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Q. Geospatial Technology have the potential to make India's growth an inclusive one along with achieving the target of US \$5 Trillion economy. Discuss. Do you think the applications of Geospatial technology can also ensure Sustainable Development? Substantiate your view.

Geospatial Technology

- Geospatial technology is a significant scientific finding, which moved the possibilities of humankind to a new level.
- Geospatial technology correlates an object's position with its geographic coordinates.
- Identification of geospatial data enables monitoring, tracing, measuring, assessment, identification, or modeling. The basic list of geospatial technologies encompasses remote sensing (RS), GPS, and GIS.

Remote Sensing: satellite imagery and geospatial data collected from satellite sensors or airborne cameras. Some commercial satellite image can produce details of 30 centimetres. Satellite imagery greatly enhances a GIS mapping project and serves as a source of information and data to support analysis and classification for geospatial assessment and modeling.

Geographic Information Systems (GIS): mapping tools for analysis of geospatial data which is georeferenced. GIS can be used to support environmental management for natural hazards and disasters, global climate change, natural resources, wildlife, land cover and many other applications.

Global Positioning System (GPS): satellite-based navigation system made up of a network of 24 satellites placed into orbit to collect coordinates locations.

Applications of Geo-Spatial Technology

- Geospatial technology allows us to make informed decisions based on the importance and priority of resources most of which are limited in nature.
- Geospatial technology may be used to create intelligent maps and models that may be interactively queried to get the desired results in a STEM application or may be used to advocate social investigations and policy-based research.
- It may be used to reveal spatial patterns that are embedded in large volumes of data that may not be accessed collectively or mapped otherwise.
- Geospatial technology has become an essential part of everyday life. It's used to track everything from personal fitness to transportation to changes on the surface of the earth.
- The scope of geospatial data use is vast: it embraces every sphere or industry where geographical position matters. The list includes geography proper, ecology, tourism, marine sciences, agriculture, forestry, marketing and advertising, military forces, navy, aircraft, law enforcement, logistics and transportation, astronomy, demography, healthcare, meteorology, and many others.

Here are some typical examples of how geospatial technology is applied:

- **Logistics:** Tracking goods and ensuring their quality.
- **Transportations:** Identifying location and time of arrival, route making, and navigation.
- **Meteorology:** Referring weather forecasts to particular territories.
- **Forestry:** Detecting forest fires and deforestation (read more about satellite monitoring of forest fires and deforestation).
- **Agriculture:** Assessing vegetation state on a selected terrain.

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- **Healthcare:** Monitoring areas of epidemic outbreaks.
- **Ecology:** Tracing species populations in certain areas, preventing and addressing calamities.
- **Marketing and advertising:** Targeting ads to relevant regions.
- **Real estate:** Visualizing and analysing real estate objects remotely.
- **Insurance:** Managing risks in questioned areas (e.g., via historical georeferenced data analysis).

Thus, from the above discussions it can be concluded that geo spatial technology has a wide range of applications and can be safely trusted upon in order to ensure efficient use of available resources in a most sustainable manner.

Potential of Geo-Spatial technology to ensure inclusive growth in India

- India is among the key engines of global economic growth and progress on development goals. It is the world's seventh-largest economy, growing second fastest among large economies after China, and is projected to be the world's second-largest economy (behind China again) by 2050.
- India has for long been using remote sensing and GIS and other geospatial technologies for planning and development. In every major national program, including Digital India, Smart Cities, transportation and highway development, river linking, industrial corridors, smart power, and agriculture, geospatial technologies are poised to play a critical role.
- As with other countries, digitization presents India with a rare opportunity to make swift economic progress all across. There is a vision for speeding up the digital revolution and accelerate this transformation to yield up to \$1 trillion of economic value by 2025, benefitting 55-60 million workers.
- New-age technologies like IoT, Artificial intelligence, Cloud, Wireless & Broadband and Big Data are empowering the assimilation of spatial information into existing business processes. Analysing data using a geographic information system is becoming a critical core strategy for successful decision making in an increasingly competitive global economy
- Geospatial technologies enhance the performance of artificial intelligence and smart machinery in multiple spheres and agriculture in particular. Remotely controlled equipment completes numerous tasks via GPS and digital dashboards. Robots and smart machinery in the fields seem futuristic no longer, and it is not the limit.
- Expansion and new application solutions are expected in biosecurity, education, construction, engineering, ecology, food supplies, precision agriculture, financial market, statistics, transportation, to mention a few.
- Basically, geospatial data enhances performance in each sphere, outlining specific needs or issues in selected regions. When it comes to farming, for example, landowners can save costs and efforts by treating only critical spots with exact coordinates on the field map and see a big picture of their farmlands at the same time.
- Further employment of GPS in the automobile and aircraft industries enables frequent use of driverless vehicles and UAVs as a matter of fact.
- The development of geospatial technologies brings quite an interesting correlation onto the scene. New achievements in this branch mean the corresponding upgrade of related industries, ensuring even greater precision, credibility, performance, quality, and security.

