Mini Project on Matrix Algebra

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1. SUPPLY and USE Table:

SUT table tells us about the flow of goods within the economy. It is a table that records the transaction between producer and consumer in an economy and plays a vital role as an integration framework of the national accounts. A country has many industries, each producing and adding its goods and values to the economy. SUT provides an efficient framework for compiling Gross Domestic Product (GDP) at current prices. It has a complete description of the economy as the detailed information of products is stored. These tables show the structure of production costs and the income generated in the production process, the flow of goods and services produced within the national economy, and the flows of goods and services with the rest of the world.

1.1 Supply table:

It stores the product's value by the supplier, distinguishing the domestic supply from a foreign supply (imports). Products are shown in rows, while the domestic industries and imports are in columns. These are at introductory prices. The total supply of each product at purchasers' price is obtained by adding taxes, fewer subsidies on products, and trade and transport margins.
The supply-use equation for any given product in an economy is expressed as :

Output - Intermediate consumption + Taxes on products – Subsidies on products = Final consumption (government and private) + Gross capital formation (fixed, changes in stocks and valuables) + Exports – Imports.

1.2 Use table:

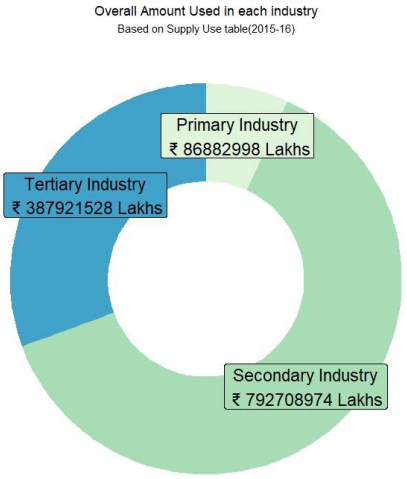
The Use table shows where and how the goods are used after production. Industries, Households, Government, Investment in Fixed Assets are listed in rows, and exports are listed in columns. It tells us about the value-added generated by each Industry. Value-added consists of wages paid to employees, Taxes on Production, and the Industry's operating surplus or profits. Organic manures, pesticides, seed, irrigation charges, electricity, diesel oil, chemical fertilizers, bullock labor, operational costs, market charges, current repairs and maintenance of fixed assets, other inputs are going into the production of agricultural commodities.

2. SUT(Supply-Use) MATRIX:

The SUT matrix has 140 products in rows and 66 industries in columns. It has two sheets: Supply Balance and Use Balance. We can categorize products in 4 sectors based on their origin: Agriculture and allied sector, Mining, Manufacturing, and service sectors. We organize it row-wise. Likewise, we can categorize Industry into three sectors based on their nature: Primary, Secondary, and tertiary sectors. We map it column-wise.
Agriculture and allied sector contain grain, paddy, wheat, fruits, and vegetables-related items. The energy or metal-related minerals like Coal and petroleum come undermining. The manufacturing industry contains processed items, dairy products, and sugar, transforming

goods. The service sector includes all the workforce and servicing related products like repair and maintenance, consulting, transport, etc.

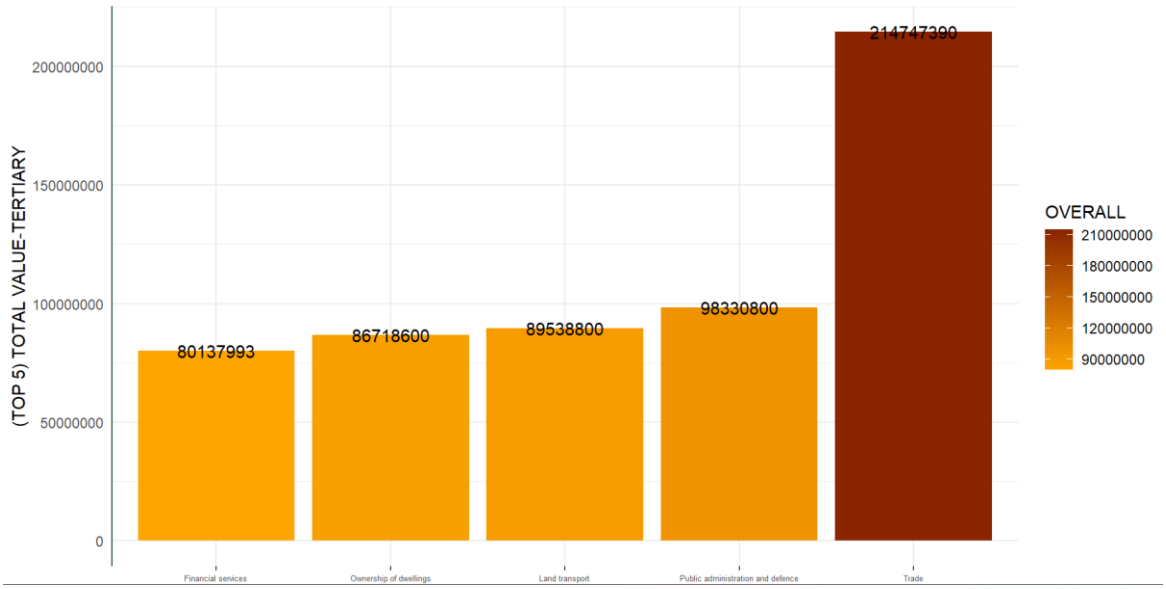
3. SECTORAL ANALYSIS(Supply):

