Eco Endeavourers Network

Striving for the Planet in Peril

Sustainability, Cities, Pandemic and Resilience: Performance, Gaps and Way Forward for Marching Ahead

Is it not the ripe time to empower our armour with Plan, Preparedness and Protection for future Uncertainty and Emergencies across Regions and Cities and align it with Better Wellbeing and Health?

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Introductory Keynote

As Nations across the globe have forayed and carved their niche in sustainability across varied sectors, industry base, cities and regions – the current COVID 19 pandemic has challenged our resilience of adaptability, survivability, livability and sustenance. Since cities are the major nodes of development and heightened dependency on industry, infrastructure and services not just impacted the economy but challenged our health care system, opening the wider gaps we have in handling unexpected health related uncertainties and emergencies. When as Nations, we are aspiring for building stronger, smart yet sustainable, resilient economies and communities to strive and thrive. This unexpected crisis questioned our approach towards economic development, health, well-being and net zero-carbon transition across regions and cities. The revival and recovery of economic disparities and health differed, be it for OECD, non –OECD countries, G20 Nations, G7 Nations and BRICS nations as performance, deliverables, plan, preparedness, protection, futuristic policies and statutory regulations depend upon countries governance and institutions to succeed as global leader irrespective of whichever sector, industry base and field it shall be. What are the new learnings from COVID 19 pandemic? The distribution of resources and the persistence of disparities across regions and cities over space and time. Distribution of resources over space is assessed by looking at the proportion of a certain national variable concentrated in a limited number of regions, corresponding to 20% of the national population and the extent to which specific regions contribute to the national change of that variable (OECD, 2020). As the UN report, time and again mentioned that more than 50% of population shall live in cities, increased pressure coupled with development to strengthen their needs shall bring about regional disparities, especially among the BPL and vulnerable communities. A suggestive of Compact Rural areas and regions (RAR), Compact Rural – Urban Fringe Areas and Regions (CRUR), Compact Townships and Estates in Cities (CTEC), Compact Satellite Townships in Nodes of Metropolitan Areas (CSTNMA) with lesser of space – area/plinth area proportionate to the requirement and avoiding unnecessary built up among residential spaces in urban dwellings shall reduce the disparities in housing as well as on the infrastructure. According to the latest OECD report, 2020 there are varied approaches to measure regional disparities. A first, simple approach is the difference between the maximum and minimum regional values in a country (regional range). A second approach consists of ranking regions by the value of an indicator and taking the ratio (or the difference) between the highest value representing 20% (or 10%) of the population and the lowest value of the regions representing 20% (or 10%) of the population. This approach is less sensitive to possible outliers and cross-country differences in the size of regions. A third approach consists of using standard composite indexes, such as the Theil general entropy index, 1(with the coefficient equal to 1) or the Gini index, which reflect inequality among all regions. Performance, livability and quality of life shall differ based on the geographies and extent of areas utilized – varied statistical indicators at three different scales - administrative regions, functional urban areas (FUAs) composed of local units, and areas defined from grid cells of regular size can be applied to compute.

Category	Icon	Description
Administrative Subnational Regions	TL 2	Large Region (Territorial Level 2)
	TL 3	Small Region (Territorial Level 3)
Functional aggregations of local units	FUA	FUA (based on local units, OECD coverage)
Grid-cell areas	eFUA	Grid-based FUAs (world coverage)
	Cities	Cities (world coverage)

In traditionally devised dwellings, regional policy analysis have used data collected for administrative regions, that is, the regional boundaries within a country are as organized by governments. Data on administrative regions have also the advantage of referring to areas that are often under the responsibility of a certain subnational government or to the scale targeted by a specific policy implemented at the national or subnational level. Regions are classified into two scales: large regions (Territorial Level 2, TL2) and small regions (Territorial Level 3, TL3), which ensure comparability across countries. Functional urban areas (FUAs) composed of local administrative units. The places where people live, work and socialize may have little formal relation to the administrative units around them. For example, a person may inhabit one city or region but work in another and, on the weekends, practice a sport in a third. A broad set of linkages, such as job mobility, production systems or collaboration among firms, determines the interactions occurring between regions. Such interactions often cross local administrative boundaries. In order to capture the above-mentioned interactions, the report uses the FUA definition, which was developed by the European Commission (EC) and OECD (Dijkstra *etal*, 2019). Boundaries of FUAs are available in practically all OECD countries. Being composed of a city and its commuting zone, FUAs encompass the economic and functional extent of cities, based on people's daily Category Icon Description Administrative subnational regions TL2 Large region (Territorial Level 2) TL3 Small region (Territorial Level 3) Functional aggregations of local units FUA FUA (based on local units, OECD coverage) Grid- cell areas (eFUA) Grid-based FUAs (world coverage) Cities (world coverage). Especially in the case of cities, the notion of FUA can better guide the way national and city governments plan infrastructure, transportation, housing, schools and space for culture and recreation. FUAs can trigger a change in the way policies are designed and implemented, better integrating and adapting them to local needs. As regard to the areas defined from grid cells of regular size comparatives were drawn on data for urbanization, air pollution, built-up areas and population density, covering information from the entire world. In these cases, the geographic areas utilized to report indicators are delineated from gridded data available at regularly sized cells rather than at local administrative units. More specifically, grid cells of one km are used to estimate the boundaries of cities and FUAs across the entire world. Cities are defined – according to the degree of urbanization (Europa web link) – as clusters of contiguous cells with at least 1 500 inhabitants per km2 and at least 50 000 inhabitants overall. Grid based FUAs are composed of cities plus surrounding cells that are estimated to be in their commuting zones, based on a probabilistic model (Moreno-Monroy, *etal*, 2020) While this method is less direct than the use of commuting flow data to determine the areas of influence of cities, it can be consistently applied to the entire world while maximizing international comparability. FUAs - Metropolitan areas: The EU-OECD definition of FUAs consists of cities (local units where at least half of the population lives in clusters of densely populated grid cells with at least 5000

inhabitants) and adjacent local units with high levels of commuting (travel-to-work flows) towards the cities. This definition overcomes previous limitations for international comparability of city and metropolitan statistics linked to administrative boundaries. A minimum threshold for the population size of the FUAs is set at 50 000. The definition is applied to 34 OECD countries and it identifies approximately 1 200 FUAs of different sizes. The aim of this approach to FUAs is to create a methodology that can be applied across all OECD member countries, thus increasing comparability across countries, unlike definitions and methodologies created within individual countries, which have been internally focused.5 In order to establish this cross-country methodology, common thresholds and similar geographical units across countries were defined. These units and thresholds may not correspond to the ones chosen in the national definitions. Therefore, the resulting FUAs may differ from

the ones derived from national definitions and, in addition, the OECD functional urban delimitation may not capture all of the local factors and dynamics in the same way as national definitions.

Classification of small regions by access to metropolitan areas as per the OECD, Cities at Glance Report, 2020: The OECD metropolitan/non- metropolitan typology for small regions (TL3) helps to assess differences in socio-economic trends in regions – both within and across countries – by controlling for the presence/absence of metropolitan areas and the extent to which the latter is accessible by the population living in each region. According to such typology, TL3 regions are classified as metropolitan if more than half of their population lives in an FUA of at least 250 000 inhabitants and as non-metropolitan otherwise. A metropolitan region becomes a large metropolitan region if the FUA accounting for more than half of the regional population has over 1.5 million inhabitants. In turn, the typology further classifies non-metropolitan regions based on the size of the FUA that is most accessible to the regional population. More specifically, non-metropolitan TL3 regions are sub classified into three possible types:

1. With access to a metropolitan area, if at least half of the regional population can reach an FUA of at least 250 000 inhabitants within a 60-minute car ride.
2. With access to a small/medium city, if at least half of the regional population can reach an FUA between 50 000 and 250 000 inhabitants within a 60-minute car ride.
3. Remote, if reaching the closest FUA by car takes more than 60 minutes for more than half of the regional population.

Metropolitan Area Classes:

Acronym	Grouping	Reduced Grouping
MR-L	Large metropolitan region	Metropolitan region
MR -M	Metropolitan region	
NM-M	Region near a metropolitan area	Region near a metropolitan area
NM -S	Region with/near a small-medium city	Region far from a metropolitan area
NM-R	Remote region	

Source: OECD Regions and Cities at a Glance 2020 Report

As regions and cities are facing disruptions and shortfalls caused by the global pandemic, they are also
advancing in the green transition and the consequent move towards a zero-carbon economy. In this respect, low-density, remote regions have made the biggest progress in the transition to clean energy production, generating 40% of the clean electricity in OECD countries and thus emitting less CO2. To achieve the objective of faster recovery and higher resilience to future shocks, OECD report stated and suggested that policy in all domains should be coordinated across government levels and target places according to their specific needs. As of 2019, both regional and municipal governments each account for nearly 19% of total public spending in OECD countries with comparable data. At the

same time, regional governments taken alone are responsible for 22.4% of total public investment, potentially providing crucial help, also for the transition to a low carbon economy. Given that health and social services are other important policy domains for subnational governments, regions and cities are at the forefront in making our societies more resilient and sustainable.

What necessitates enhancing resilient places to thrive and survive in futuristic cities built up?

According to the latest OECD estimates, the second quarter of 2020 saw a fall in GDP by somewhat above 10% in the OECD area compared with the previous quarter and a full recovery to pre-COVID levels is projected to take until 2022. The report of Cities at glance, 2020 mentioned that long-lasting progress towards higher well-being and capacity to adapt to external shocks shall also require strengthening efforts towards the broader objective of sustainable development. It is now more than 5 years since the UN designed the 17 interlinked goals to achieve a better and more sustainable future for all. All the efforts to adapt healthcare to the emerging needs and to sustain the economy in the current crisis need to combine with many other interrelated aspects, including, among others, climate and education but also trust in institutions and gender equality, for which the role of regions and cities shall be crucial. Large cities and capitals were able to seize the opportunities of digitalization and embrace remote working and digitization. However, many rural areas still suffer a gap of access to high-speed broadband, a lower share of jobs amenable to remote working and lower education of the workforce. While we cannot avoid, many other crises might come in the future, what we can do much in present situation is to be better prepared and plan and protect yourself and our societies with precaution, empowerment, awareness, capacity building and maximized outreach. Regions and cities need to enhance their resilience now, not only to alleviate the immediate blow of the current crisis but also to thrive in the future.

Peek through into Societal Resilience : Towards Good Health and Wellbeing

In most OECD countries, remote regions have experienced lower excess mortality than other regions. The COVID-19 pandemic has hit certain parts of countries harder than others. Beyond the count of fatalities directly reported as due to the COVID-19 infection, the increase in the number of total deaths in a region relative to previous years provides a useful indication of the overall health impact of the current pandemic. Excess mortality is defined as the percentage increase in the cumulative number of deaths. So, scenario benchmarking, pre-existing diseases and vulnerabilities need to be look into in order to have access, allocation and administration of medical interventions, economic stimuli and functional and institutional aids. Foremost, important aspect that has emerged is aligning every development and its reach with sustainable development goals. As regard to societal resilience towards good health and wellbeing – The UN SDG 3 shall be a key nudging for overall strengthening of health care machinery and the financial allocation it needs to address the health impacts and risks associated. Even in 2016, through the report covering UN SDGs as a part of capacity building and policy making directive, as a founder of Eco Endeavourers Network, varied schemes and applicability was suggested and prospective was proposed – one such was the UN feature coverage of goal 3 on Universal Health Coverage (UHC) be aligned with our health-related financial interventions and policies. Arogya Setu medical intervention be aligned with UHC on an immediate basis as though regions differs, disparities are there from place to policies and infrastructure to financials required to give structural strengthening – a surplus stimuli can be co-created between states and centre via aligning municipal bonds as zoned testing, isolation and recoveries data are available with the municipalities, so containment zones, mildly affected areas, moderately affected areas and severely affected areas be-

catered by PPP along with municipalities as cohorts of cohesion. Since Municipalities are sounder in financials than their state machinery – a co-creative pathway shall be a win – win preposition both for the states as well as for the centre.

List of variable indicatives

Confidence in the government
COVID-19 deaths
Doctors
Education: educational attainment
Education: participation in formal and/or non-formal training
Education: rate of young people not in employment, education or training (NEET)
Excess mortality
Homicide rate
Hospital beds
Mortality rate due to cardiovascular or respiratory diseases
Obesity Rate
Voter turnout

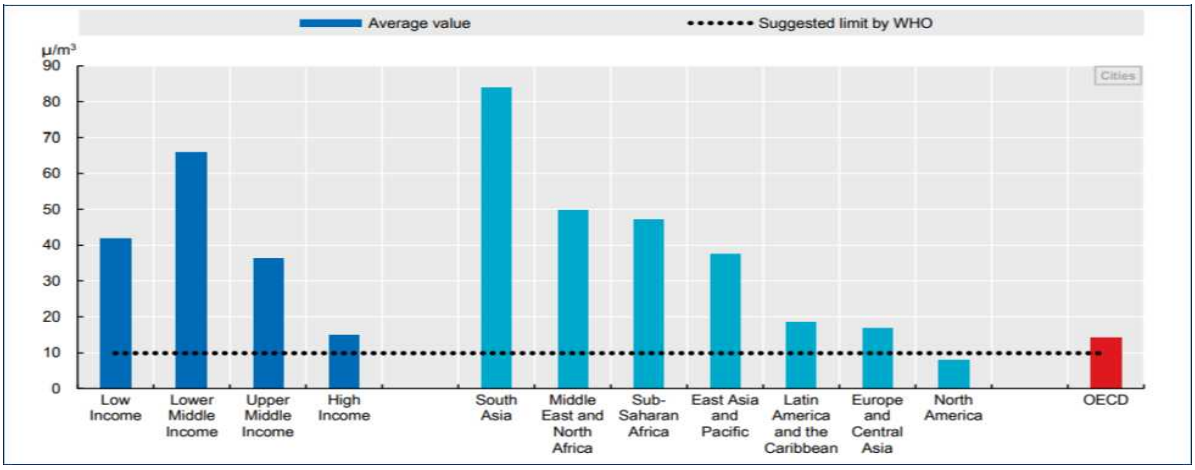
As the OECD Cities at Glance Report, 2020, the Metropolitan regions have 65% more hospital beds per capita than remote regions, a gap that can affect the capacity to cope with health crises. A number of factors related to healthcare, living standards and people's behaviour can make regions unevenly prepared to face a health crisis. Stark regional inequalities in morbidity rates make some places within OECD countries more vulnerable than others. As reported by the World Health Organization (WHO), people with pre-existing medical conditions, including high blood pressure, heart and lung diseases, cancer, diabetes or obesity, are more susceptible to suffer serious consequences if infected by COVID-19 (WHO, 2020). Across OECD regions, the spatial concentration of disease-specific mortality rates reflects differing health challenges. Also Respiratory and cardiovascular mortality correspond to the number of deaths from diseases of categories J00 to J99 (respiratory) and I00 to I99 (cardiovascular) in the International Classification of Diseases (ICD).

Nudging Cities and Communities - Aligning Air Quality with UN SDG 11 (Sustainable Cities and Communities)

A review into the OECD latest December 2020 report mentioned the following key points: Despite improvements during the last decade, air pollution in cities remains high, especially in poorer countries. Air pollution is among the greatest environmental health threats across the world. This is particularly true for cities, where the higher concentration of people and economic activity compared to less dense areas make them more exposed to air pollution (OECD, 2020a; OECD/European Commission, 2020). As suggested by the United Nations (UN) Sustainable Development Goals (UN, 2017), one the most relevant measures of air pollution is population

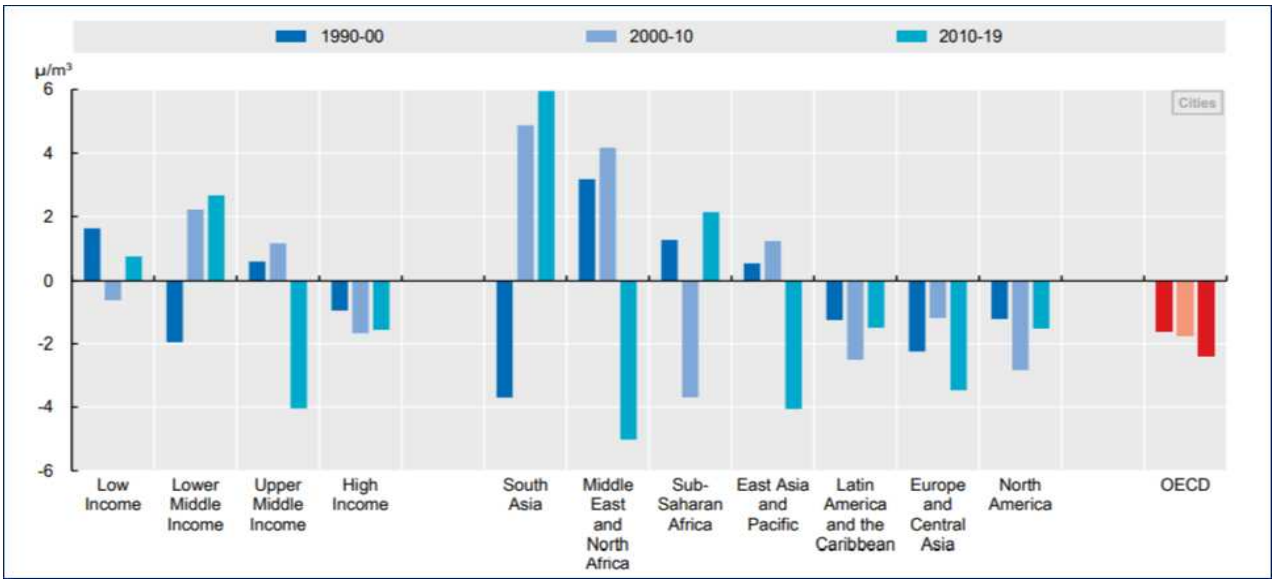
exposure to fine particulate matter 2.5 ($PM_{2.5}$ in micrograms per cubic metre or μ/m3). Chronic exposure to PM2.5 significantly increases the risk of heart and respiratory diseases. In addition, the current pandemic is showing that air quality is also a source of health resilience. Recent studies have demonstrated that air pollution contributes to the airborne transmission of SARS-CoV-2 and a higher risk of mortality due to COVID-19 (Comunian *et al.,* 2020; Cole et al., 2020). Across the world, air pollution levels in cities tend to be higher in poorer countries. In 2019, the average PM2.5 concentration levels across cities was highest in lower-middle-income countries (66 μ/m3 of PM2.5), followed by low-income (42 μ/m3) and upper-middle-income countries (36 μ/m3). On the other hand, cities in high-income countries recorded significantly lower air pollution (15 μ/m3 of PM2.5), although still above the levels recommended by the WHO of 10 μ/m3. Air pollution levels also differ across world regions. With an average pollution level of 84 μ/m3 of PM2.5, South Asian cities have the lowest air quality, while cities in North America recorded the lowest average concentration of PM2.5 (8 μ/m^3) – this is partially explained by the significantly higher population density of South Asian cities. Globally, air pollution levels in cities have changed significantly in the last 30 years. While cities in high-income and OECD countries have been reducing people's exposure to PM2.5 since 1990, cities in upper-middle-income countries have started to make progress only since 2010. On the other hand, air pollution has been on the rise in the last 10 years in cities from lower middle and low-income countries. More precisely, since 2010, most world macro-regions – except for South Asia and Sub-Saharan Africa – have recorded a decrease in air pollution in cities. This reduction in PM2.5 concentration was strongest in East Asia and the Pacific (falling by 4 points) and the Middle East and North Africa region (falling by 5 points). In the OECD area, differences in air pollution levels across cities remain relatively small within countries compared to between countries. Nevertheless, most cities still have exposure to $PM_{2.5}$ above the limit recommended by the WHO. Within-country differences are largest in countries such as Turkey, Chile, Spain or Poland, where pollution is high on average and where some cities experience levels of PM2.5 around the 30 μ/m3 or more. Although air pollution has been declining on average across OECD cities in the last 30 years, 66% of cities in the OECD (789 out of 1187) still had their residents exposed to harmful levels of air pollution in 2019 (above 10 μ/m3). In 30 countries (out of 37), there is at least one city with population exposure to air pollution above the suggested threshold of 10 μ/m3.

Population-weighted average of cities, levels of PM2.5 in μ/m3



Source : OECD Cities at Glance Report, 2020

Change in air pollution in cities by countries' income and macro-region



Source: OECD Cities at Glance Report, 2020

Inclusive Education: Aligning the Current Educational disparities with UN SDG 4 : Quality Education

As per the Cities at Glance report, 2020 of OECD, in most OECD countries, capital regions concentrate disproportionately large shares of the highly educated population. On average, the population share with tertiary education in capital regions is more than 10 percentage points higher than the national average. The capital region is the place with the highest share of people that completed tertiary education in 26 out of 30 OECD countries with comparable data. School dropout and youth inactivity remain important challenges. Lifelong learning matters for people's well-being. It contributes to mental health, subjective life satisfaction, as well as better job opportunities. In the context of the job crisis triggered by COVID-19 (OECD, 2020a), more flexible and short-time training (from formal and non-formal educational systems) will be required to facilitate workers' reintegration in the labour market and mobility across firms. Yet, lifelong learning – measured as the share of the adult population enrolled in any form of training or learning – is still very low in most OECD regions and significantly unequal within one-third of OECD countries (out of 22 with available data). Within-country differences are largest in Australia, Italy and Switzerland, where the share of lifelong learning is high on average – above 37%. On the other hand, in countries with overall low lifelong learning, regional disparities are the lowest. In half of OECD countries with available data, not a single region has more than 15% of their adult population enrolled in formal or informal training or learning.

Gender Equality among Regions and Cities : Focusing Goal 5 of UNSDG – Gender Equality

Women represent less than half of total mayors in all OECD regions with available data. Only in 10% of regions, located in Norway, Spain and Sweden, women account for at least 30% of mayors. Achieving gender equality in all places requires pursuing inclusive labour markets, which are a

source of economic empowerment and well-being for women. Between 2010 and 2018, the gender gap in the employment rate (male-female) of OECD countries has declined by one percentage point, although significant differences exist across regions. For example, from 2010 to 2018, two-thirds of OECD regions saw a widening of the gap between the employment rate of men and women. Gender inequality is also present in research and development (R&D) occupations, as women hold less than half of the R&D jobs in virtually all (99%) OECD regions. In addition to an inclusive labour market, the participation of women in politics is essential for designing laws and policies that generate gender-balanced opportunities and outcomes. Fighting violence towards women remains another important objective to achieve gender equality in all places. In about one third of regions in 10 countries with available data, at least 5% of women report having experienced physical or sexual violence in the past year.

