



How to achieve a mitigation-adaptation integrated transition?

A case study in the coffee
sector in Viet Nam

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A case study in the coffee sector

Why coffee?

- Globally, it is projected that 63% of suitable land for Robusta coffee production and 75% for Arabica coffee will be lost by 2050 due to climate change (Sachs 2019)
- In coffee production, once the trees are planted, they are used for 20 years.
- Coffee is an internationally traded agricultural product. Producers in tropical countries and consumers in developed countries are connected in the supply chain.
 - It is advanced with international support to promote sustainable production especially from the private sector (importers) with sustainable procurement policies

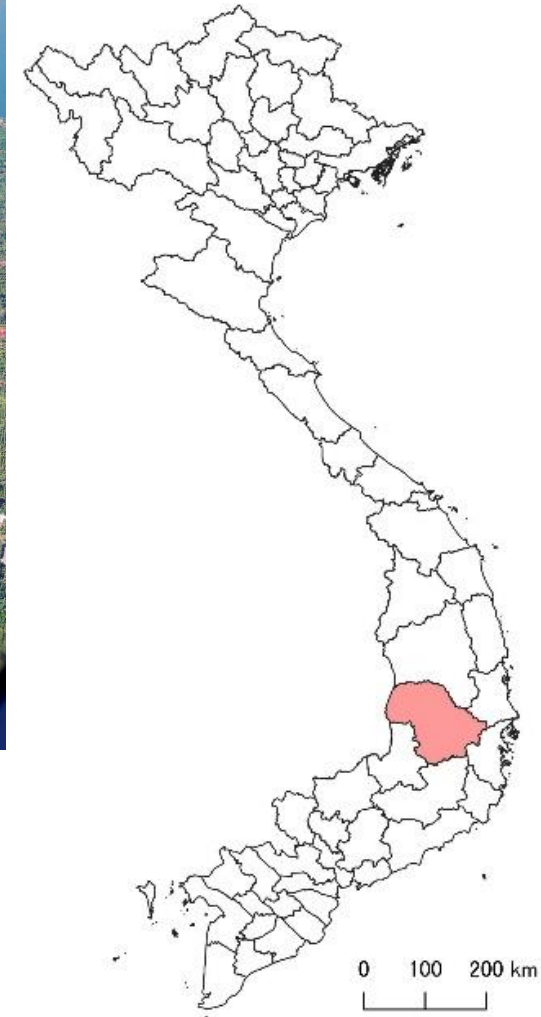
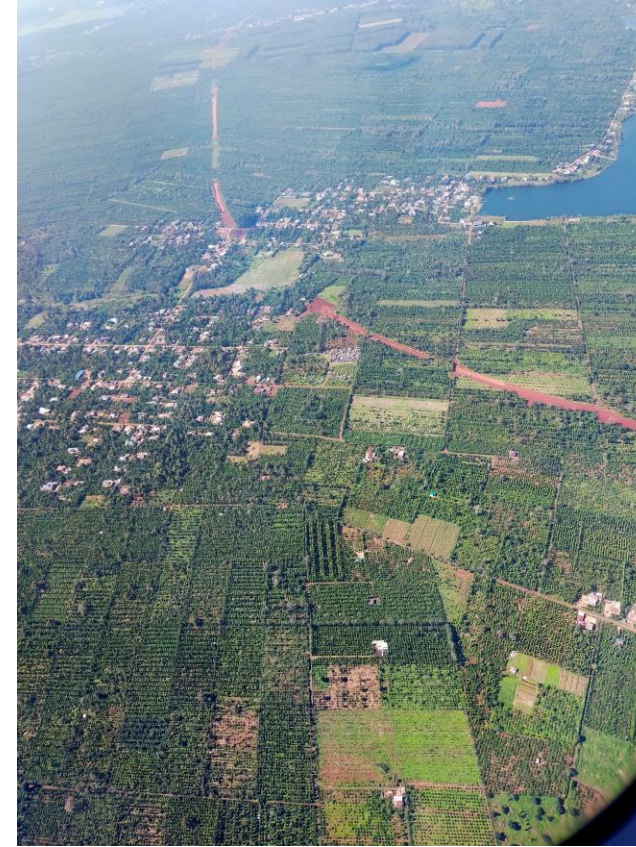
Key questions

- What are current progress of climate adaptation and sustainable agricultural practices promotion?
- What kinds of adaptation measures are understood by local stakeholders such as local researchers and local farmers?
- What is the mitigation potential of adaptation measures?
- What are the factors facilitating and inhibiting an integrated transition of mitigation and adaptation in the coffee sector?