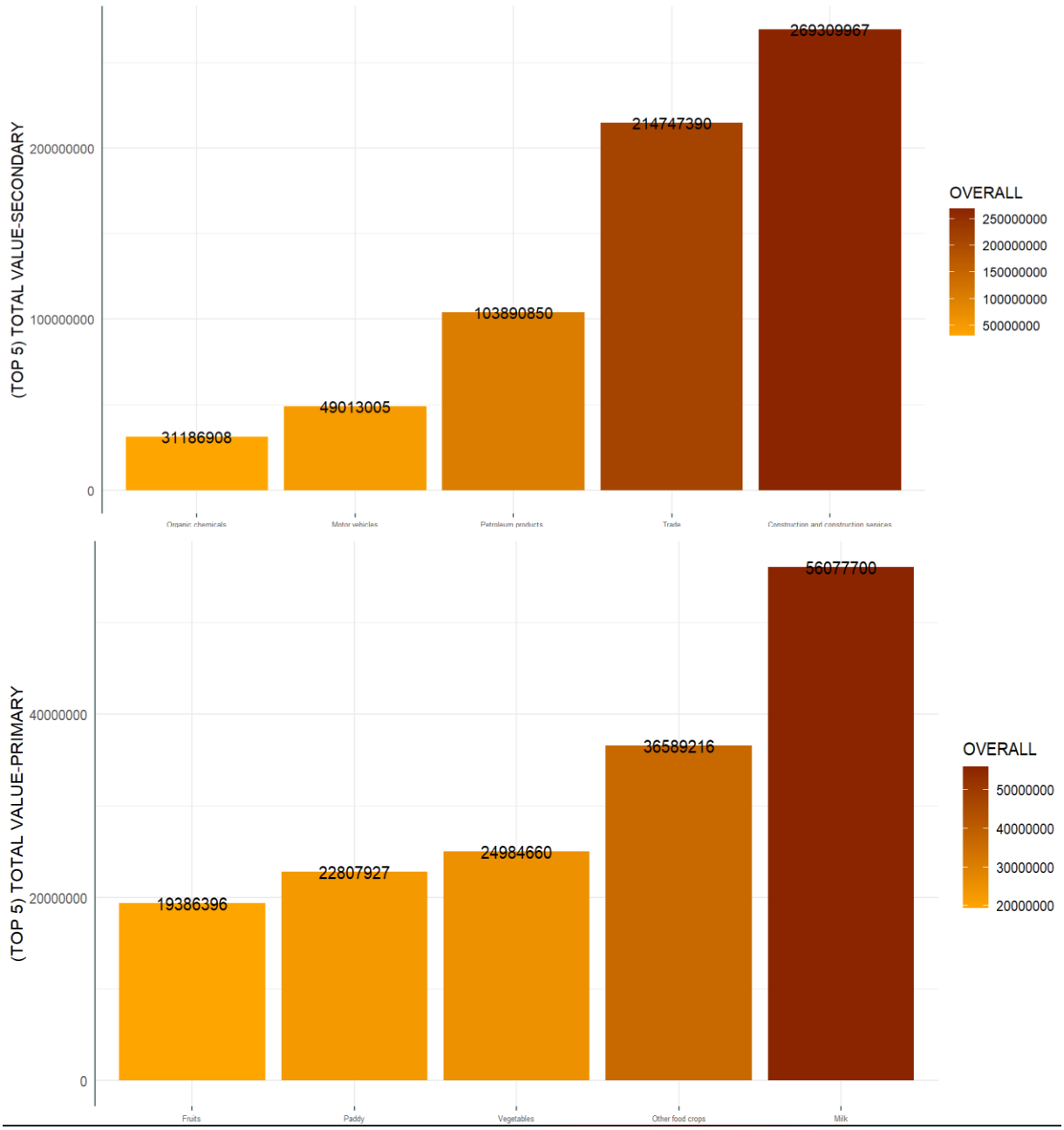


India is the world's sixth-largest economy in the world. The contribution of the primary sector is 18%, the secondary sector is 26%, and the tertiary sector is 56%. The strength of any country's economy is measured by its manufacturing ability. Unfortunately, from the above, we can see that India's secondary sector is still far behind the required standard. If we compare with its other competitor China whose secondary sector contribution is 41%, we alack far behind. These things were taken seriously by the Indian government. So, they have taken many initiatives like Make in India and "Aatmanirbhar Bharat Yojana." They provide capital and resource assistance to people who want to open MSME or small industries.

We plotted and found the top contributors in each sector:

- **Top contributor in primary sectors-***1. Milk 2. Other Food crops 3. Vegetables 4. Paddy 5. Fruits*





- **Top contributor in secondary sectors-**
  1. Construction and construction services 2. Trade 3. Petroleum products 4. Motor vehicles 5 . Organic Chemicals

