



Simpson Foundation - Malawi

Soil Carbon Sequestration, Food Security and Climate Change

in

Sub-Saharan Africa

Synergies and Trade offs

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- **19.1 million** people rely on depleted soils
- **25 million** people will need quality FOOD by 2030 (growth rate of 3%.)
- **Over 3 million** people require food Aid annually.
- **6%** of popln remain unemployed and they engage in unsustainable coping mechanism. (selling of fuelwood, brick molding, sand-mining) leading to environmental degradation.
- Despite agriculture contributing 30% of the GDP (\$20.7bn) the impact of soil loss/fertility is stagnating the economy by low agriculture productivity.
- The Zero hunger target remains a dream than a reality

- From 2001 to 2020 Malawi lost **193kha** of tree cover,
- This is a 13% decrease in tree cover from the previous decade
- This translate to 76.7metric tons of carbon dioxide emissions. (*Global Forest Watch website*)
- Poor farming practices is significantly contributing to emissions of carbon dioxide, green house gases and loss of soil carbon stocks leading to foods insecurity, and climate change.

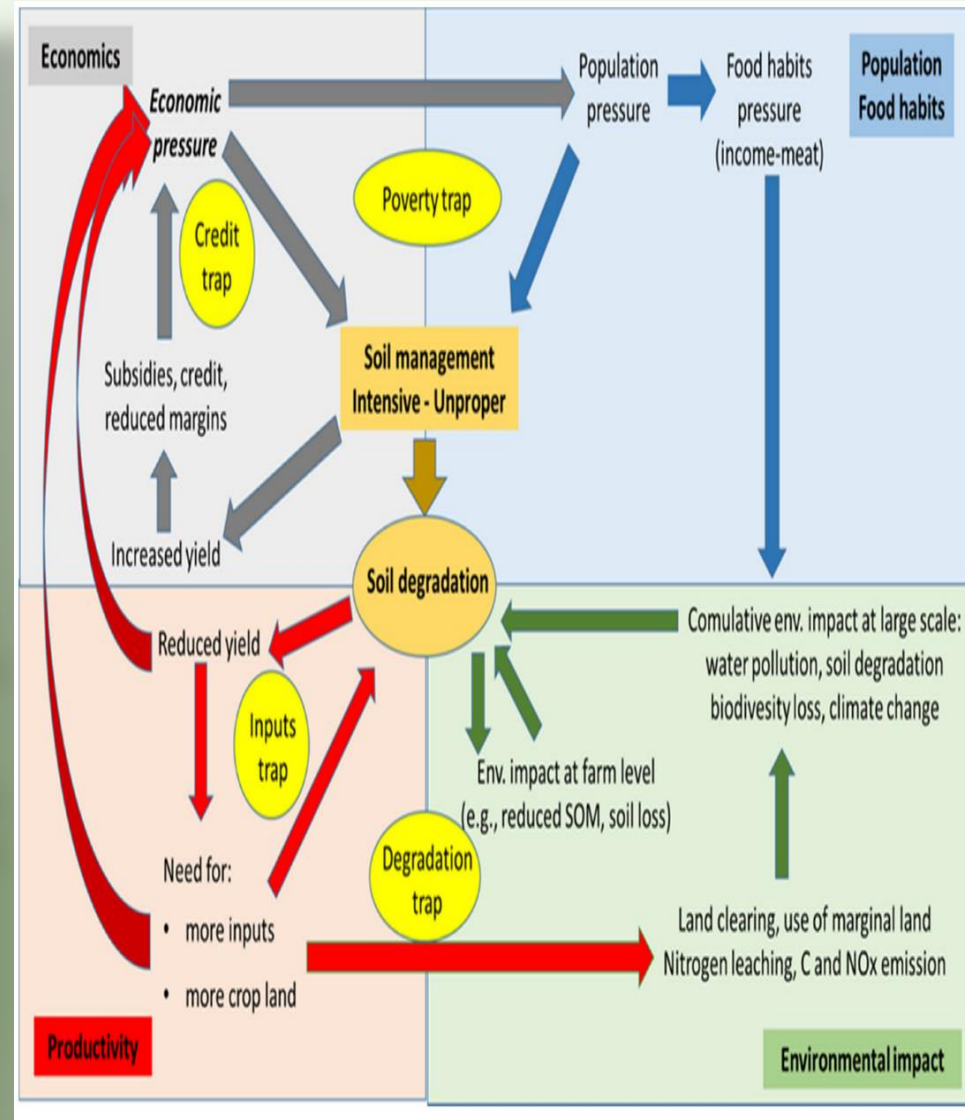


- loss of SOC stocks/loss of fertility
- Soil pollution
- Soil compaction
- Soil salinization/acidic soils
- Loss of organic matter
- Loss of biodiversity

The Dynamic relationship

We believe that:

