



The Economics of Ecosystems and Biodiversity TEEB for Agriculture & Food Global Symposium, February 2019

A Holistic Lens on Rice Value Chain Pathways in Senegal: Application of “The Economics of Ecosystems and Biodiversity for Agriculture and Food” Framework

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**The Economics
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& Biodiversity**

based on a decision of the German Bundestag

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A Holistic Lens on Rice Value Chain Pathways in Senegal: Application of “The Economics of Ecosystems and Biodiversity for Agriculture and Food” Framework

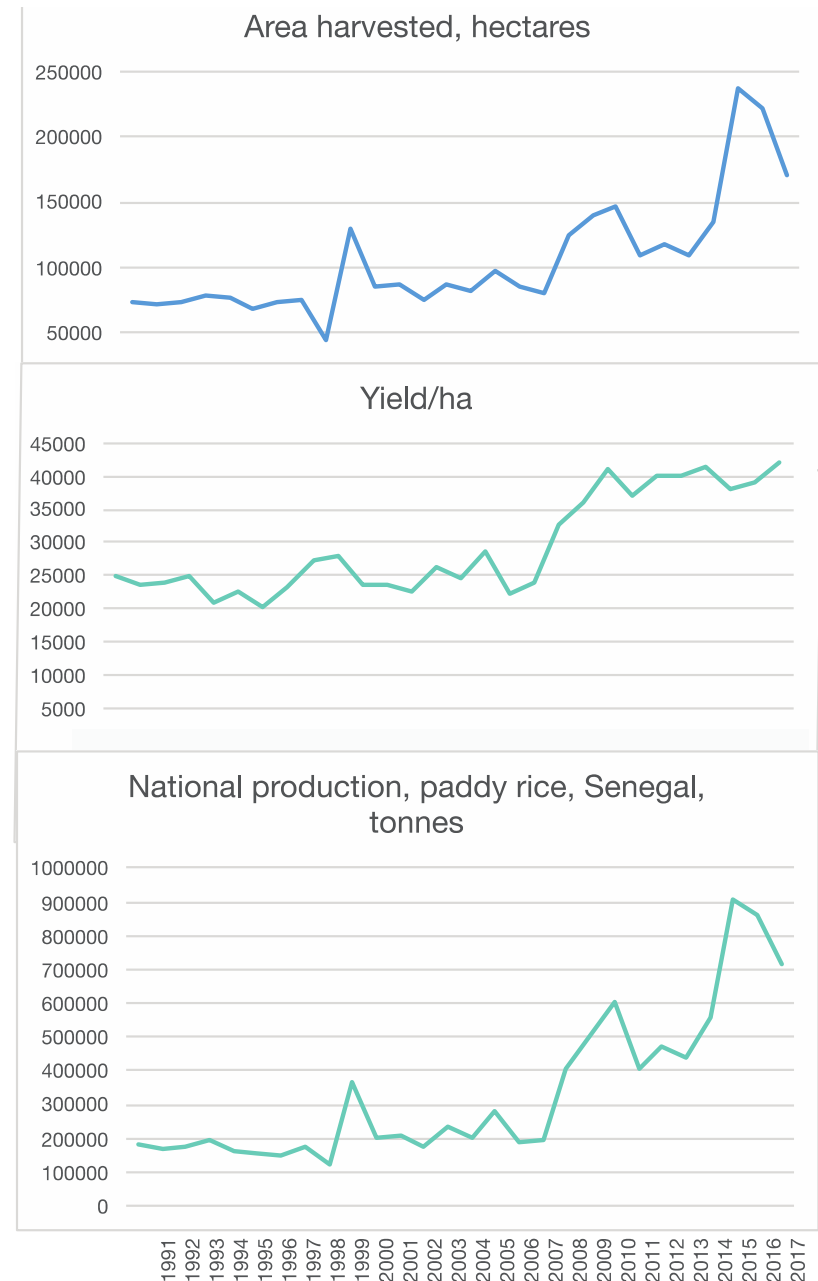


Rice is a valued crop in Senegal, with increasing importance over the last decades.

Senegal is recognized for having one of the largest production increases, from 2010 to 2017 in West Africa.

Although overall regional rice production increased by 25% from 2010 to 2017, rice consumption was up by 35%, a more rapid increase than expected.

As a consequence, regional self-sufficiency declined from 59% to 54%.