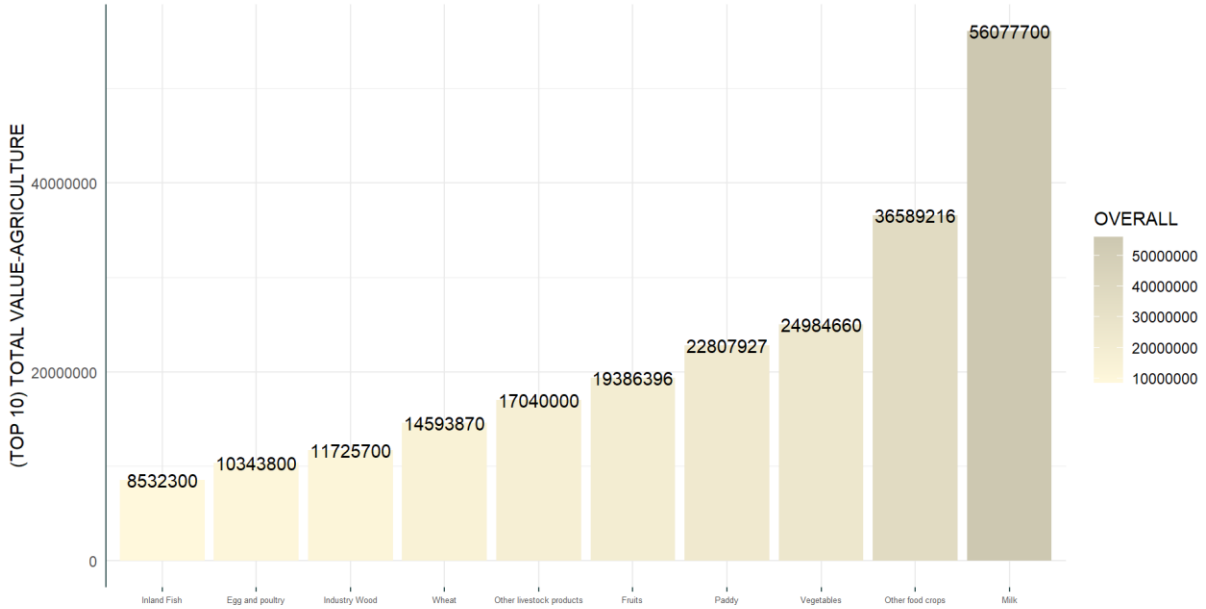
- **Top contributor in tertiary sectors-**
  1. Trade 2. Public administration and defense 3. Land transport 4. ownership of dwellings vehicles 5 . Financial services

The agriculture sector's contribution to the Indian economy is much higher than the world's average (6.4%). The industry and services sector's contribution is lower than the world's average 30% for the Industry sector and 63% for the Services sector.

4. Supply- Industry Analysis:

A. Agriculture:

With its allied sectors, agriculture is India's largest source of livelihood. Seventy percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal. In 2015-16, total agriculture production was estimated at 275 million tonnes (MT). India's annual milk production was 56,077,700 lakhs rupees (2015-16), making India the largest milk producer. India is self-sufficient in producing vegetables and fruits, which we can see in the graph.



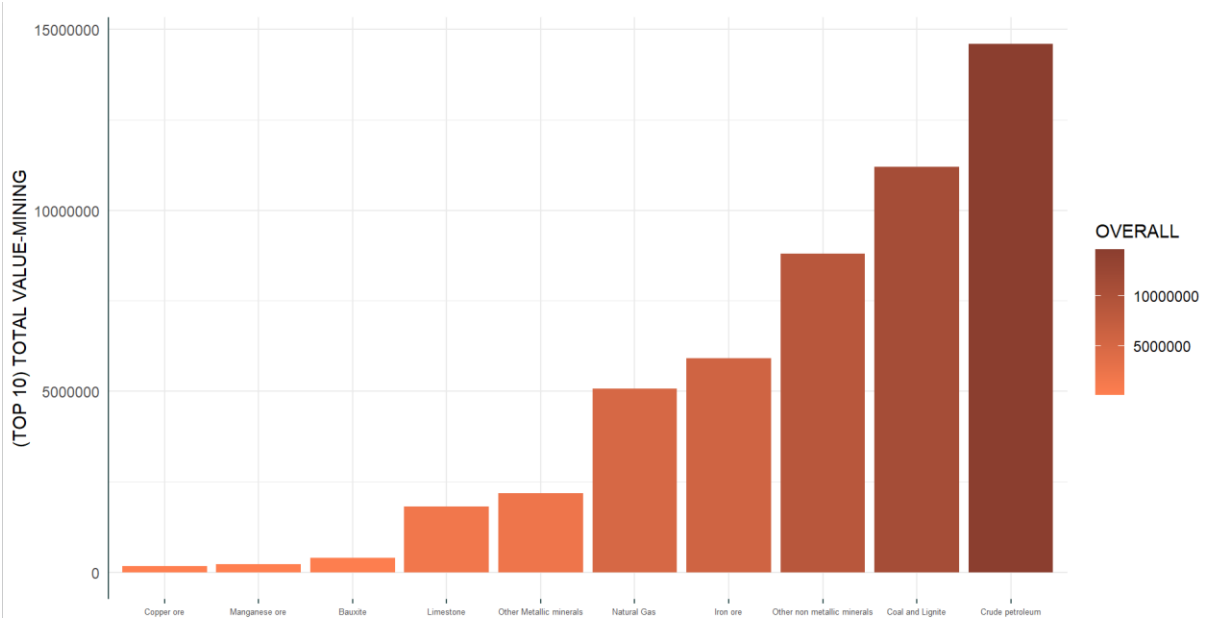
Top agriculture products by value :

