Impacts of Climate Change and Strategies on Small Holder Coffee Plantations in Latin America

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Introduction and Background

Coffee is the second most traded commodity in the world and serves a livelihood for over 100 million small holder farmers worldwide. Future projections of a 2°C-6°C increase in 2030 to 2050 have shown that climate change is exacerbating pathogens and pests, causing up to $500 million in economic losses and 90% losses in coffee yields. Despite the vast research in coffee and climate change, stringent international and domestic climate commitments, there has been limitations in understanding how agricultural policies can be beneficial if they lack interactions with the SDGs. This research aims to bridge the gap of legal frameworks and tools in practicing governance, risk mitigation, and education by suggesting positive synergies with the SDGs to enhance coffee production and farmers' livelihoods in Ecuador, Colombia, and Mexico.

Research Question

How effective are government policies, tools and instruments in mitigating and adapting to climate change impacts to small holder coffee plantations in Latin America?

Research Objectives

- Elaborate on the scope of climate change impacts, within environmental, social and economic areas
- Compare and contrast the best practices in mitigating and adapting and discuss the barriers from achieving these outcomes
- Recommend strengthened policies and tools to support small holder farmers to fulfill socioeconomic needs, protect the environment, and meet global coffee demand
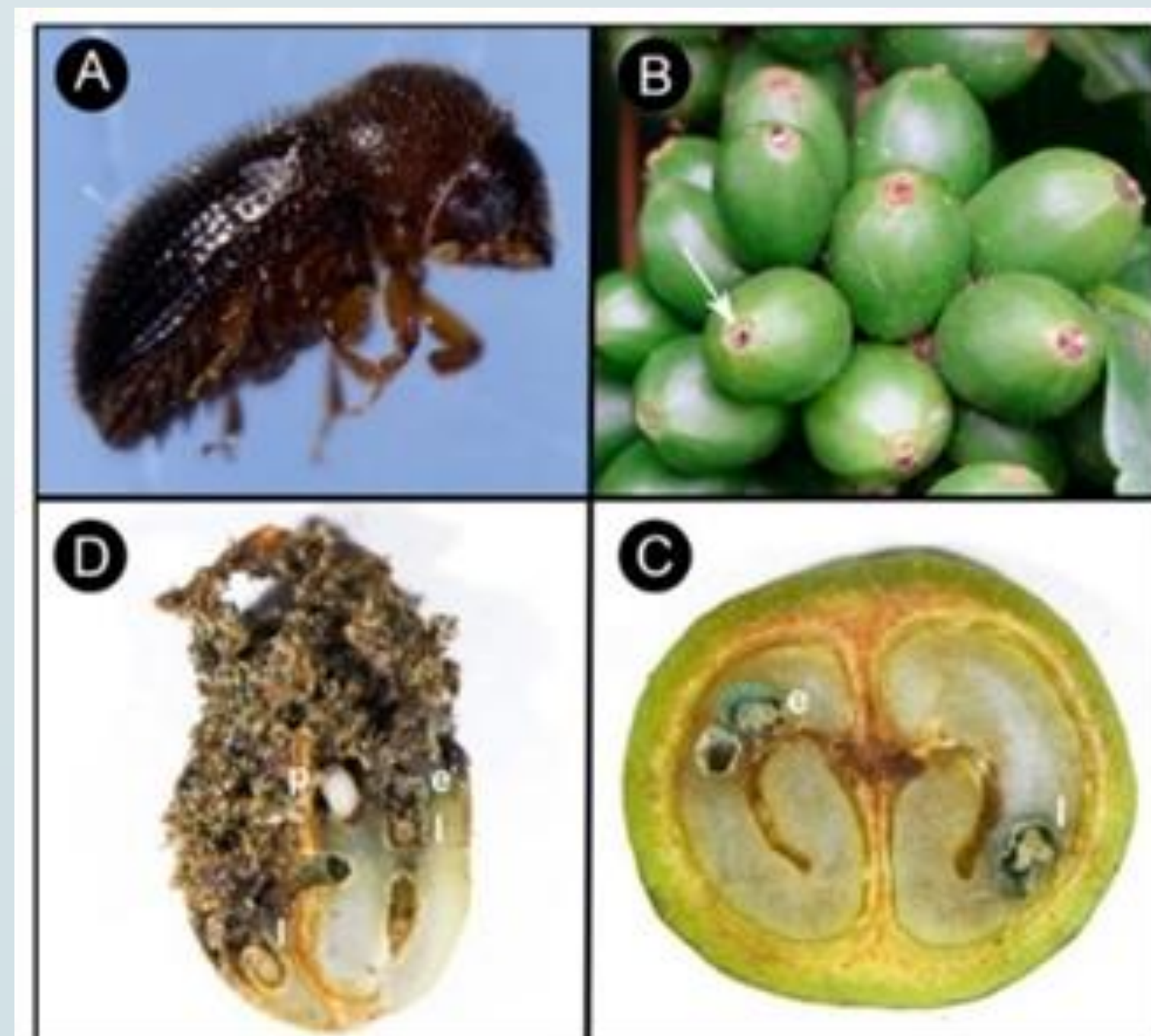
Methodology