Dimensions of rice beyond yields



Produced around the world by millions of small-scale family farmers, often through complex social relationships

Rice paddies, sculpting the land, often serve as a form of water storage and supply and erosion control.

When irrigated rice is grown under organic conditions, it creates its own “agricultural ecosystem of unrivaled complexity”

Rice holds unique cultural values for many societies

Application of the TEEB framework to rice value chains in Senegal

What did we do particularly in alignment with the framework?

- Carried out an evaluation across the food chain, from production of both irrigated and rainfed rice, to processing and transportation, to consumption;
- Worked to bring in the perspective of multiple stakeholders: farmers, civil society, researchers and a governance think tank, and to solicit their input on the key issues, and the relevant policy questions;
- Applied “systems thinking”- translating proposed policy recommendations into policy interventions that change key indicators between “Business as Usual” and an “Agroecological” alternative;

Application of the TEEB framework to rice value chains in Senegal

What did we do that expands the framework in particular directions?

- Structured the policy interventions around FAO's ten elements of Agroecology
- Did not immediately link to the four forms of capital, and their stocks and flows; rather: used an existing systems dynamics model developed for the Government of Senegal to play out the implications of the proposed policy interventions, and assess their impacts on key indicators within the four forms of capital;
- The form of assessment is not solely or explicitly monetary; rather the assessment is based on the impacts throughout the system of different policy measures, as evaluated by many different means;
- Used the systems dynamics model developed for the Government of Senegal to assess their pathways to attain the Sustainable Development Goals, to assess the relevant changes in indicators and impacts on types of capital and SDGs.

Evaluation across the food chain, from production of both irrigated and rainfed rice, to processing and transportation, to consumption;

Production



Processing



Distribution



Consumption



Farming systems
Land tenure
Training and education
Traditional knowledge
seeds and genetic diversity
water management
fertility management
residue management;
GHG emissions;
Pest and weed management;
Addressing salinization
Mechanization;
Inputs and subsidies
Agricultural credit
Diversification
Integration of fish with rice
Import vs. domestic production
Employment
Equity; fair pricing

Evaluation across the food chain, from production of both irrigated and rainfed rice, to processing and transportation, to consumption;

Production



Processing



Processing infrastructure and investment
Ownership of processing facilities
Use of rice by-products

Distribution



Consumption



Evaluation across the food chain, from production of both irrigated and rainfed rice, to processing and transportation, to consumption;

Production



Processing



Distribution



Consumption



Transportation

Continuity of supply

Rice markets, organization of market

Credit in the value chain

Evaluation across the food chain, from production of both irrigated and rainfed rice, to processing and transportation, to consumption;