1. *Milk*
2. *Other food crops*
3. *Paddy*
4. *fruits*
5. *other livestock*

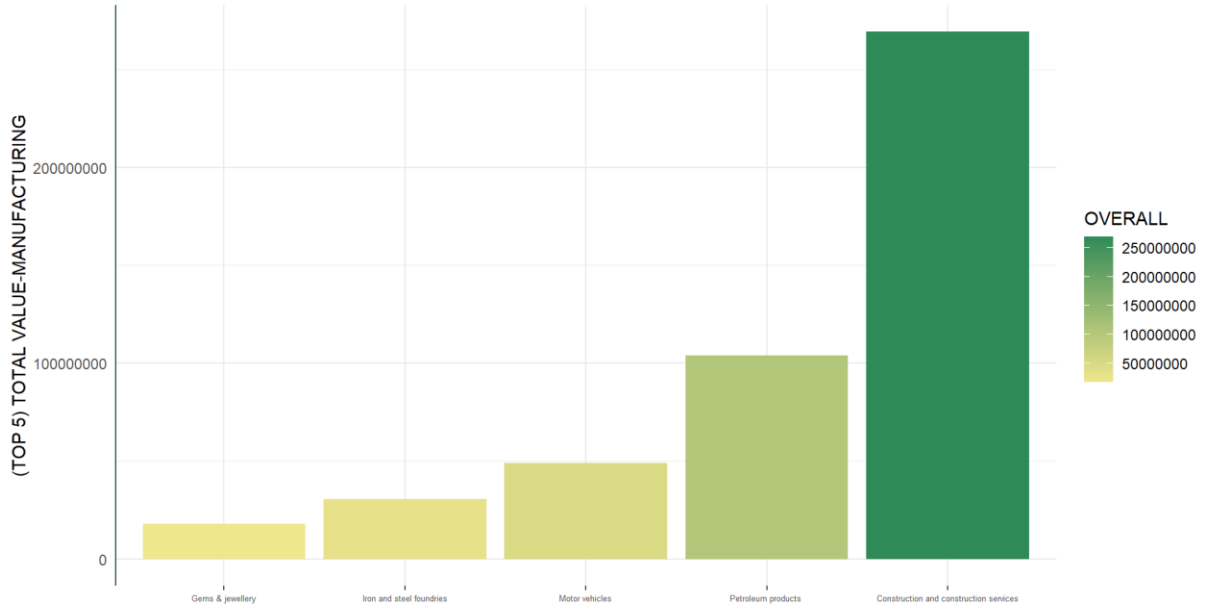
B. Mining:

The mining industry is one of the most critical industries for the country's economic growth. It helps in manufacturing, constructing, and automotive transforming the minerals into the infrastructure and products we use every day by supporting thousands of jobs and providing essential raw materials, minerals, and metals.

If we see the mining industry's shares items, crude petroleum has the highest value with



Coal and lignite are the second most crucial mineral by value in the mining sector. Others are *iron ore, natural gas, etc.*

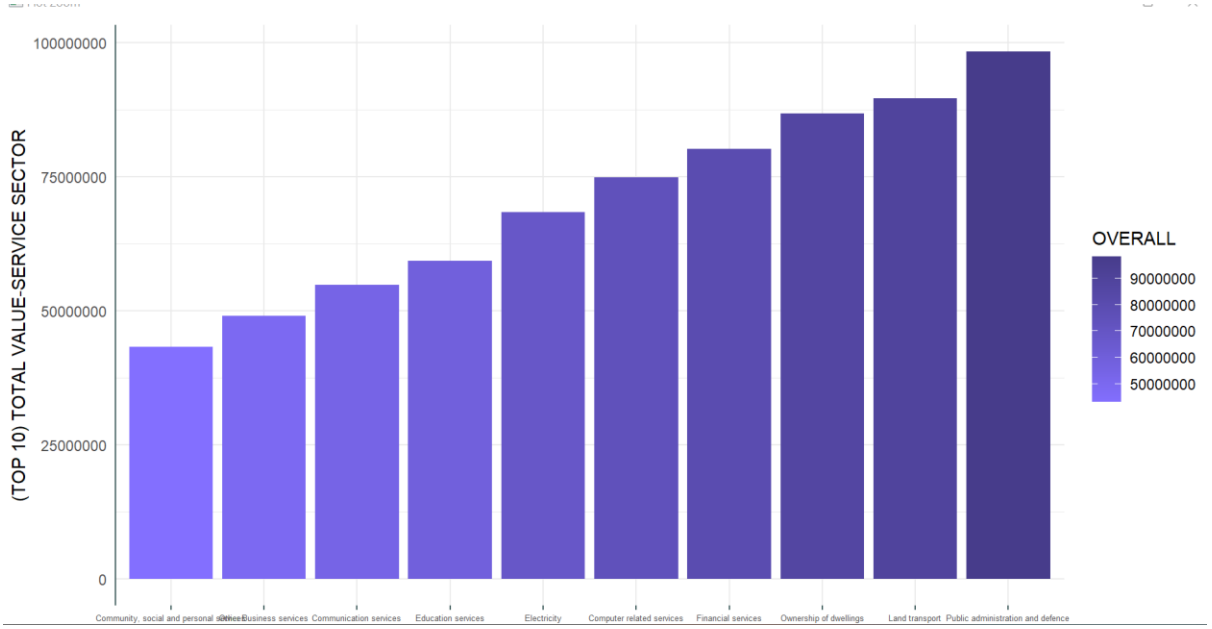


C. Manufacturing industry:

Production of goods in large quantities after processing from raw materials to more valuable products is called manufacturing. Manufacturing belongs to the secondary sector in which the primary materials are processed and converted into finished goods.