In this background, an enabling geospatial content policy will act as a catalyst in embedding geographic information into various government processes and building powerful decision

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support systems. Thus, Indeed Geo Spatial technology due to its innate abilities has a huge potential to ensure inclusive growth in India which will help in achieving decent standard of living to every Indian. It will ensure enhanced productivity of vast human resource of India thereby helping us to achieve a \$5 trillion economy target.

Q. The recent change in geo-politics have resulted in oil price war. With reference to this find out the causes of oil price war and analyse its impact on India. Discuss the short and long-term alternatives for India to avoid oil price volatility at global level.

The causes of oil price war

Oil is a commodity, and as such, it tends to see larger fluctuations in price than more stable investments, such as stocks and bonds. There are several influences on oil prices,

- Oil prices are influenced by a variety of factors, particularly the decisions about output made by producers like the **Organization of Petroleum Exporting Countries (OPEC)**, independent petro-states like Russia, and private oil-producing firms like ExxonMobil.
 - According to 2018 statistics, OPEC controls almost 80% of the world's supply of oil reserves. The consortium sets production levels to meet global demand and can influence the price of oil and gas by increasing or decreasing production.
- **The laws of supply and demand** influence prices. As with any commodity, stock, or bond, the laws of supply and demand cause oil prices to change. When supply exceeds demand, prices fall; the inverse is also true when demand outpaces supply.
 - The dramatic drop in oil prices in 2014 has been attributed to lower demand for oil in Europe and China, coupled with a steady supply of oil from OPEC. The excess supply of oil caused oil prices to fall sharply.
- **A dispute between OPEC member Saudi Arabia and Russia** (not an OPEC member) led to a flood of supply hitting the market. The then US President Trump tried to broker a deal to cut production, but it was not implemented in time to prop up oil prices.
- **Natural disasters** are another factor that can cause oil prices to fluctuate. For example, when Hurricane Katrina struck the southern U.S. in 2005, affecting almost 20% of the U.S. oil supply, it caused the price per barrel of oil to rise by \$13. In May 2011, the flooding of the Mississippi River also led to oil price fluctuation.
- **The COVID-19 pandemic** is another example of a natural disaster, but unlike nearly all other natural disasters that raise the price of oil by creating a supply shock, the COVID-19 disaster created a demand shock. Many flights—both international and domestic—were cancelled on orders of governments to close borders. As a result, gasoline consumption in the U.S. fell off a cliff.
- **Political Instability** From a global perspective, political instability in the Middle East causes oil prices to fluctuate, as the region accounts for the lion's share of the worldwide oil supply. For example, in July 2008, the price of a barrel of oil reached \$128 due to the unrest and consumer fear about the wars in both Afghanistan and Iraq.
- **Production Costs and Storage** Production costs can cause oil prices to rise or fall as well. While oil in the Middle East is relatively cheap to extract, oil in Canada in Alberta's oil

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sands is more costly. Once the supply of cheap oil is exhausted, the price could conceivably rise, if the only remaining oil is in the tar sands.

- Given the demand crisis created by the COVID-19 pandemic, the rate at which oil has filled up reserves prompted oil majors and oil-producing governments to slash production. In this unprecedented environment, the only winners are companies who store oil, including shipping companies with tankers who have been able to raise prices for oil storage.
- **Interest Rate Impact:** Although less impactful, the direction of interest rates can also influence the price of commodities.

Impact of Oil Price War on India and Possible Alternatives Available (Short and Long Term):