Production



Processing



Distribution

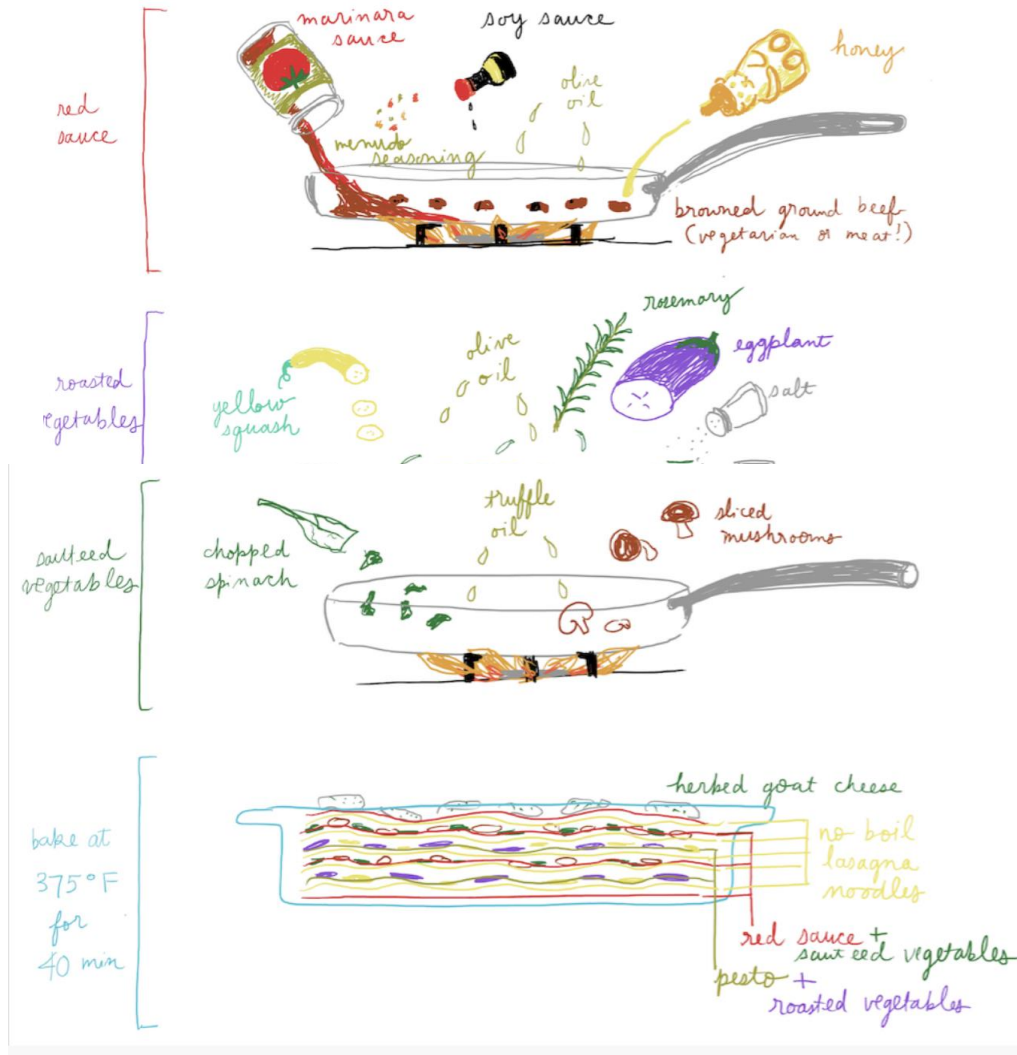


Consumption



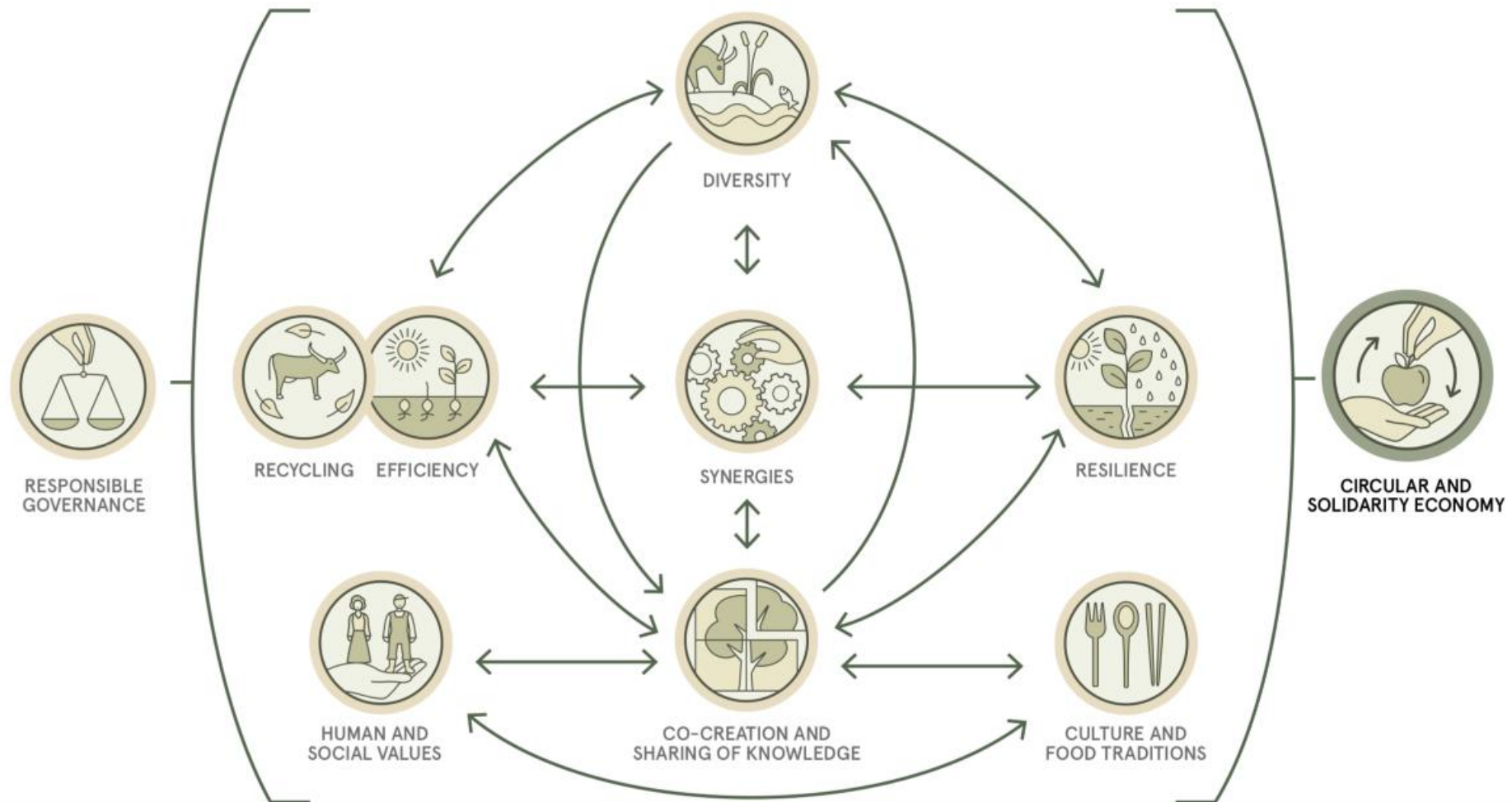
Consumption patterns and policies
Local demand vs. imported
Cultural importance
Food security/food sovereignty

