6TH INTERNATIONAL RICE CONGRESS

Investment scenarios for rice R&D in LAC

Welfare and food security implications

Petsakos, A.[1], Andrade, R.[1], Rivera, T.[1], Schiek, B.[1]

Alliance Bioversity-CIAT[1]

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Key facts about rice in LAC

- Major food security role

  A major staple crop, providing a significant portion of daily calories, especially for lower-income consumers

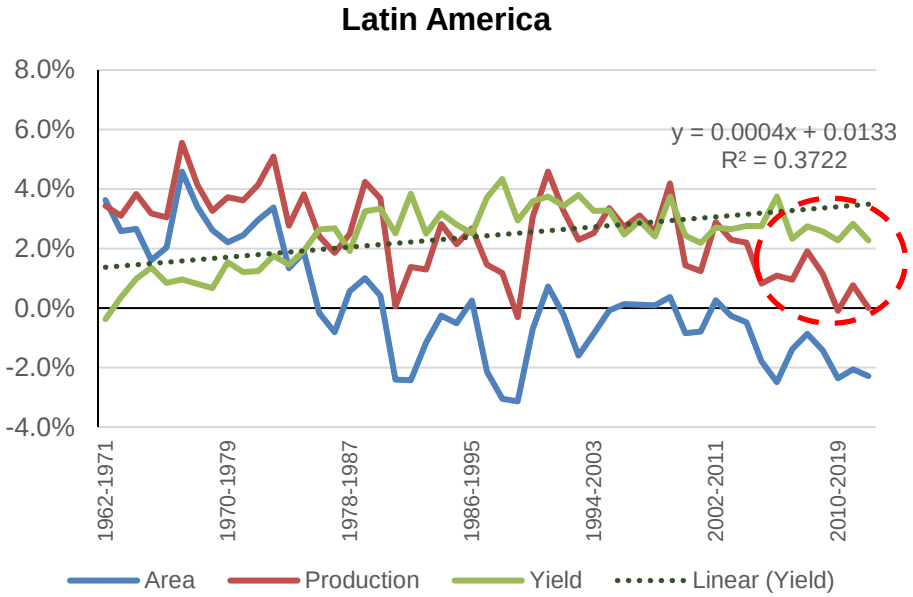
- Crop of great economic importance

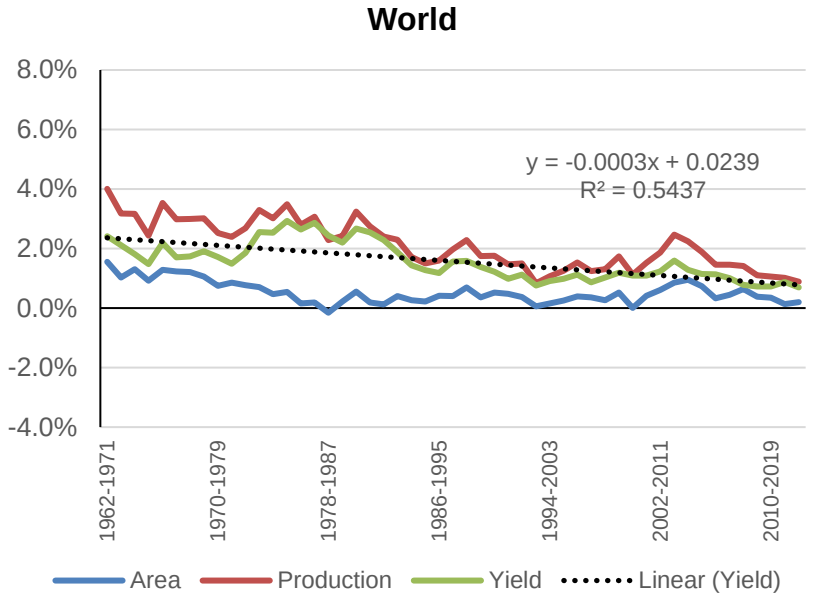
  Among the top ten crops with the highest contribution to agricultural GDP for several LAC countries

- Public-private alliances are prevalent for rice research in LAC (e.g., FLAR)