Safety, trust in institutions and political engagement in regions : Focus on UN SDG 16 – Peace, Justice and Institutions

Confidence in national governments is very unequal across OECD regions. Low trust in institutions can trigger discontent and weak political participation in regions. Although over the last 20 years, voter turnout has slightly increased, on average, across OECD regions (by 2.7 percentage points), changes in voter turnout since 2000 differed by up to 20 percentage points across regions, leading to higher territorial disparities. People in metropolitan regions participate more in elections than people living in regions far from metropolitan areas. A more focused detailing on e-voting and strong institutions is already available as an endeavour of Eco Endeavour Network and can be peep through for knowhow.

Economic Resilience and Economic Disparities

Cities and capital regions have the highest capacity for remote working as per the OECD data of Cities at glance 2020. Since the distribution of population differs and so are vulnerabilities and standard of living – the approach of economic resilience is directly dependent upon the support and aids being provided, scope of employment opportunities, extent of wages and payrolls, housing and education, means of commute. These nodes of interlinking factors along with the, regions, cities and communities connect or engage with varied stakeholders and supply chain infuse resilience and help reduce economic disparities. The UN SDG 10: Reducing economic disparities can be a key focus arena to align with local challenges to develop a base for future policies based on the factors mentioned above for carving economically inclusive not just regions, cities and countries but also the communities or populace who dwell in it. The COVID-19 pandemic has affected regional economies in OECD countries, not just fast-growing economies but teared apart emerging economies and developing economies with a cumulative lack of support of about 27 – 30 %, across varied sectors and paces. As pre COVID scenarios are not align to stimulate the current crisis - a GDP gap shall reflect in upcoming months, but the high end strategic clustered stimuli based on the requirement can steer through the GDP lagging. When subsidies were announced, payments were done half, manufacturing and services operated at half the force, educational institutions closure and digitization being the focus not just for remote working and learning, pressure on household and grid affected the pocket as well the emissions and resource stewardship – is it not the ripe time for a roll over time to reduce the dependency and enact strategies for B2B, B2C, B2G and G2BCC via -

PPP – with cluster economic schemes and the Companies Act with CSR policy dimension changed or for to say exclude commitments for the time being of 2% of net profit for the year 2021 and create

"ONE NATION ONE COCREATION PLATFORM" – i.e. ; self-sustaining, balancing, leveraging as well as addressing multiple issues as a unified factorial with a section be added mentioning in lieu of Medical emergencies companies shall get a not payable tax and reduction, but covering it up in the next fiscal year or after companies accelerate, it shall not burden the companies, government and the entire supply chain, rather than opting for repo rebates and subsidies, as subsidies are bad for economy, on an immediate basis they are helpful to survive from crisis, but in long run it burdens government budgetary allocation for future policies framing – as scenarios of issues keep on changing and unforeseen requirements emerge in every sector, country from time to time so are bails out irrespective of whatever the need be - a slab of 5 year futuristic budgetary be planned, so that every year annual budget when drafted and presented shall have surplus to circulate back for the next fiscal year. "Co-creation" can be a **"Fiscal Year Budget Saving Tool"–** circulating the capital shall reduce the company's distress as well as reduce insolvencies issues – why hard sale during pandemic to get profit when to infuse banking and financials, loans get burdened. Utilizing your own available stocks shall reduce burden and empower companies, government and the companies and sector and services in a single stroke of framework applied.

Within-country regional economic gaps have increased in half of OECD countries since 2000. While the exact impact of the COVID-19 pandemic on regional economies remains to be seen, the last two decades offer important insights for the whole OECD area. Regional economic disparities show different trends depending on the geographical level observed. Overall, within-country disparities in GDP per capita tend to be starker when assessed across small regions (TL3), as small regions might capture the differences between cities and low-density areas more precisely. Within-country disparities in GDP per capita across large regions (TL2) have followed a bell-shaped pattern over the last two decades and are at the lowest level since 2000. The moderate fall and rise of economic disparities across large and small regions respectively, in the OECD area taken as a whole, masks a substantial heterogeneity in how regional economic gaps have changed within countries. Half of OECD countries experienced an increase in the GDP per capita gap between the top and bottom 20% of regions, no matter whether small or large regions are taken into account. The Theil index measures inequality in GDP per capita between all TL2 OECD regions. It breaks down the overall inequality into inequality due to differences within countries and inequality due to discrepancies across countries. The GDP per capita of the top and bottom 20% regions are defined as those with the highest/lowest GDP per capita until the equivalent of 20% of the national population is reached.

Theil = ∑i = 1 N yi −y ln yi −y where N is the number of regions in the OECD, yi is the variable of interest in the ith region (i.e. household income, life expectancy, homicide rate, etc.) and −y is the mean of the variable of interest across all regions. The Theil index can be easily decomposed in two components: i) the disparities within subgroups of regions – where for example a subgroup is identified by a set of regions belonging to a country; ii) the disparities between subgroups of regions (i.e. between countries). The sum of these two components is equal to the Theil index.

The index assigns equal weight to each region regardless of its size; therefore, differences in the values of the index among countries may be partially due to differences in the average size of regions in each country

Composite Leading Indicator (CLI) - The composite leading indicator (CLI) is designed to provide early signals of turning points in business cycles showing fluctuation of the economic activity

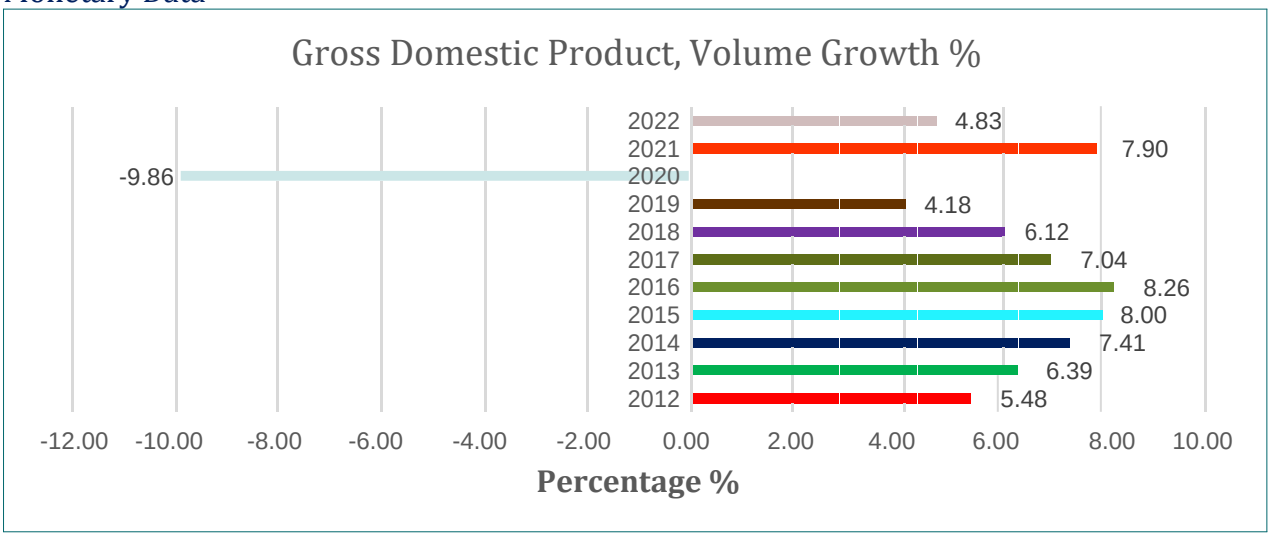
around its long-term potential level. CLIs show short-term economic movements in qualitative rather than quantitative terms.

Consumer confidence index (CCI)

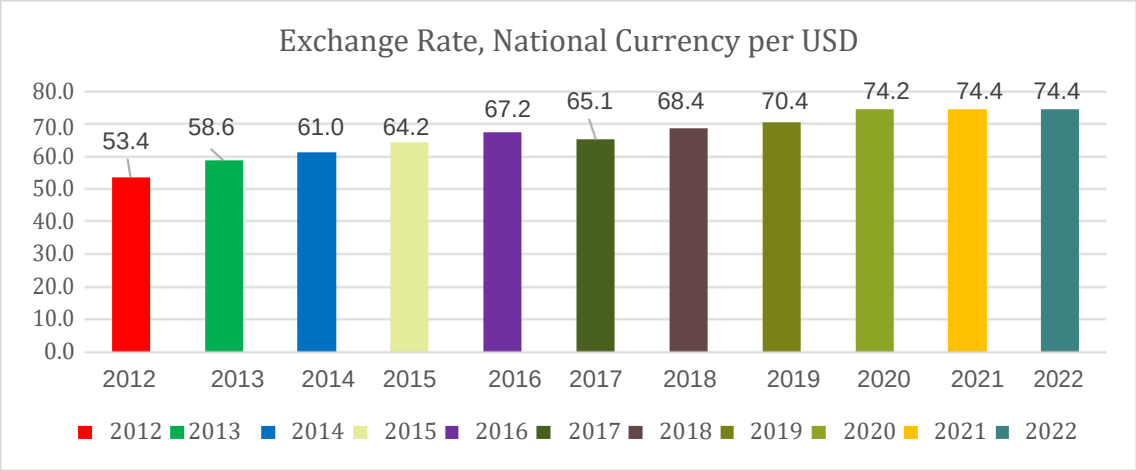
Consumer confidence indicator provides an indication of future developments of households' consumption and saving, based upon answers regarding their expected financial situation, their sentiment about the general economic situation, unemployment and capability of savings. An indicator above 100 signals a boost in the consumers' confidence towards the future economic situation, as a consequence of which they are less prone to save, and more inclined to spend money on major purchases in the next 12 months. Values below 100 indicate a pessimistic attitude towards future developments in the economy, possibly resulting in a tendency to save more and consume less. As regard to the Indian economic growth and projections, with fiscal years changes in progress were witnessed from 2014 due to the earlier reform policies and it accelerated further. In lieu of pandemic though the economic progress took a backing, country is coping up to match the future projector benchmarking set. The following tables shall reflect the economic outlook from the time scale of 2012 to projections till 2030. As data of the earlier fiscal years is already available in the form of varied publications. This paper would like to streamline the benchmarking and performance in a concise and to the point indicators applied scale.

Variables or Indicators:

External sector, trade and payments
Government Accounts
Expenditure and GDP
Readymade Growth Rates
Prices and Deflators
Monetary Data



Source : Data from OECD, December, 2020 Cities @Glance Report *2021 – 2021 Data are projections



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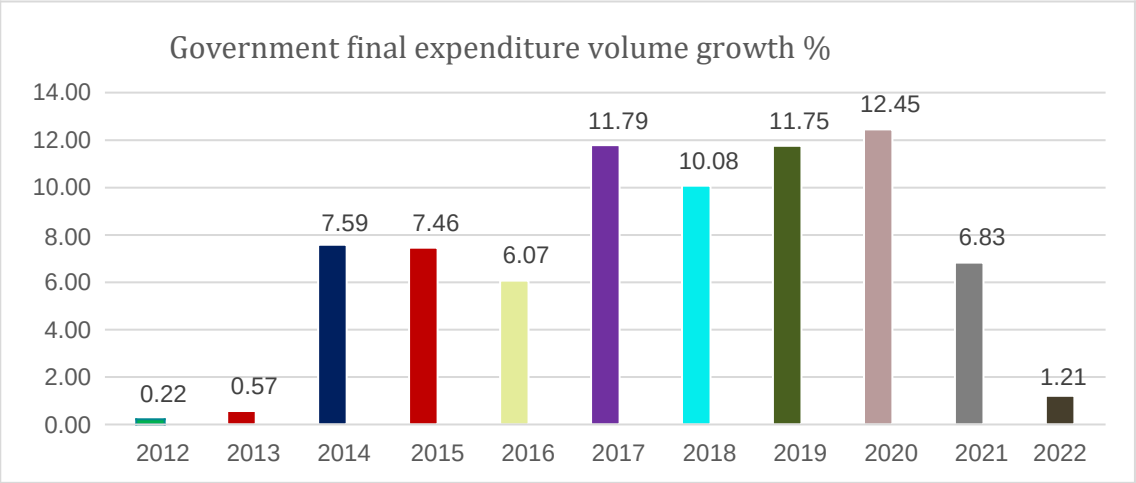

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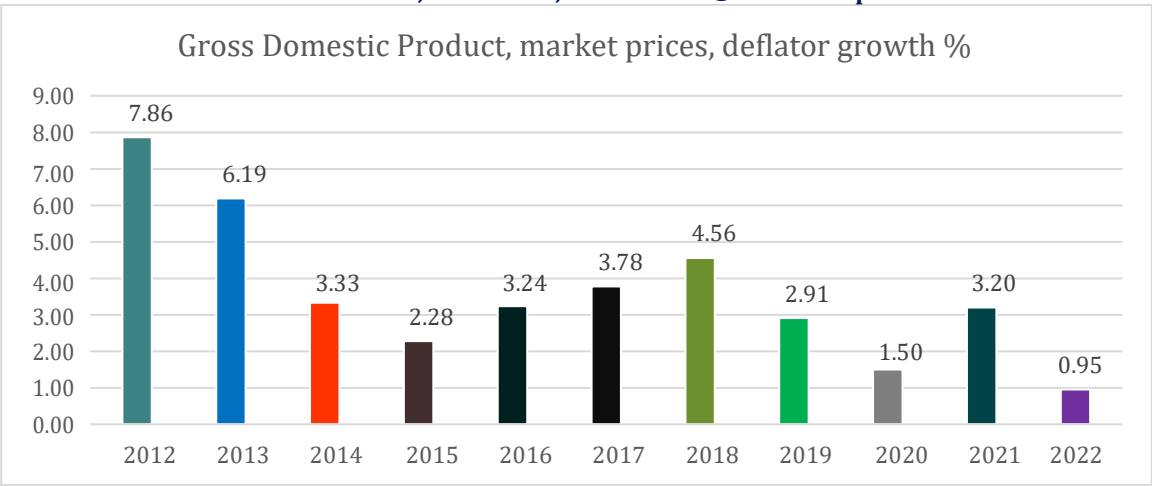

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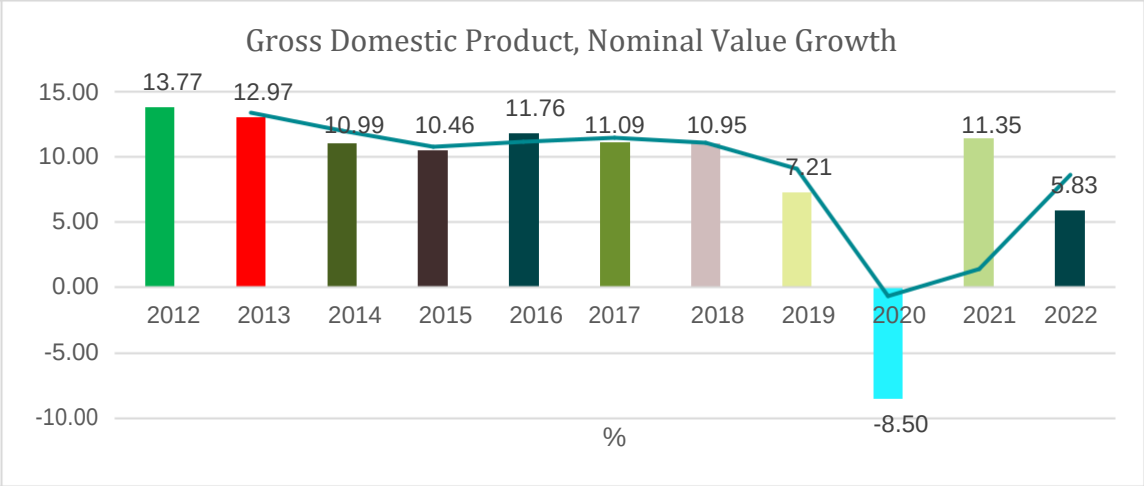

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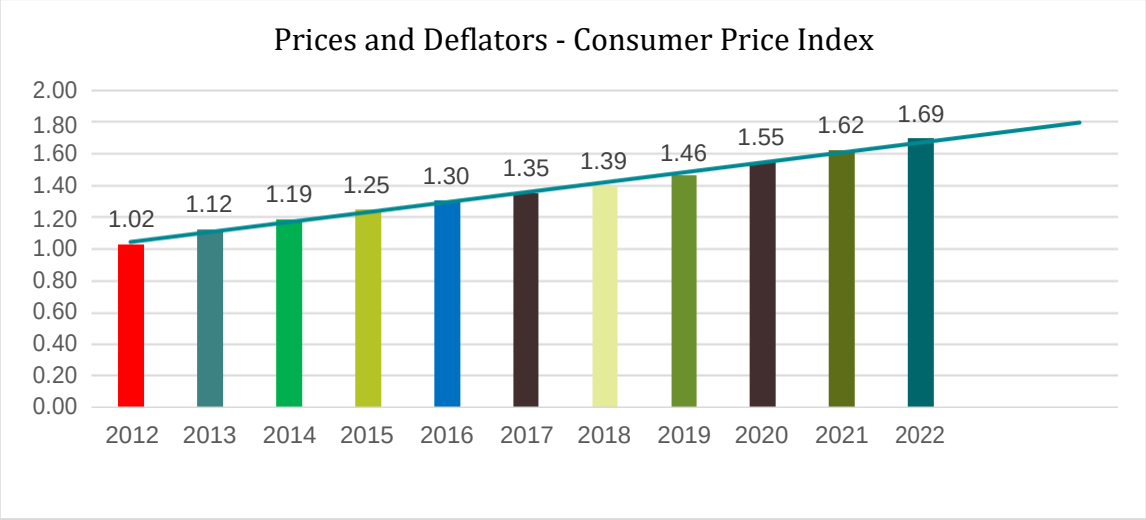

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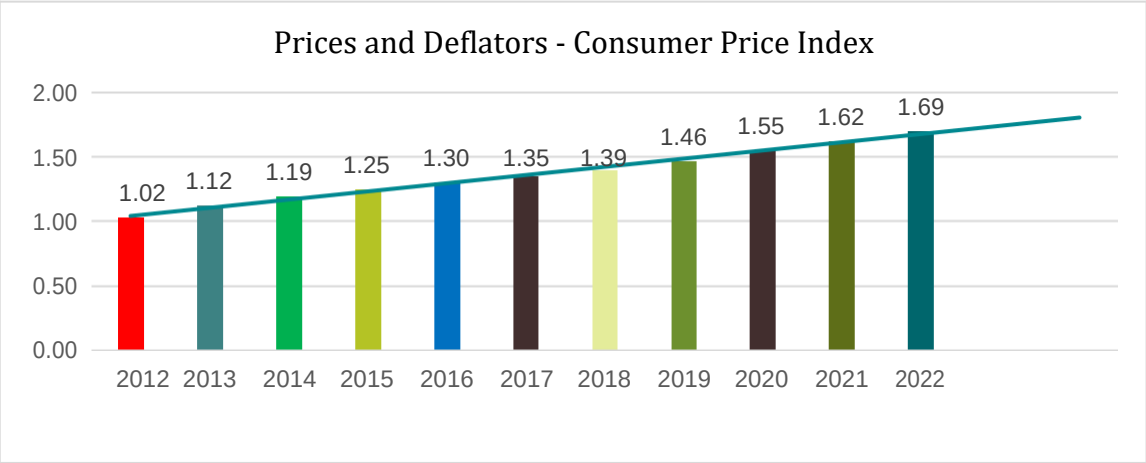

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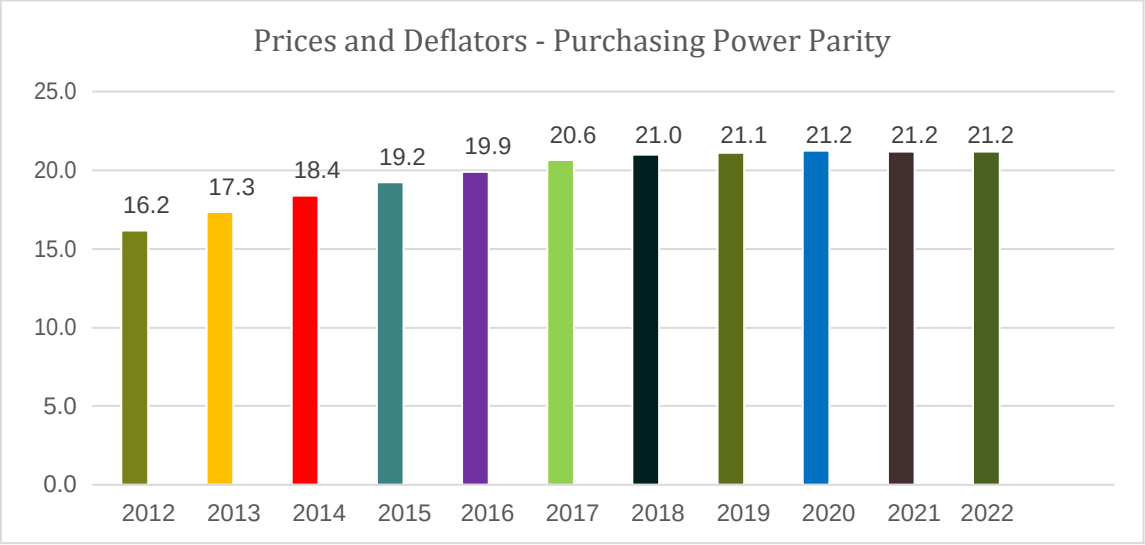
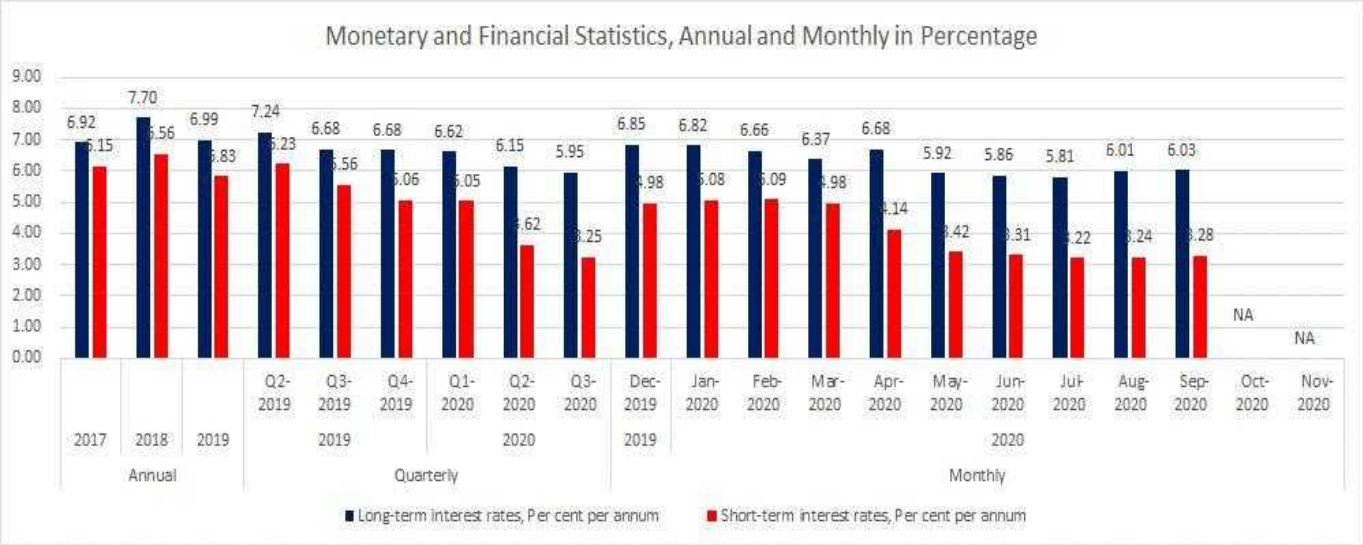