Vegetable Lasagna



Brought in the perspective of multiple stakeholders: farmers, civil society, researchers and a governance think tank, to solicit their input on the key issues, and the relevant policy questions;

Formulation of a consensus set of policy interventions, organized along the framework of FAO's 10 elements of Agroecology



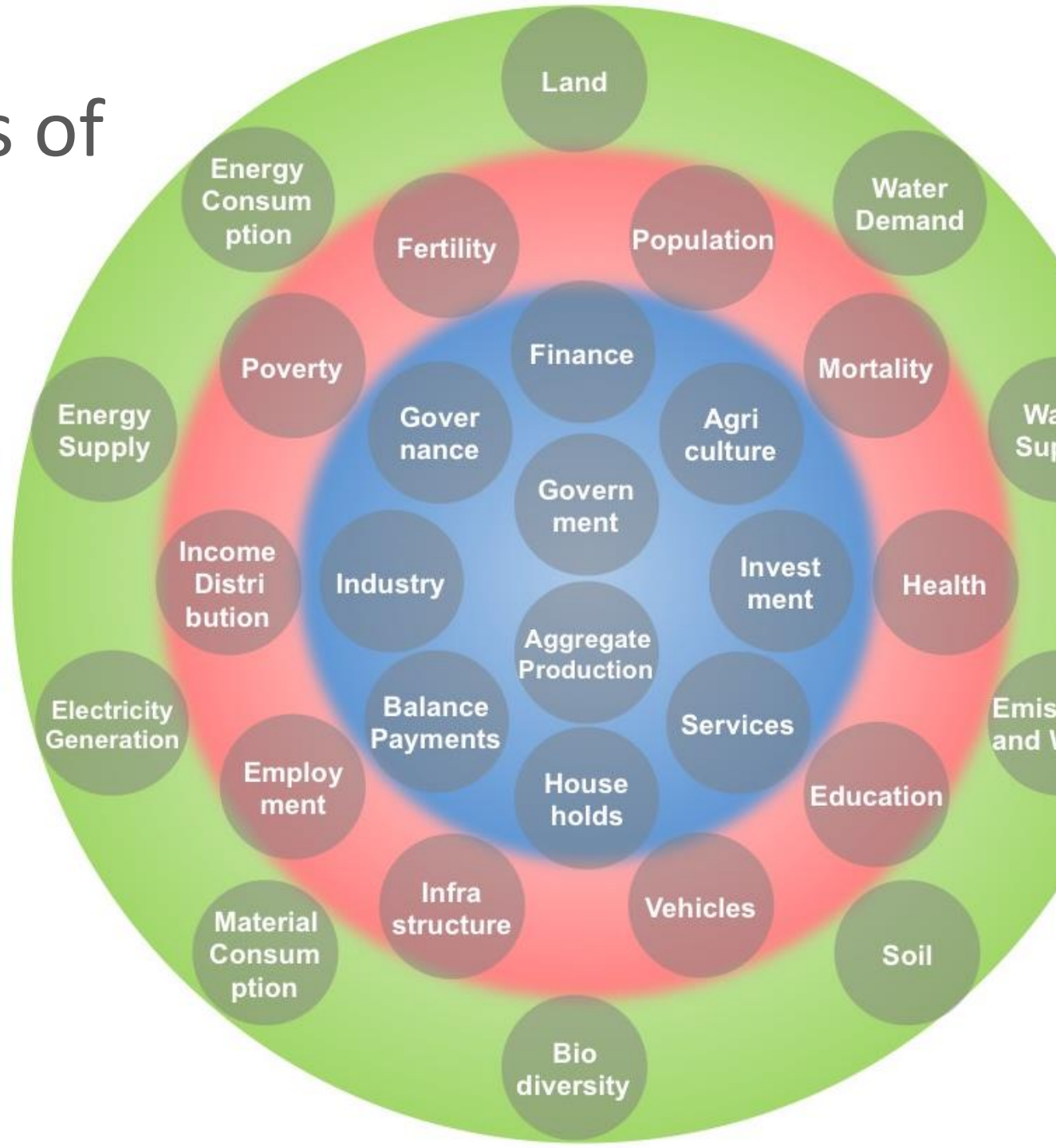
Formulation of a consensus set of policy interventions, organized along the framework of FAO's 10 elements of Agroecology