  Many technological innovations targeting yield growth

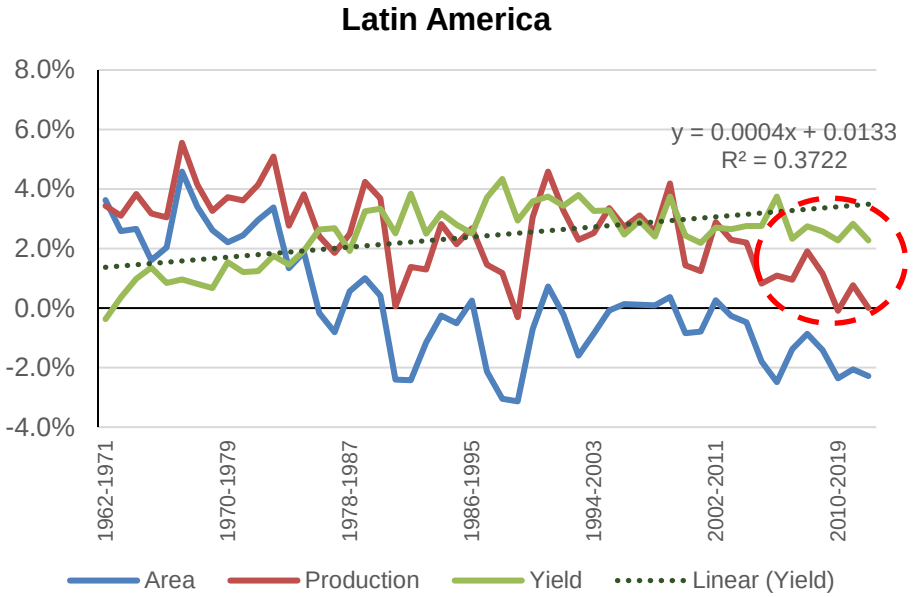
Rice production in LAC vs. the world





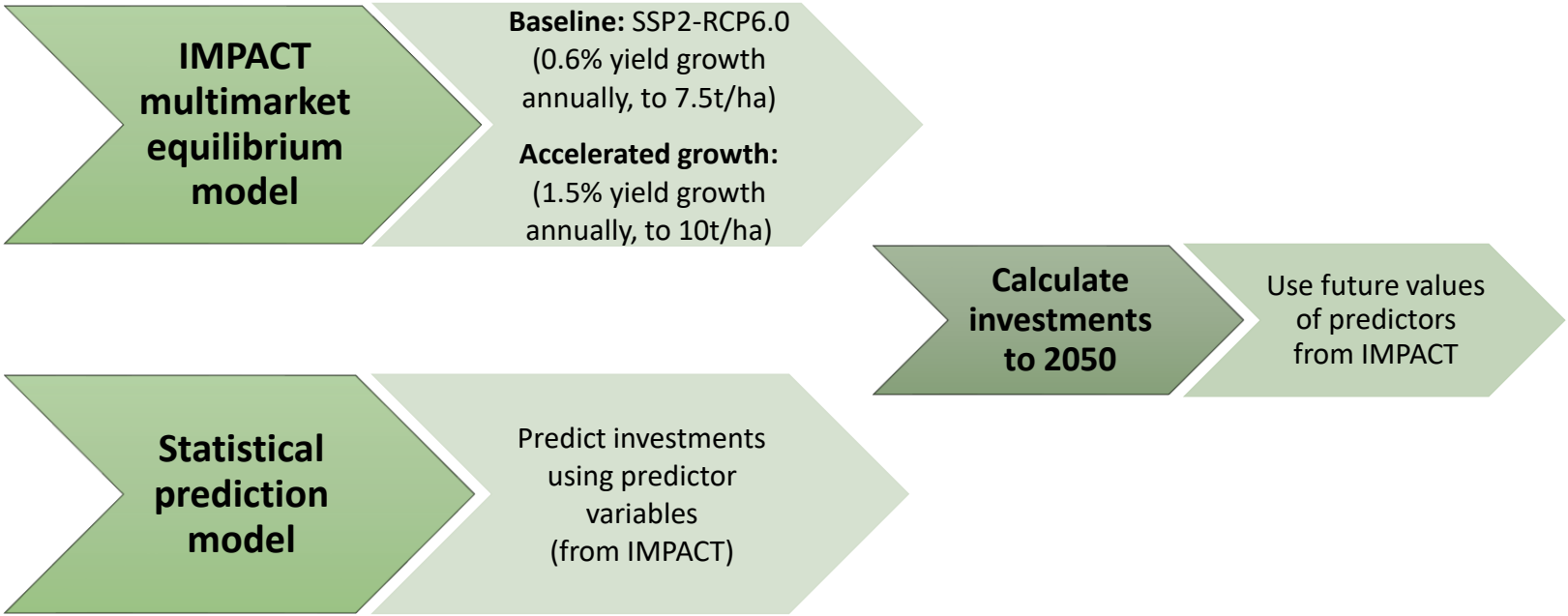
Growth rates: 10-year moving averages

Research objective



- How should we allocate investments in the “future” for rice R&D to ensure sustainable yield and production growth?
- What if we opt for an “accelerated growth” in average yields and close the yield gap?
- Would this extra investment be beneficial, and for whom?