- **Soils, food systems and climate change** are closely intertwined with a **dynamic relationship**.
- It is essential to identify and understand these interlinkages to **address** poverty, hunger, climate change and environmental degradation.
- **Understanding** these interlinkages and relationships **WILL** provide insights to support strategic decisions **CHANGE and CALL FOR ACTION** to enhance synergies and reduce trade-offs to achieve better results for **SOILS, FOOD and CLIMATE CHANGE** investments.
- **Carbon sequestration synergies** and trade offs have great potential to enhance better results for investments



Carbon sequestration food security and Climate change Scenario in Malawi

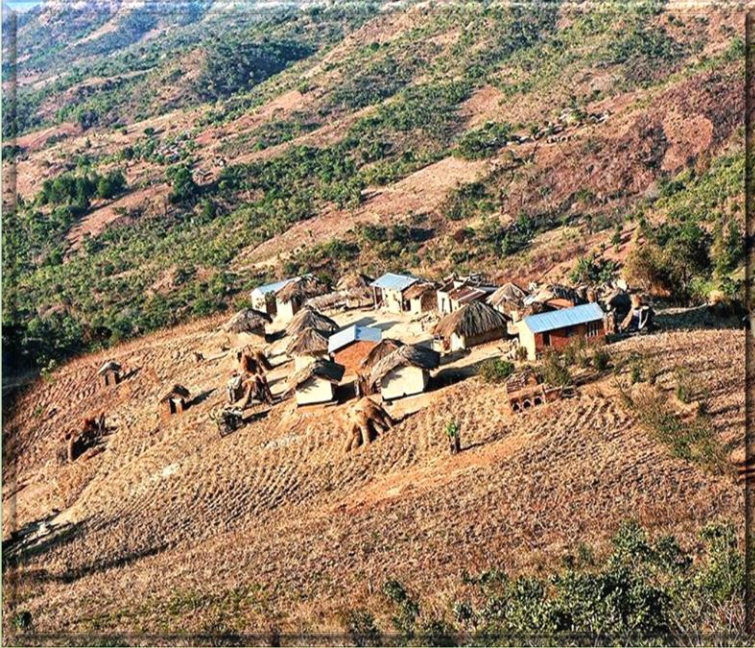


Exposure to impacts of climate change



Poor land management practices

Carbon Sequestration, Food Security & Climate Change Scenario in Malawi



Unsustainable coping mechanism



Poor land management practices

The Potential to replenish and regenerate Soil carbon, and reduce ghg emissions for food security and climate change

Land restoration practices

(Cover crops/agro-forest/afforestation/contour bunds)

Sustainable agriculture practices

(Zero/minimal tillage/crop diversification/Mulching
crop rotations/crop residue management)

Forest practices

(soil and water conservation/tree planting/agro-forest
Tree and crop residue management)