Study site: Dak Lak Province, Viet Nam

- Viet Nam is one of the world's leading producers of Robusta coffee (*Coffea canephora*). Approx. 90% of the production is exported.
- Dak Lak Province in Central Highland is called the coffee capital of Viet Nam because its coffee cultivation area (213k ha) and production (508k tons) account for one-third of the country's total.
- About 90% coffee production farms are managed by smallholders, with farm sizes ranging from 1-1.5 hectares



Adaptation measures in coffee sector (Literature review)

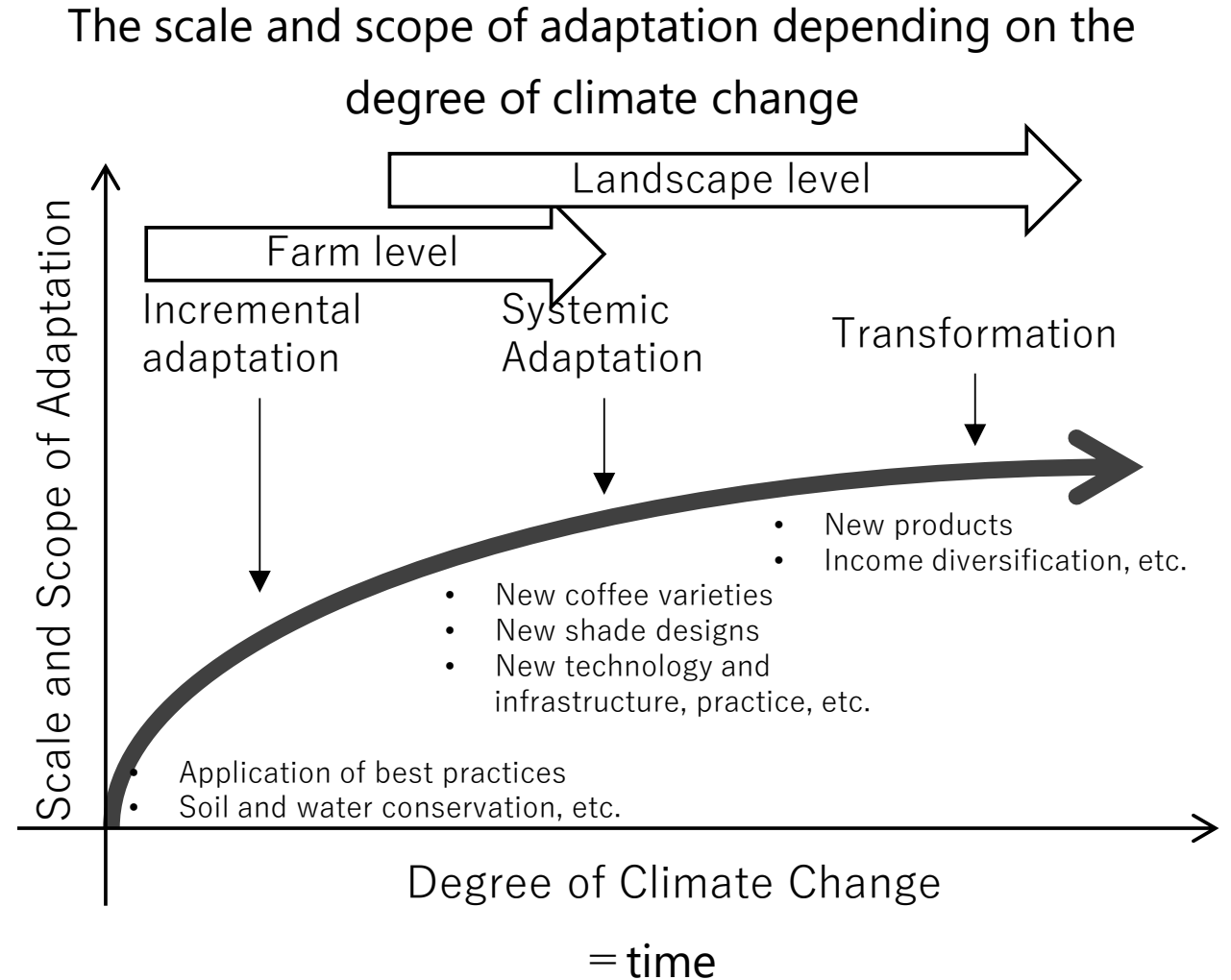
Adaptation measures frequently mentioned