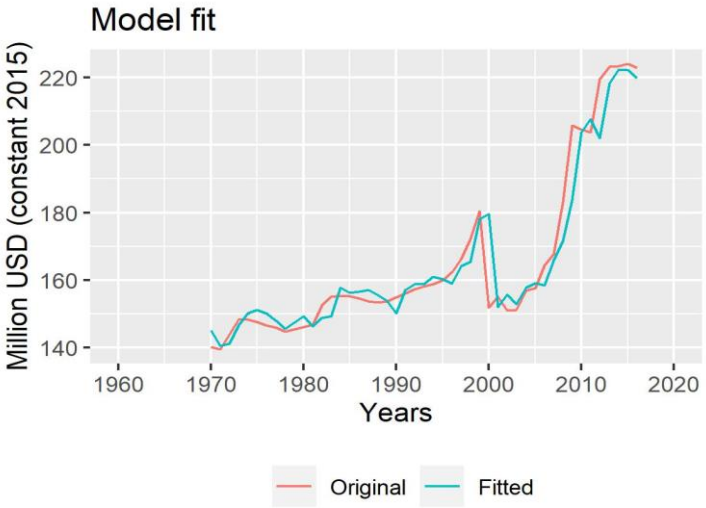
Methodology



Objective: Predict future investments (correlation, **NOT** causation)

$$Investments = f(Predictors)$$

Understanding investments in rice research

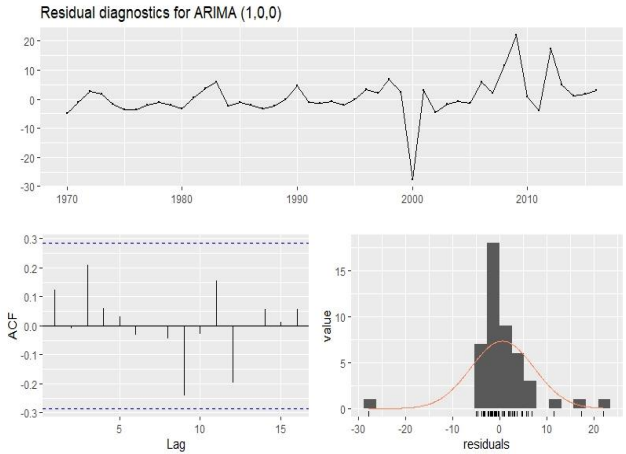


Final model: AR(1)*

$$y_t = 127.79 + 0.95\, y_{t-1} + 3.71\, ProdValue + 3.42\, GDP/Capita$$

*Best fitting model, selected based on AIC

Production value in billion USD (2015=100)
GDP/Capita in thousand USD (2015=100)

