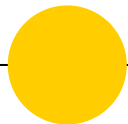# Environmental Impact assessment of Food Production

IDB - International American Development Bank

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Data Analysis Process?

01 Ask

Define the problem you're trying to solve

02 Prepare

Choose data sources

03 Process

Clean the data, maintain data integrity

04 Analyze

Make data-driven decisions

05 Share

Successfully communicate your findings

06 Act

Make decisions

Defining business situation [Environmental impact assessment of food production]

IDB Inter-American Development Bank

Our client (IDB) hired us as consultants to assess:

ENVIRONMENTAL IMPACT of a series of **AGRICULTURAL PROJECTS** for **FUNDING**

+

Funding for ..?

CASH CROP - agricultural crop (**Sell for profit**)

Brazil, Colombia, Costa Rica and Mexico evaluated to approve or reject funding

→

Funding evaluation ..? Do we ACCEPT or REJECT ?

Analyzing **environmental impact markers FOOD PRODUCTION CYCLE**, we focused on:

- **FRESH WATER** resource
- **WATER SCARCITY** per country

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Exploring [Dataset]

Missing values

Combine Two datasets

Dropping unwanted columns

Datasets references:

Environment Impact of Food Production   Kaggle.com   2020

Water-scarcity Water Footprint   Our World in Data 2020

Dataset

```
df.columns

Index(['Food product', 'Land use change', 'Animal Feed', 'Farm', 'Processing',
       'Transport', 'Packging', 'Retail', 'Total_emissions',
       'Eutrophying emissions per kilogram',
       'Freshwater withdrawals per kilogram',
       'Greenhouse gas emissions per 100g protein', 'Land use per kilogram',
       'Scarcity-weighted water use per kilogram'],
```

Environmental Markers

- Total_emissions
- Eutrophying emissions per kilogram
- Freshwater withdrawals per kilogram
- Land use change

Questions [Answers]

1. Food products with **highest environmental impact** considering the 4 markers: **CHEESE, NUTS**

Highest Environmental Impact Across Products for Different Markers
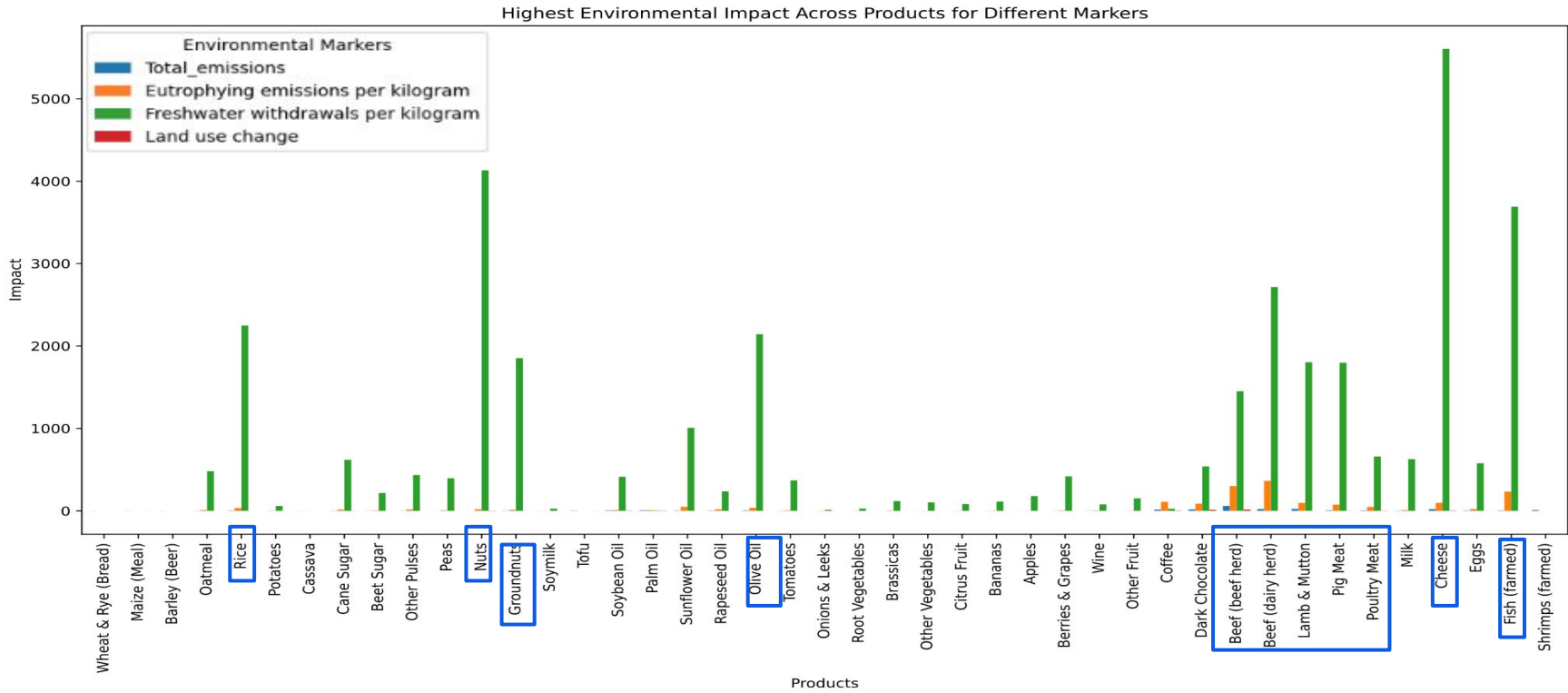
2. **Food production cycle** with the most **Carbon Emissions per KG** across all food production