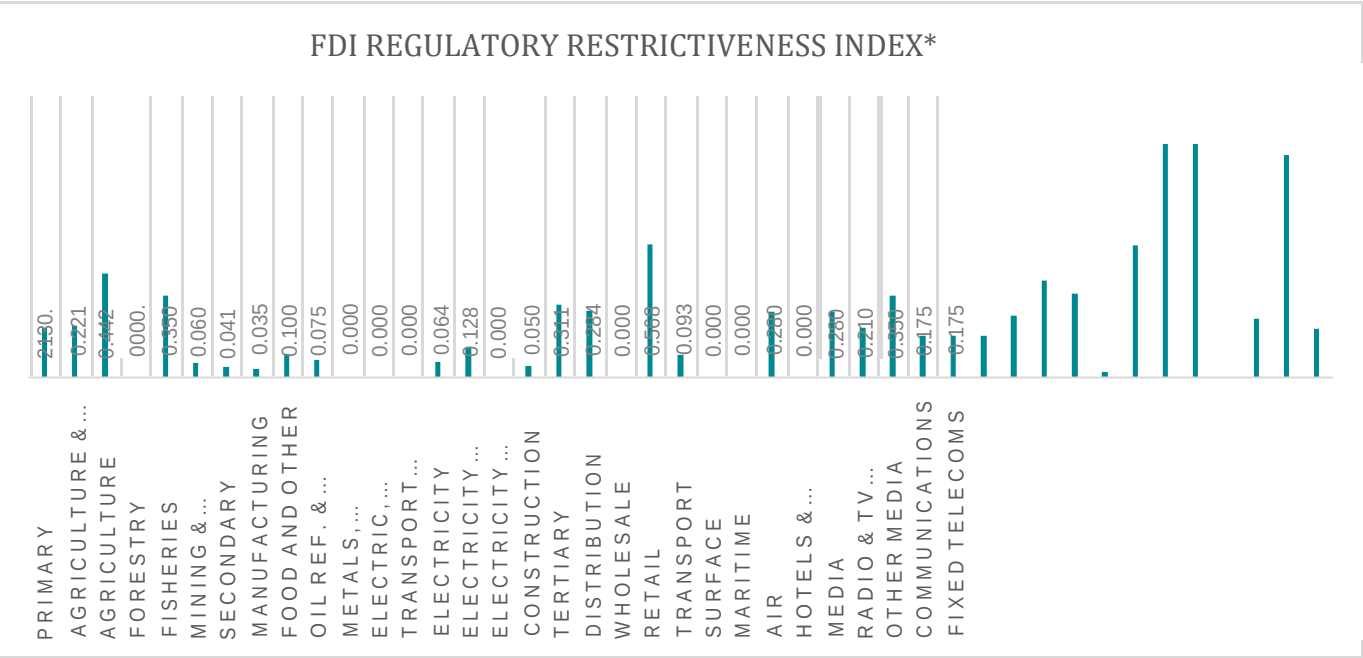
Source : Data from OECD, December, 2020 Cities @Glance Report

**Inequality in the tertiary sector - The Kernel Density Functions based on the APCE from the NSS

Is the growth of business services responsible for higher inequality? The tertiary sector is indeed a diverse set of activities which spans the spectrum of income distribution. **The financial, insurance, real estate and business services, which might be expected to constitute the ―high end‖ of the tertiary sector, employed only a small proportion of the workers in this sector.**



Source : Data Statistics from OECD, 2020



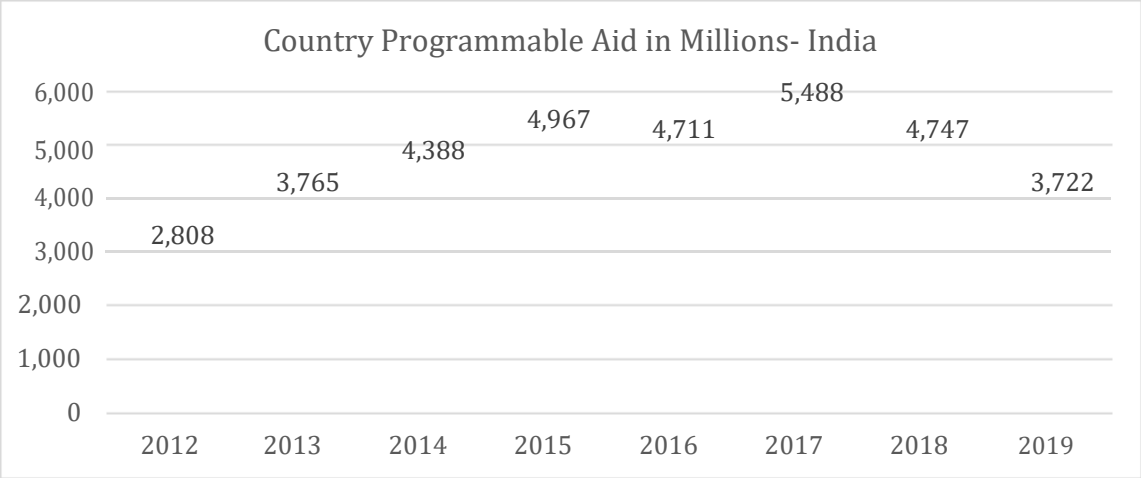
Source : Data Statistics from OECD, 2020
***2019**

Area of Legislation	Titles and Dates of Legislation	Main Provisions
Working conditions	The Factories Act, 1948 The Industrial Employment (Standing Orders) Act (IDA) 1946 The Contract Labour (Regulation and Abolition) Act, 1970	Governs the health, safety, and welfare of workers in factories. The Act extends to the whole of India, and includes service sector units employing intellectual labour. Separate Acts cover mines and railways workers. In 1987, a major amendment incorporated elements of occupational health and safety in the Act Specifies the form of the employment contract Seeks to control the use of non-regular workers.
Wages	The Payment of Wages Act, 1937 The Minimum Wages Act 1948	A central law applying to workers earning below a certain amount in the formal sector. The Minimum Wages Act 1948 Enacted for specified occupations/industries (mostly in the informal sector
Social Security and Insurance	The Workmen's Compensation Act, 1923 The Employees State Insurance Act, 1948	Specifies compensation that the employers need to pay on account of injury by accident at work-site or occupational diseases. Requires contributions from both

	The Employees State Insurance Act, 1948	employers and employees to be paid for insurance against sickness, maternity, funeral, and disablement. Applies primarily to factories and specifies deposit-linked provident fund or pension scheme

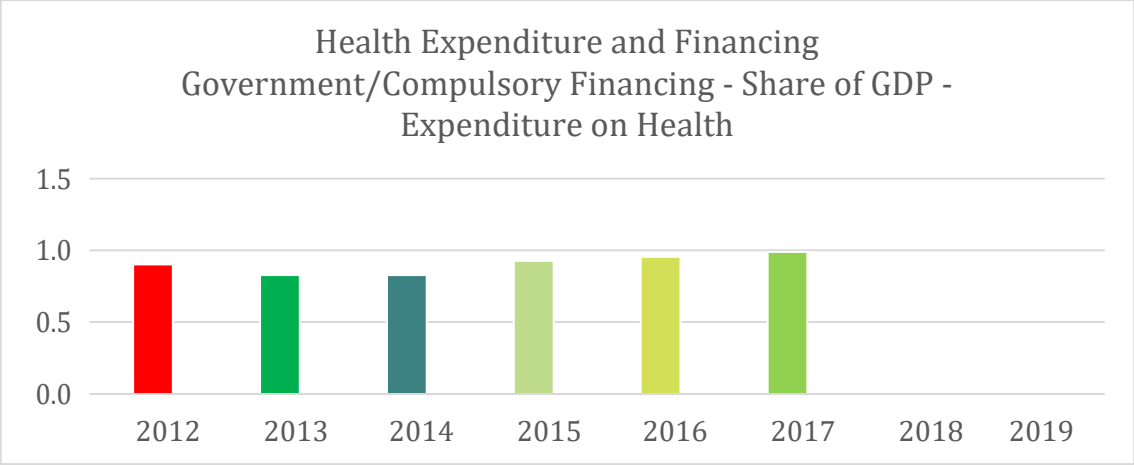
The National Old Age Pension Scheme (NOAPS) was available to all poor persons aged 65 years or older. Under the NOAPS, the Central Government provided for Rs. 200/- per pensioner per month and the states are urged to contribute an equal amount. NFBS and National Maternity Benefit Scheme (NMBS) —The amount of pension for NOAPS has been abysmally low. Data indicate that the average payment has been even less than the stipulated amount, which indicates that some of the eligible beneficiaries may not have been provided with pensions. (Remesh, 2008) Recasting the NAOPS from November 2007 onwards a new scheme called —Indira Gandhi National Old Age Pension Scheme (IGNOAPS) came into existence. Similarly, the National Maternity Benefit Scheme (NBMS) got replaced by a modified scheme called —***Janani Suraksha Yojana*** (JSY). The existing literature and assessments in the subject suggest that the standard criticisms against government sponsored schemes in terms of poor design, inadequate allocation, improper implementation and weak beneficiary participation also may hold true in the case of the above cash transfer programmes of the earlier government prior to 2014.

CPA is the proportion of aid that is subjected to multi-year programming at country level, and hence represent a subset of ODA outflows. It takes as a starting point data on gross ODA disbursements by recipient but excludes spending which is: (1) inherently unpredictable (humanitarian aid and debt relief); or (2) entails no flows to the recipient country (administration costs, student costs, development awareness and research and refugee spending in donor countries); or (3) is usually not discussed between the main donor agency and recipient governments (food aid, aid from local governments, core funding to NGOs, aid through secondary agencies, ODA equity investments and aid which is not allocable by country). (4) CPA does not net out loan repayments, as these are not usually factored into aid allocation decisions. CPA is therefore a gross concept. CPA figures for the previous year and for the future. CPA is derived by subtracting non- CPA expenditures (e.g. humanitarian aid, debt relief, administrative costs etc.) from gross ODA figures reported by recipient in the table DAC2a. Non-CPA expenditures are identified in DAC2a (e.g. humanitarian aid is reported as DAC2a column 216) and in the CRS activity database (e.g. using sector/purpose codes, channel codes of delivery, agency codes and/or description fields). The non-CPA flows are: Debt relief (DAC2a: col 212), Re-scheduled debt (DAC2a: col 214), Other forms of debt relief (DAC2a: col 221), Humanitarian aid (DAC2a: col 216), Developmental food aid (DAC2a: col 213), Promotion of development awareness (CRS), Imputed student costs (CRS), Administrative costs (CRS), Refugees in donor country (CRS), Aid from local governments (CRS), Core support to national, international and local NGOs (CRS), Export subsidies (CRS), University subsidies (CRS), Equity investments (CRS), Aid not from main agencies as notified by the donor (CRS), Aid that is not country or regionally allocable (DAC2a: ODA reported as bilateral unspecified, recipient code 998). Preliminary CPA data for the previous year and CPA projections for the future are based on aid providers' most recent plans as reported to the latest OECD-DAC Survey on Forward Spending Plans.

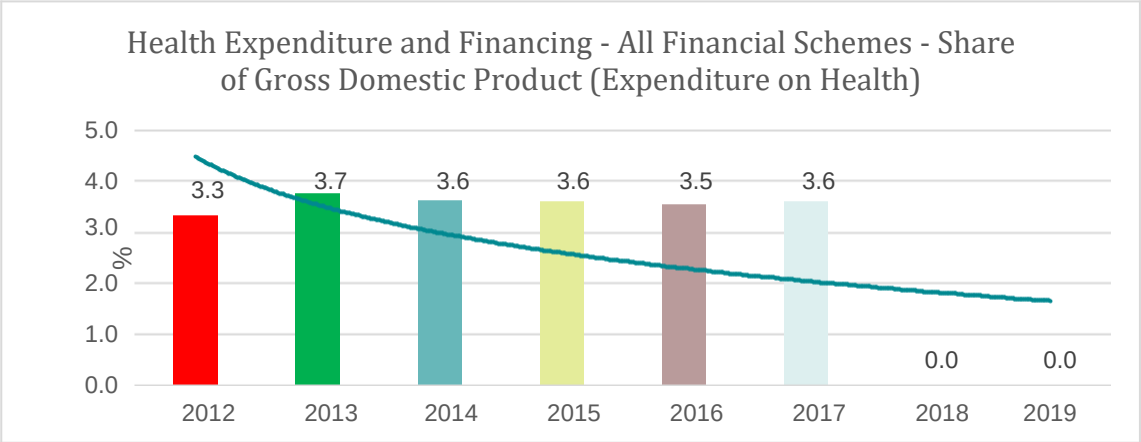


Source : Data from OECD, December, 2020 Cities @Glance Report

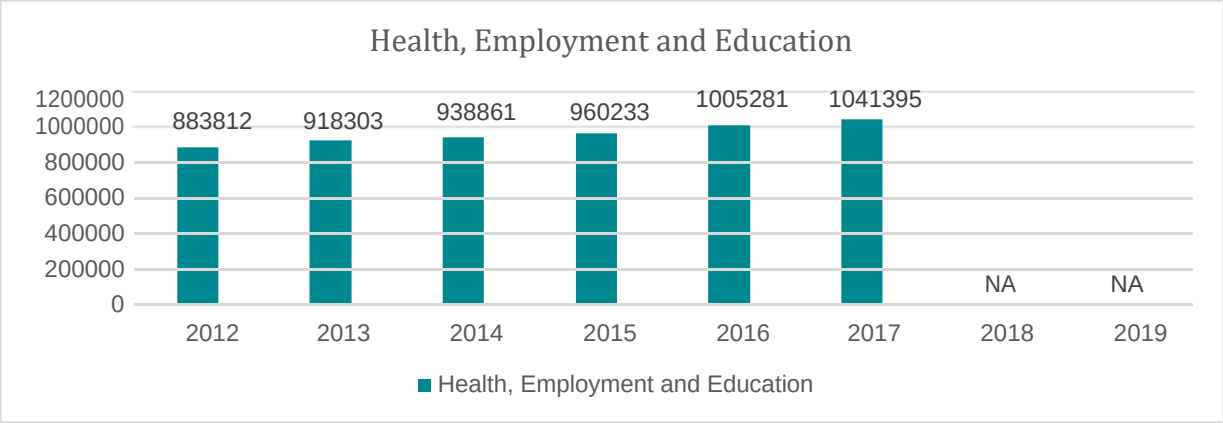
Gross fixed capital formation in the health care system – not available in India – suggestive to be added



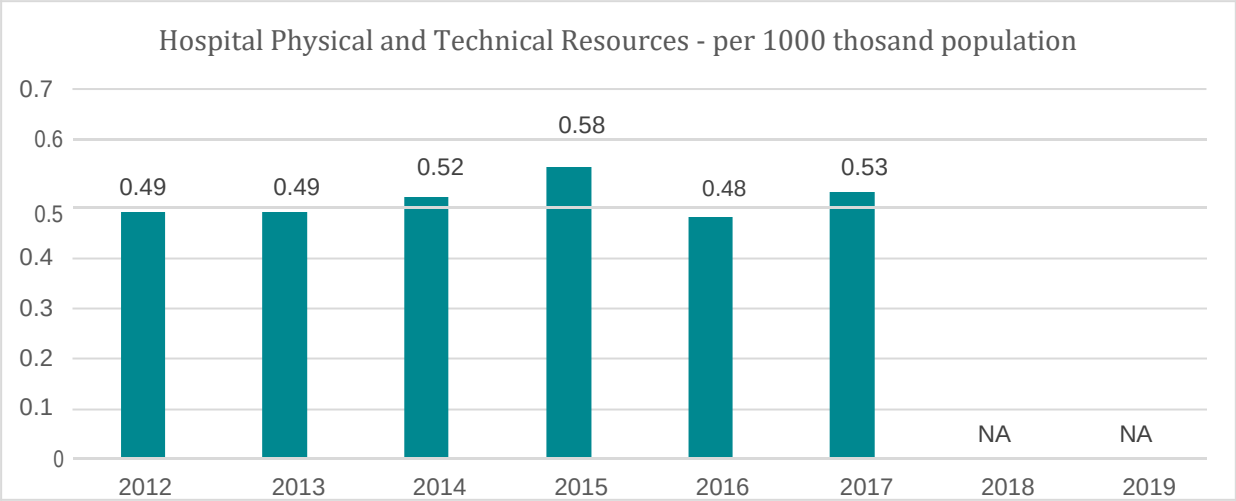
Source : Data from OECD, December, 2020 Cities @Glance Report



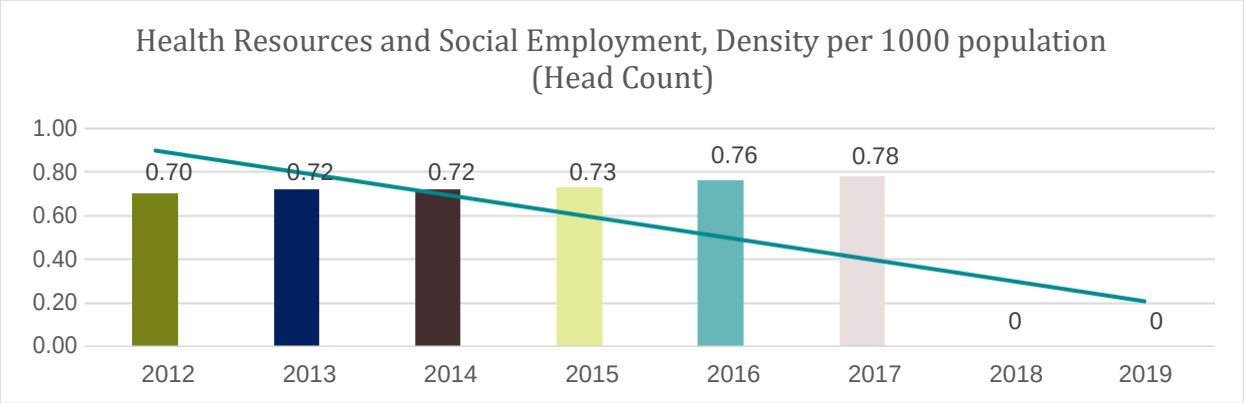
Source : Data from OECD, December, 2020 Cities @Glance Report



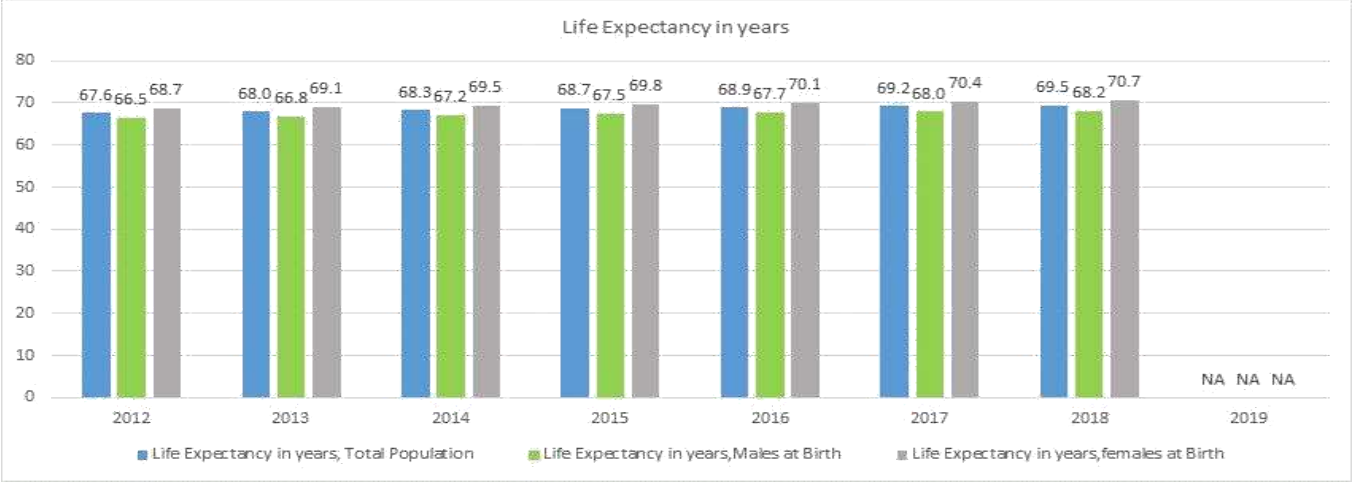
Source : Data from OECD, Data Statistics, 2020



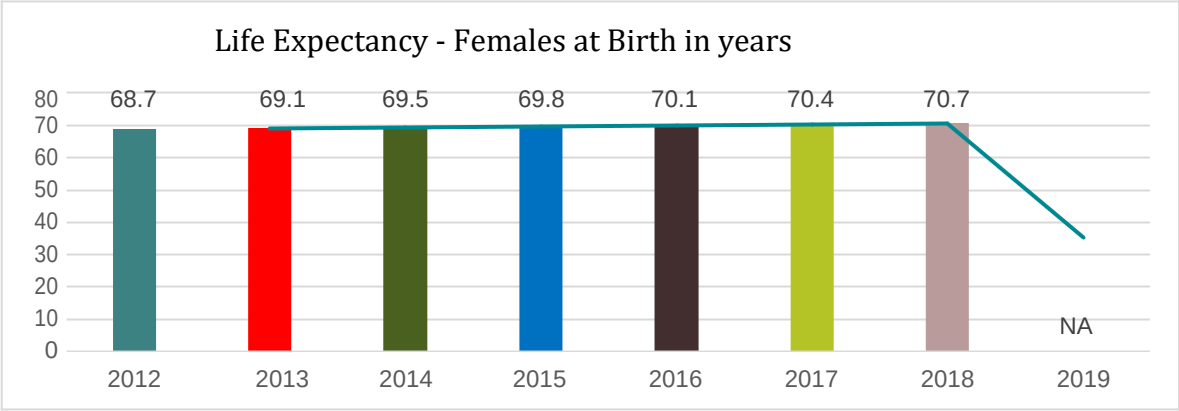
Source : Data from OECD, Data Statistics, 2020