1. LITERATURE REVIEW

A query of 60 key words combined with Boolean operators were conducted on Scopus; one of the largest international abstract and citation collection of peer-reviewed scientific literature. The query string begins with "COFFEE" AND "climate change", OR "farmers", OR "government", OR "policies"

2. INTERVIEWS

Interviews were conducted by non-random sampling of three key informants from the Galápagos Island, Ecuador, Nariño Colombia, and Chiapas, México. A combination of likert-scale, open-ended and closed-ended questions were asked to gain insight of the coffee producer's perceptions.

3. SDG INTERACTIONS

The primary and secondary data were allocated into fulfilling each SDG target

Results

Personal Estimations:	Nariño, Colombia	Chiapas, Mexico
Timeline of impact:	5-10 years from now	Currently
Frequency of pathogens:	Faster than normal recurrence	Faster than normal recurrence
Loss of Coffee Yields:	25-50%	50-75%
Do you consider government support, and policies effective?	No	No
From a scale of 1 to 5 with 1 being the least concerned and 5 being the most concerned, how concerned are you with climate change impacting your coffee?	3	5

SDG Targets	Ecuador, Colombia, Mexico	Interaction
TARGET 1-5 TARGET 2-C — BUILD RESILIENCE TO ENVIRONMENTAL, ECONOMIC AND SOCIAL DISASTERS / ENSURE STABLE FOOD COMMODITY MARKETS AND TIMELY ACCESS TO INFORMATION	Certifications and selling to the government do not make a measurable difference in revenue. No negotiability with government. Farmers move onto other crops	-2
TARGET 2-3 TARGET 15-3 — DOUBLE THE PRODUCTIVITY AND INCOMES OF SMALL-SCALE FOOD PRODUCERS / END DESERTIFICATION AND RESTORE DEGRADED LAND	Not enough coffee supply to meet global demand. Either deforestation or less biodiversity will occur to create more suitable land for coffee plants.	-2
TARGET 2-A TARGET 13-3 — INVEST IN RURAL INFRASTRUCTURE, AGRICULTURAL RESEARCH, TECHNOLOGY AND GENE BANKS / BUILD KNOWLEDGE AND CAPACITY TO MEET CLIMATE CHANGE	Access to subsidized irrigation technology is needed. Universities and international organizations provide educational resources to assist rural farmers.	+1
TARGET 6-5 TARGET 13-2 — IMPLEMENT INTEGRATED WATER RESOURCES MANAGEMENT / INTEGRATE CLIMATE CHANGE MEASURES INTO POLICIES AND PLANNING	Agro-chemicals, fertilizers and pesticides contaminate water. Excess precipitation causes water-logging or droughts and there is minimal climate policies to monitor environmental parameters.	-2

Recommendations

- Training and education with subsidized irrigation technology
- Marketing: Promote Rainforest alliance certified more than fair-trade
- Social-protection policy to protect against economic shocks and crop insurance to adapt to extreme weather events
- Regulatory instruments: early warning systems using remote sensed data
- Persuasive instrument: farmers, and government bodies should communicate needs directly to craft useful policies

Conclusion

Coffee is a commodity that cannot keep up with global demand without the necessary adaptation tools against climate change. Local and international climate commitments and common understanding between stakeholders can create positive synergies between SDGs to sustainably manage coffee and farmer's livelihoods.

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