Total Carbon Emissions by Food Production Step
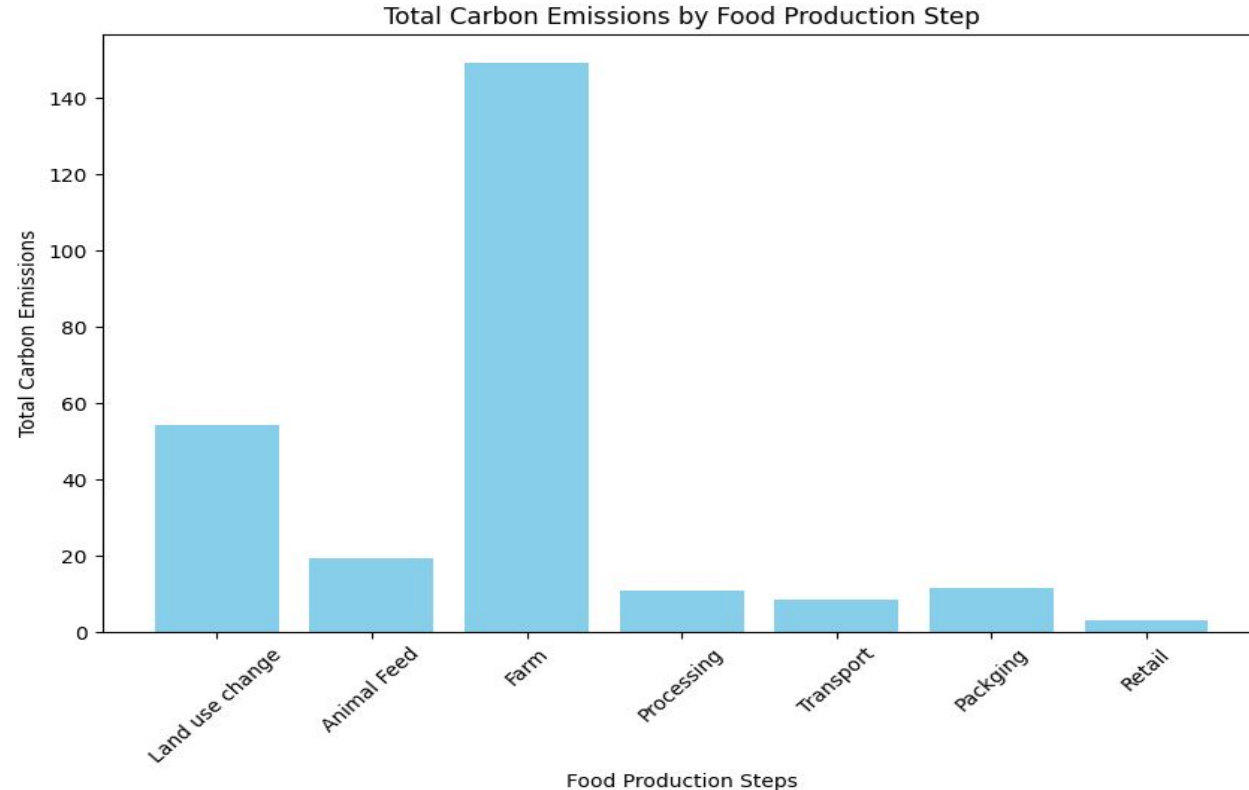
58,1% Farm
21,1% Land use
7,6% Animal feed

