Analysing the international wheat trade network

Ashish Poonia, and Manmohan Meena
Discipline of Civil Engineering, IIT Gandhinagar

1. Introduction

- As nations become more interconnected in the era of globalisation, trade networks play an increasingly significant role in the well-being of nation states.
- Within the complex framework of international wheat trade, some countries have emerged as important players, exerting significant influence as both importers and exporters.
- By exploring key network metrics and community structures, we try to understand the underlying patterns and dynamics within the global wheat trade network.
- Every trade in the wheat network unveils insights into the resilience, adaptability, and interconnectedness of our modern society.
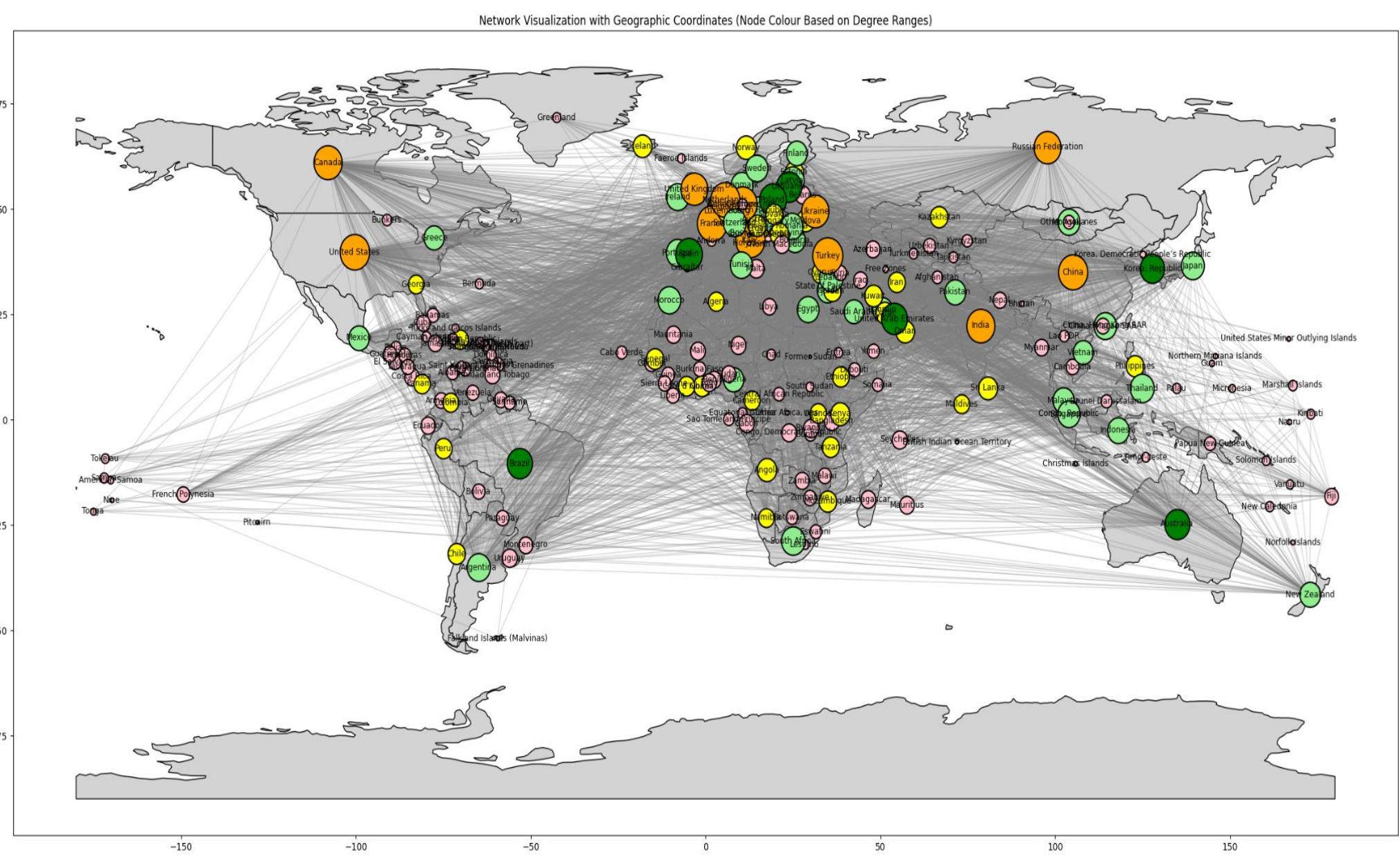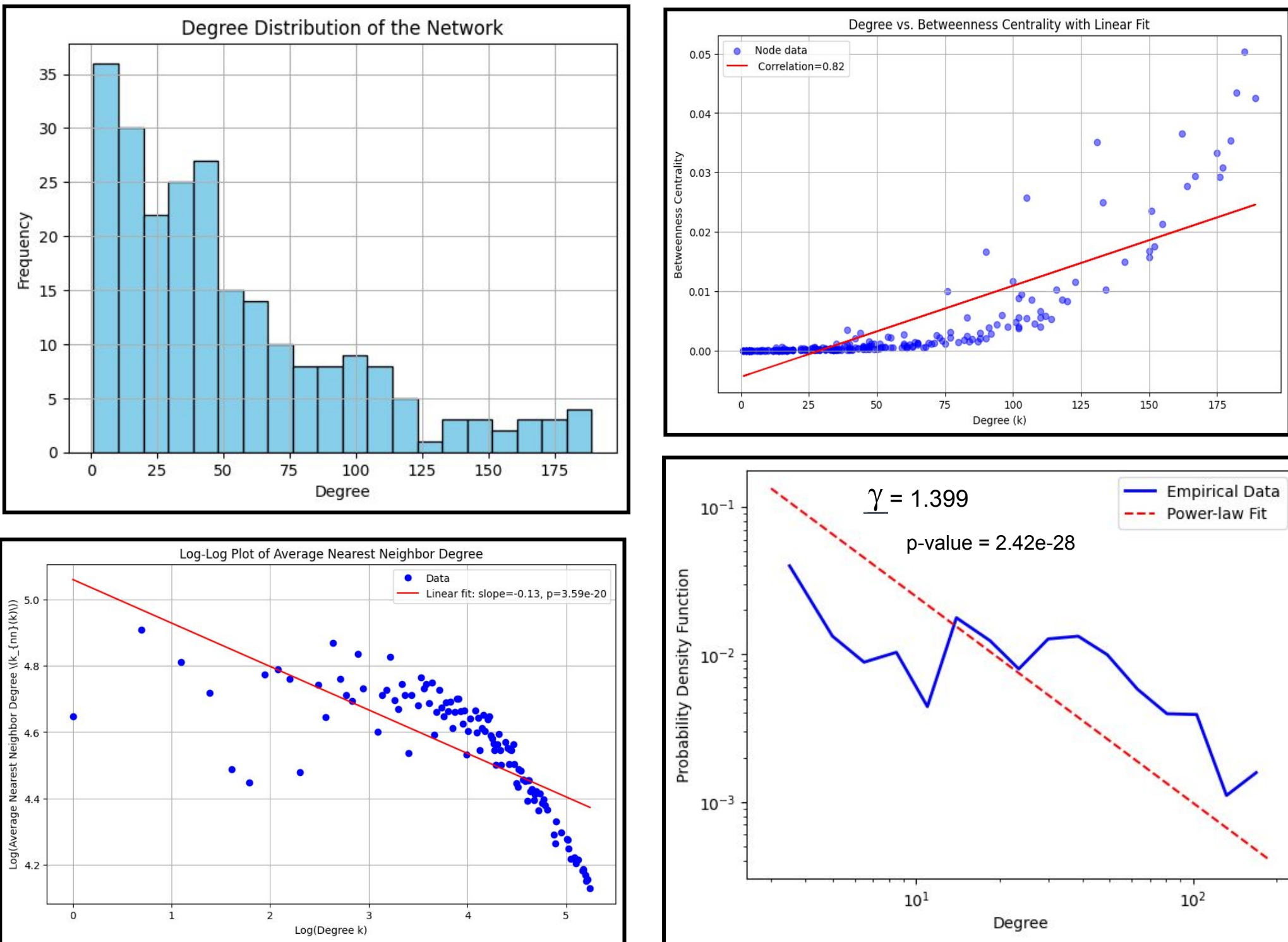
2. Overview of research

Figure 1: Overview of the research.