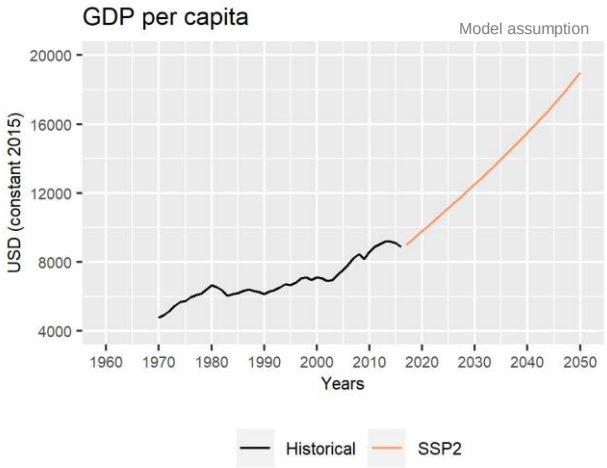


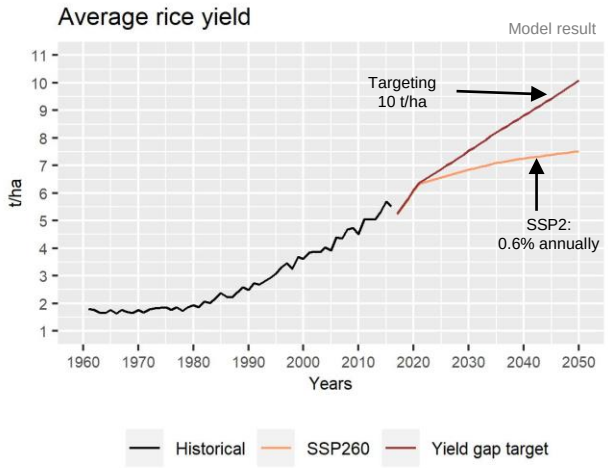
Countries considered:
ARG, BOL, BRA, CHL, COL, CRI, DOM, ECU, HND, MEX, NIC, PAN, PER, URY, VEN

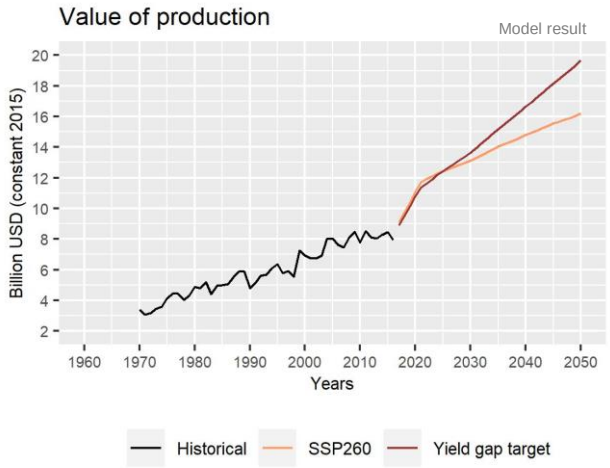
Data source for GDP/capita, ProdValue: FAOSTAT