Resilience: Support the construction of dikes and bunds in the lowlands to retain / manage the "surplus" rainwater and control salt

Human and social values: Empower people, especially women and young people at household, community levels and beyond by building knowledge, through collective action and creating opportunities for commercialization

Circular economy: Support for smaller and medium sized decentralized mills and storage facilities managed by the communities (providing benefits, such as capacity for milling by-products to be allocated to other uses, such as animal feed, field fertilizers, breweries or other sectors, reduction of transportation costs, higher prices for producers, lower prices for consumers, greater market efficiency and availability at the community markets)

Core Sectors of iSDG Model



1. Defining the problem and selecting Policies

2. Representing the system T21-iSDG Model

3. Measuring the impact, 4 types of Capital and SDGs

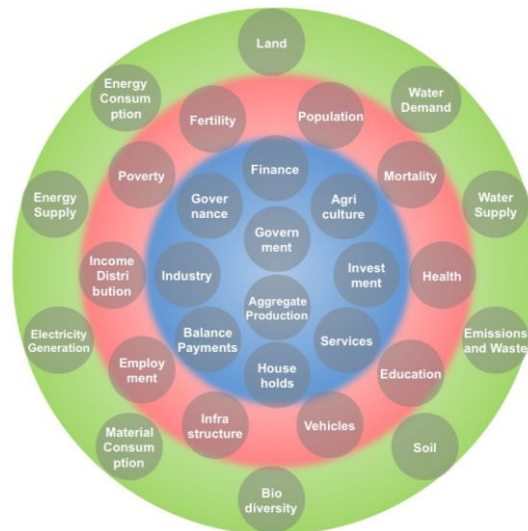
Stakeholder Consultation

FAO principles of Agroecology



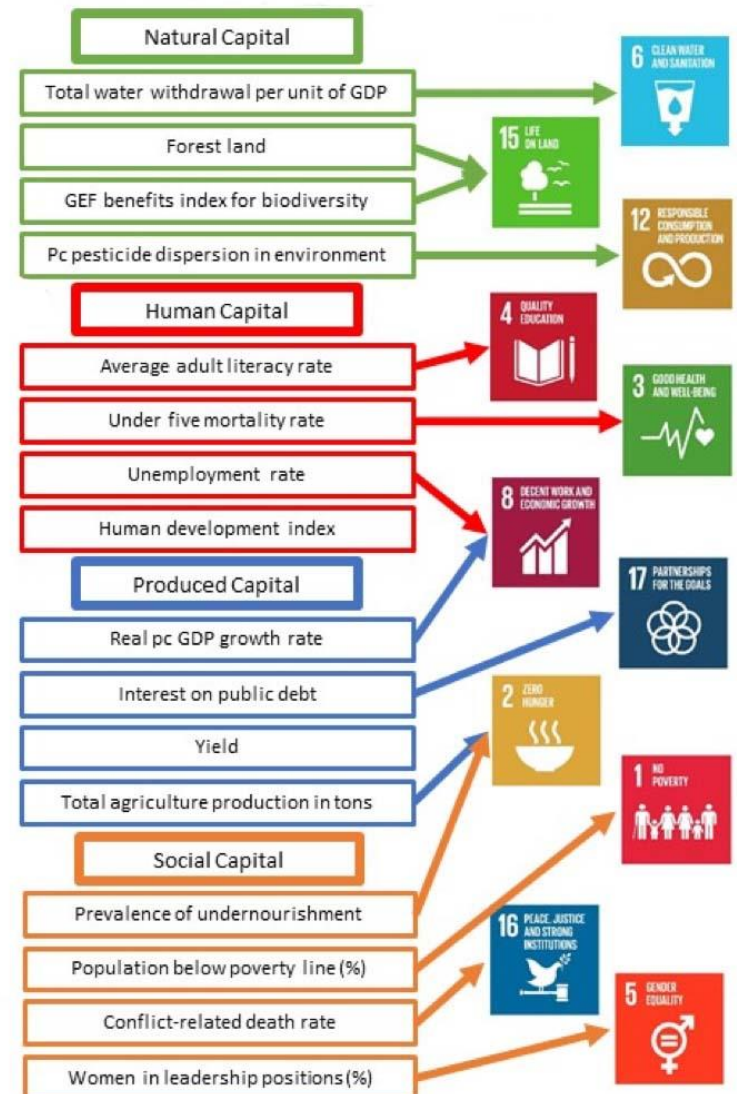
Causal Loop Diagrams

Stock and Flow System Dynam

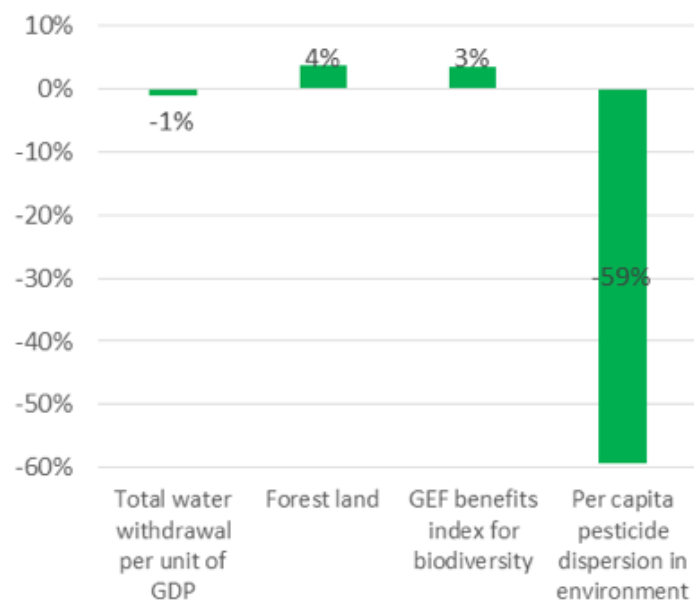


Policy interventions

Dynamic simulation Results



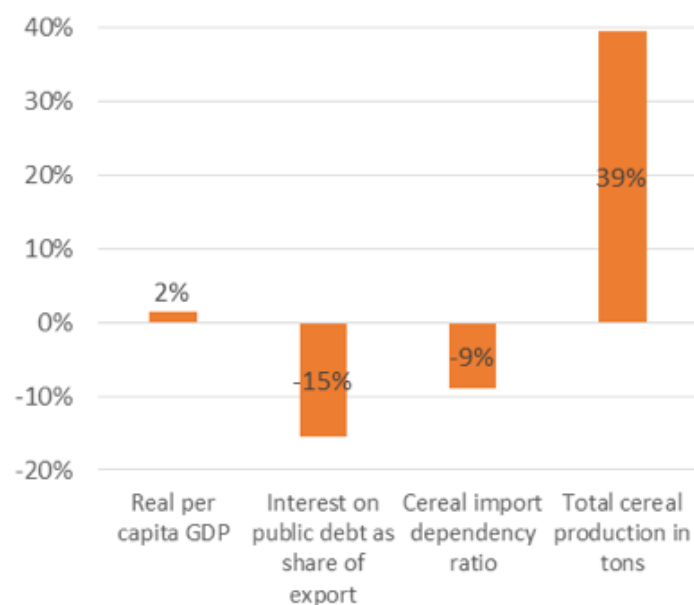
Natural Capital



Human Capital



Produced Capital



Social Capital