Soil carbon stock

Biomass

Reduced CO₂ +GHG emission

Reduced CO₂ +GHG emission



High yields

Yield stability

High Incomes

Income stability

Adaptation

Livelihood resilience
Farm system resilience
Agro-ecosystem resilience

Mitigation

Soil organic stocks
Reduced emission ghg/co₂

Soil Health
Soil Fertility

Synergy and Trade off for Carbon sequestration and food security

- **Synergy** : a positive relationship between two or more measurable objectives, i.e. it **HAPPENS** when a positive impact on a given objective coincides with a positive impact on another objective
- **Trade off** : a negative relationship between two measurable objectives, i.e. it **HAPPENS** when a positive impact on a given objective coincides with a detrimental effect on another objective

Potential Objectives for synergy and Trade off for carbon sequestration and food security.

1. Agricultural productivity and incomes
2. Adapting and building resilience to climate change
3. Reducing and/or removing greenhouse gas emissions.

Potential synergies and trade offs objectives

Productivity - Objective 1:

Sustainably increasing agricultural productivity and incomes

1a: Increasing agricultural productivity **(Productivity)**

efficiency of food production systems; expressed as food production per unit area.

1b: Increasing food producers' incomes **(Incomes)**

profitability at households, expressed as household income.

1c: Social and environmental sustainability **(social/Environmental sustainability)**

Sustainable practices for food security, social equality, biodiversity and ecosystem services.

Potential synergies and trade offs objectives

Adaptation - Objective 2:

Adapting and building resilience to climate change

2a: Improving climate risk mitigation strategies for food producers' livelihoods

(Livelihood resilience)

Improvements in livelihood resilience to climate impacts expressed as income stability, and change in unsustainable coping strategies,

2b: Adapting food production systems to current and expected future climate change.

(Production system adaptation)

agronomic adaptation measures that aim to reduce exposure and sensitivity to physical impacts of climate change, expressed as yield stability.

2c: Increasing the resilience of agro-ecosystems.

(agro-ecosystem resilience)

improvements in the resilience of food production systems to climate impacts derived from the enhancement of ecosystem expressed as yield stability, damage from climate-related disasters, etc.

Mitigation - Objective 3:

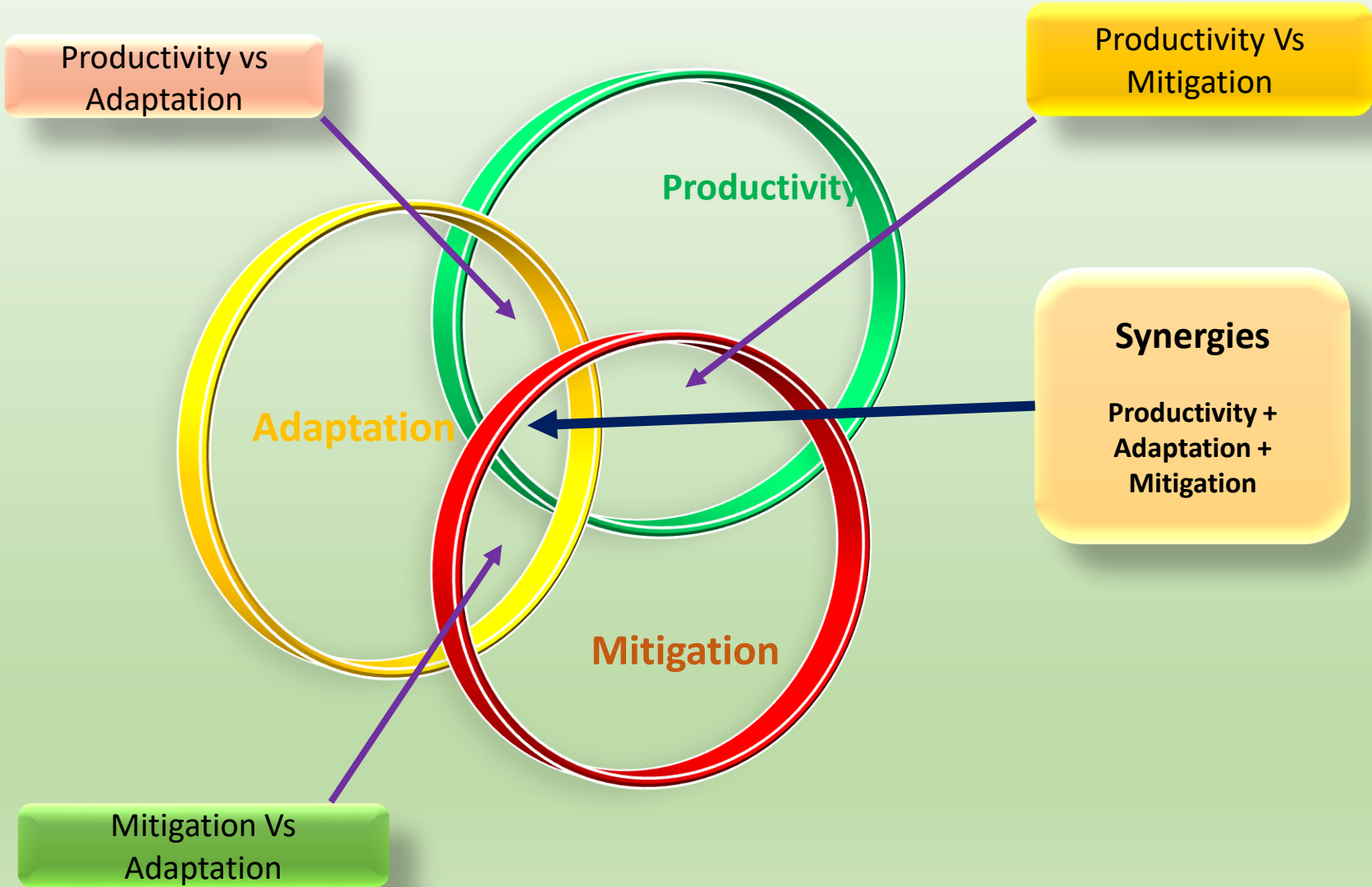
Reducing and/or removing greenhouse gas emissions.

3a: Increasing carbon stocks in soils and biomass. **(carbon stocks)** Any measures to conserve or enhance carbon sinks at field, farm, expressed as carbon stock per unit area,

3b: Reducing emission intensities of agricultural products **(emissions)**

improvements in GHG emission per unit area expressed as emissions of individual GHGs per unit or emissions of carbon dioxide equivalent (CO₂eq),

Possible Synergies & Trade-Offs



Opportunities for synergy and trade offs

Malawi case study: The Food Subsidy Input Program: Any opportunity for Synergy and Trade-off

The Program

- For 3 decades Malawi government has been implementing a food productivity political flagship program " The Food Subsidy Input Program (FISIP)
- To stimulate agricultural productivity to achieve food and nutrition security, income security (economic growth) and Livelihood resilience
- Over \$100million has been invested in fertilizer and seed input subsidy