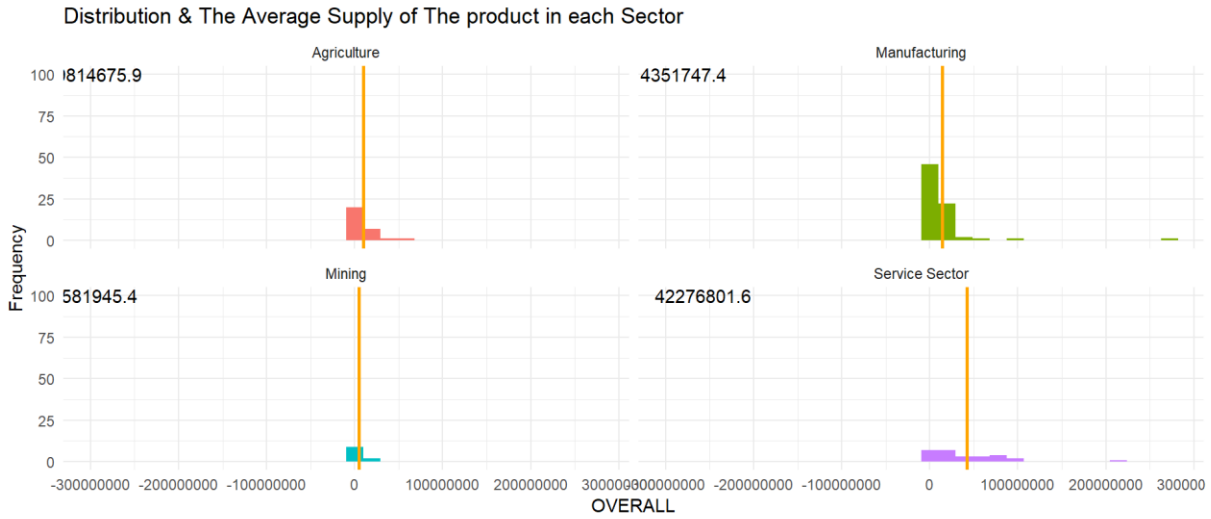
Agriculture and Industry in India are interdependent.

Construction and construction services are top contributors to India's manufacturing Industry. Others are *motor vehicles, organic chemicals like pesticides, Iron, and steel foundries.*

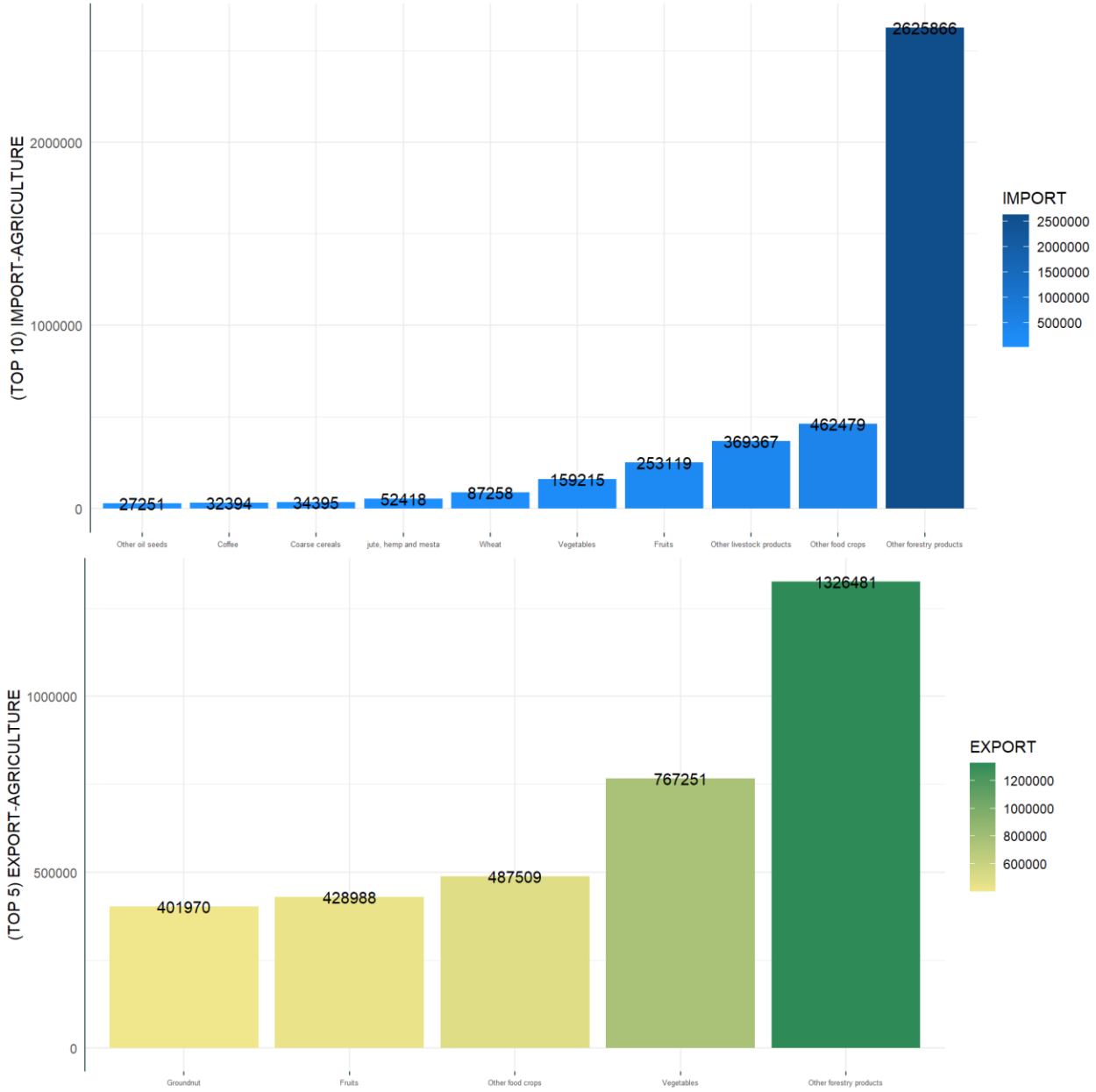


D. Service sector:

The services sector is not only the dominant sector in India's GDP but has also attracted significant foreign investment, has contributed significantly to export, and has provided large-scale employment. India's services sector covers various activities such as trade, hotel and restaurants, transport, storage and communication, financing, insurance, real estate, business services, community, social and personal services, and services associated with construction. Trade has the highest contribution to the service sector. The top 5 contributors of the service sector *are Trade, Public administration and defence, Land transport, ownership of dwellings, and financial services.*