3. Scientific questions

- How can we identify the country with highest imports and the country with highest exports?
- How do we determine the top five trade flow networks on based on volume?
- What regional trade patterns are observed in the wheat trade network? Are there any distinct patterns or clusters of countries engaging in intra-regional trade?
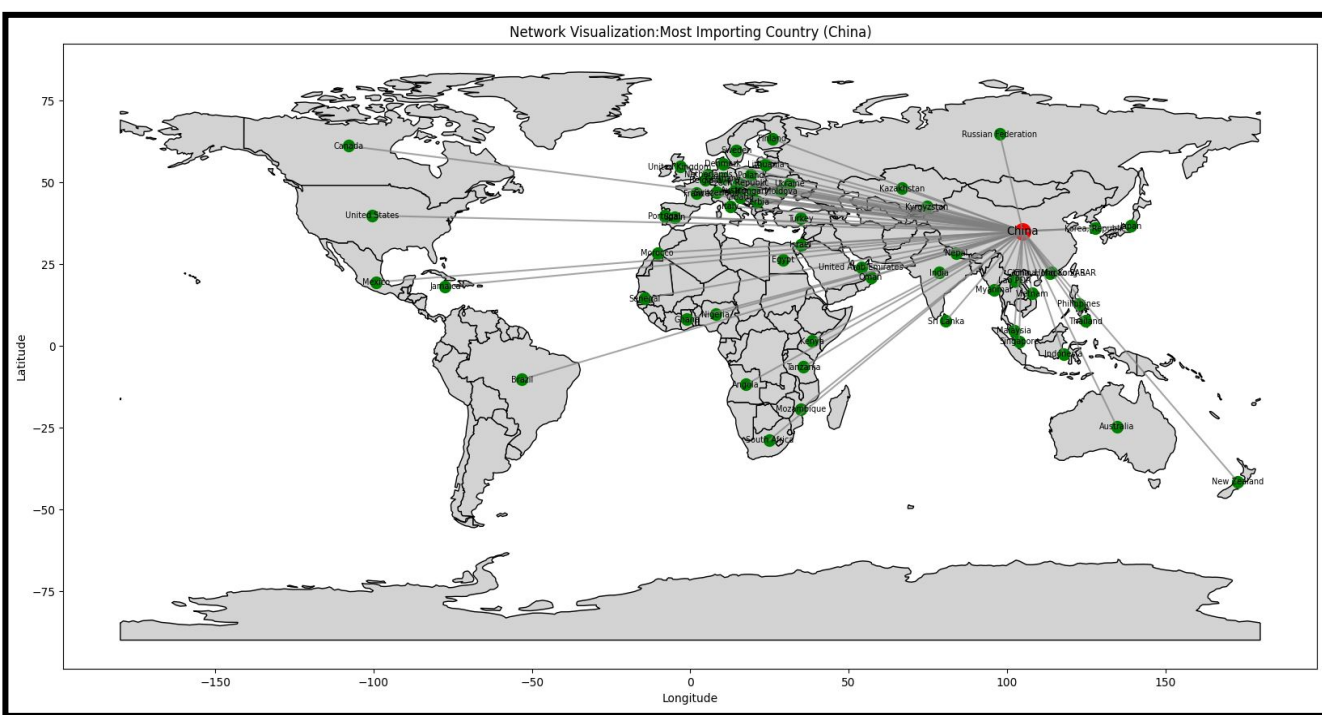
4. Decoding Trade Dynamics: Exploring Structural Patterns in the International Wheat Trade Network

Objective: Analyse key network metrics such as degree distribution, degree v/s betweenness centrality, power law, and average nearest neighbor degree to understand the structural properties and resilience of the international wheat trade network.