- Farm level (incremental adaptation)

- introducing shade systems
- effective use and management of water
- Soil conservation
- developing new coffee varieties
- pest management

- Landscape level (systemic and transformational adaptation)

- irrigation infrastructure development
- forest conservation
- agrivoltaics
- moving coffee farms to suitable areas



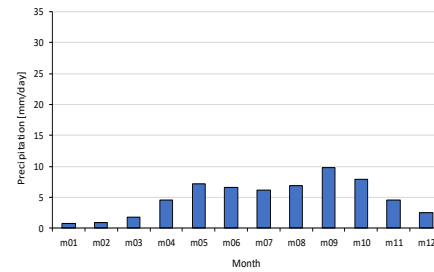
(modified based on the figure of Morales et al., 2022).

What are current progress of climate adaptation in coffee sector in Dak Lak?

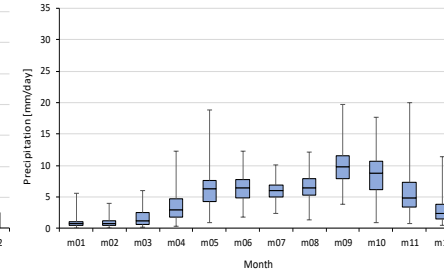
- “Climate Change Adaptation Strategy for Dak Lak Province until 2030 and Vision until 2050 (March 2024)”
 - it was decided to formulate plans for climate change adaptation and mitigation in each industrial sector including agriculture
 - At present, there is no adaptation plan for the agricultural sector in Dak Lak Province
- “Sustainable Coffee Development in Dak Lak Province by 2020 with a Vision to 2030” (2017)
 - Irrigation infrastructure development is mentioned as an adaptation measure
- Discussions on climate adaptation measures have not yet started in the coffee sector
 - Regional future climate projection is not shared
 - Insufficient data and climate-production models to predict climate impacts for Robusta coffee

RCP8.5

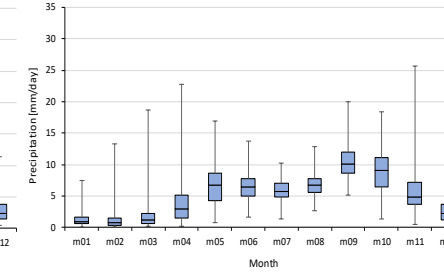
historical
Base period (1981-2000)