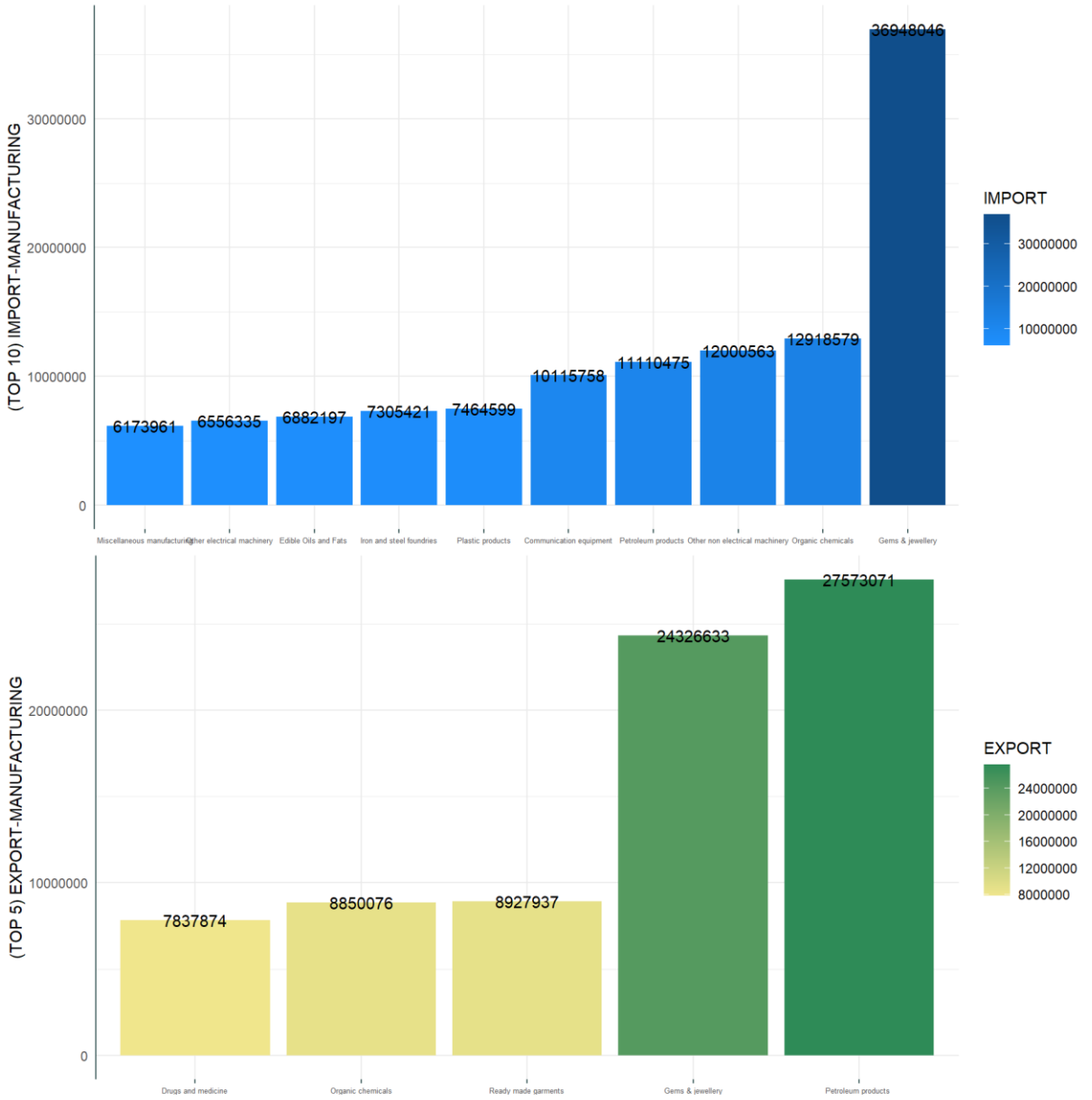
5. Import and export:



A. Agriculture and allied sectors:

Import: *forestry products, food crops, livestock, fruits, and vegetables were the top contributors to imports.*

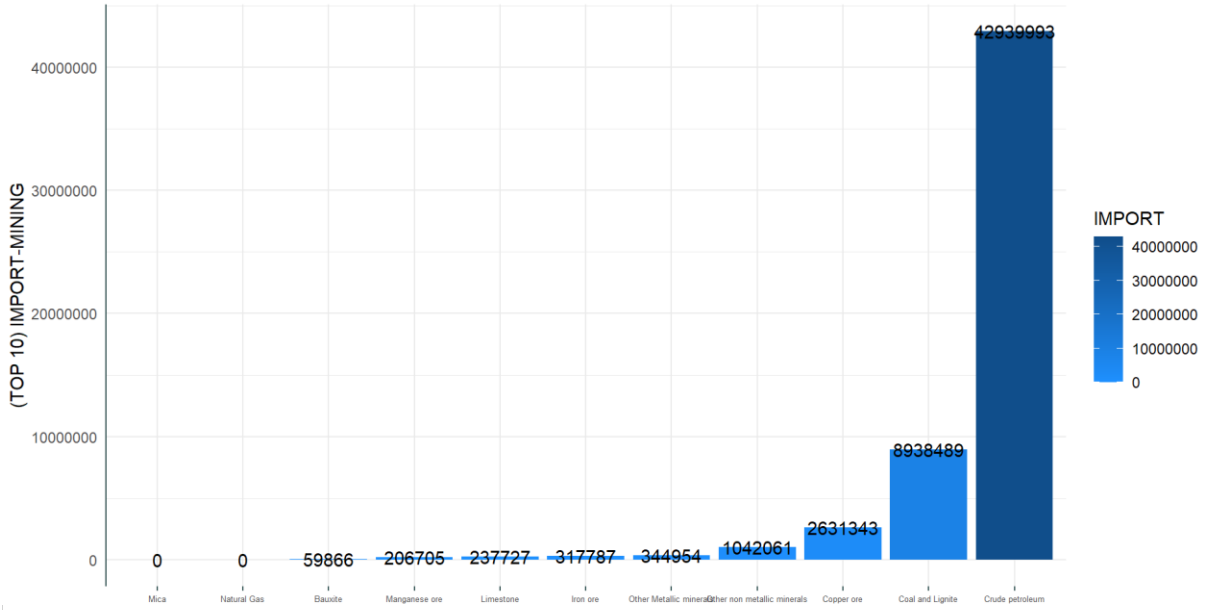
Export*: forestry products, vegetables, food crops, fruits, and groundnuts were the top contributors to exports.*

