# Input-output and sustainable Development in the tropics, yesterday and tomorrow

**J. R. Vargas**
**Universidad de Costa Rica**

Input-output Analysis for Sustainable Development
**Bochum University of Applied Sciences**
**Lennershofstr. 140**
**D-44801 Bochum**

# Background

- *Costa Rica is no newcomer into sustainable development or in input-output accounting.*
- *The early national accounts system started in 1966*
- *The old input-output table was dated 1968*
- *The national park system was created in the 1970´s*
- *The debt-for-nature scheme was enacted in the 1980´s.*
- *RCE XIV/2 (our journal) published 7 papers on economic analysis of sustainable development in 1994 with. Two had input-output backing*

# Background

- *The new national accounts system based on 2012 has a major Environmental Accounts subsystem.*
- *It opens a major window for redoing the 1990´s research and going further.*
- *The Fall 2019 course will be directed to five applications, many of which will be redoing last century applications*
- *We are exploring international cooperation to develop joint research*
- *Martina NIBBELING-WRIESSNIG may be interested. She was part of the Framework Convention on Climate Change*

# Footsteps

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- **Ina Porras** was part of the Tropical Scientific Center Research (CCT) project looking at: a) soil, b) forest and c) fishery depletion at the Nicoya Gulf in the Costa Rican Pacific Basin.
- It was designed to do economic measurement and to lay the foundations of an environmental account system.
- The numbers she found were out of proportion (too large, but there were no previous one to compare) and the basic data was very limited.
- Having no input-output accounts for that period and sector, the consistency was rough. Yet, it provided a pioneering effort. The finding section looked at the fishery numbers on a capital account sense.

# Footsteps

- **Montiel and Vargas** (1994) applied Leontief and Ford (1972) input-output approach to assess **air pollution** due to economic activity.
- That result was later used by Vargas et al.(2007) on their regional (Rio Grande Basin) in their input-output assessment.
- Air pollution is mostly a local issue and using the Leontief-Ford coefficients was a gross measurement.
- Yet, it both provided pioneering material and a sense of what was involved in air quality in periods when the issue was not a serious public health one.
- Additional air quality research has been carried out in Costa Rica, but it is not done by economist.

# Footsteps

- **BCCR** received foreign assistance on the satellite environmental accounts.
- Some of the early results of their research are:

a) forest accounts for 2% of GDP,

b) forest coverage increased by 96 thousand hectares in the early 2010´s,

c) 57% of the reservoirs were lost by the operators and

d) hydroelectricity is 71% of the total supply.

- The policy cycle received important feedbacks on reviewing, monitoring and implementation phases thanks to the early results of the accounts

# Findings

# Findings

- **Echevarría and Porras** (1994) provided graphs with the assessment of capital formation adjusted for natural resources depletion as well as forest value added with the same methods for the 1979 to 1987 period.
- They figure the dollar value of the fishing wealth on the Nicoya Gulf. It slows down until 1987, when it turns negative.
- Interesting as they are, their numbers are not in agreement with the National Accounts project BCCR has just finished (2016), which is the finest accounting work ever done in Costa Rica and most likely the best in Latin America today

# Findings

- **Montiel and Vargas** (1994) compare 1957 and 1987 air pollution assessments.
- They followed Leontief and Ford approach to single out particles, sulfur oxides, carbon dioxide and the like on the I-A inverse matrix, so that direct and indirect effect are present.
- Chemical products, food and beverages lead the list for all five contaminants.
- For sulfur oxides and carbon monoxide, metal products and electrical products score high, too.
- Non metallic mineral products (glass, cement and the like) show a high ranking on particles pollution

# Findings

- The **BCCR** (2015) new accounts include: production of drinking water and sewerage industry at basic prices, gross value added of water, intermediate consumption at purchaser´s prices, gross operating surplus, production taxes and employees´ compensation, net savings and gross fixed investment.
- It means the whole set of accounts is implemented.
- The new accounts developed measurements for land cover usage changes, which is a novelty
- It includes: a) urban, b) crops, c) grassland, d) forest, e) mangrove, f) shrubs, g) water and h) barren land.
- It yields a comparison between 2008 and 2013 in a way it was not possible before, and it is not easily found on LDC´s

