offs and synergies

(selected indicators)

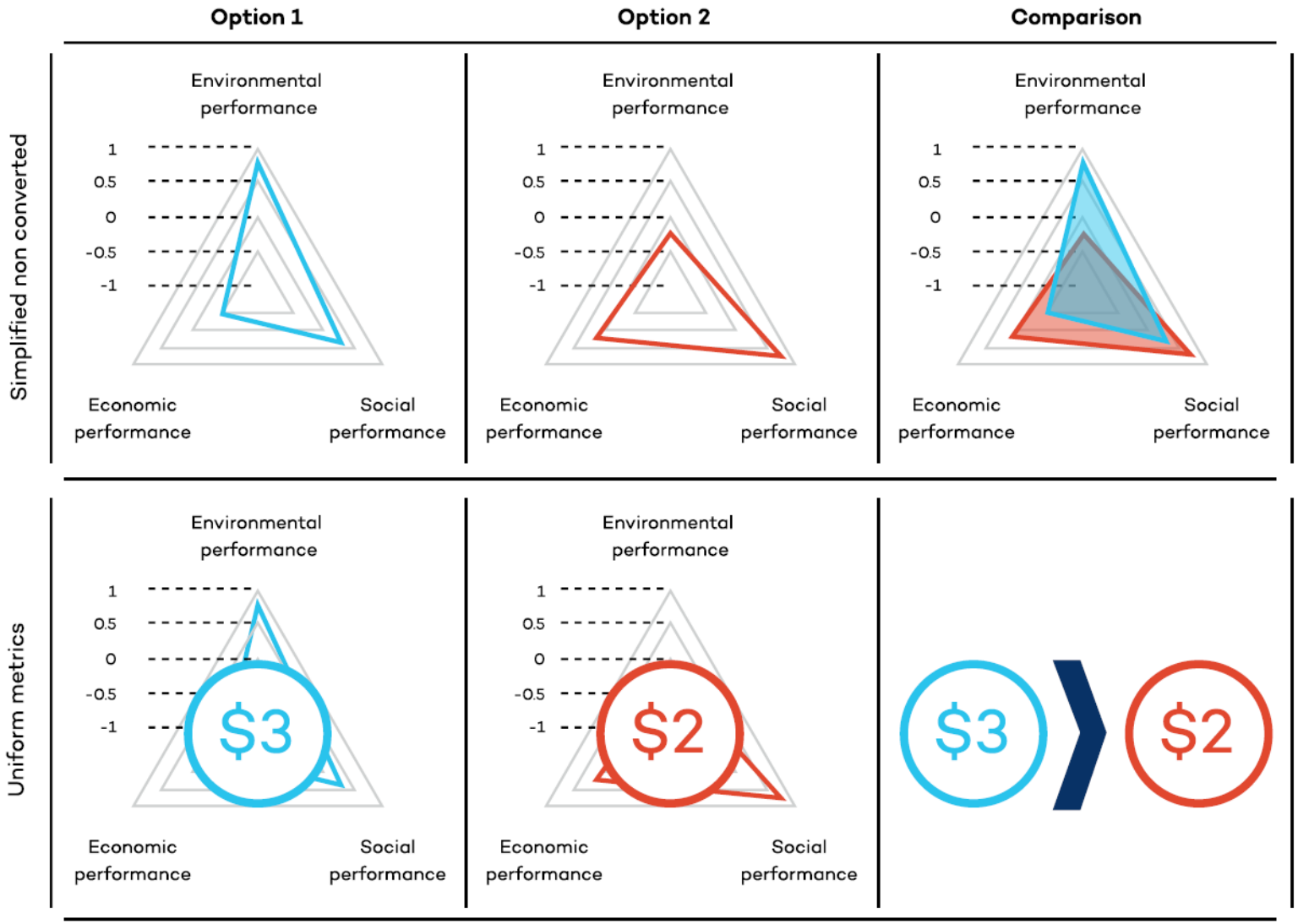


Source: MIRAGRODEP simulations, Laborde and Torero (2021)