5. Detecting Global Grain Giants: Identifying the Premier Exporters and Importers
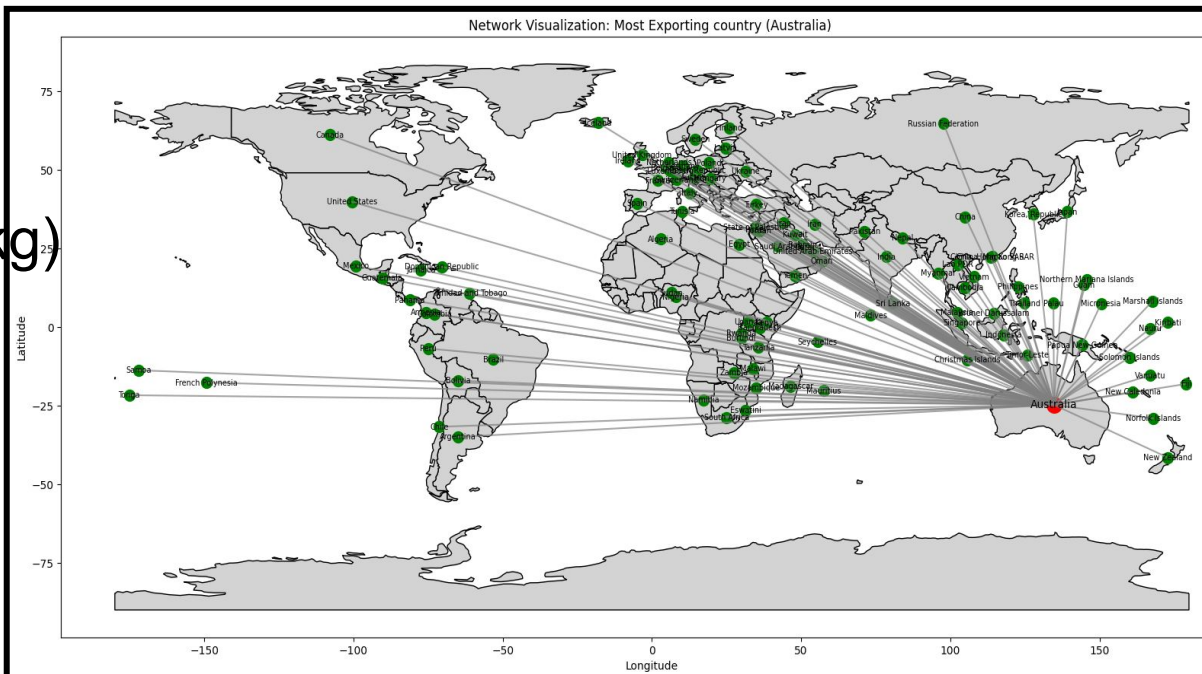
Objective: To identify the country which exports the most and which imports the most.