- Crude oil prices have always been determining Indian oil imports bill and subsidies given for petroleum products. For example, oil imports increased from around \$83 billion in FY15 to \$141 billion in 2018-19 (21.5% in FY15 to 27% as percentage of total imports) mostly due to rise in crude oil prices.
- In fact, the fall in crude oil prices helped reduce India's fiscal deficit in the range of 0.5-1% between 2014 and 2016, and improved the current account balance. Therefore, the current fall in crude price impacts the Indian economy positively—through its macroeconomic effect on trade balance, fiscal balance, domestic inflation, exchange rate, capital flows and overall growth.
- The crude price fall also provides more fiscal space. Both central and state governments charge heavy taxes on petroleum products (around 100% on petrol and 70% on diesel) and generate huge tax revenues. In FY19, the combined revenues from petroleum products were Rs 5.3 lakh crore.
- The government may pass on the benefits to retail customers, which will reduce the general price level bringing down the overall cost of production, which is necessary in the times of lack of demand.
- The government also has the option to increase levies to garner more revenues apart from less petroleum subsidies meant for petroleum products such as LPG and kerosene. Both ways the outcome is positive. Overall, the oil price fall will bear a positive impact on the twin deficits (trade deficit and fiscal deficit).
- Present situation is also an opportunity for monetary authorities to combat the economic slowdown. The dollar is the major invoicing and settlement currency in the oil market. A decrease in oil prices will lead to a decrease in prices for tradable goods, causing the real exchange rate to decline.
- The fall in oil prices may also lead to appreciation of the rupee in the short run, while in the medium term there will be a reduction in the cost of production, which will further lead to a decrease in domestic inflation.
- Thus, with lower inflationary pressures, the monetary authority may further decrease the policy rate and still be able to attract capital inflows.
- The Indian economy is affected by demand slowdown, and industrial growth has been the lowest for the last couple of years. On top of that, the coronavirus has affected production supply chains. In this context, the fall in crude oil prices is a relief for the Indian economy on fiscal, external and monetary fronts.
- There will be some negative fallout on India's petroleum exports—which form one of the top exports—and remittances (a large number of Indians work in oil-exporting countries like Saudi Arabia, and India is one of the biggest recipients of remittances from oil-exporting countries).

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- The price war between Saudi Arabia and Russia and the falling demand of oil from major oil-importing countries like China and India will keep oil prices from rising. It's a blessing in disguise for the Indian economy, which is currently grappling with severe slowdown and seeks a quick turnaround.

Q. Paternity leave should be given due consideration along with maternity leave to break the stereotyped roles of women. Elaborate.

There is a persistent, deeply entrenched ideology in our society, and in the legal system reflecting that society, that men and women perform different roles and occupy different spheres. The male role is that of worker and breadwinner, the female role is that of child bearer and rearer. The male sphere is the public world of work, of politics, and of culture. The female sphere is the private world of family, home, and nurturing support for the separate public activities of men.

The notion that the world of remunerative work and the world of home-or the realms of production and reproduction-are separate, has fostered the economic and social subordination of women in two interrelated ways.

- First, the values necessary for success in the home world, such as nurturing, responsiveness to others' needs, and mutual dependence, have been viewed as unnecessary, even incompatible with the work world. Since the work world is assigned economic importance, the traditionally "female" tasks and qualities of the home world have come to be generally devalued in our society.
- Second, the separateness of the public and private worlds, and the consignment of women to the home world, is seen as natural, based on unquestioned assumptions stemming from the apparent immutability of roles derived from different reproductive capacity.

The lack of integration of women into the public world has made the workplace unresponsive to values such as interconnectedness and concern for the needs of others. This unresponsiveness not only perpetuates barriers to the participation of women in the economically valued work world, it also denies men opportunities to participate more meaningfully in the home world.

Indian men are notorious for not pitching in with the unglamorous and essential work that sustains homes, whether it is parenting or childcare, cooking or cleaning. The time-use survey report released by the National Sample Survey Office shows that Indian women spend nearly four hours more on unpaid work than men, with grim consequences for women's participation in the workforce.

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Historically, maternity has been treated as a state of disability in women workers from undertaking any work during the few weeks immediately preceding and following child birth. With the emergence of the system of wage labour in the industrial undertakings, many employers tended to terminate the services of the women workers when they found that maternity interfered with the performance of normal duties by women workers.

To remove this hardship of the women workers, the concept of maternity benefit came about in order to enable the women workers to carry on the social function of child; bearing and rearing without undue strain on their health and loss of wages. This essential pre requisite has been recognized in various international human rights instruments such as the international covenant on Economic, Social and Cultural rights, 1996 and various international labour conventions.

The Government of India has enacted the Maternity Benefits Act, 1961 where women are entitled to certain benefits, perks, facilities to raise their children. In 2017, the country passed the **Maternity** (Amendment) Bill that increased the right to paid **maternity leave** for working women from 12 weeks to 26 weeks—the third highest in the world.

It has been seen that maternity leave alone does not prove helpful to a woman who chooses to become a mother while sustaining a career. It results in mounting a very huge pressure of family, child care responsibilities as well as demands of workplace. A provision of paternity leave will allow the father to share the responsibilities and therefore truly give shape to the idea of aiding women in balancing their productive and reproductive roles.