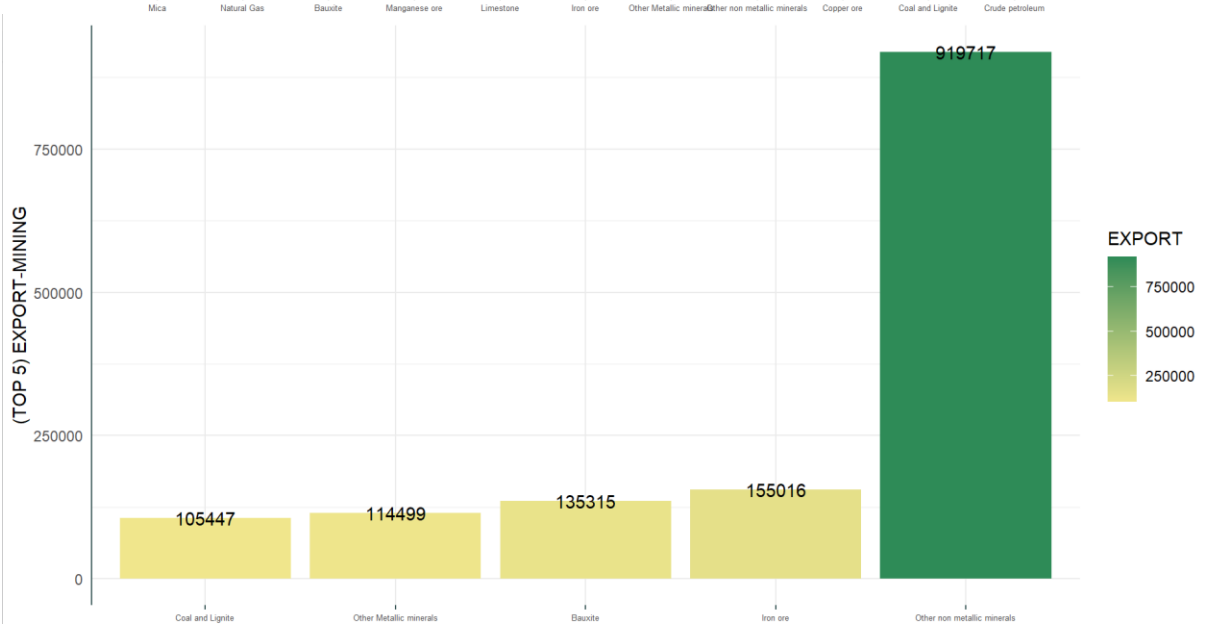


B. Manufacturing:

Import: *Gems&jewellery, Organic chemicals, non-electrical machinery, petroleum products, edible oils, and fats were the top contributors to imports.*

Export: *petroleum products, Gems and jewelry, Readymade garments, organic chemicals, and Drugs and medicines were the top contributors to exports.*