4,5% Packaging
4,2% Processing
3,3 % Transport
1,2 % Retail

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3. Group products categorized in **Plant and Animal based products.** **Difference?.**

Carbon intensity Animal products

Animal Feed — 11.9%
Land use change — 17.1%
Retail — 1.1%
Packging — 1.3%
Transport — 1.5%
Processing — 3.1%
Farm — 64.0%
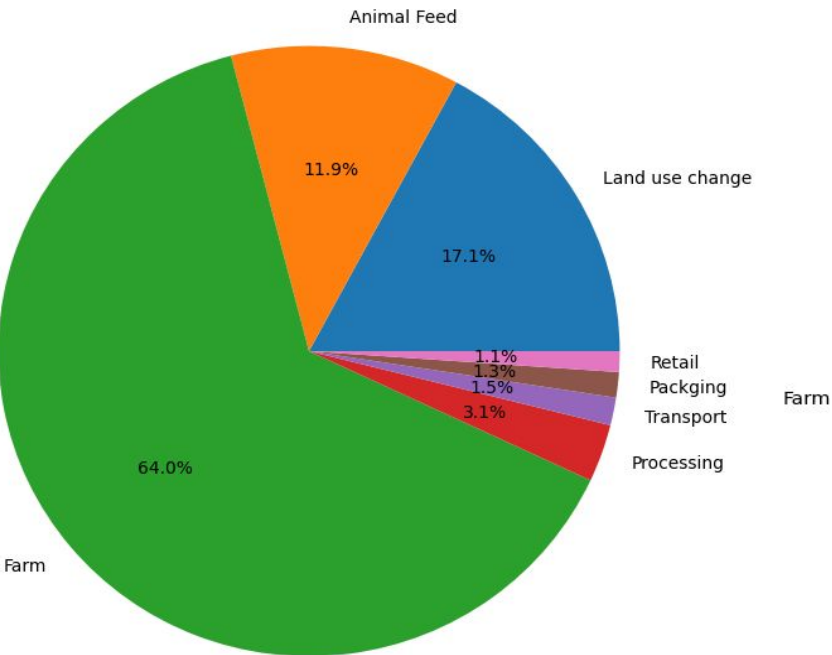
Carbon intensity Plant products

Animal Feed — 0.0%
Land use change — 28.1%
Retail — 1.3%
Packging — 10.1%
Transport — 6.5%
Processing — 6.4%
Farm — 47.7%