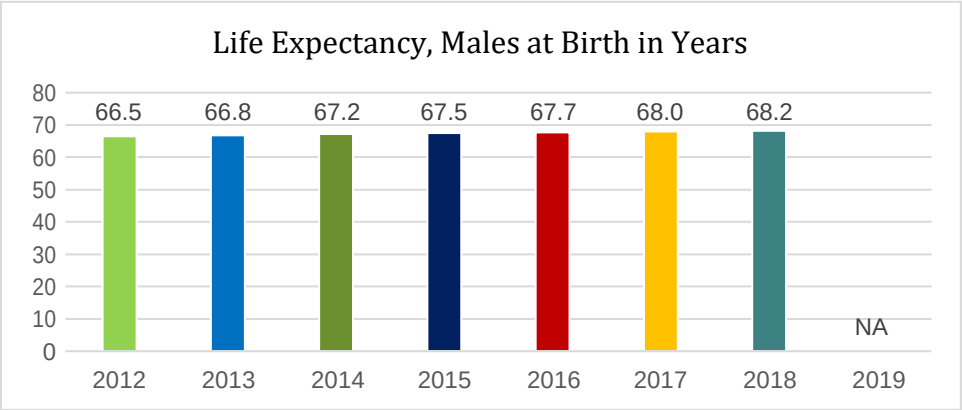
Source : Data from OECD, Data Statistics, 2020



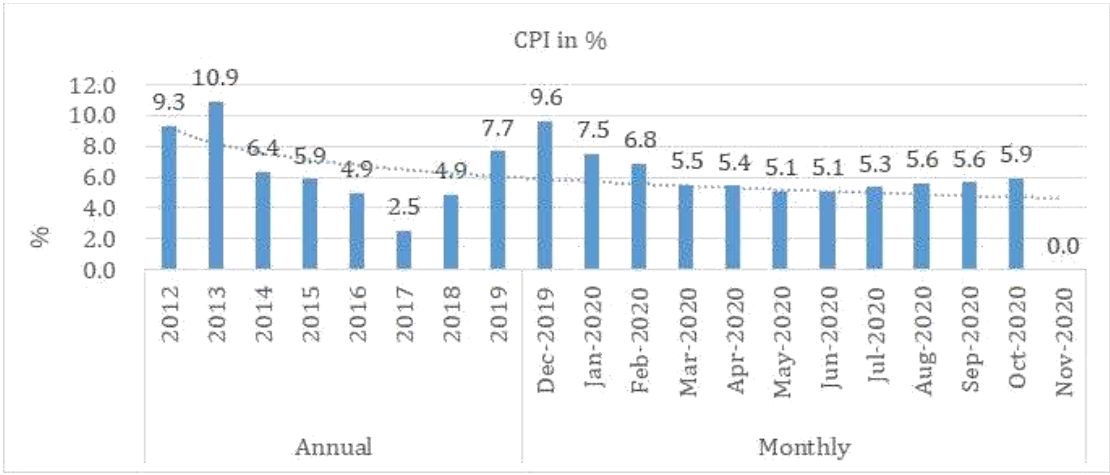
Source : Data from OECD, Data Statistics
NA : Data Not Available



Source : Data from OECD, Data Statistics
NA : Data Not Available



Source : Data from OECD, Data Statistics
NA : Data Not Available



Source: Data from OECD, Data Statistics, 2020

The 'Consumer Price Indices (CPIs)' dataset contains statistics on Consumer Price Indices including national CPIs, Harmonized Indices of Consumer Prices (HICPs) and their associated weights and contributions to national annual inflation. The data series presented have been chosen as the most relevant prices statistics for which comparable data across countries is available. In all cases, a lot of effort has been made to ensure that the data are internationally comparable across all countries presented and that all the subjects have good historical time-series' data to aid with analysis.

Globalization Indicators, Development synergies with Economy, Health and Cities – *Changing the perspectives of our outlook towards local challenges towards benchmarking globalized nudging of contributions and commitments*

Classification by type of entity includes: All resident units, Resident SPEs, and Resident Operating Units (Non-SPEs).

The financing structures of multinational enterprises (MNEs) have grown more complex over time in response to several factors, including the need to manage global production networks and the desire to reduce tax and regulatory burdens. These complex structures often involve the use of special purpose entities (SPEs) to channel investments through several countries before reaching their final destinations. The existence of SPEs is one important factor that can distort foreign direct investment (FDI) statistics. First, transactions by SPEs inflate the FDI flows into and out of the country where they are located as investment passes through via SPEs to its ultimate destination. Second, SPEs can distort the geographic distribution of FDI statistics for countries that host a significant number of them because it can appear they are receiving investment from countries whose investors are just passing capital through SPEs. Likewise, it can appear that investors from this country are investing abroad when that investment really reflects the funds that have been passed through. To address these issues, the OECD developed the 4th edition of its Benchmark Definition of Foreign Direct Investment (BMD4). BMD4 recommends that countries should compile FDI statistics separately for SPEs so that data for SPEs can be excluded, resulting in more meaningful measures of FDI.

India does not have inward FDI instrument and by partner country reporting framework mention among OECD Nations, as it's a non – OECD country, however as regard to the globalization indicators – India is following the protocol parameters and reporting it as well be it with regard to main flow aggregates, equity (this excludes reinvestment of earning), reinvesting earnings, debts, assets, liabilities and flows by industry.

FDI flow by industry and FDI position by industry- for India

The balance of payments is a statistical statement that provides a systematic summary of economic transactions of an economy with the rest of the world, for a specific time period. The transactions are for the most part between residents and non-residents of the economy. A transaction is defined as an economic flow that reflects the creation, transformation, exchange, transfer, or extinction of economic value and involves changes in ownership, of goods or assets, the provision of services, labour or capital. This dataset presents countries compiling balance of payments statistics in accordance with the 6th edition of the Balance of Payments and International Investment Position Manual published by the IMF (BPM6). Transactions include: the goods and services accounts, the primary income account (income account in BPM5), the secondary income account (transfers in BPM5), the capital account, and the financial account. Changes in BPM6 compared to BPM5 are often a consequence of a stricter application of the change of ownership principle in particular in the goods and services accounts. They relate to transactions on goods and services (merchanting, goods for processing, Insurance), income (investment income), and financial operations (direct investment).

Growth in GDP per capita, productivity and ULC

Productivity is a key driver of economic growth and changes in living standards. Labour productivity growth implies a higher level of output for unit of labour input (hours worked or persons employed). This can be achieved if more capital is used in production or through improved overall efficiency with which labour and capital are used together, i.e., higher multifactor productivity growth (MFP). Productivity is also a key driver of international competitiveness, e.g. as measured by Unit Labour Costs (ULC).

Composite Leading Indicators

The OECD CLI system is based on the "growth cycle" approach, where business cycles and turning points are measured and identified in the deviation-from-trend series. The Gross Domestic Product (GDP) is used as the reference for identification of turning points in the growth cycle for all countries, except for China for which the OECD relies on the value added of industry at 1995 prices. Zones aggregates of the CLIs and the reference series are calculated as weighted averages of the corresponding zone member series. The Urban Access Framework is comprised of a set of indicators for urban areas. These indicators measure how many destinations you can reach (absolute accessibility), how many destinations are nearby (proximity) and what is the impact of the transport system in reaching these destinations (transport performance). The indicators are computed for many different destinations, for four transport modes (car, public transport, walking and cycling), for different geographical levels and for different thresholds. This dataset contains indicators for 121 European cities and is an outcome of the "Access and safety in European cities" project, which:

was done in collaboration with OECD's Centre for Entrepreneurship, SMEs, Regions and Cities (CFE) and funded by the European Commission's Directorate-General for Regional and Urban Policy.

The turning point detection algorithm is a simplified version of the original Bry and Boschan routine. (The routine parses local minima and maxima in the cycle series and applies censor rules to guarantee alternating peaks and troughs, as well as phase and cycle length constraints. The Bry and Boschan routine used by the OECD does not include the correction for outlier, as is the case in the original version, as such a correction is implanted at an earlier stage of the filtering process). The OECD maintains a database of *Policy Instruments for the Environment (PINE)*, originally developed in co-operation with the European Environment Agency (EEA). The database contains detailed qualitative and quantitative information on environmentally related taxes, fees and charges, tradable permits, deposit-refund systems, environmentally motivated subsidies and voluntary approaches used for environmental policy. The database is freely accessible at oe.cd/pine.

Environmentally related taxes are an important instrument for governments to shape relative prices of goods and services. A number of the characteristics of such taxes are included in the database (e.g., revenue, tax base, tax rates, exemptions, etc.). This information is used to construct the ***environmentally related tax revenue*** with a breakdown by tax-base category and environmental domain. Note that tax-base categories are mutually exclusive, while domains are not. Therefore, one should not aggregate revenue across domains as it might lead to double counting.

Carbon emissions embodied in trade

This indicator reports the amount of carbon emissions from fossil fuel combustion embodied in imports and exports in mega tonnes of CO_2 ($MtCO_2$)

Imported emissions: the amount of carbon emissions from fossil fuel combustion, associated with the final consumption in a given industry in a given country but that are generated in other countries.

Exported emissions: the amount of carbon emissions from fossil fuel combustion associated with the final consumption in other countries but that are generated by a given industry in a given country before export.

Consumption-based emissions: the total amount of carbon emissions from fossil fuel combustion that is associated with the final consumption of a given industry in a given country, both domestically generated and imported.

Production-based emissions: the total amount of carbon emissions from fossil fuel combustion that is generated by a given industry in a given country and which is associated with both domestic and foreign final demands.

Carbon Emissions Embodied in Trade under the Equal Carbon Intensity (ECI) Assumption

The indicator reports the hypothetical amount of carbon emissions from fossil fuel combustion embodied in imports if imported goods were produced with a carbon intensity (i.e. emissions factors) equal to that of the importing country at a given time – the Equal Carbon Intensity (ECI) assumption.

Imported emissions: the actual amount of carbon emissions from fossil fuel combustion, associated with the final consumption of a given industry in a given country, that are generated in other countries (scaled so that the 1995 value equals 100).

ECI imported emissions: the hypothetical amount of carbon emissions from fossil fuel combustion, associated with the final consumption of a given industry in a given country that would have been generated in other countries under the Equal Carbon Intensity (ECI) assumption (divided by the 1995 value of actual emissions).

Scale, Composition and Technique Effects of Imported Carbon Emissions

The indicator reports the hypothetical amount of carbon emissions from fossil fuel combustion embodied in imports under two scenarios:

- a scenario where the sectorial composition of the imports and their associated emissions factors remain constant over time, allowing only for the scale of the imports to vary;
- a scenario where only the emissions factors remain constant over time, allowing for both the scale and the composition of the imports to vary.

Imported emissions by scale effect: the hypothetical amount of carbon emissions from fossil fuel combustion, associated with the final consumption of a given country that would have been generated in other countries if both the composition of industries making the final consumption and emissions factors would have remained constant over time (scaled so that the 1995 value equals 100).

Imported emissions by scale and composition effect: the hypothetical amount of carbon emissions from fossil fuel combustion, associated with the final consumption of a given country that would have been generated in other countries if emissions factors had remained constant over time (scaled so that the 1995 value equals 100).

This indicator estimates the total raw materials embedded in the final consumption for all countries between 1990 and 2010. Estimates of this consumption-based material extraction are called material footprint (MF) or raw material consumption (RMC). The different categories of raw materials considered are biomass, fossil fuels, metal ores, and non-metallic minerals.

Material footprint (MF): total material extraction associated with the final demand of the country considered.
Material footprint of exports (MFE): total material extraction in the country considered associated with the final demand from other countries

Material footprint of imports (MFI): Total material extraction in other countries associated with the final demand in the country considered.

Support Measures for Fossil Fuels

The indicator reports the amount provided by governments to fossil fuel producers and consumers.

Coal: the amount of producer and consumer support to the coal industry (in USD)
Natural gas: the amount of producer and consumer support to the natural gas industry (in USD).
Petroleum: the amount of producer and consumer support to the petroleum industry (in USD).
Total: the total amount of support to fossil fuels (in USD)

Tariffs on Environmental Goods: This indicator reports the import-weighted applied tariffs on environmentally related goods as defined in the Combined List of Environmental Goods (CLEG). HS code: the code in the Harmonized System (HS) identifying the traded good. Codes for years 2002-2008 are reported in the H2 version of the HS, codes for years 2009-2011 are reported in the H3 version of the HS, codes for years 2012-2016 are reported in the H4 version of the HS. Medium: Environmental medium of the good. The environmental media covered by this indicator are: APC = Air pollution control; CRE = Cleaner or more resource efficient technologies and products; EPP = Environmentally preferable products based on end use or disposal characteristics; HEM = Heat and energy management; MON = Environmental monitoring, analysis and assessment equipment; NRP = Natural resources protection; NVA = Noise and vibration abatement; REP = Renewable energy plant; SWM = Management of solid and hazardous waste and recycling systems; SWR = Clean up or remediation of soil and water; WAT = Waste water management and potable water treatment.

Average Applied Tariff: Rate of the import-weighted applied tariffs on environmentally-related goods in percentage points.

Exports value: value of exports from the considered country in current USD

Exports weight: weight of exports from the considered country in kilograms.

Import's value: value of imports in the considered country in current USD

Import's weight: weight of imports in the considered country in kilograms.

The indicator reports the amount of exports and imports of waste and scrap as defined in Kellenberg (2012) in current USD and in kilograms for all countries between 2003 and 2016.

The code in the Harmonized System (HS) identifying the traded good. Codes for years 2002-2008 are reported in the H2 version of the HS, codes for years 2009-2011 are reported in the H3 version of the HS, codes for years 2012-2016 are reported in the H4 version of the HS. Waste type: the waste types covered by this indicator are: chemicals, metals, minerals, papers, plastics textile and others.

Exports value: value of exports from the considered country in current USD
Exports weight: weight of exports from the considered country in kilograms.
Imports value: value of imports in the considered country in current USD.
Imports weight: weight of imports in the considered country in kilograms.

Environmental Policy Stringency Index

The OECD Environmental Policy Stringency Index (EPS) is a country-specific and internationally-comparable measure of the stringency of environmental policy. Stringency is defined as the degree to which environmental policies put an explicit or implicit price on polluting or environmentally harmful behaviour. The index ranges from 0 (not stringent) to 6 (highest degree of stringency).

Green Growth Indicators

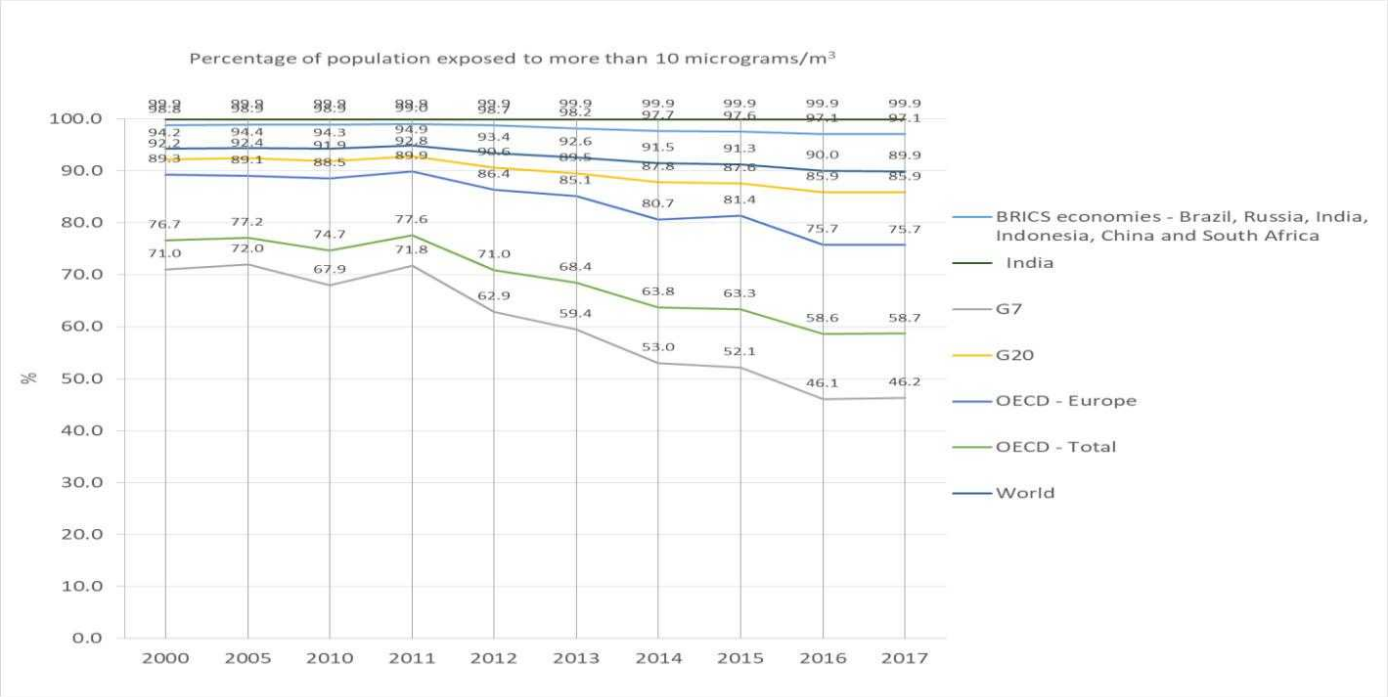
The OECD Green Growth database contains selected indicators for monitoring progress towards green growth to support policy making and inform the public at large. The database synthesises data and indicators across a wide range of domains including a range of OECD databases as well as external data sources. The database covers OECD member and accession countries, key partners (including Brazil, China, India, Indonesia and South Africa) and other selected non-OECD countries. The indicators have been selected according to well-specified criteria and embedded in a conceptual framework, which is structured around four groups to capture the main features of green growth:

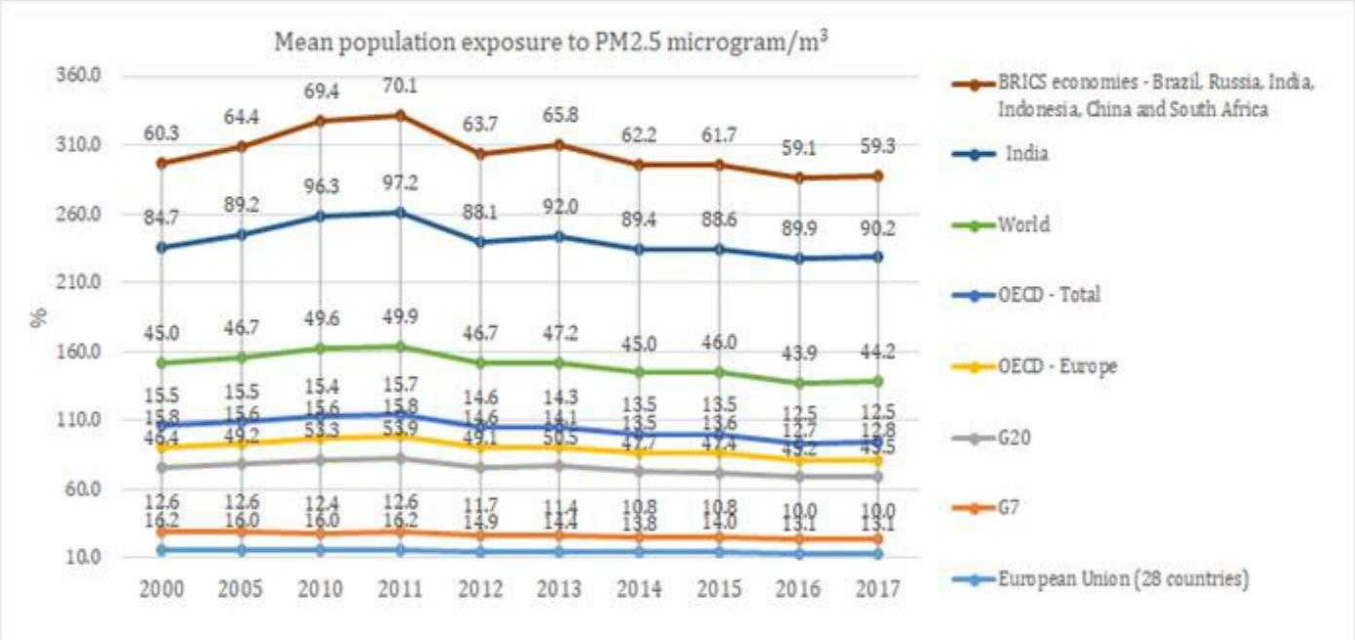
Environmental and resource productivity: indicate whether economic growth is becoming greener with more efficient use of natural capital and to capture aspects of production which are rarely quantified in economic models and accounting frameworks;