# Conclusions

# Conclusions

- **Montiel and Vargas** (1994) were able obtain the employment level by the eight sectors on the product input matrix disaggregation: Mining, Construction, Wholesale Trade, Hotels and Restaurants, Financial Intermediation and Business, Public Administration, Education, Health and other services and Private households
- Together, they represented 56% of the total in 2013, which is quite reasonable percentage.
- The tradeoff between employment and pollution was set for Costa Rica for the first time ever.
- Now days, new and most accurate measurement are possible. The 2019 students should be able to do a better and more complex assessment.

# Conclusions

- The water and fishing studies have a lot to offer, too. Costa Rica has improved on the quality of economic accounts. Several research groups have developed at different universities. It will be hard to find better data set in Latin America.
- Today students are better trained than the one in late XX Century. It will be a reasonable guess some five excellent papers will develop out this effort.

# Thank you for your patience and attention

# a thank you bonus

more than a decade ago, the President set a goal of Carbon Neutrality for 2021, the country bicentennial

since he is longer in charge and Costa Rica is the country where the Government plans, and plans and plans, the target is ellusive

Yet, the current Government has set a bit different goal and they are making plans

# Decarbonization

- On January 24, 2019, Costa Rica announced it will become a green, emission-free, resilient and inclusive economy
- Human rights and gender equity were to be reinforced

- What is the Costa Rican National Decarbonization Plan ?

- Starting ground: electricity network, 95% free of emissions and a forest cover that exceeds 52% of the territory.

- 1 - GOALS :
- 2035: 70% of buses and taxis will be zero emissions, TRP will operate 100% electric
- 2050: transportation system will replace private vehicles as the main mobility option
- 2050: 100% of buses and taxis will be zero emissions.
- 2 - GOALS :
- 2025: The growth of motorcycle purchases will stabilize and standards will be adopted to favor the sales of motorcycles zero emissions
- 2035: 25% of the vehicle fleet will be electric
- 2050: 100% of sales of new light vehicles will be zero emissions vehicles and 60% of the fleet of light vehicles -private and public- will be zero emissions.
- 3 - GOALS :
- 2022: Country will have public inventory on the emissions of the fleet of cargo vehicles. 2050: At least 50% of cargo transport will be highly efficient and will have reduced emissions by 20% compared to 2018 emissions.

# Decarbonization

- **4-GOALS:**
- 2030: electricity will be 100% with renewable energies
- 2050: Electric power will be a primary source of energy for the transport, residential and commercial, industrial sectors.
- **5 - GOALS:**
- 2030: 100% of new commercial, residential and institutional buildings will be low emission technologies.
- 2050: 100% of commercial, residential and institutional buildings will operate with low emission standards, also implementing the use of renewable energy in cooking and hot water processes.
- **6 - GOALS**:
- 2030: There will be a comprehensive strategy to mitigate and take responsibility for the impact of a product from birth, distribution and subsequent disposal2050: The industrial sector will rely more on low-emission energy sources.

# Decarbonization

- 7 - GOALS:
- 2022: Strategy to reduce methane emissions by organic waste.
- 2050: 100% of the territory will have solutions for the collection, separation, reuse and disposal of waste.
- 8 - GOALS:
- 2050: At least 50% of cargo transport will be highly efficient and will have reduced emissions by 20% compared to 2018 emissions.
- 9 - GOALS:
- 2050: National producers will have adopted the most advanced technology in accordance with standards of sustainability, competitiveness and low emissions.
- 10 - GOALS:
- 2030: To increase forest coverage in Costa Rica to 60% to consolidate biological corridors and increase the availability of green areas for recreation.

# Decarbonization

- How do you plan to achieve?
- Lots of wishful thinking (RECOPE, ICE, MOPT, CTP)
- educational strengthening initiatives. Transparency in processes, metrics and open data
- When is the goal expected to be achieved?
- Costa Rica defines that its goal is to be a zero net emissions economy by 2050.
- “the road to hell is planted with good deeds”