Paternity leave is generally a short period of leave for the father immediately following childbirth. Its aim is to enable fathers to assist the mother to recover from childbirth, take care of the new born as well as other children, attend to the registration of the birth and other family-related responsibilities. No ILO standard exists dealing specifically with paternity leave, however the 2009 ILC Resolution concerning gender equality at the heart of decent work recognizes that work-family reconciliation measures concern not only women but also men. Paternity Leave keeps profound importance because of the following benefits-

- Men who go ahead for opting for paternity leave have found to have more stable and stronger relationship with their better-halves in the long run. Sharing parental responsibilities together during this time ensures a good marital bond between the couple.
- The physical interactions make the dad-child bond stronger which creates a positive implication on a kid's development.
- Builds a man's trust upon himself to be a good father.
- A 2019 research suggests that men who participate in family caregiving, which includes taking paternity leave show better and greater levels of satisfaction with their jobs.
- Paternity Leave is an important tool to promote Gender-Equality.

While there is no provision for paternity leave under the Indian labour law, under the Central Civil Services (Leave) Rules, 1972, male government employees are entitled to paternity leave of 15 days before or within six months of the delivery of the child. The Indian law on paternity leave, then, is not only extremely narrow in terms of the beneficiary class, but also seems to be based on the assumption that taking care of a child is primarily the mother's responsibility.

In the year 2009, in ***Chander Mohan Jain v. N.K Bagrodia Public School*** case, the New Delhi High Court held that all male employees of unaided recognised private schools were entitled to paternity leave. UNICEF had the provision of four weeks paid paternity leaves to

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its male employees but now it has been extended to sixteen weeks across all its offices worldwide. After the introduction of Maternity Benefit (Amendment) Act, 2017, a Paternity Benefit Bill has been proposed in the Lok Sabha, to protect the paternity rights of working men.

The availability of adequate paternity leave would not only allow the father to bond with his child as much as the mother, but also promote the possibility that the child would grow up sharing a strong relationship with two rather than just one parent. From the beginning, the child would be able to witness the sharing of parental and caregiving responsibilities between the two genders, rather than boxing women into the role of caregivers and men into the role of bread-earners.

Further, the availability of paid paternity leave would mean that men are able to, and have the incentive to, take the pressure off of their wives. Placing the task of childcare entirely on the shoulders of women usually compels them to take long leave from work. This creates a structure that disadvantages them at the workplace, at best, and forces them to quit altogether, at worst.

No doubt there might be men who would take unpaid leave to play their part. However, it is worth remembering that having another family member only increases the need for money, and thus, unpaid paternity leave is unaffordable, even if desirable, for most employees.

By turning the home and the workplace into one geography, the pandemic has only underlined the extent to which the invisible, gendered labour at home shores up the strides at work. For many women, the disruption of the pandemic has turned the home into a battlefield, with competing needs of family and work. The post-COVID reality makes it even more urgent for workplaces to incentivise men to take more responsibility at home, if more women are not to drop off the work grid.

The battle against this deep-grained sexist skew in work and labour is a long haul. But the idea of an official paternity leave would take a minimum first step in acknowledging that parenting and childcare is the shared responsibility of men and women. A research study conducted in Spain also found that after the introduction of two weeks of paid paternity leave, fertility rates fell, suggesting that when fathers are more engaged in raising children, they may become more aware of the challenges associated with it. This in turn may lead to a relationship which is compassionate and understanding – one of the first steps towards achieving gender equality, after all, is acquiring an awareness of each other's problems. It has also been proven that children whose fathers are more involved in their lives have better developmental outcomes.

Women of childbearing age are discriminated against in the workplace as they are seen to be a liability. Some women have also complained about difficulty in adjustment after returning from leave. If paternity leaves are normalised and men actively start taking them up, this attitude might change towards a more egalitarian view.

While maternity leaves are meant to facilitate working mothers' careers, often they do the exact opposite. Making maternity leaves as the only parental leave option in a company doesn't really bridge the gap between the domestic and the public, rather it demarcates the two even more strongly. The indirect implications are that women are supposed to not only juggle both work and home life, but also return – alone – to home life the second their 'nurturing' role is called to the fore. No matter how high up the corporate ladder she might go, only and only she must return to take care of her child.

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Parenting is, and should be, a task shared equally between the partners — and it is high time the law on paternity leave in India reinforces rather than rejects this. Not only would this make each parent a more satisfied employee, if the economic argument must be made, but it would also go a long way towards changing the stereotypical gender dynamics at home as well as in the workplace.