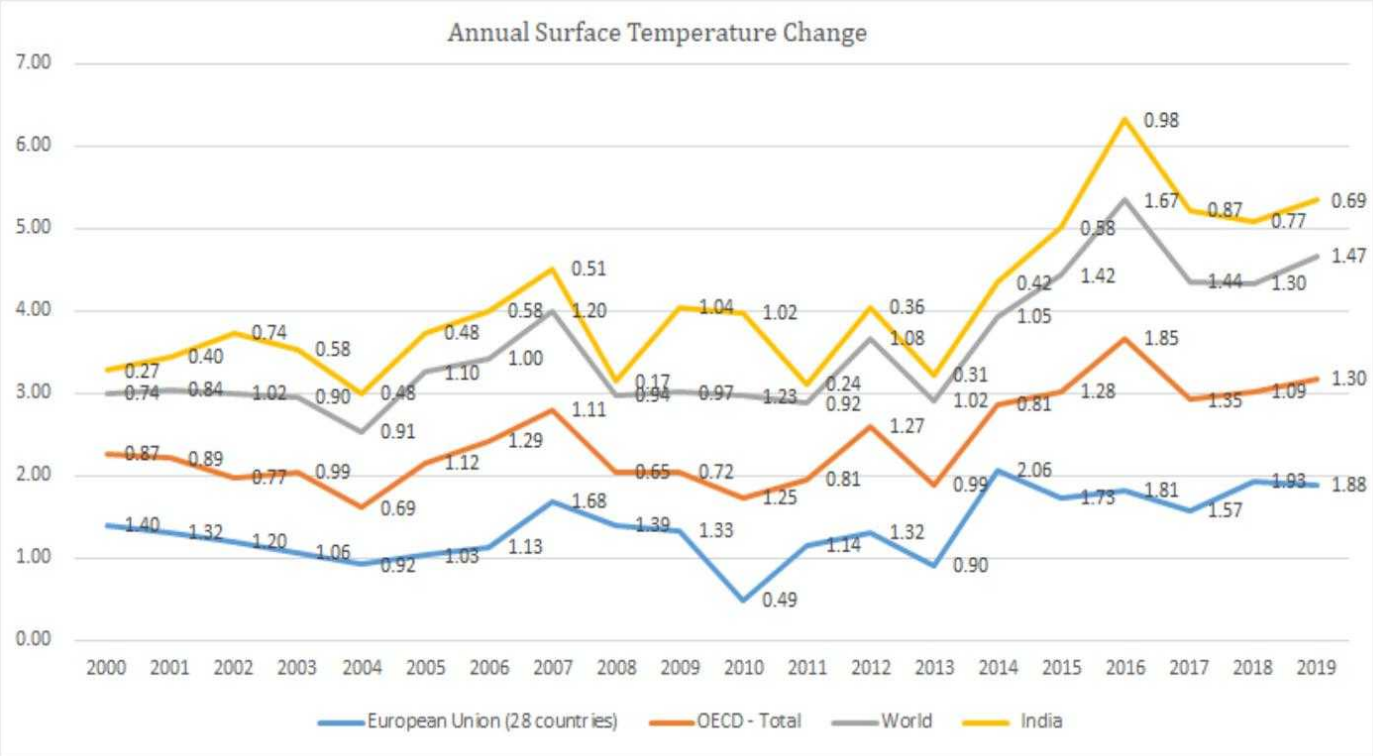
The natural asset base: indicate the risks to growth from a declining natural asset base;

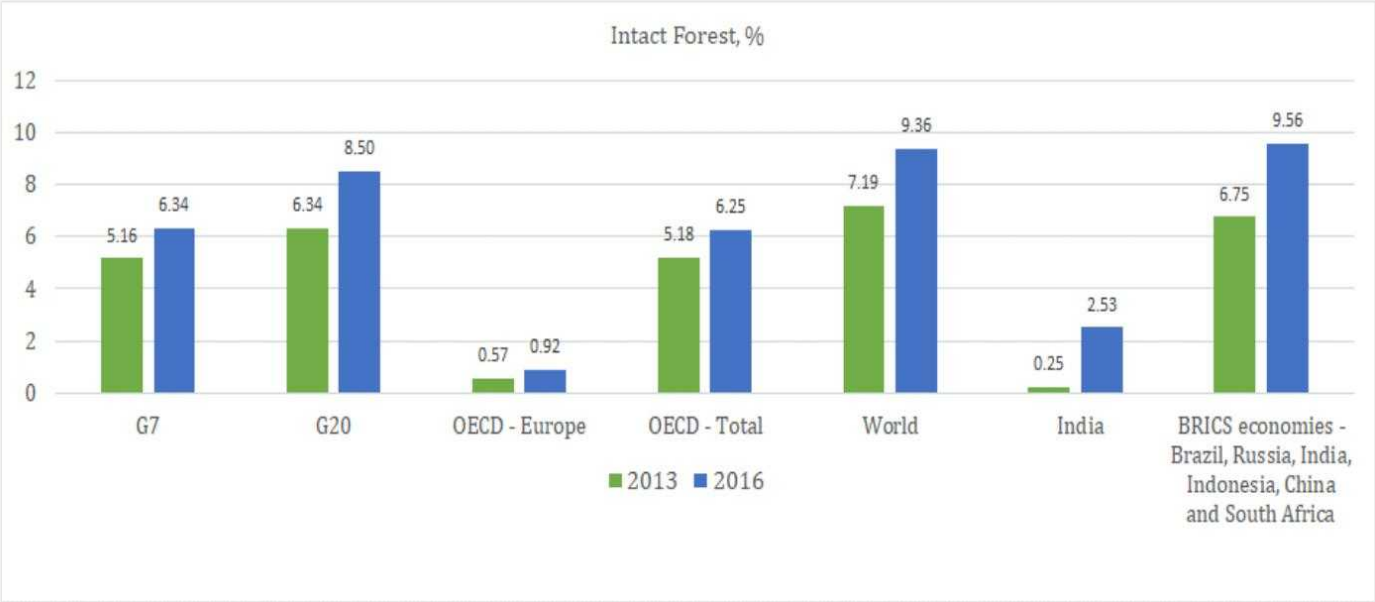
Environmental dimension of quality of life: indicate how environmental conditions affect the quality of life and wellbeing of people;

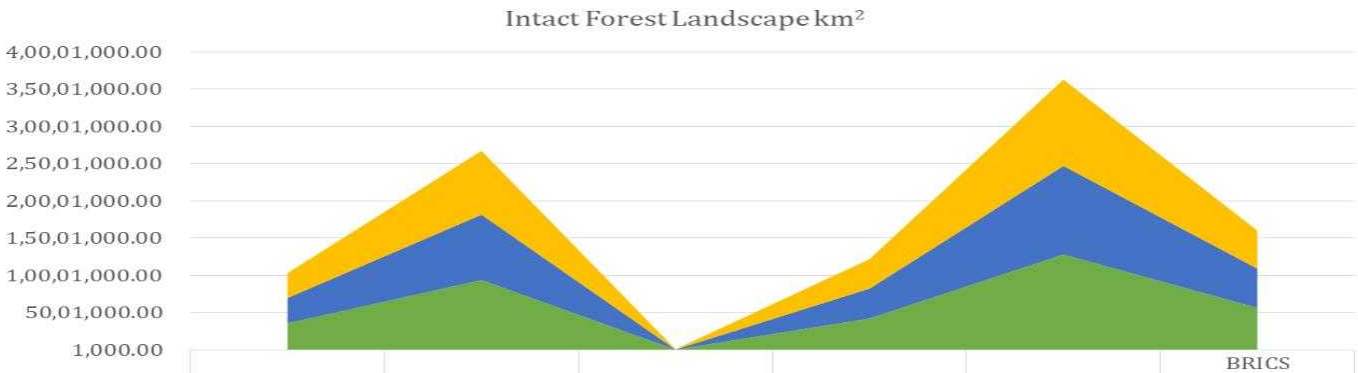
Economic opportunities and policy responses: indicate the effectiveness of policies in delivering green growth and describe the societal responses needed to secure business and employment opportunities.


Percentage of population exposed to more than 10 micrograms/m³
%
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2000
2005
2010
2011
2012
2013
2014
2015
2016
2017
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
India
G7
G20
OECD - Europe
OECD - Total
World


Mean population exposure to PM2.5 microgram/m³
%
360.0
310.0
260.0
210.0
160.0
110.0
60.0
10.0
2000
2005
2010
2011
2012
2013
2014
2015
2016
2017
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
India
World
OECD - Total
OECD - Europe
G20
G7
European Union (28 countries)

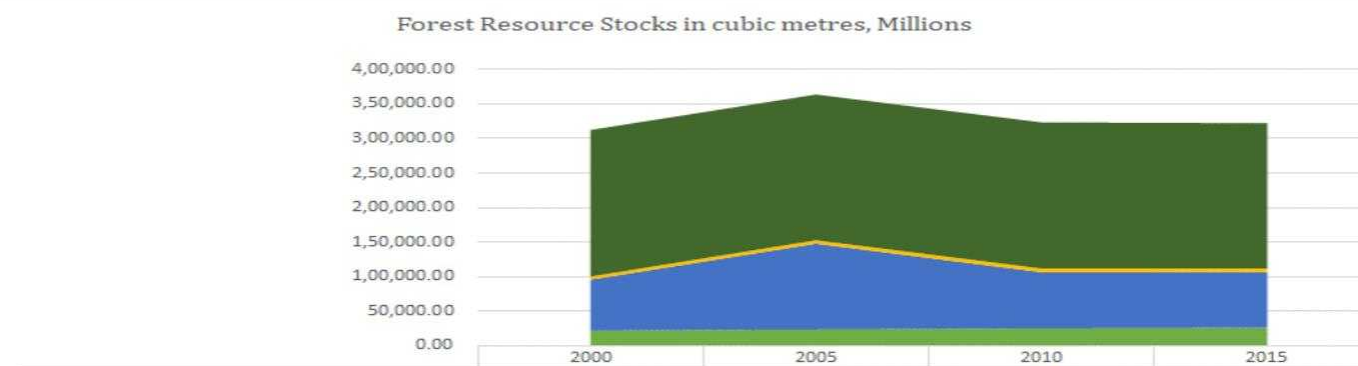

Annual Surface Temperature Change
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
European Union (28 countries)
OECD - Total
World
India


Intact Forest, %
12
10
8
6
4
2
0
5.16
6.34
6.34
8.50
0.57
0.92
5.18
6.25
7.19
9.36
0.25
2.53
6.75
9.56
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2013
2016

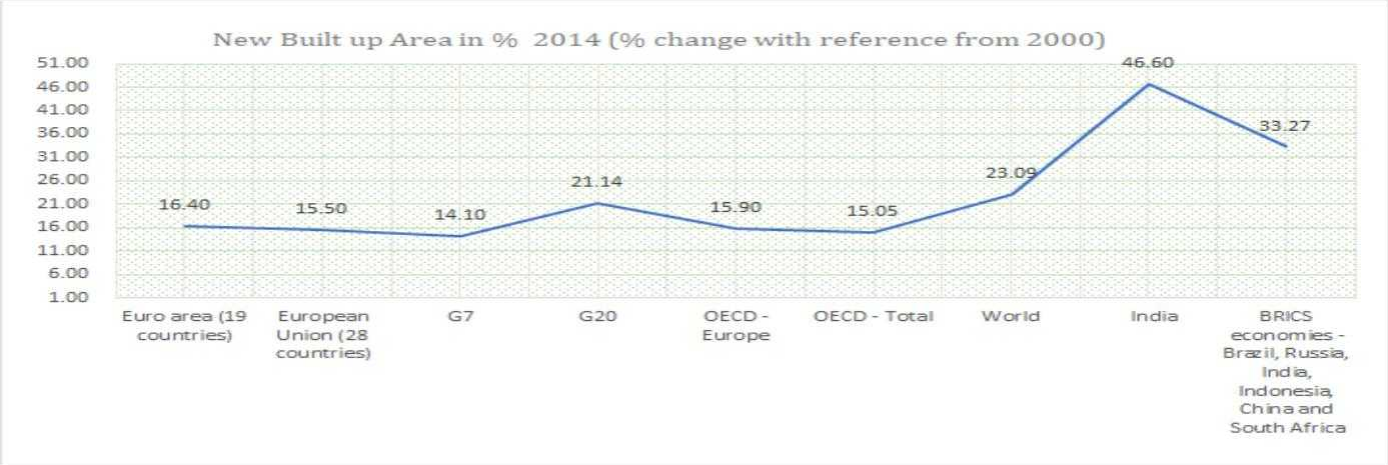


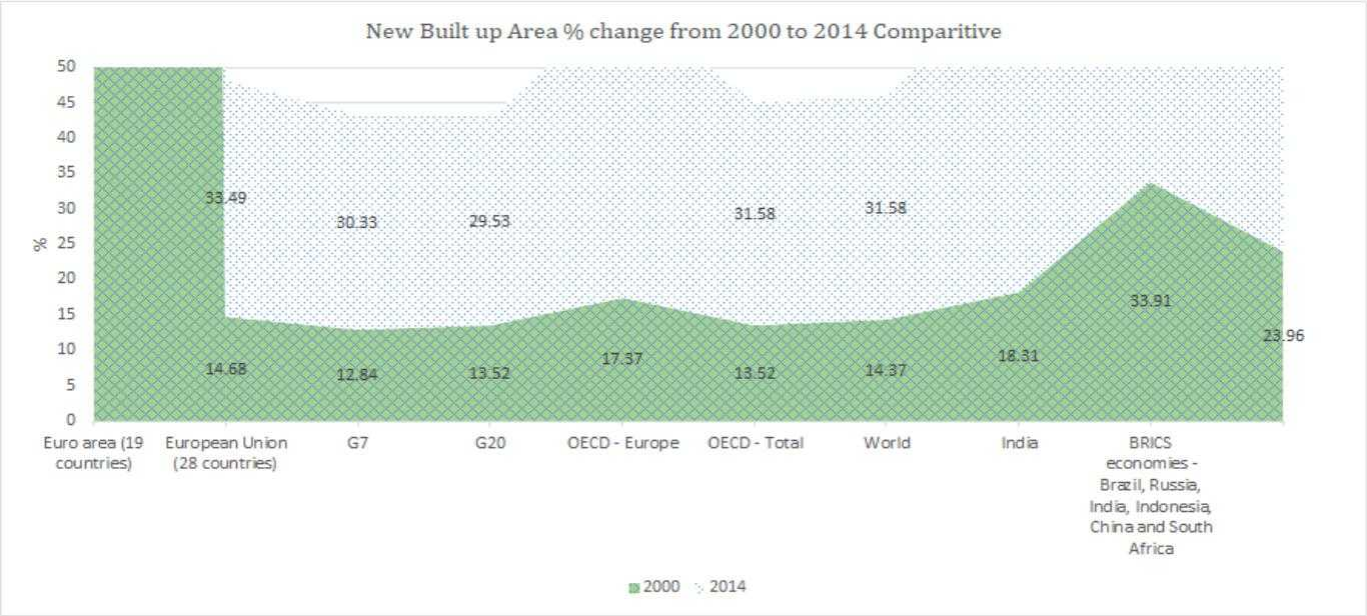
	G7	G20	OECD - Europe	OECD - Total	World	BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2016	33,44,773.40	85,71,691.18	22,795.84	39,53,749.67	1,16,02,151.53	50,97,685.65
2013	33,86,891.74	87,74,338.49	22,876.09	39,98,913.91	1,18,79,635.46	52,56,032.98
2000	35,71,050.93	93,68,087.13	23,006.54	42,17,364.82	1,28,00,221.56	56,36,316.28

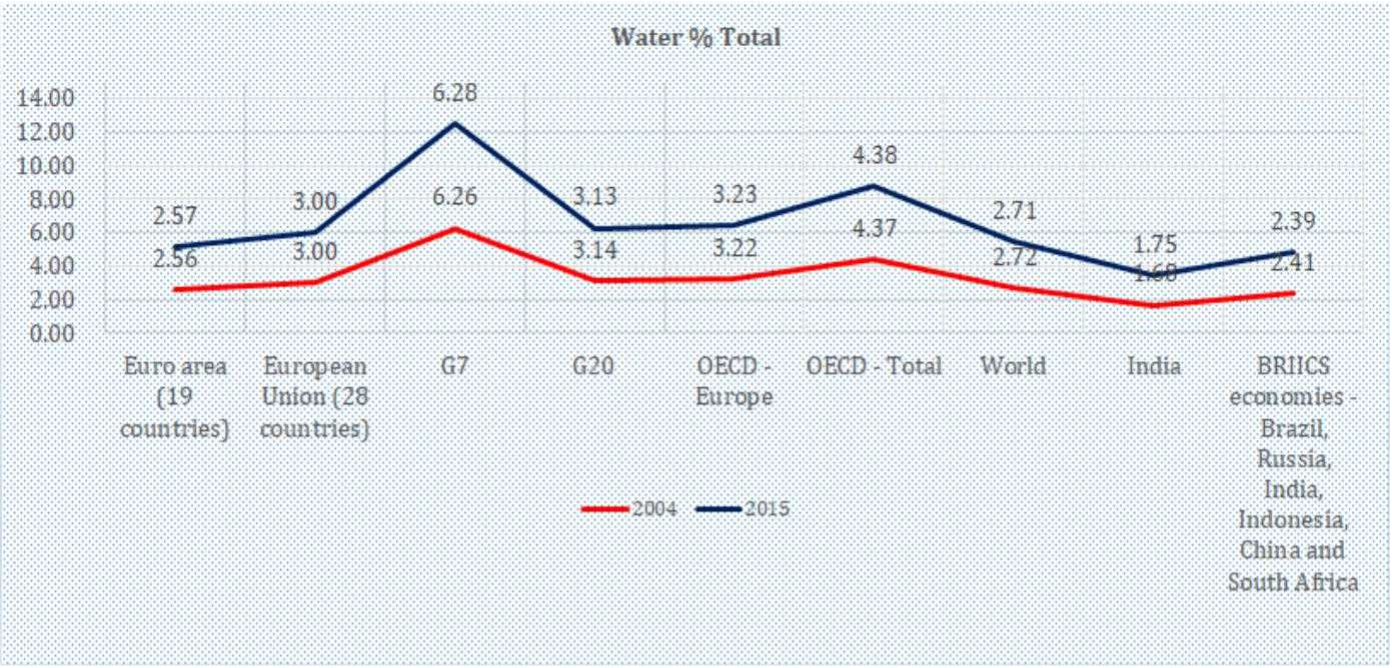
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
BRIICS economies - Brazil, Russia, India, Indonesia, China and South Africa	0.10	0.12	0.17	0.27	0.30	0.59	0.81	1.37	1.49	1.78	2.09	2.24	2.25	2.95	2.92
India	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.59	0.64
OECD - Total	0.04	0.16	2.24	2.68	3.05	4.32	4.94	5.30	5.54	6.34	7.31	7.83	8.79	9.39	9.57
OECD - Europe	0.25	0.89	11.89	12.49	13.38	14.17	14.22	14.11	13.50	14.50	14.95	14.52	16.00	17.17	18.22

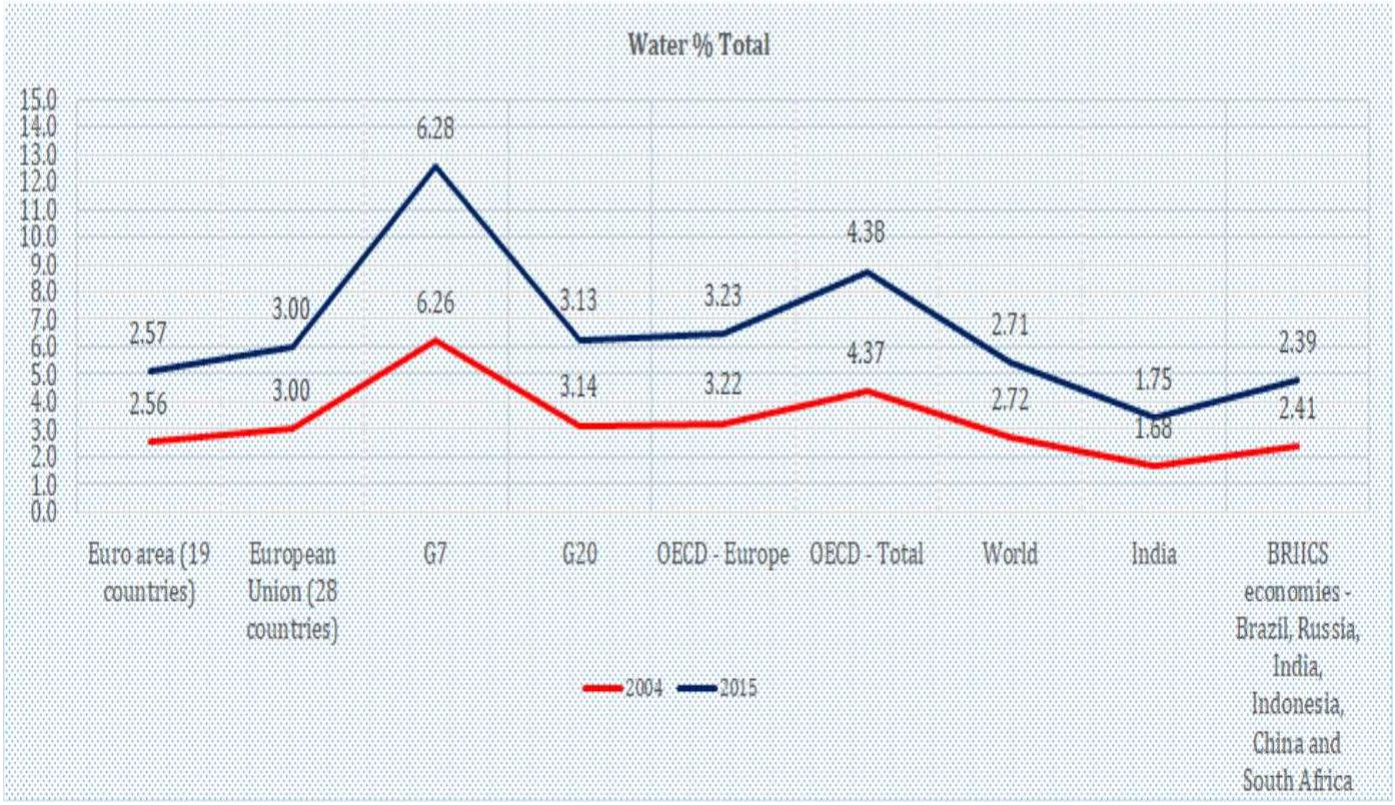


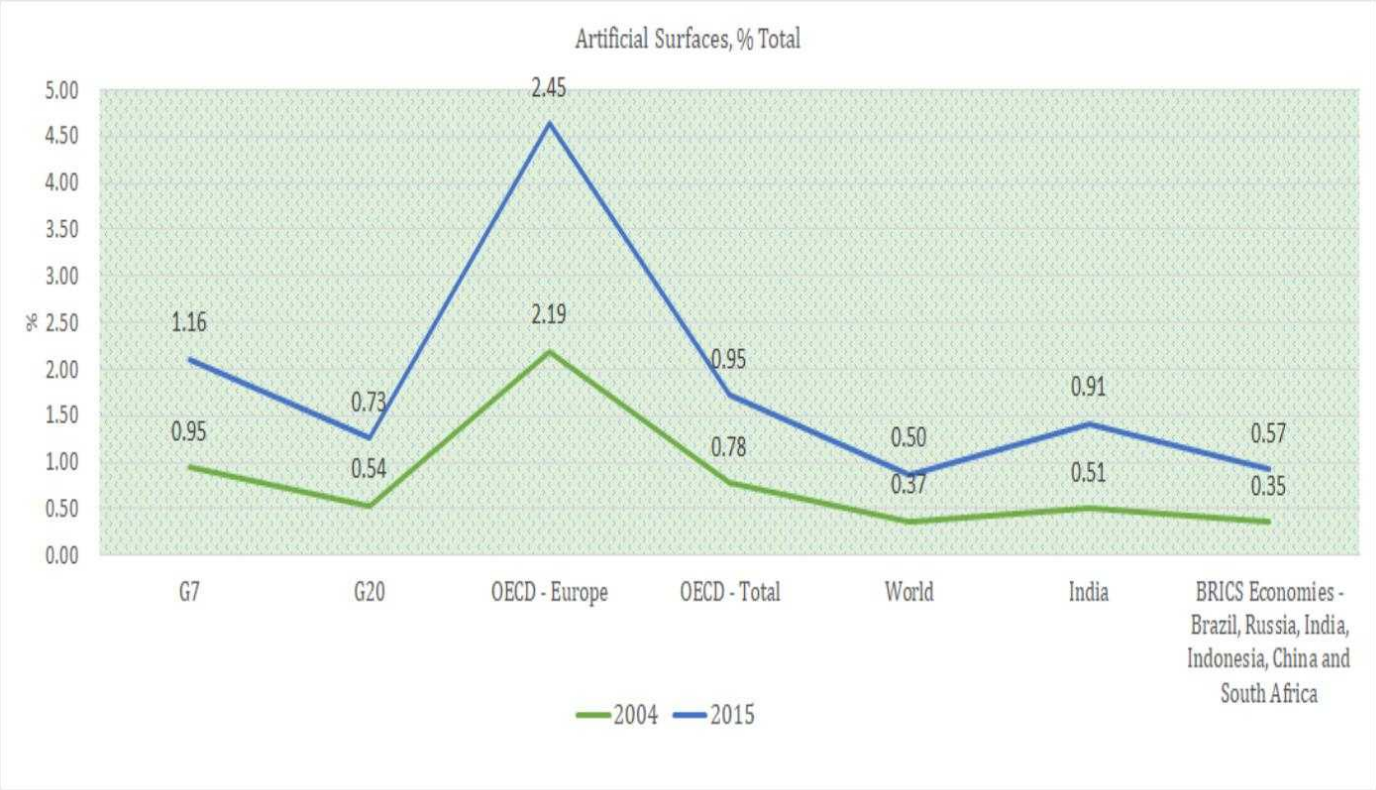
	2000	2005	2010	2015
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa	2,11,983.80	2,10,720.60	2,11,331.90	2,10,299.90
India	4,662.00	5,129.00	5,489.00	5,167.00
OECD - Total	73,569.22	1,24,034.30	81,075.30	80,109.78
OECD - Europe	22,094.19	23,699.57	25,338.71	26,468.55