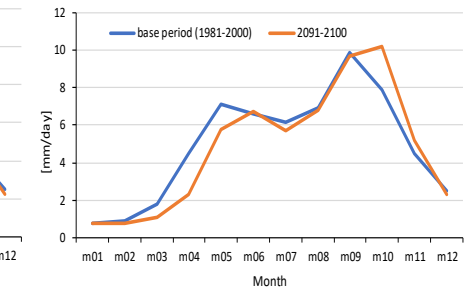
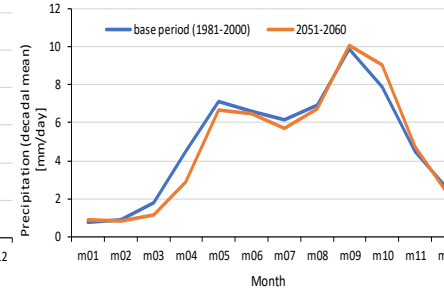
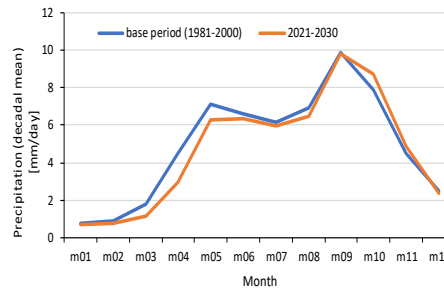
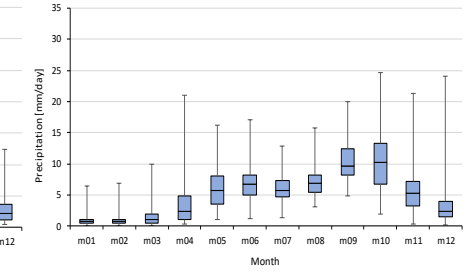
2021-2030



2051-2060



2091-2100



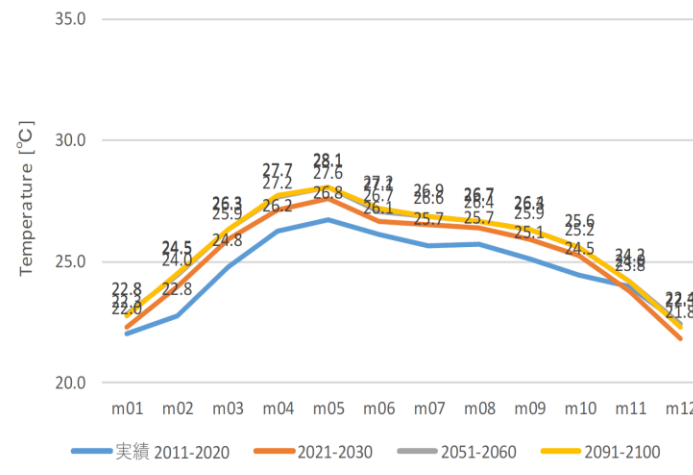
CLIMOCAST on AP-PLAT provides regional future climate projection data and anyone can download and utilize it.

Downloaded data should be processed in a format which is useful to discuss adaptation measures

- Skill development of local human resources or improvement of data format of AP-PLAT

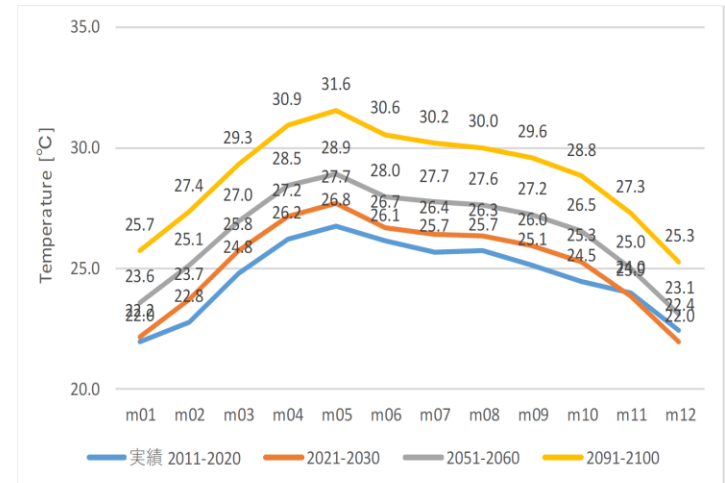
Low emission scenario

RCP2.6



High emission scenario

RCP8.5



Source: IGES made this figure based on AP-PLAT (ClimoCast) data

What are current progress of sustainable agricultural practices promotion in coffee sector in Dak Lak??