Investment data: https://www.asti.cgiar.org/

Scenarios for rice in LAC by 2050





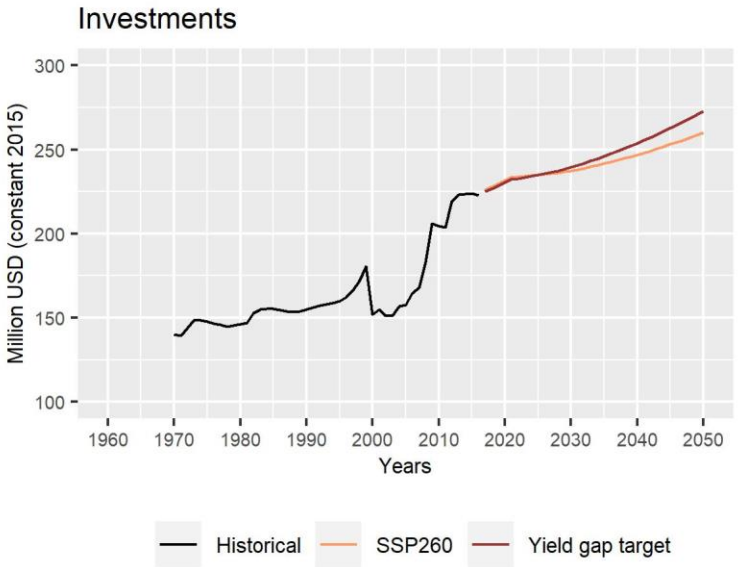


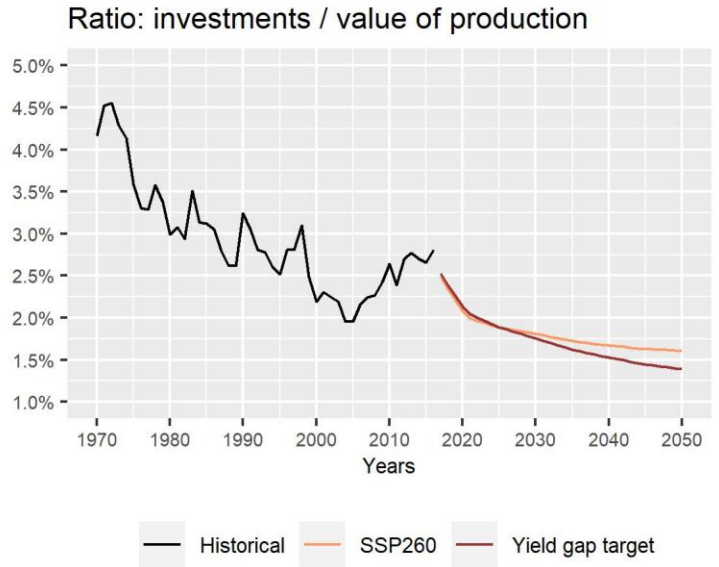
Data source for GDP/capita, yields and ProdValue: FAOSTAT

SSP assumptions for GDP and population growth:
https://iiasa.ac.at/models-tools-data/ssp

SSP assumptions for annual crop yield growth:
Fricko, O., Havlik, P., Rogelj, J., Klimont, Z., Gusti, M., Johnson, N., et al. (2017). The marker quantification of the Shared Socioeconomic Pathway 2: A middle-of-the-road scenario for the 21st century. Global Environmental Change 42, 251–267.

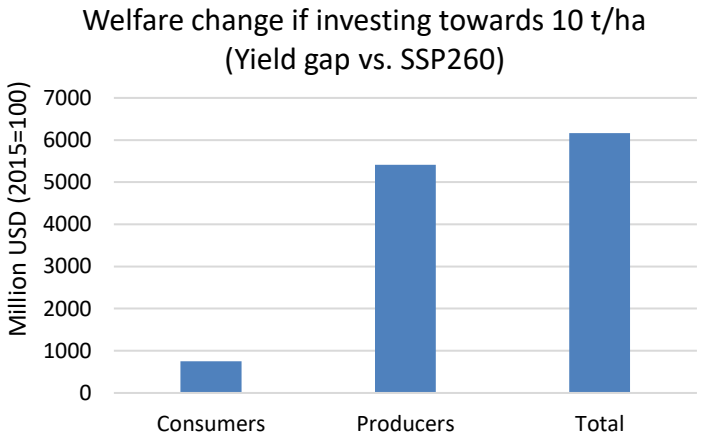
Results: investments for rice research





Closing the yield gap: is the extra investment worth it?

	FAOSTAT (2020)	SSP260 (2050)	Yield gap target (2050)
Total Kcal/capita/day	3112.8	3195.5	3236.5
% of rice in Kcal/capita/day	7.78%	7.93%	8.18%
% of population at risk of hunger	5.51%	2.87%	2.67%



NPV of benefits over the period 2017-2050, assuming 5% discount rate

Lessons learned and next steps

- Increasing annual investments from 225 to 260 million USD by 2050 is needed to sustain the yield growth implied by SSP2 (0.6% annually)
- If we want to reach 10t/ha (1.5% annual increase) investments must increase to 275 million USD annually by 2050
- Targeting higher yields will mainly generate economic benefits for producers, but very limited benefits for consumers and for food security in LAC
- These economic benefits in LAC can be attained if international trade is possible
- When prioritizing R&D investments we need to identify broader impacts: who wins, who losses, and where
- Further work can include:
    - Country-level analysis
    - Alternative predictors
    - Alternative future scenarios

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Thank you!

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