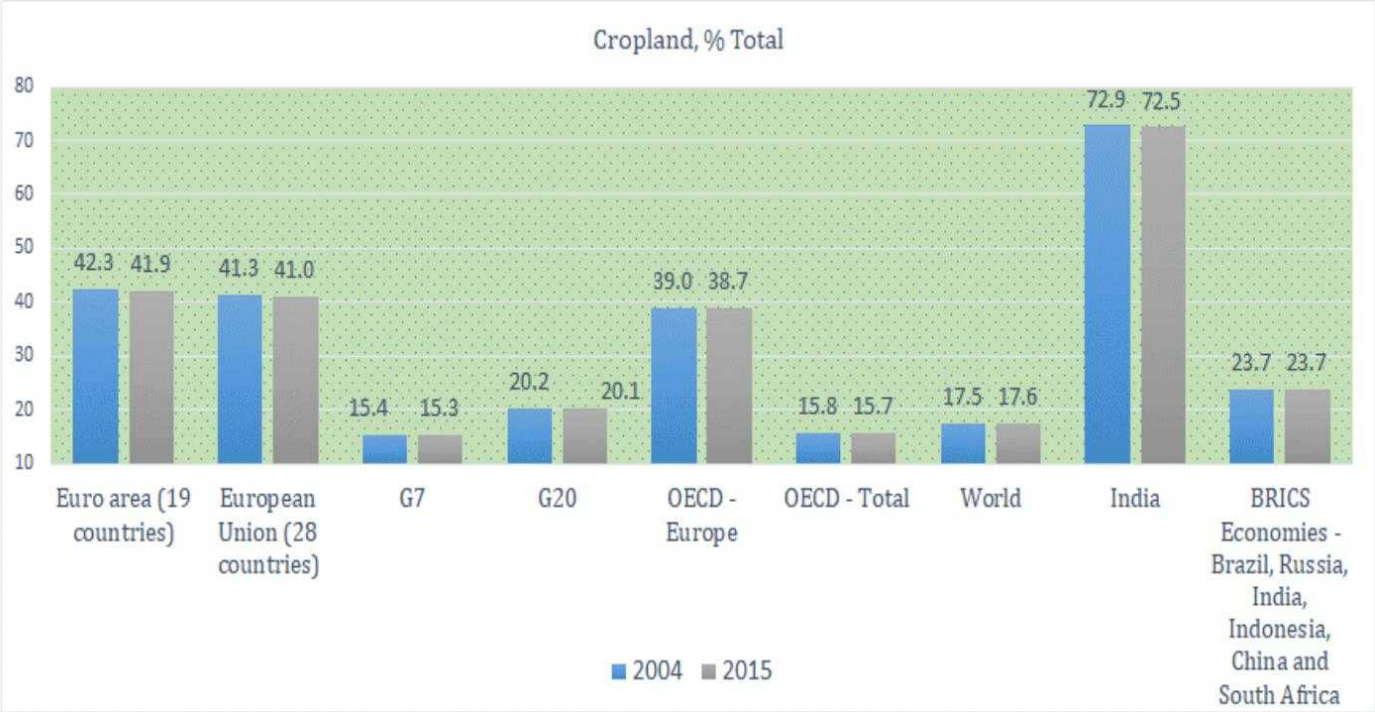

New Built up Area in % 2014 (% change with reference from 2000)
51.00
46.00
41.00
36.00
31.00
26.00
21.00
16.00
11.00
6.00
1.00
16.40
15.50
14.10
21.14
15.90
15.05
23.09
46.60
33.27
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa

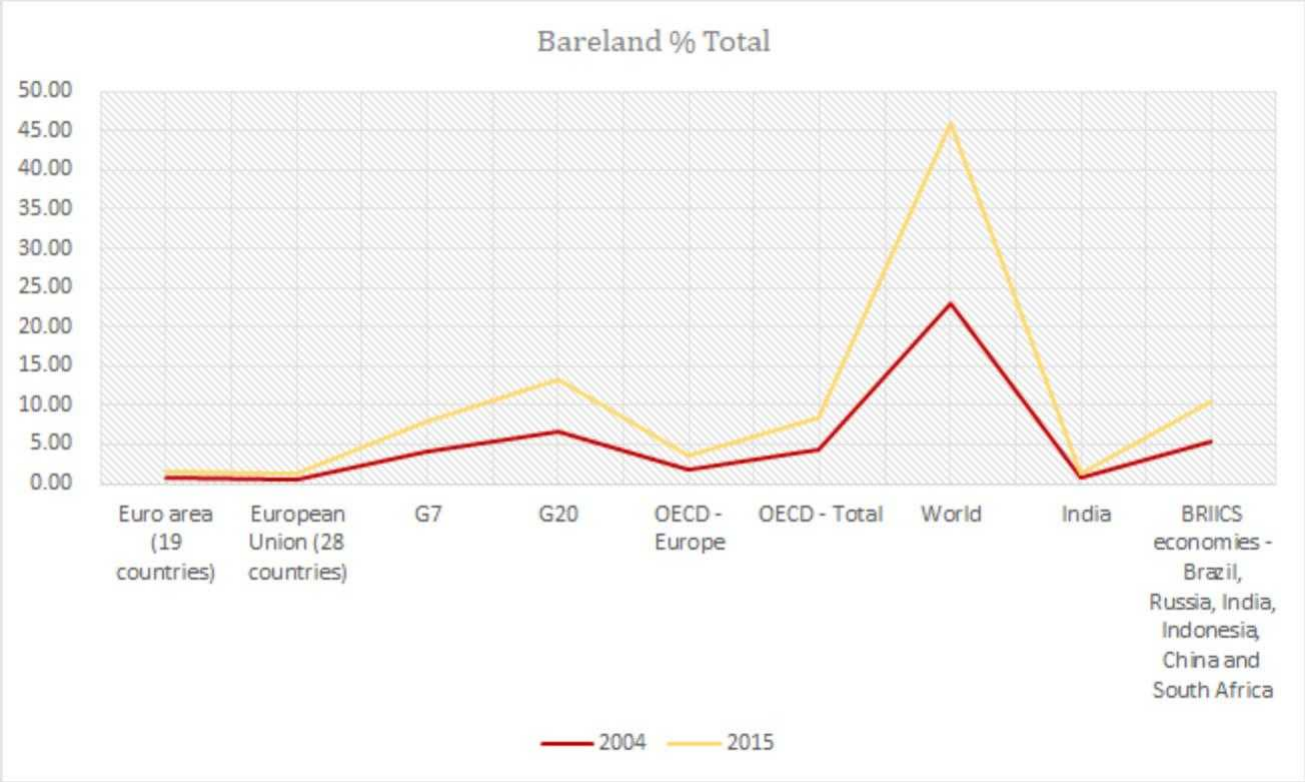

New Built up Area % change from 2000 to 2014 Comparitive
50
45
40
35
30
25
20
15
10
5
0
%
33.49
30.33
29.53
31.58
31.58
14.68
12.84
13.52
17.37
13.52
14.37
18.31
33.91
23.96
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2000
2014


Water % Total
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
2.57
3.00
6.28
3.13
3.23
4.38
2.71
1.75
2.39
2.56
3.00
6.26
3.14
3.22
4.37
2.72
1.68
2.41
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRIICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015

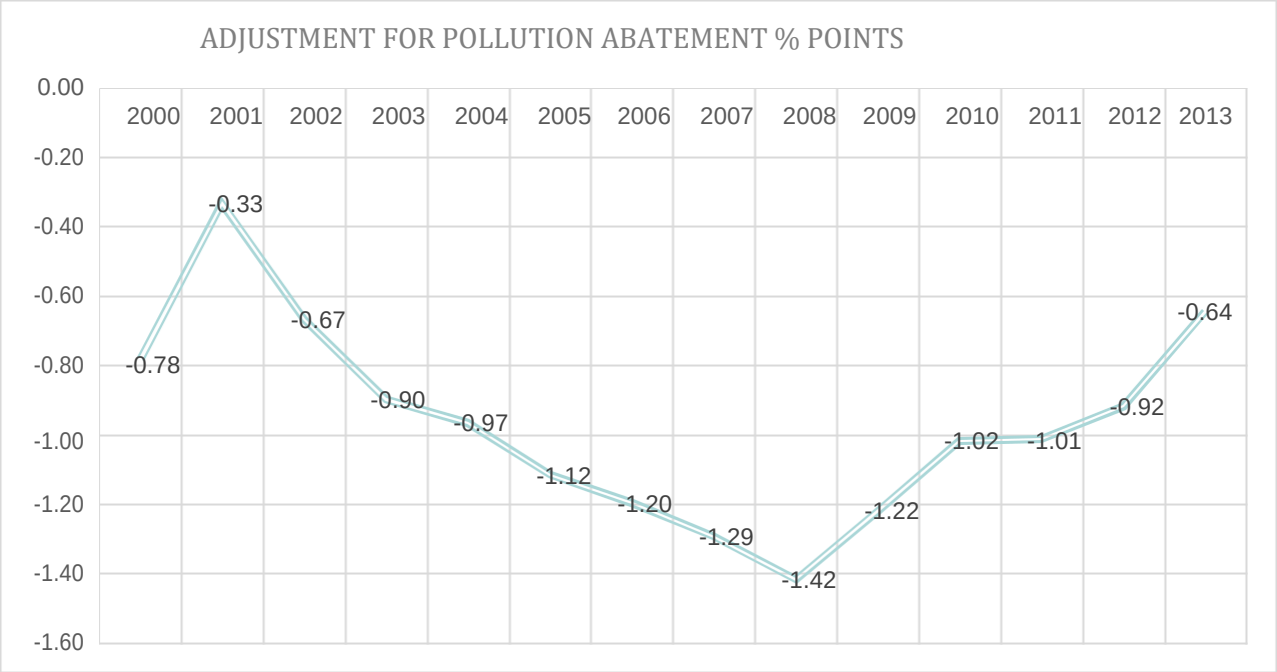

Water % Total
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.57
3.00
6.28
3.13
3.23
4.38
2.71
1.75
2.39
2.56
3.00
6.26
3.14
3.22
4.37
2.72
1.68
2.41
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRIICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015

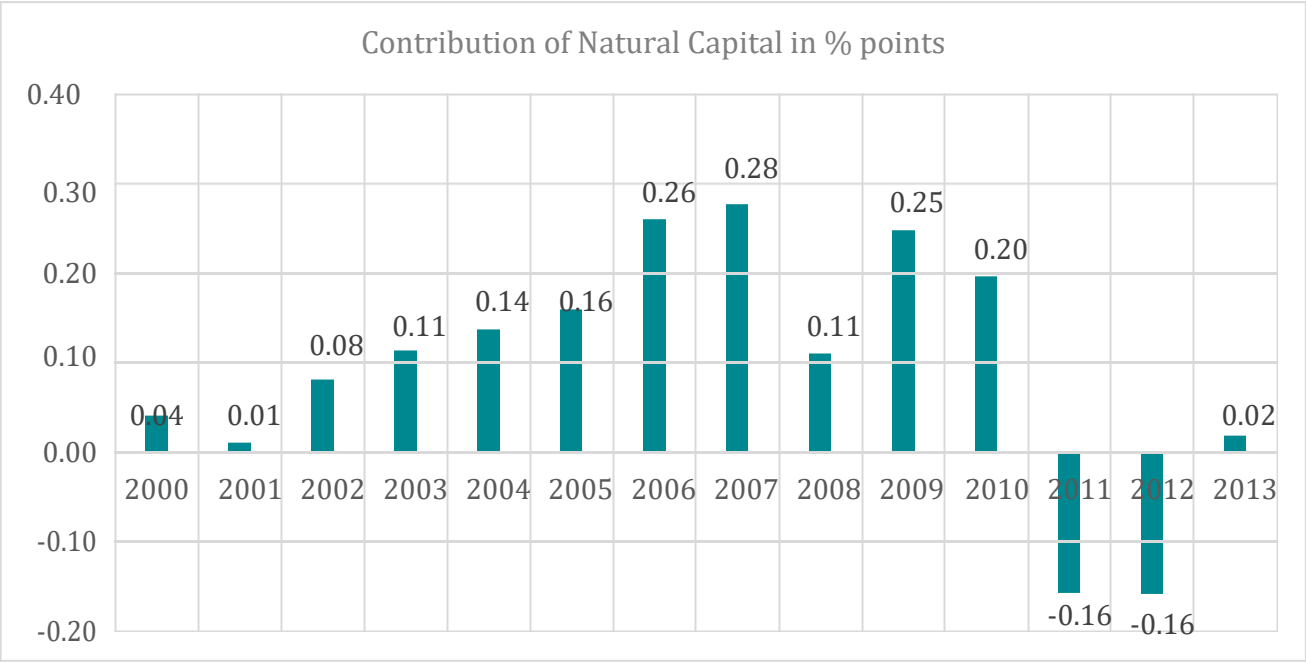

Artificial Surfaces, % Total
%
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1.16
0.73
2.45
0.95
0.50
0.91
0.57
0.95
0.54
2.19
0.78
0.37
0.51
0.35
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS Economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015

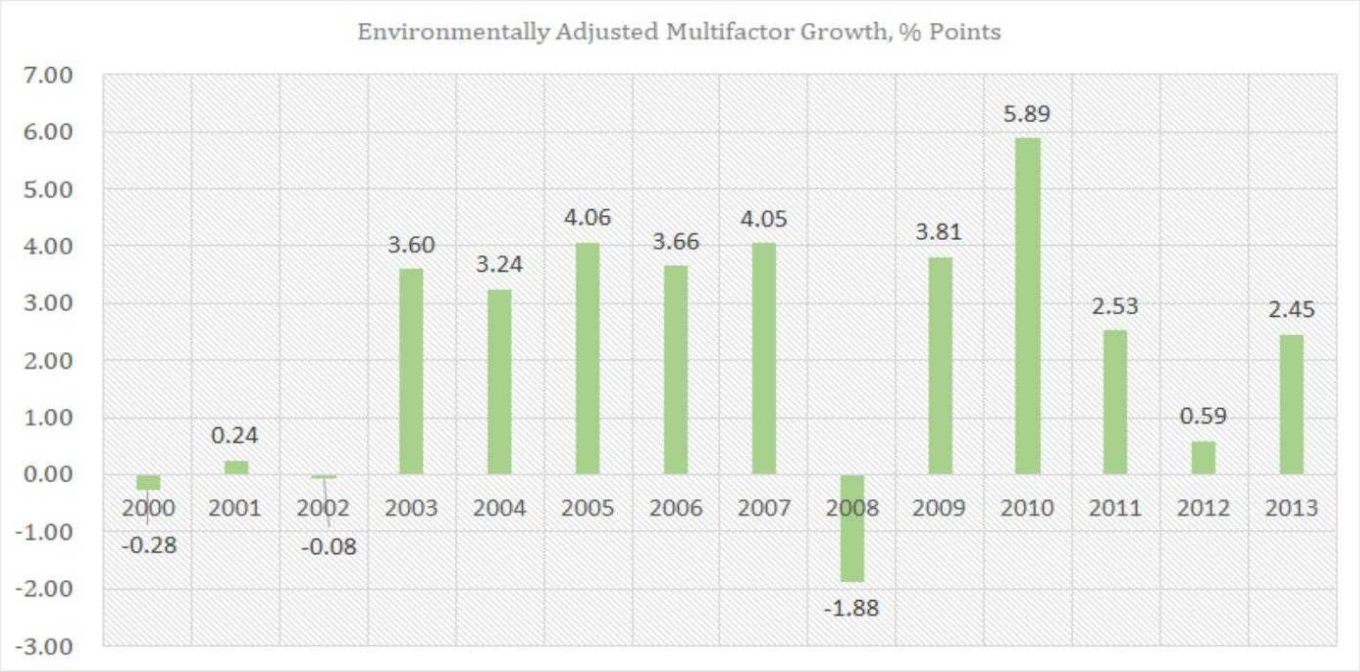

Cropland, % Total
80
70
60
50
40
30
20
10
42.3
41.9
41.3
41.0
15.4
15.3
20.2
20.1
39.0
38.7
15.8
15.7
17.5
17.6
72.9
72.5
23.7
23.7
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS Economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015

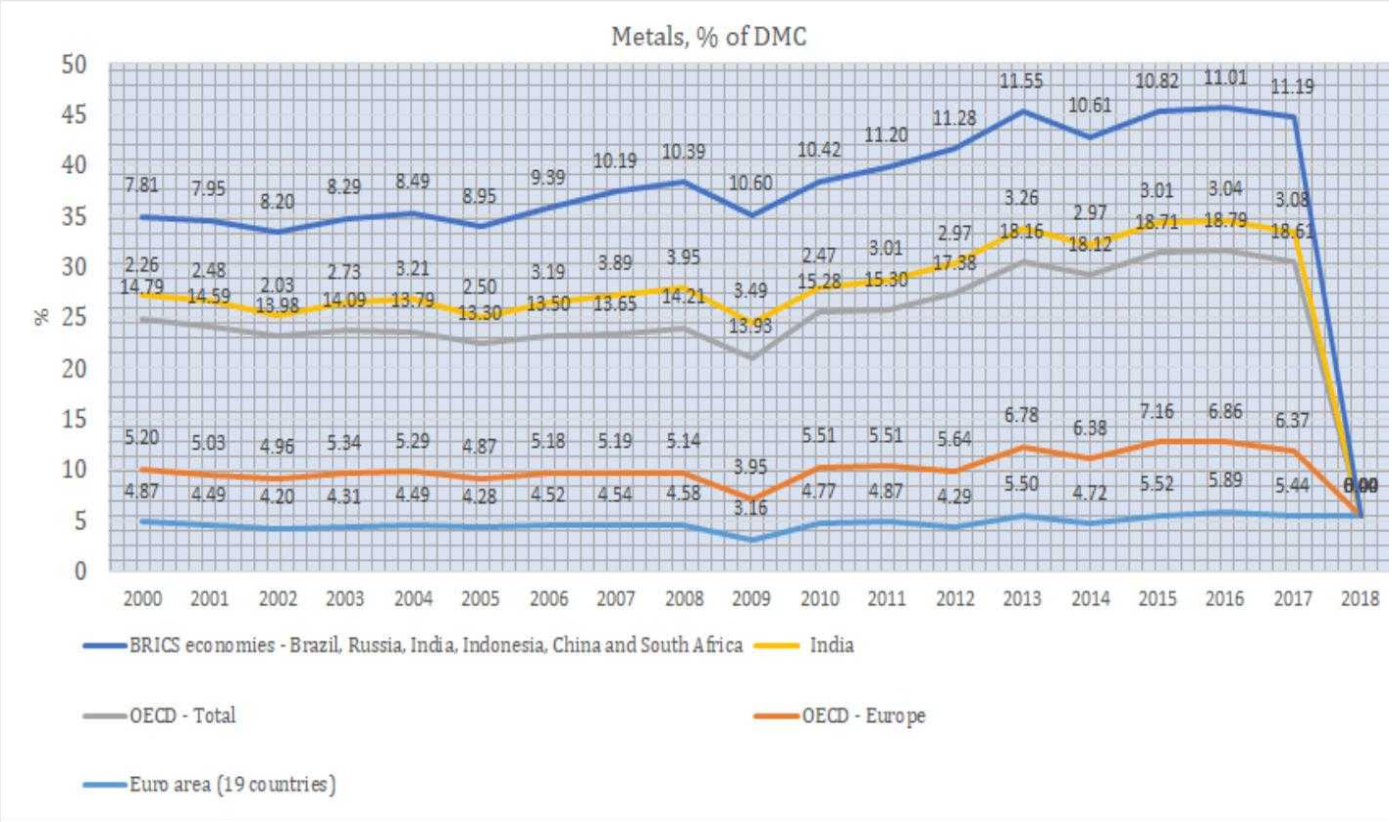

Bareland % Total
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRIICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015