- Several initiatives to promote sustainable agricultural practices (SAPs) to farmers are underway including Public-Private Partnership at land scape (jurisdictional) level
- Those initiatives emphasize the climate mitigation benefits but not consider adaptation
- Most of these SAPs are actually consistent with climate change adaptation measures that contribute to improving farmers' resilience to climate change
 - incremental adaptation measures that should be implemented in the short term, when the degree of climate change is small.

Practices indicated as SAP	Environmental issues to be addressed
Irrigation water optimization	<ul style="list-style-type: none">• Conservation of water resources• GHG emission reduction by minimizing energy use for irrigation
Irrigation infra dev	<ul style="list-style-type: none">• Conservation of water resources
Fertilizer optimization	<ul style="list-style-type: none">• Soil and water conservation• GHG emission reduction
Adequate use of pesticide & herbicide	<ul style="list-style-type: none">• Soil and water conservation
cover-crop	<ul style="list-style-type: none">• Soil and water conservation• Biodiversity conservation
Inter-cropping, agroforestry	<ul style="list-style-type: none">• Shading• Soil and water conservation• CO2 removals

Cover crop



What is the mitigation potential of adaptation measures?

- Farm-level adaptation measures (incremental adaptation measures) serve as mitigation measures
- Adaptation measures utilizing technologies (agrivoltaics) has much larger mitigation potential

Mitigation Function/ Potential		Beyond farmland			Inside farmland (per ha)		
Function	Removal	Solar PV (agrivoltaics) – direct and indirect use	Protecting and expanding forests	Introducing shade trees	Fertilizer management	Solar PV (agrivoltaics) – direct use	Irrigation to save water
		632.56	86.17	7.59	2.59	0.11	0.03
Emissions reduction		✓	✓	✓	✓	✓	✓
Potential (tCO2e/yr)		632.56	86.17	7.59	2.59	0.11	0.03

What kinds of adaptation measures are understood by local stakeholders such as local researchers and local farmers?

Local researchers:

- 10 adaptation measures were proposed which were all incremental adaptation measures.
- Difficult for them to determine which adaptation measures would be effective up to what level of temperature increase.
- The measures using technologies (eg. agrivoltaics and dripping irrigation) were NOT proposed
 - The researchers have never seen agrivoltaics working
 - They think those measures were too costly and difficult for farmers

A table with columns for adaptation measures, climate synergies, and co-benefits to sustainability. The table is filled with yellow sticky notes and has a grid structure with rows and columns. The columns are labeled: measures (counter measures), adaptation, climate synergies, and Co-benefits to sustainability. The Co-benefits to sustainability column is further divided into environment, social, and Economic. The table is used for organizing and presenting information about adaptation measures and their impacts.