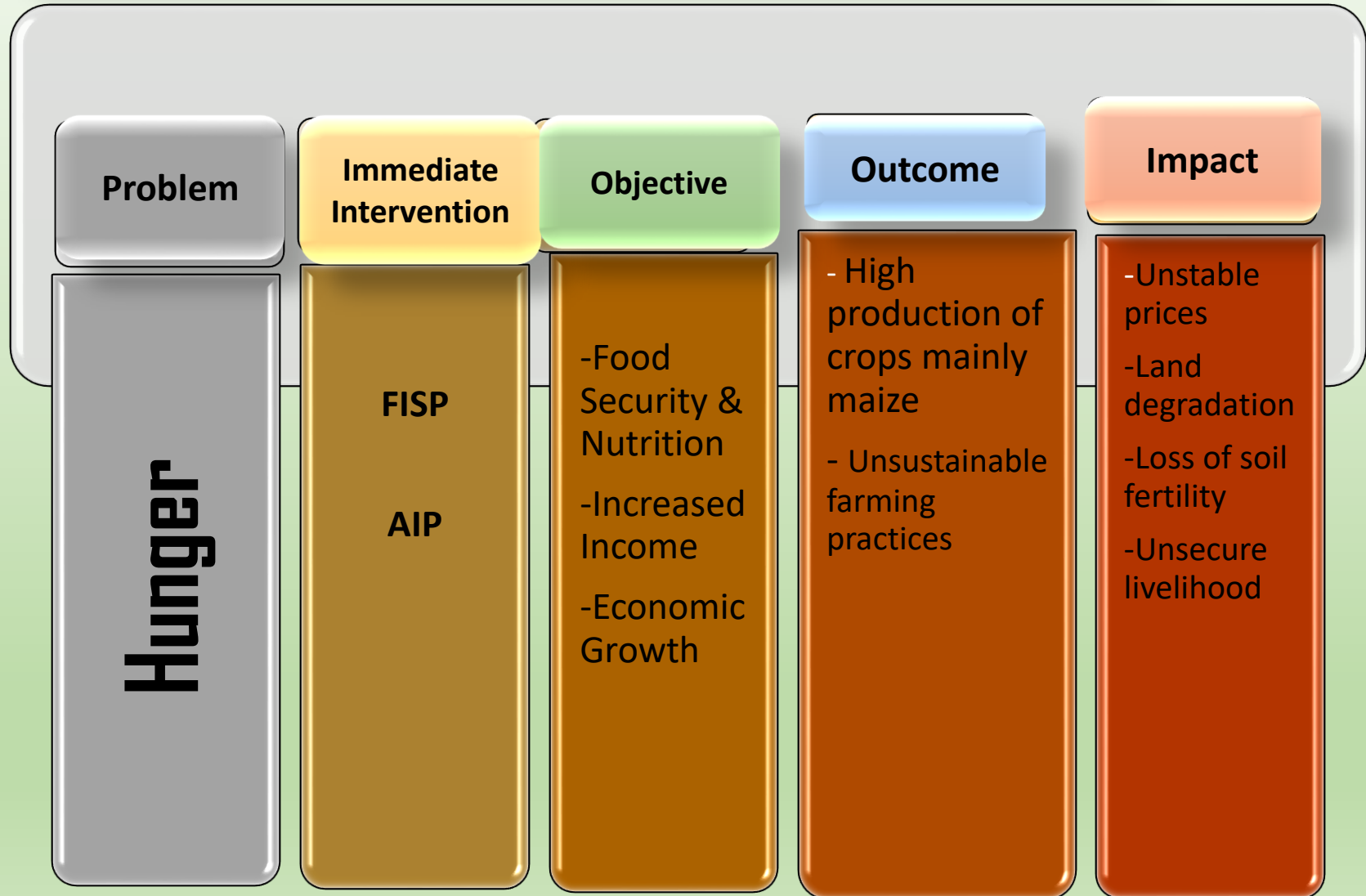
Results/Impact

- Declining and unstable yields
- Increasing demand for food aid
- Unstable food prices of staple food