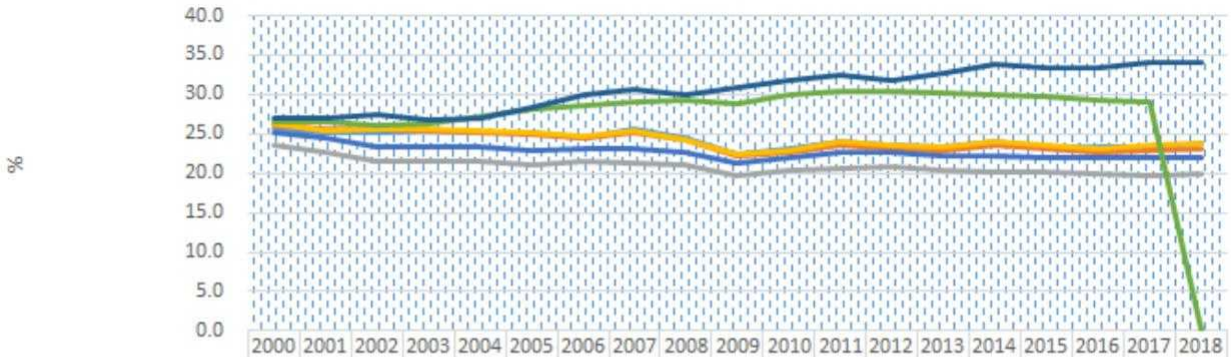

Natural and semi-natural vegetated land, % total
190
170
150
130
110
90
70
50
30
10
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
2004
2015


ADJUSTMENT FOR POLLUTION ABATEMENT % POINTS
0.00
-0.20
-0.40
-0.60
-0.80
-1.00
-1.20
-1.40
-1.60
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
-0.78
-0.33
-0.67
-0.90
-0.97
-1.12
-1.20
-1.29
-1.42
-1.22
-1.02
-1.01
-0.92
-0.64

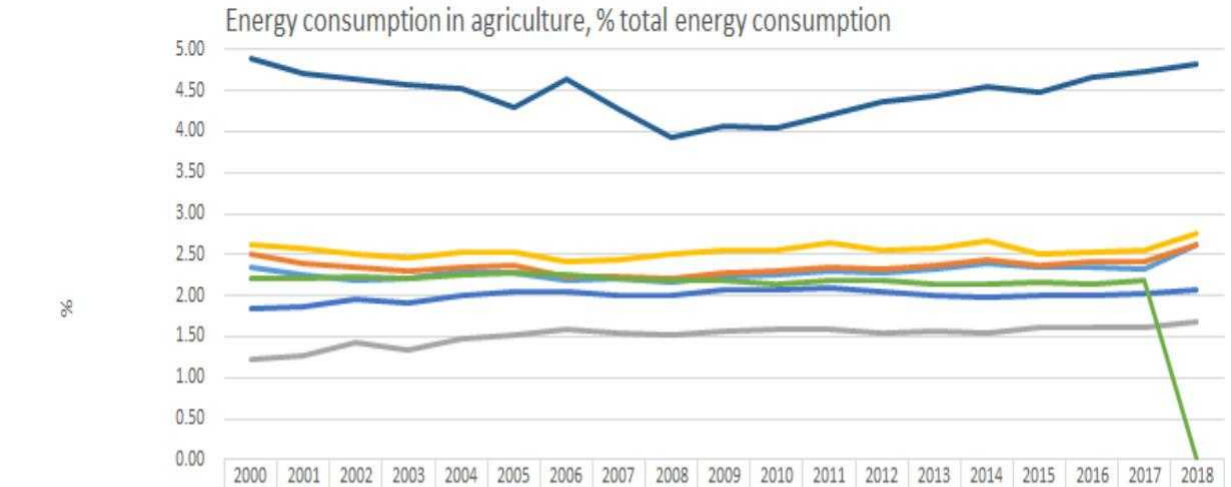

Contribution of Natural Capital in % points
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
0.04
0.01
0.08
0.11
0.14
0.16
0.26
0.28
0.11
0.25
0.20
-0.16
-0.16
0.02


Environmentally Adjusted Multifactor Growth, % Points
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
-0.28
0.24
-0.08
3.60
3.24
4.06
3.66
4.05
-1.88
3.81
5.89
2.53
0.59
2.45

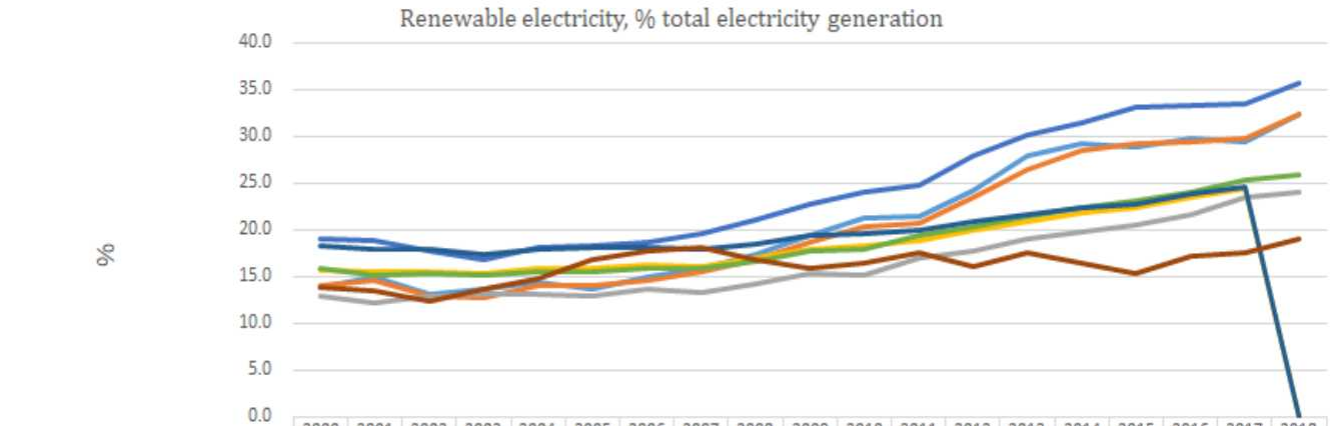

Metals, % of DMC
%
50
45
40
35
30
25
20
15
10
5
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
7.81
7.95
8.20
8.29
8.49
8.95
9.39
10.19
10.39
10.60
10.42
11.20
11.28
11.55
10.61
10.82
11.01
11.19
2.26
2.48
2.03
2.73
3.21
2.50
3.19
3.89
3.95
3.49
2.47
3.01
2.97
3.26
2.97
3.01
3.04
3.08
14.79
14.59
13.98
14.09
13.79
13.30
13.50
13.65
14.21
13.93
15.28
15.30
17.38
18.16
18.12
18.71
18.79
18.61
5.20
5.03
4.96
5.34
5.29
4.87
5.18
5.19
5.14
3.95
5.51
5.51
5.64
6.78
6.38
7.16
6.86
6.37
4.87
4.49
4.20
4.31
4.49
4.28
4.52
4.54
4.58
3.16
4.77
4.87
4.29
5.50
4.72
5.52
5.89
5.44
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa
India
OECD - Total
OECD - Europe
Euro area (19 countries)



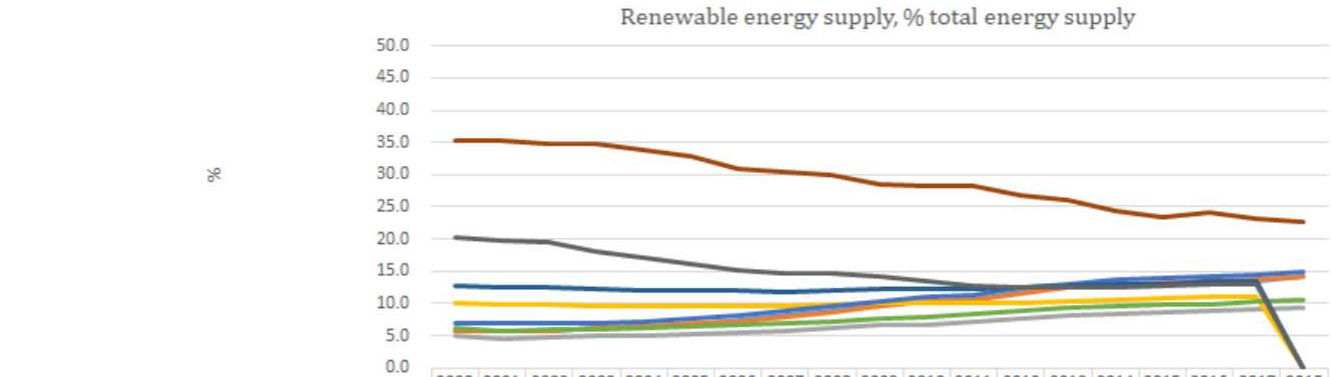
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Euro area (19 countries)	25.6	25.2	25.2	25.3	25.1	25.1	24.5	25.5	24.6	22.4	23.1	24.0	23.6	23.3	23.9	23.4	23.4	23.4	23.8
European Union (28 countries)	26.1	25.6	25.6	25.5	25.1	24.9	24.4	25.2	24.3	22.1	22.6	23.5	23.0	22.9	23.5	23.0	22.7	22.8	23.1
G7	23.6	22.8	21.5	21.4	21.5	21.1	21.5	21.4	21.1	19.7	20.4	20.7	20.8	20.3	20.3	20.1	20.0	19.8	19.8
OECD - Europe	26.3	25.5	25.6	25.7	25.3	25.1	24.8	25.5	24.2	22.4	23.0	24.0	23.6	23.3	23.9	23.5	23.2	23.6	23.9
OECD - Total	25.2	24.4	23.5	23.3	23.3	22.9	23.2	23.2	22.7	21.3	22.1	22.6	22.6	22.3	22.3	22.0	21.9	21.9	22.0
World	26.6	26.4	26.1	26.3	27.1	28.1	28.7	29.0	29.3	28.8	29.9	30.4	30.5	30.1	30.0	29.6	29.2	29.0	0.0
India	27.1	27.1	27.5	26.7	27.0	28.3	30.0	30.6	29.9	30.9	31.7	32.5	31.7	32.8	33.9	33.3	33.5	34.1	34.0



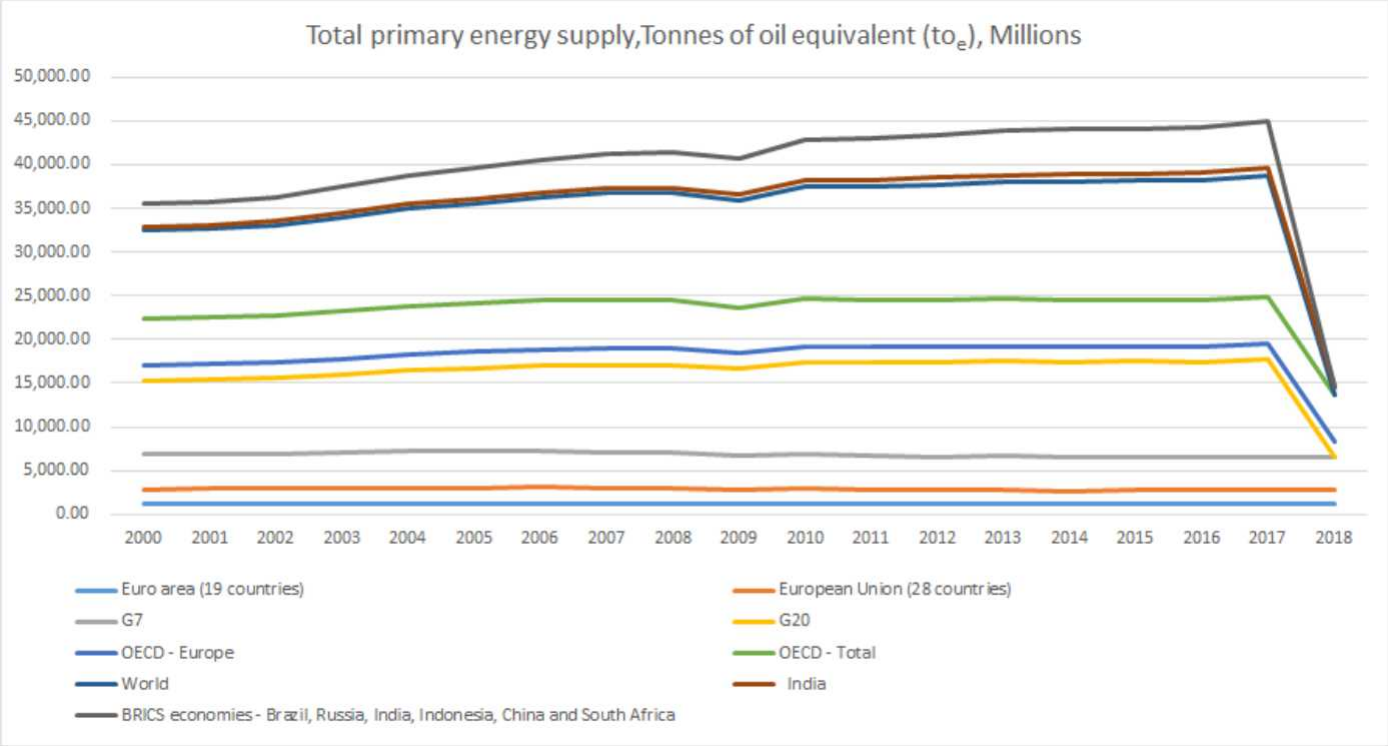
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Euro area (19 countries)	2.34	2.25	2.18	2.21	2.29	2.28	2.18	2.21	2.16	2.23	2.25	2.29	2.28	2.33	2.39	2.35	2.35	2.32	2.62
European Union (28 countries)	2.50	2.40	2.34	2.30	2.35	2.37	2.24	2.23	2.21	2.28	2.30	2.34	2.33	2.38	2.44	2.37	2.42	2.41	2.63
G7	1.21	1.28	1.43	1.35	1.46	1.52	1.59	1.54	1.51	1.56	1.58	1.59	1.54	1.56	1.55	1.61	1.62	1.61	1.68
OECD - Europe	2.63	2.57	2.52	2.46	2.52	2.54	2.41	2.43	2.50	2.55	2.56	2.64	2.55	2.57	2.66	2.50	2.53	2.54	2.76
OECD - Total	1.83	1.87	1.97	1.90	1.99	2.04	2.04	2.00	2.01	2.07	2.07	2.09	2.05	2.01	1.99	2.00	2.01	2.02	2.08
World	2.20	2.21	2.23	2.21	2.25	2.28	2.26	2.20	2.19	2.19	2.14	2.19	2.18	2.15	2.15	2.16	2.14	2.18	0.00
India	4.89	4.71	4.65	4.57	4.53	4.30	4.63	4.28	3.94	4.07	4.05	4.20	4.37	4.42	4.55	4.48	4.67	4.73	4.83

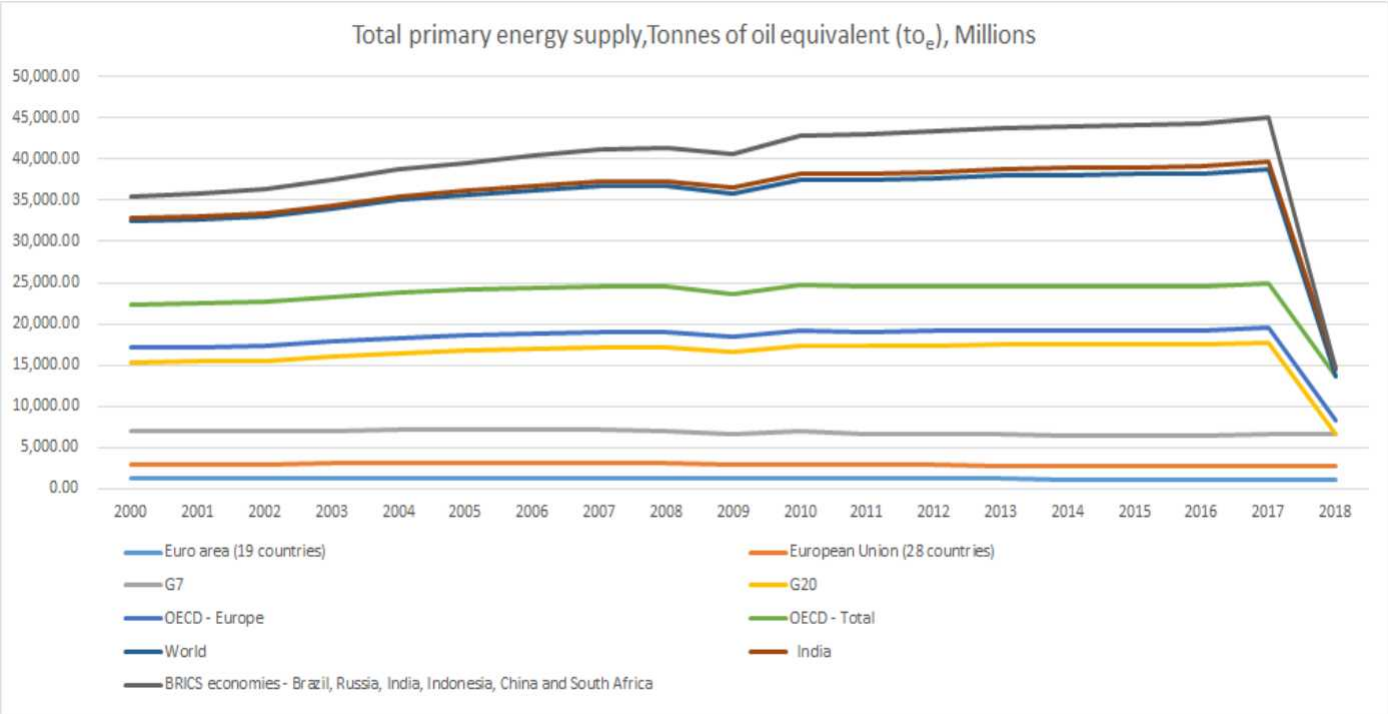


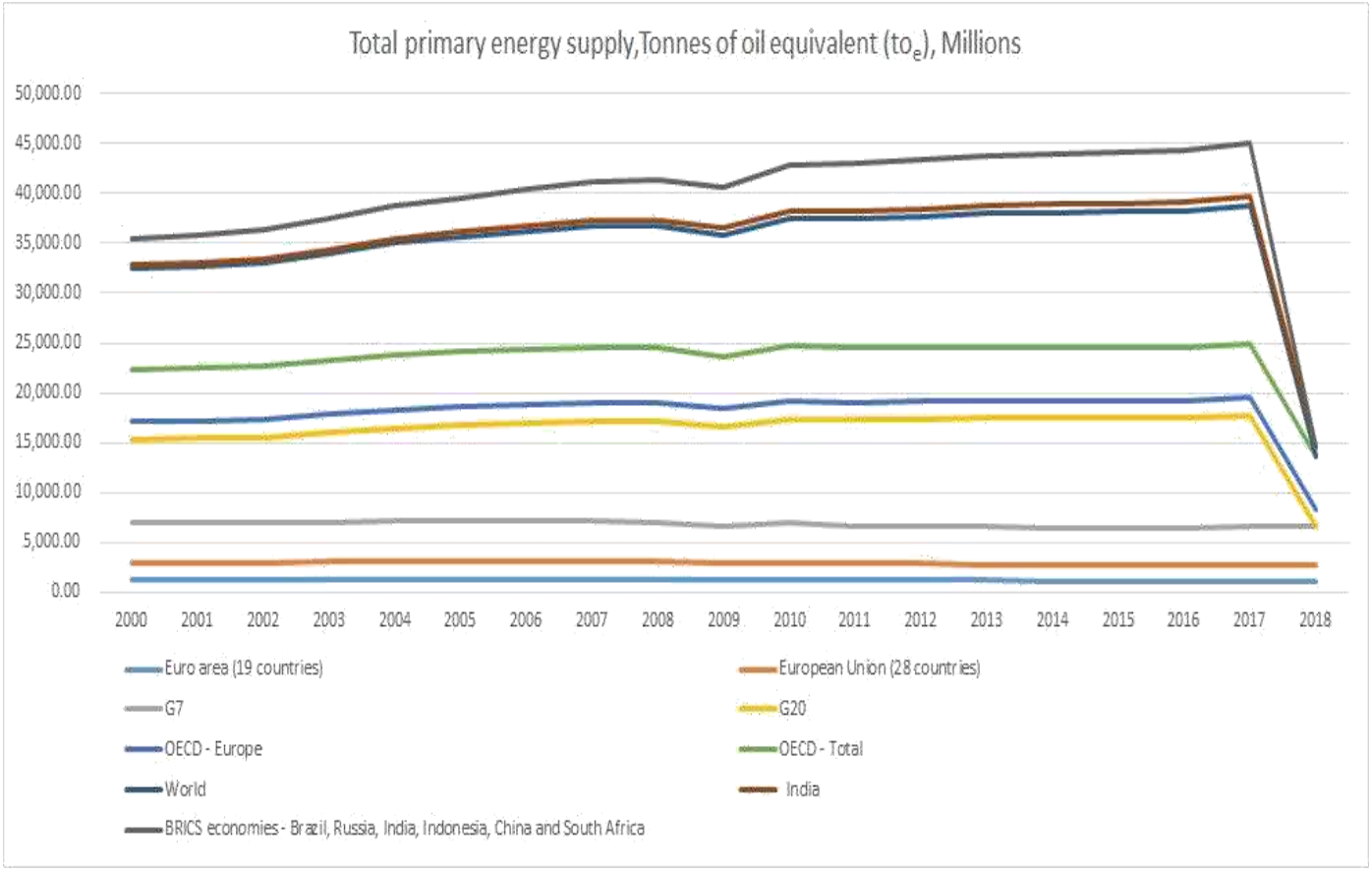
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Euro area (19 countries)	13.9	14.9	13.0	13.6	14.3	13.6	14.9	15.9	17.3	19.4	21.3	21.5	24.3	27.8	29.2	28.8	29.7	29.4	32.4
European Union (28 countries)	13.9	14.5	12.9	12.8	13.9	14.0	14.6	15.4	16.8	18.7	20.4	20.7	23.5	26.5	28.5	29.2	29.5	29.8	32.3
G7	12.9	12.1	13.0	13.1	13.1	13.0	13.6	13.3	14.1	15.4	15.1	17.0	17.7	19.0	19.8	20.6	21.6	23.5	24.0
G20	15.8	15.4	15.5	15.2	15.8	15.9	16.2	16.1	16.9	17.9	18.3	18.8	19.9	20.8	21.7	22.4	23.5	24.3	0.0
OECD - Europe	18.9	18.8	17.6	16.8	18.0	18.3	18.6	19.6	21.0	22.7	24.1	24.7	27.9	30.2	31.5	33.0	33.3	33.4	35.7
OECD - Total	15.8	15.0	15.4	15.2	15.5	15.5	15.9	15.8	16.7	17.7	17.9	19.3	20.3	21.5	22.3	23.1	24.0	25.3	26.0
World	18.3	17.9	17.8	17.4	17.8	18.0	18.1	17.9	18.5	19.3	19.5	19.9	20.8	21.7	22.3	22.8	23.7	24.5	0.0
India	13.8	13.4	12.3	13.7	14.7	16.8	17.8	18.1	16.8	15.8	16.3	17.5	16.0	17.6	16.4	15.3	17.1	17.5	18.9