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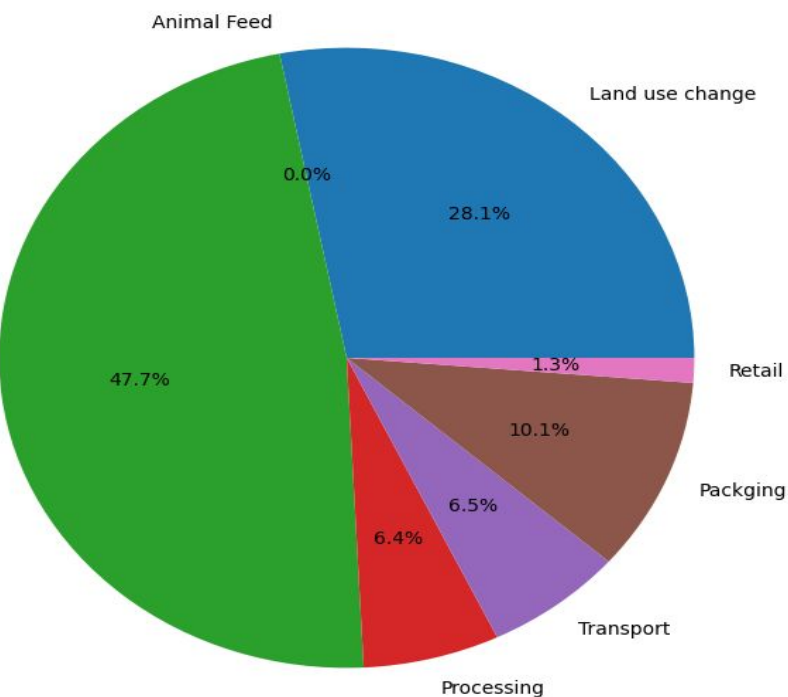
4. Considering only the **products** that the listed countries manifested as being interested in developing and considered for **funding BID** #**Brazil, Colombia, Costa Rica, Mexico**.

- **Animal products have the highest impact** across all markers, although when analyzing only the listed products, the difference is not as pronounced.

5. Based in the **water-scarcity** information available, what agricultural projects would we advise the IDB (Inter American development bank) to finance (funding) in our **listed countries**?

Freshwater Withdrawals per Kilogram Across Food Products
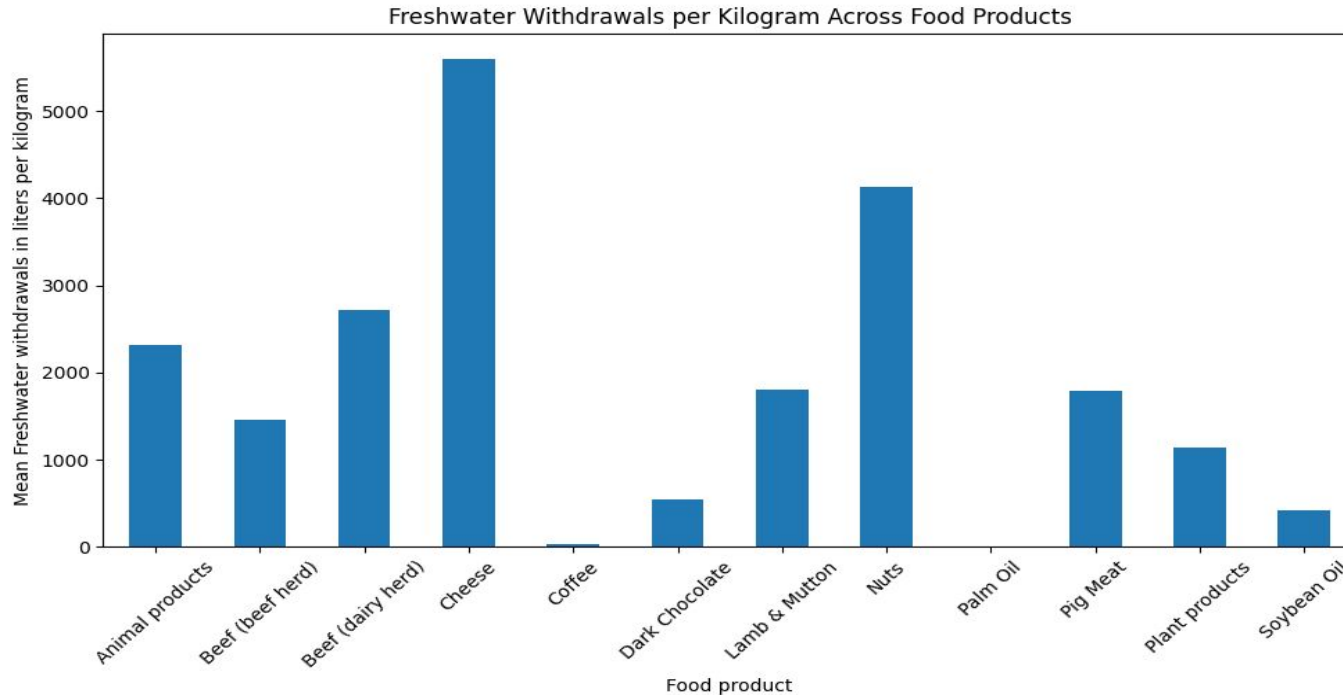
5. Based in the **water-scarcity** information available, what agricultural projects would we advise the IDB (Inter American development bank) to finance (funding) in our listed countries?