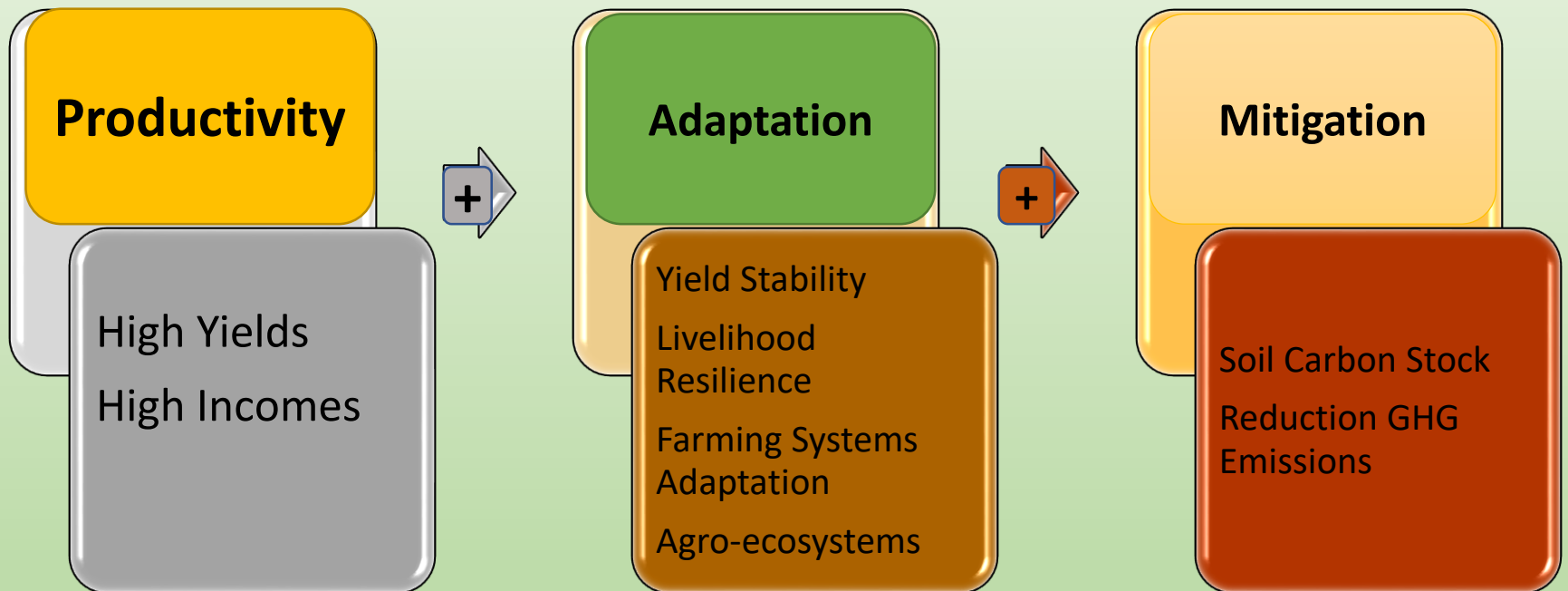
- Population exposure to impacts of climate change (floods/dry spells/pests)
- Unsustainable coping mechanism
- Erosion of livelihoods
- Depletion of agro-ecosystems
- Reduced capacity of farming systems to produce optimal yields.
- Loss of soil fertility/ soil degradation

Opportunity for Synergies and trade offs with Carbon sequestration practices to reverse the current trends:

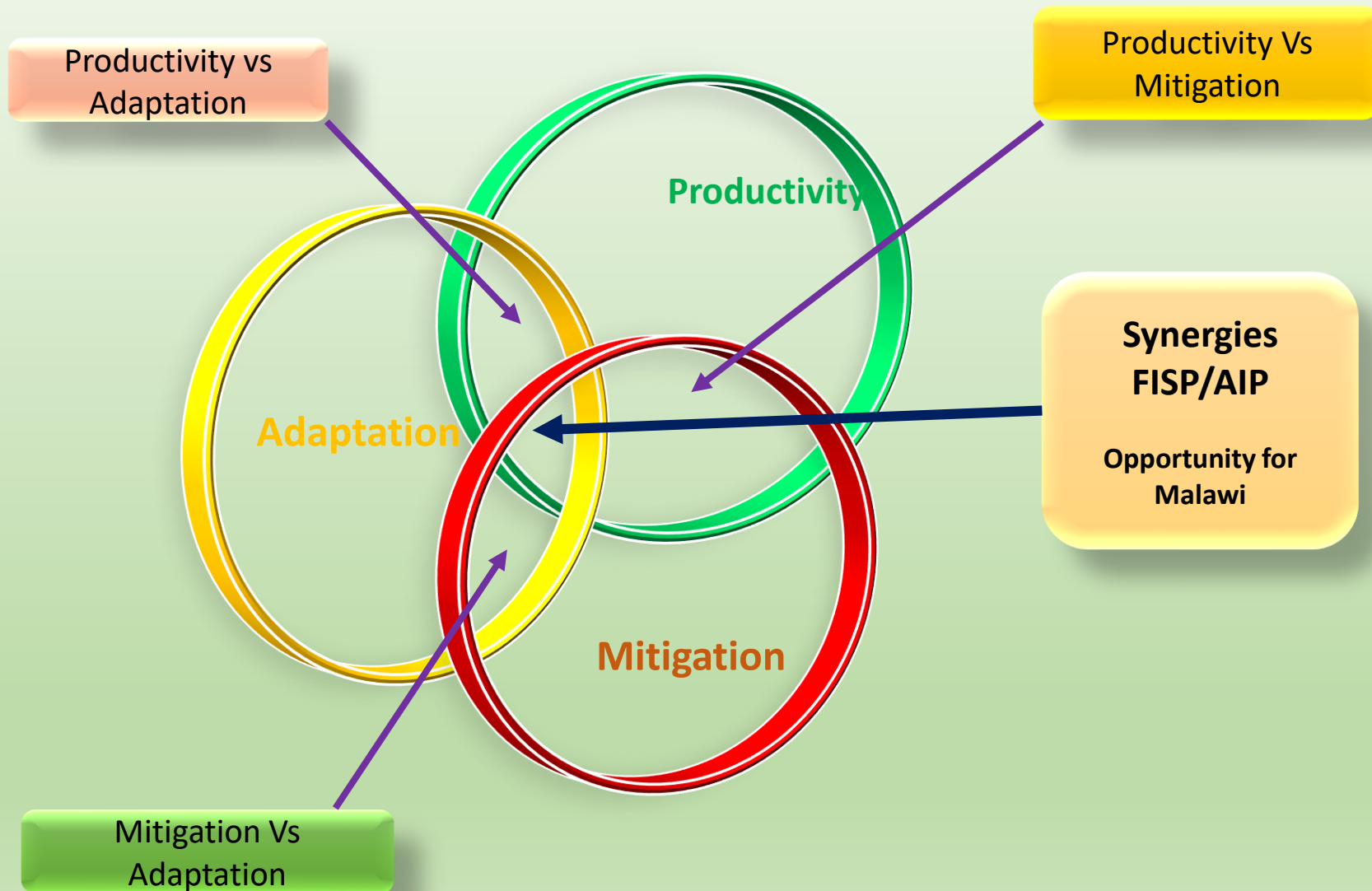
Malawi Government Intervention



Opportunity in Synergies



Possible Synergies & Trade-Offs



Conclusion

- ✓ Create an In-depth understanding of synergies and tradeoff of Soils, food security and climate change (**Political leaders, policy makers, practitioners, and farmers**)
- ✓ Create a Leadership and change **political-institutional environment** that will allow a strategic support and adoption of sustainable management practices based on SOC maintenance and/or sequestration. (**change from quick fix political mileage to sustainable lasting solutions**)
- ✓ Agricultural Policies to incorporate and **incentivize** the important role of soils and SOC in the context of climate change adaptation and mitigation, sustainable development and land degradation neutrality.
- ✓ Capacity building to measure, monitor, report and verification of the **Evidence** of soil organic carbon sequestration in increasing agricultural productivity, climate change adaptation and mitigation. (Evidence to stimulate adoption change.
- ✓ Create political will to ensure availability, access and distribution of **quality food for Health and well being of all**



THE END - THANK YOU



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