China is the largest importer of wheat. While Australia is the largest exporter of wheat in the world.
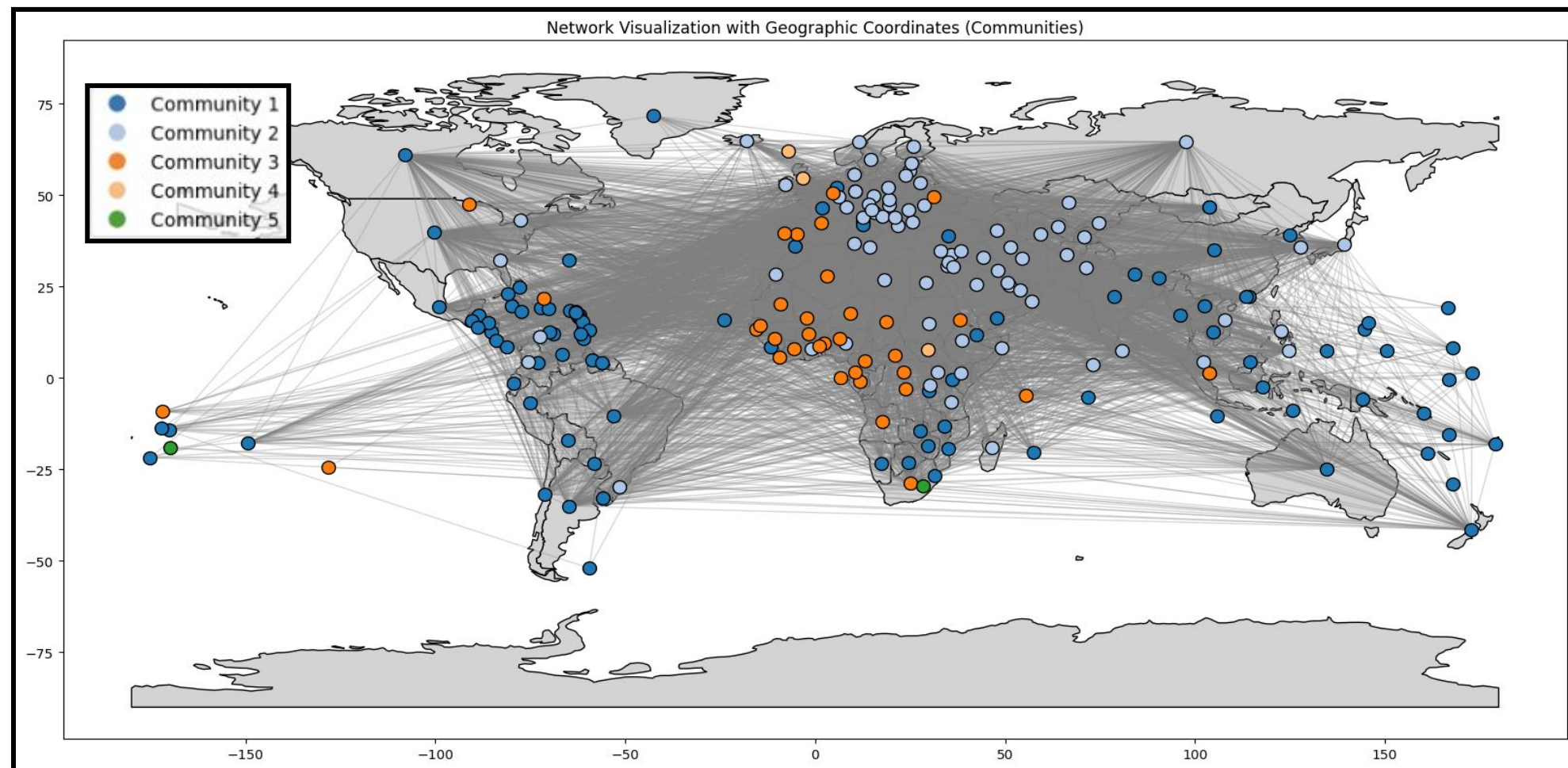
Top 5 Strongest Trade Relationships:

Exporter	Importer	Weight(1000kg)
Russian	Egypt	4.6e+07
Russian	Turkey	3.6e+07
Argentina	Brazil	2.7e+07
France	Algeria	1.8e+07
Ukraine	Egypt	1.6e+07

6. Unveiling Trade Communities: Exploring Patterns in the Wheat Trade Network

Objective: Develop a framework to identify and analyse communities within the international wheat trade network, aiming to uncover underlying patterns and structures to enhance understanding of global trade dynamics.

Community 1: Dominant Country - Turkey (Degree: 189)
Community 2: Dominant Country - Russian Federation (Degree: 152)
Community 3: Dominant Country - Belgium (Degree: 162)
Community 4: Dominant Country - United Kingdom (Degree: 151)
Community 5: Dominant Country - Lesotho (Degree: 13)

7. Research Outcomes

- In the realm of wheat trade, China emerges as the foremost importer, demonstrating its substantial demand for this essential commodity. Conversely, Australia emerges as a leading wheat exporter, leveraging its fertile agricultural lands and advanced farming techniques to meet global demand.
- Talking about the specific trade corridors, the two countries which have the highest trade flow network is Russian Federation and Turkey.
- For the community one, we have detected a total of five communities

8. References

- Network Science by Albert-László Barabási. Available: http://networksciencebook.com/
- "Data," Resource Trade. https://resourcetrade.earth/?year=2022&category=52&units=weight&autozoom=1 (accessed Apr. 21, 2024).

9. Acknowledgement