Main Scenario: reducing PHL by 50%

Prioritization in a multi-dimensional space

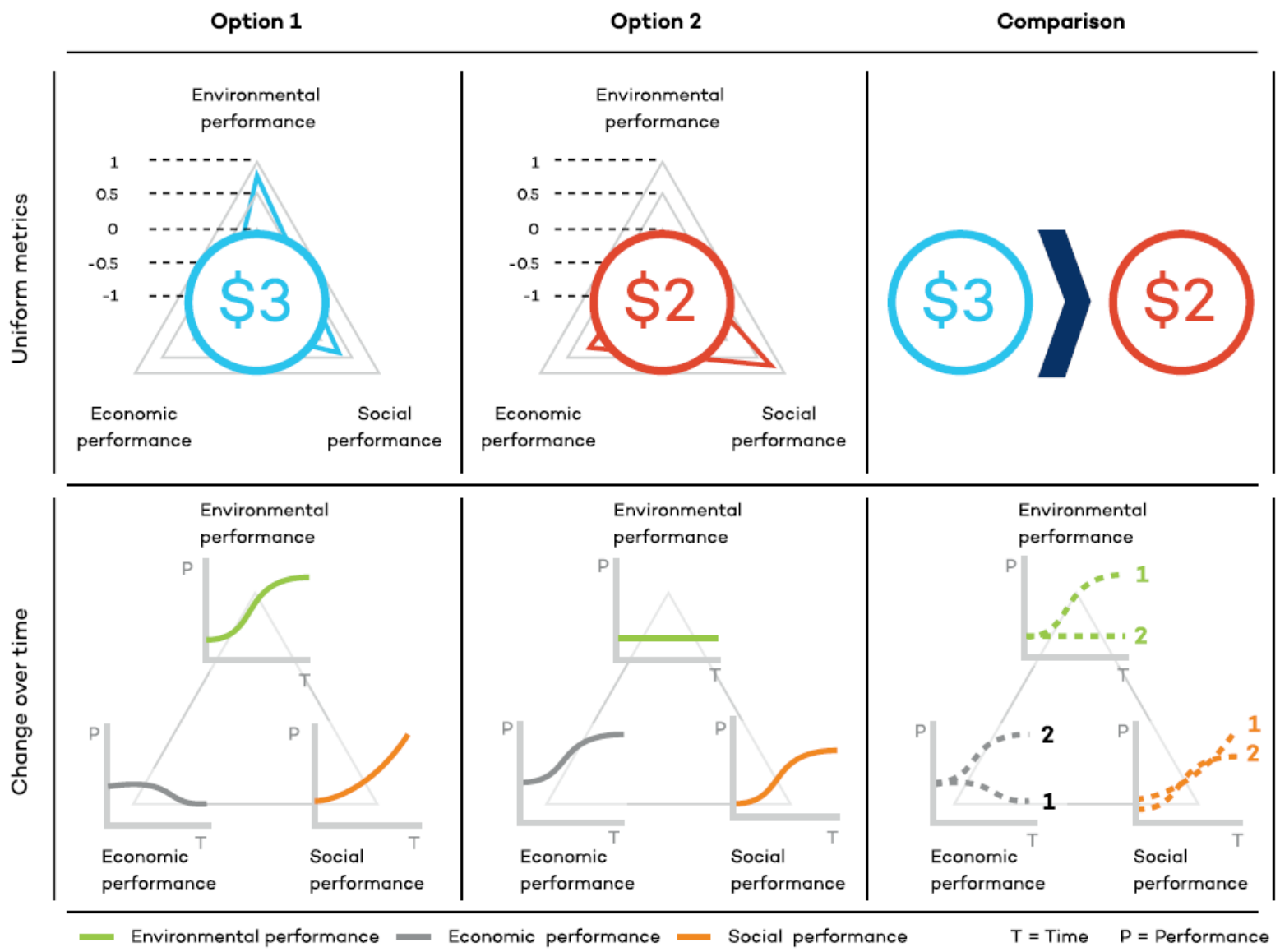
From multi-metric to common currency comparison (how to identify the monetary equivalence?)



Source: Modelling for Sustainable Development, New Decisions for a New Age, (IISD)

Prioritization in a multi-dimensional space

Common currency comparison with time-dimension added (how to identify the proper discount rates and non linearity's?)