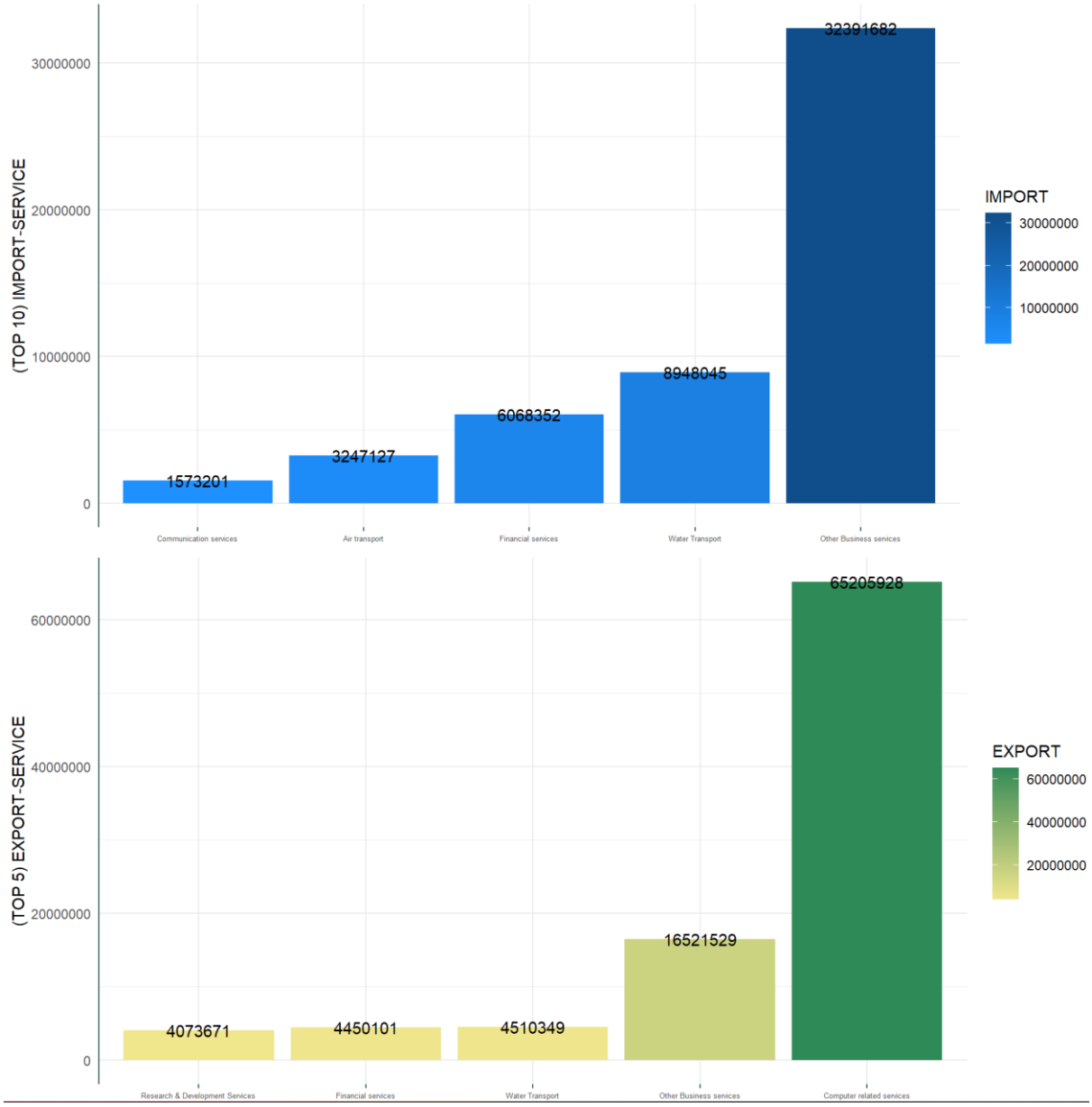




C. Mining:

Import: *Crude petroleum, Coal and lignite, Copper ore, non-metallic minerals, Iron ore, and limestone were the top contributors to imports.*

Export: *non-metallic minerals, Iron-ore, Bauxite, Other Metallic minerals, and Coal and lignite were the top contributors to exports.*

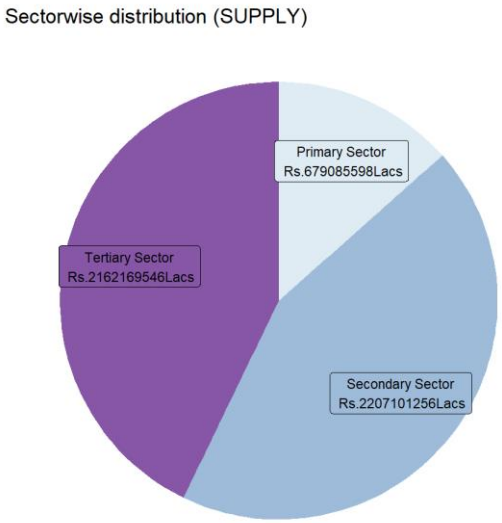


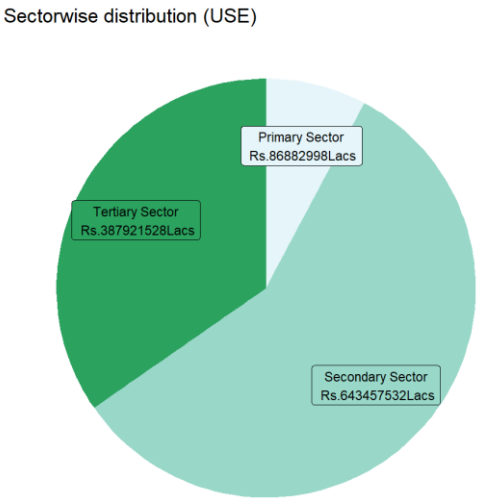
D. Service:

Import: *Other Business Services, Financial Services, Water transport, Air transport, and Communication services were the top contributors to imports.*

Export: *Computer-related services, Water Transport, Financial Services, Research and Development Services, Air transport, and Insurance services were the top contributors to exports.*

6. Supply and Use Balancing:





The commodity flow approach estimates private Final Consumption Expenditure. The goods which are consumed by everyday people in their households their input-output values are easier to achieve. We use the input and output table to see the mismatch in the demand and supply. The areas in which government should focus to frame their policies. The demand and supply should be in equilibrium for the economy's proper functioning. If use increases, it leads to inflation, and if the supply increases, it leads to deflation, which can lead to unemployment in the long run.

6.1 Analysis of the sector (supply vs. use data):

From the graphs, we can see that supply in the secondary sector is quite less than the use. It shows that India has to import the manufacturing items like electronics, mobile, heavy

vehicles, etc., to fill the gap. It leads to a significant loss amount of foreign reserve for the country.
Government should launch many more initiatives like "Make in India" and "Atmanirbhar Bharat yojana" to boost the manufacturing industry.

6.2 Analysis of the Industry (supply vs. use data):
India has a vast population, and we can see its effect in the service industry. India exports a large pool of IT professionals to foreign nations, which we can see in the graph. On the other hand, Business services and financial services are imported by the Indian population.