	Country	Code	Year	water_stress_level
20	Brazil	BRA	2020	1.48
41	Colombia	COL	2020	4.36
50	Costa Rica	CRI	2020	5.35
71	Mexico	MEX	2020	44.82

Considering the **water stress levels** and **Freshwater withdrawals per kilogram** for our listed countries

Brazil, Colombia and Costa Rica should be able to **receive funding** for all projects,
Vs
Mexico we would not advise investing in projects working with **nuts, beef and cheese production**

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5. Based in the **water-scarcity** information available, what agricultural projects would we advise the IDB (Inter American development bank) to finance (funding) in our listed countries?

Freshwater withdrawals as a share of internal resources, 2020

Freshwater withdrawals refer to total water withdrawals from agriculture, industry and municipal/domestic uses. Withdrawals can exceed 100% of total renewable resources where extraction from non-renewable aquifers or desalination plants is considerable.

No data | No stress | Low stress | Medium stress | High stress | Critical stress
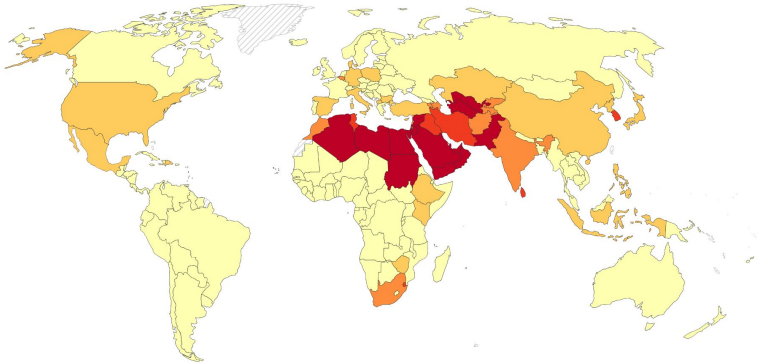
Data source: Food and Agriculture Organization of the United Nations

OurWorldInData.org/water-use-stress | CC BY

Conclusion

Cash crops and **animal farming** have a higher environmental impact than the average vegetable crop

Brazil, Colombia and Costa Rica can receive funding for all projects, as they are not water stressed.

México, on the other hand, is approximately 10 times more water stressed than Brazil, for which we recommend not to fund projects regarding nuts, beef and cheese production

Conclusion

In general, single environmental markers can be used to discriminate between agriculture development projects, specially if the projected area is being affected mainly by a single environmental problem, or if governmental regulations focus on a specific marker.

This, nonetheless, offers a very limited image of a system that is composed of connected and interdependent aspects.

Questions?

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THANKS !