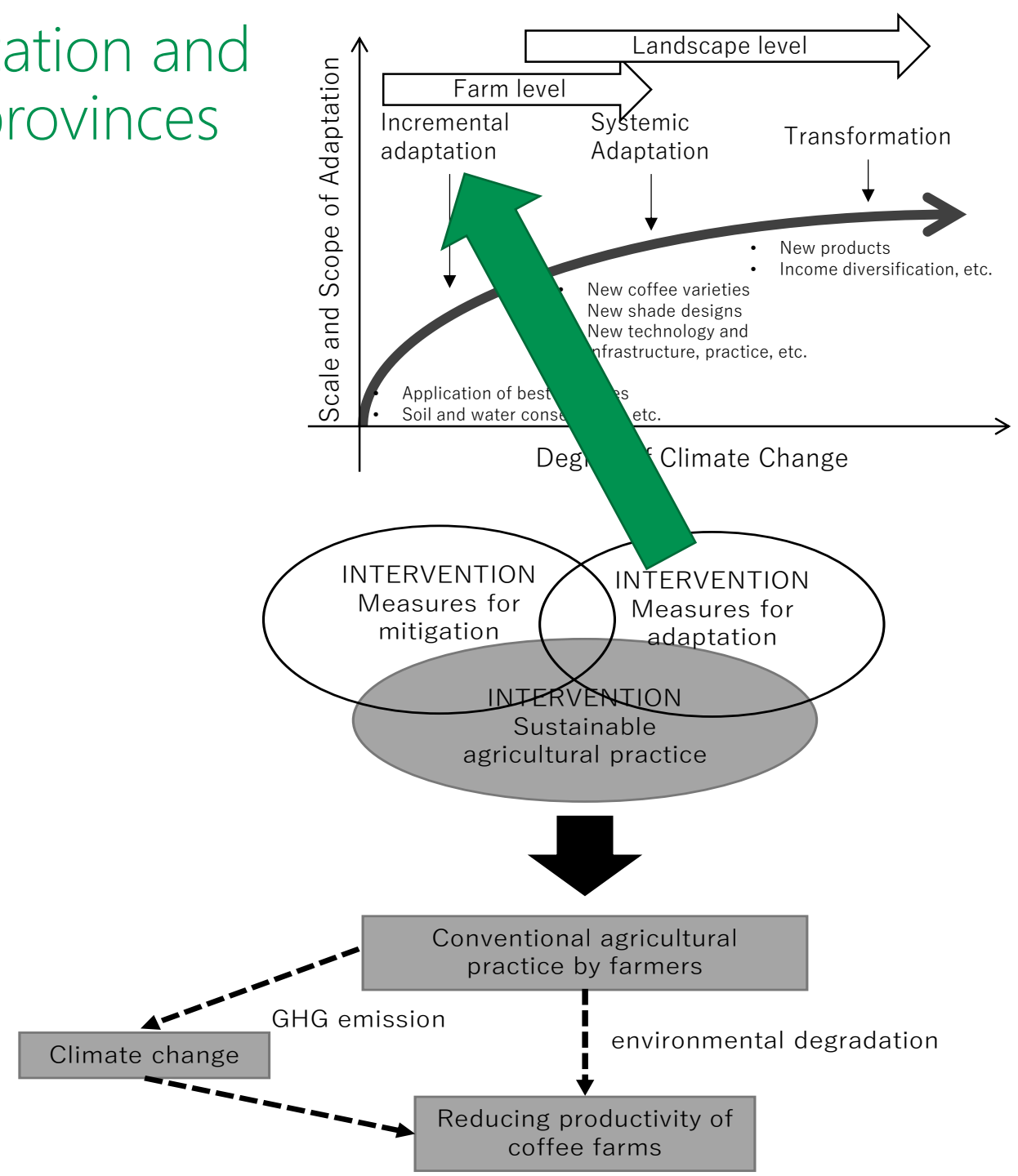
Local farmers:

- introduction of cover crops and shade trees were effective countermeasures for recent drought they experienced
- It is difficult for them to take practical action based on the long-term future projections



Current status of climate change adaptation and mitigation in coffee sector in Dak Lak provinces

- Intervention for promoting sustainable agricultural practice is underway supported by private sector
- Some SAPs have synergies to climate mitigation and adaptation
 - Even without the regional adaptation plan for coffee sector, actions for adaptation has been started.
- However, SAPs do not consider long-term climate change.
 - Only easy-to-adopt practices (incremental adaptation measures) considering current farmers' capacity



What are the factors facilitating and inhibiting an integrated transition of mitigation and adaptation in the coffee sector?

Factors facilitating an integrated transition:

- Private initiative lead by importers for sustainable coffee production has already started
 - SAPs has synergies to mitigation and adaptation
 - Enhancing resilience of farmers to changing climate by incremental adaptation measures
 - The gov is able to focus more on the measures NOT covered by the private initiatives

Factors inhibiting an integrated transition:

- Insufficient scientific information for adaptation planning
 - Future climate projection
 - Climate change impact to coffee production
- Even for the local coffee expert, it is difficult to identify systemic/transformational adaptation measures as their knowledge is limited
 - Information from outside such as new tech
 - R&D for systemic adaptation measures
- When developing adaptation plan, the gov needs to oversee the current situation and coordinate with private initiatives

Thank you