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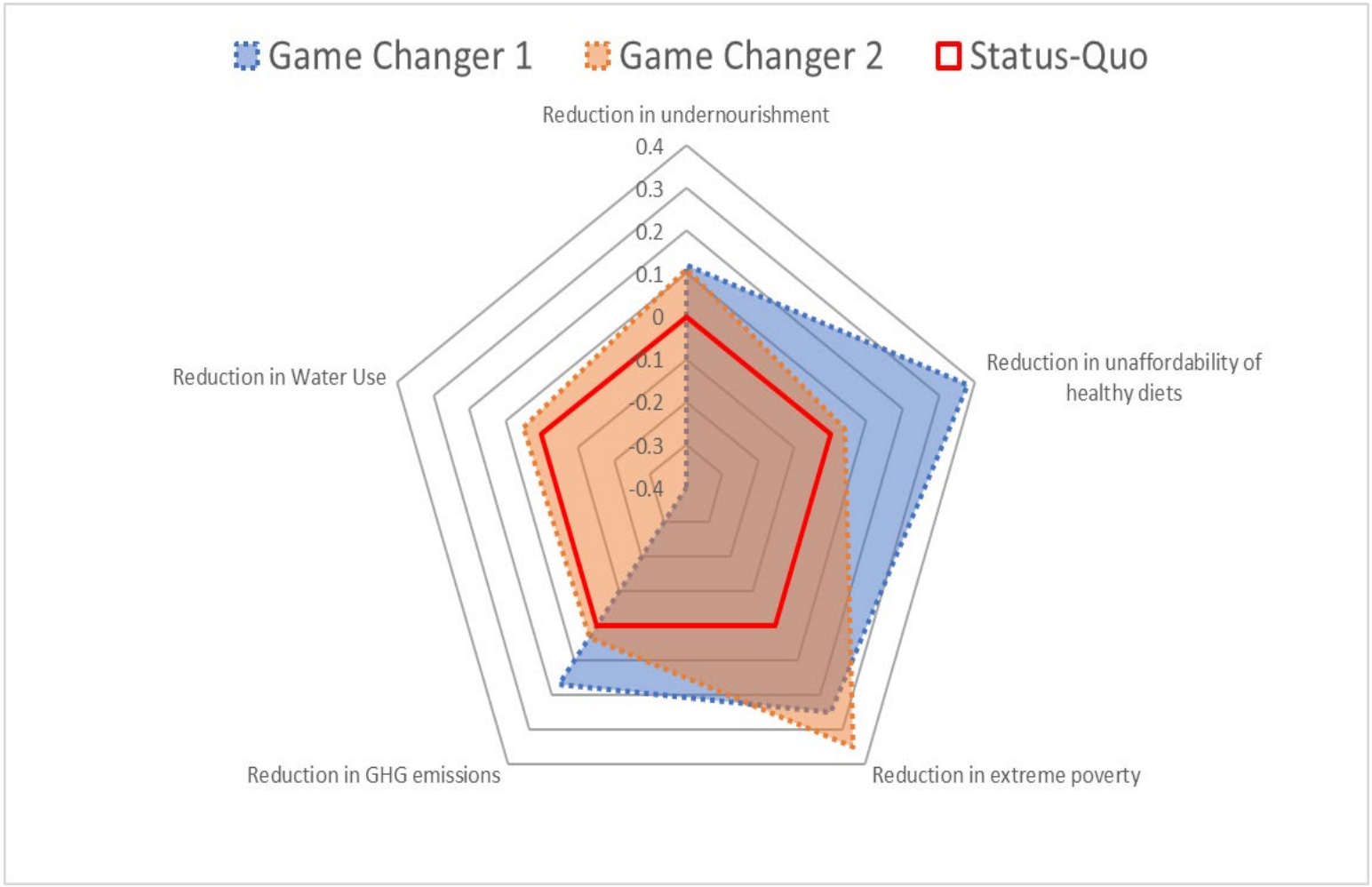
Prioritization in a multi-dimensional space



A simplified outcome representation

- How to compare Game Changer 1 & Game Changer 2?
- Do we want to rank them?
- Different options are available
  - Social utility function specification
  - Monetary-equivalent (e.g. use of shadow prices)
- Proper discount rate

Thanks!