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
India	35.3	35.3	34.8	34.8	33.8	32.9	31.0	30.5	29.9	28.4	28.2	28.4	26.7	26.1	24.3	23.4	24.1	23.3	22.6
Euro area (19 countries)	5.7	5.8	5.7	6.2	6.5	6.7	7.4	8.2	8.8	9.8	10.5	10.6	11.8	12.7	13.1	13.1	13.4	13.4	14.2
European Union (28 countries)	5.8	5.9	5.8	6.1	6.4	6.9	7.3	8.0	8.7	9.7	10.3	10.5	11.7	12.5	13.1	13.4	13.5	13.7	14.3
G7	5.0	4.6	4.8	5.0	5.1	5.3	5.6	5.8	6.2	6.6	6.8	7.3	7.7	8.2	8.4	8.5	8.8	9.2	9.4
G20	10.1	9.9	9.8	9.7	9.6	9.6	9.5	9.6	9.8	10.1	10.0	10.0	10.2	10.4	10.6	10.7	11.0	11.2	0.0
OECD - Europe	7.0	6.9	6.9	7.0	7.3	7.8	8.1	8.9	9.5	10.4	11.0	11.3	12.5	13.1	13.6	14.1	14.2	14.4	15.1
OECD - Total	6.1	5.8	5.9	6.0	6.2	6.4	6.6	6.8	7.3	7.7	8.0	8.3	8.9	9.4	9.6	9.8	10.0	10.3	10.6
World	12.7	12.5	12.5	12.3	12.1	12.0	11.9	11.9	12.1	12.4	12.3	12.3	12.6	12.9	12.9	13.1	13.5	13.6	0.0
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa	20.3	19.9	19.4	18.1	17.0	16.2	15.3	14.8	14.7	14.3	13.5	12.9	12.6	12.6	12.5	12.7	13.1	13.0	0.0


Total primary energy supply,Tonnes of oil equivalent (to$_e$), Millions
50,000.00
45,000.00
40,000.00
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa


Total primary energy supply,Tonnes of oil equivalent (to$_e$), Millions
50,000.00
45,000.00
40,000.00
35,000.00
30,000.00
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
Euro area (19 countries)
European Union (28 countries)
G7
G20
OECD - Europe
OECD - Total
World
India
BRICS economies - Brazil, Russia, India, Indonesia, China and South Africa



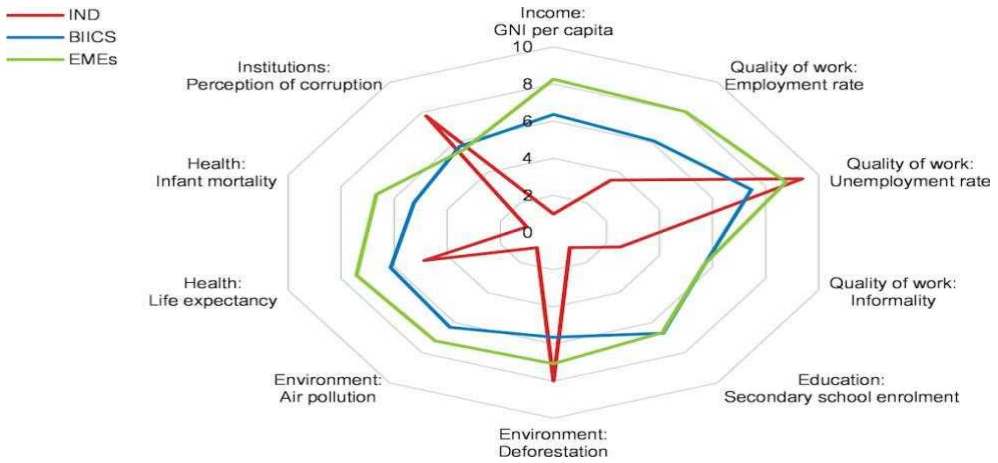
Digitization – Remote Working, Digital Access, Divide and Pressurized Digital Nodes and Data Centres

The OECD in its report mentioned that widespread measures of social distancing to contain the spread of COVID-19 have required many workplaces to remain shut. While lockdowns practically forced many people to stop working, others were able to continue their activities from home. In this context, not all regions were equally prepared to adapt to remote working and therefore mitigate the economic disruptions due to the lockdown. The extent to which jobs are amenable to remote working depends on the nature of the tasks carried out by workers, meaning on the type of occupation. In turn, occupations that can be performed remotely are not evenly spread across space, with some places being able to shift a much larger share of employment to remote working than other places. The share of jobs amenable to remote working varies greatly both between and within OECD countries. So, irrespective of pre pandemic or during and after lockdown exit, the overall employee per se economic inequalities depends upon the cultural and working hierarchy of the organization and the employee approach. The skill requirement of occupations correlates to their amenability to being performed remotely. As a result, the share of the employed population that can potentially work remotely across regions reflects the skill composition of the local workforce. The massive shift to remote working following the COVID-19 containment measures introduced in many countries has further increased the need for access to fast and efficient Internet connections and to minimum digital equipment. However, not all places within countries offer sufficient infrastructure for seizing the opportunities offered by digitalization. Bridging the regional divide in access to fast broadband connections and terminal devices will become increasingly important as households,

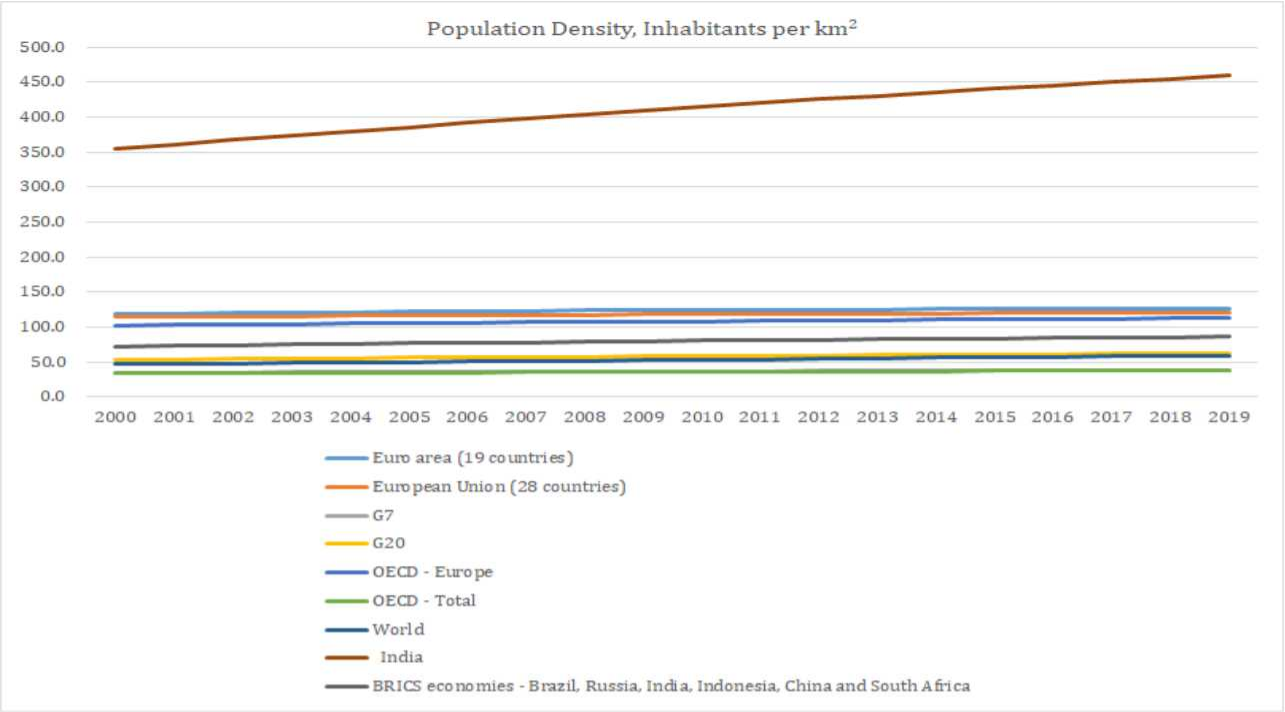
governments and businesses switch their activities to the digital terrain not just during the current crisis, but it has opened avenue even after lockdown shall exit for digitized gateways and working culture. Access to high-speed connections (above 30 Mbit/s) is fundamental to seize the opportunities of digitalization, as the quality of connections matter beyond the access to basic Internet (OECD, 2019). According to the information provided from regulators in 26 OECD countries, 1 in 3 households in rural areas do not have access to high-speed broadband on average. Overall, only 7 out of 26 countries have succeeded in ensuring access to a high -speed connection to more than 80% of households in rural regions. In order to seize the benefits of digitalization, access to digital infrastructure needs to be accompanied by the widespread adoption of digital technologies and by minimum digital skills. Almost 11% of people in OECD countries are not using the Internet or do not have access to a computer. Urban nodes with burgeoning needs and extended usage for remote access work, online learning, payments and services, banking and financials, business ventures, government meetings and international cooperation, MOUs, Webinars, events and Summit and entertainment envisaged excess pressure on the nodes and data centres. On the optimistic front, reduced commute, non-usage of infrastructure for conducting summits/conferences, closure of organizations, institutions, and other sectors - reduced emissions, wastes, manpower and machinery but the newer connections, wiring for broadband, nodes of fibre connections pressured the data centres. Service providers had the advantage for fast speed and connectivity extended packages were availed. Connectivity requirement is need based and depends on the nature of work for which it is used. Why was this service not strategized with slabs?

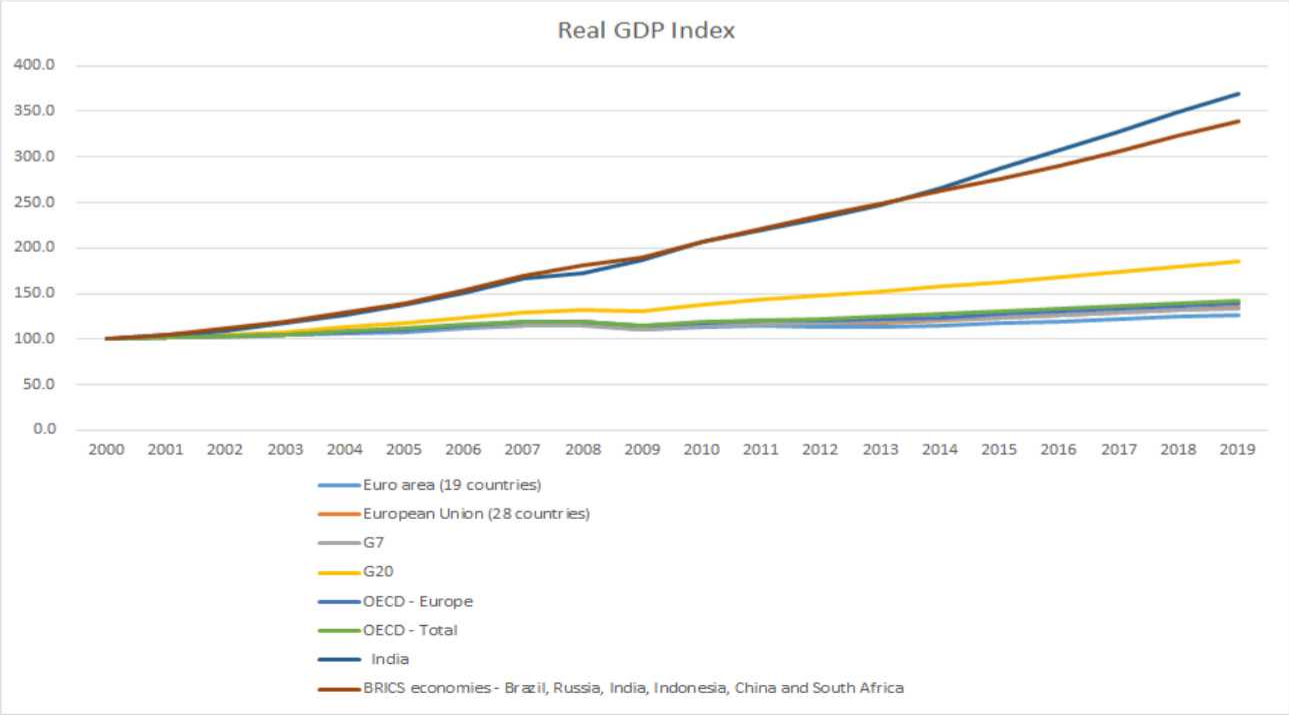
Social Protection and Wellbeing Policy framework - Participation Tax Rate, Marginal Effective Rate, Income distribution and poverty database – based on it Tier based employment and schemes can be brought about. Although income is a key component of the population wellbeing, other dimensions matter. The employment rate has declined and, among those working, there are persistent gaps in working conditions and wages between the organized/formal and unorganized/informal sectors. The gender gap is also large, with a low female labour market participation rate and, for those women who participate, a high unemployment rate (OECD, 2014).

Challenges remain to improving wellbeing



Source : OECD Statistics, 2020





Fostering innovation, creating newer job market and steering regional economies in lieu of pandemic via the following definitive

Firm birth: Creation of a combination of production factors with the restriction that no other enterprise is involved in the event. Excludes entries in the business population due to reactivations, mergers, breakups, split-offs and restructuring. The firm birth rate is the ratio of new firms to active firms.

Firm death: Dissolution of a combination of production factors with the restriction that no other enterprises are involved in the event. Excludes exits from the population due to mergers, take-overs, breakups and restructuring of a set of enterprises.

Employment creation rate: The ratio of employees in new firms versus employees in all firms.

Employer enterprise: An enterprise having a positive number of employees in any part of the year.

Non-employer enterprise: An enterprise having no employees in any part of the year. The enterprise can have a positive number of persons employed (working proprietors, partners working regularly).

Towards Carbon Neutral Economy

Metropolitan regions release higher carbon emissions per electricity generated compared to other regions.

The dramatic increase in the energy required for cooling buildings, due to rising global temperatures, has been very unequal within countries over the last five decades. During the last 50 years, the annual cooling degree days (or CDD, a measure for how long outside air temperature was above 22°C) have on average increased by almost 25% in OECD cities and their commuting zones (functional urban areas or FUAs) and in country like India 32% as cities climatic zones varies from region and so shall be the requirement for cooling. The 32 % is the weighted average derived based on regional and city grid nodes. So the functionalities shall differ – nudging the FUAs with zone specific buildings and resource material use and recovery shall save capital investment. In addition to efficient energy consumption and cleaner modes of transport, pursuing sustainable development also requires lowering materials consumption, thereby avoiding waste and recycling more. Materials extraction and processing contributes to GHG emissions and accounts for substantial water, soil and air pollution (OECD, 2019). Over the last decade, the 10% of FUAs with the highest average cooling needs were in Mexico, Colombia and the United States. These three countries have also recorded the largest differences across FUAs in terms of changes over time in CDD between 1970 and 2018. For example, in Mexico, Mexicali's average annual cooling needs increased from 700 to 1 400 CDD, while Villahermosa experienced a reduction of 320 CDD. In Europe, the cooling needs have increased in all cities and their commuting zones, although at a stronger pace in some southern regions. For example, in the metropolitan areas of Seville (Spain), Athens (Greece) and Taranto (Italy), the cooling needs have risen by more than 215 CDD since 1970 – an increase of 70%, 170% and 250% respectively. In order to move towards a climate-neutral economy and halt global warming, regions and cities have an important role to play, including in the energy supply sector, which accounts for the largest share of global greenhouse gas (GHG) emissions (IPCC, 2014) due to its high reliance on fossil fuels. Since much energy use (in transport for example) needs to be electrified, progress in moving to zero-carbon electricity generation needs to be particularly rapid. Yet, the transition to zero-carbon electricity production remains very unequal across OECD regions. In OECD countries, metropolitan regions have higher carbon emissions in electricity production than other regions. They emit 65% of the CO_2 associated with electricity generation but produce only 57% of electricity. On the other hand, regions far from metropolitan areas are more

efficient than metropolitan regions, generating 27% of the electricity and accounting for only 21% of the CO_2. With an average of 285 tonnes of CO_2 per gigawatt-hour (GWh) of electricity generated, regions far from metropolitan areas release 34% fewer tonnes of CO_2 per GWh than metropolitan regions. Data suggest that carbon efficiency in electricity production is also very unequal across OECD large regions. For the same amount of electricity production, high-carbon-intensive regions release, on average, 23 times more tons of CO_2 than low-carbon-intensive regions within each country. Behind such stark inequalities in carbon efficiency is the shift towards renewable sources for electricity production.

CDD measures how much (in degrees) and for how long (in days) outside air temperature was higher than 22°C (degrees Celsius). More precisely, annual CDD are the sum over a year of the differences between the threshold temperature (22°C) and the daily mean outdoor air temperature when the building needs to be cooled.

CO_2-equivalent emissions from electricity generation: GHG emissions are calculated using the Intergovernmental Panel on Climate Change (IPCC) estimates on GHG emissions of electricity supply technologies. It corresponds to the lifecycle emissions.

Transitioning to clean electricity production in every region

Remote regions produce the most electricity using renewable sources and generate 36% of the clean electricity in OECD countries. The transition to zero-carbon electricity production requires investing in renewable sources of energy and abandoning the use of fossil fuels. Among the main fossil fuels used in electricity generation, coal is particularly emission-intensive and its unabated use will need to be phased out first. In the Powering Past Coal Alliance, many OECD countries have committed to exiting all unabated coal-fired electricity generation by 2030 (unless CO2 emissions are captured and stored) – consistent with the Paris Agreement. Although capturing and storing emissions is an option towards climate objectives, which has not yet been deployed at scale, the use of renewable sources is the main strategy to decarbonize electricity.

Regions located further away from metropolitan areas are leading in clean electricity. Such regions, which account for 27% of the electricity produced in OECD countries, generate 44% of their electricity using renewable sources. Among them, remote regions record a higher share of renewables (51% of total production) than regions that are close to a small or medium city (32% of total production). Taken together, regions far from metropolitan areas account for around half of the total electricity produced from renewable sources in the OECD, with hydropower being the most used renewable source.

Overall, the use of renewable sources tends to increase with distance to metropolitan areas. Metropolitan regions, which are home to around 70% of the OECD population, generate almost 60% of the total electricity in OECD countries but only 16% of their total electricity production comes from renewable sources. The dependency on fossil fuels (including coal) for electricity production in metropolitan regions remains high, raising their carbon emissions and associated long-term environmental risks. In 2017, metropolitan regions generated 29% of their electricity using coal and 37% using other fossil fuels.

Electricity production from renewable sources is also very unequal across regions of the same country. In 14 OECD countries, the use of renewable sources is particularly concentrated, with regions far from metropolitan areas generating twice as much of their electricity through renewable sources compared to metropolitan regions. The differences are largest in Canada, Finland, Germany and Latvia. Similarly, electricity production from clean energy sources is also highly concentrated across large OECD regions (TL2). Available estimates indicate that in around three-quarters of OECD countries, the share of electricity produced through renewable sources can be more than 50 percentage point higher than in the region with the lowest share in the same country.

Indicators on production of electricity are based on the Global Power Plant Database (GPPD). The GPPD provides information on power plants located in 164 countries all over the world, including the 37 OECD countries. For each power plant, the GPPD provides the geographic coordinates, the energy source, the generation capacity (the maximum power that the plant can deliver) and the gross annual electricity generation (i.e. the electricity consumption of the power plant for its operation is not deducted).

Renewable energy sources include hydropower, wind, waste, biomass, wave and tidal, geothermal and solar.

Fossil fuels are divided into two subcategories: coal, which corresponds to the most carbon-intensive energy source; and the other fossil fuels, including oil, petroleum coke and gas.

Energy consumption per capita refers to households' electricity and heat consumption, excluding energy used for transportation. Kilograms of oil equivalent, or kgoe, is a normalized unit of energy. It is equivalent to the amount of energy that can be generated from one kilogram of crude oil.

Motor vehicles per capita refers to the road motor vehicles intended for the carriage of passengers and designed to seat no more than nine persons including the driver. Motorcycle are excluded.

Recycled municipal waste includes waste that undergoes material recycling, composting or energy recovering. Landfilling is excluded.

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In OECD countries, cities and their respective commuting zones have three and a half times more buildings and infrastructure per capita than in the rest of the world.

In cities and their commuting zones (i.e. FUAs) of OECD countries, around 280 m^2 of land per person are built-up, 3.5 times more than the average in the rest of the world. While housing and infrastructure for public services are crucial for well-being, extensive artificial surface cover can have major environmental impacts, such as diminishing biodiversity and deteriorating soil quality (Haščič and Mackie, 2018). In addition, low-density housing and urban sprawl can be associated with higher energy demand and transport-related CO2 emissions (OECD, 2018). The extent to which built-up land in cities

changes with respect to population is an indicator included in the UN Sustainable Development Goals to promote efficient land use and prevent urban sprawl. In this respect, FUAs in OECD countries differ remarkably from those in the rest of the world, with much higher average values, reflecting relatively high levels of infrastructure provision and road network. In many OECD countries, the change in built-up area per capita in FUAs during the last 15 years has been high despite already high initial levels of the built environment. For example, in 160 out of 428 (37%) FUAs with high levels of built-up area per capita in 2000 (above 300 m2 per person), land consumption has increased at a higher rate than the population. On the other hand, in 40 out of 143 FUAs with initial low levels of built-up area per capita in 2000 (below the 100 m2 per person), the population is growing faster than the built-up area, which can intensify pressure on relatively limited infrastructure networks and undermine the provision of basic services to a growing population.

The amount of land dedicated to buildings and infrastructure has been increasing at different speeds depending on city size, with faster increases in the small- and medium-sized cities. Built-up areas per capita in FUAs with less than half a million inhabitants have increased by 15.6 m2 per person since 2000, while it has increased by only 1.2 m^2 per person in those above half a million inhabitants during the same period. This trend is leading to a convergence in built-up area per capita across FUAs of different sizes in OECD countries – to an average close to 280 m^2 per inhabitant. Efficient public transport systems can make cities not only more sustainable but also more productive. Good transport networks improve people's accessibility to existing services and amenities. They also minimize the commuting time of workers to their place of work and maximise the number of jobs (firms) reachable to workers, which can contribute to higher productivity (OECD, 2020b). European metropolitan areas display a positive and significant correlation between the performance of the public transport network and labour productivity (gross value added [GVA] per worker). Such a correlation does not hold between the performance of the road network and labour productivity. While metropolitan areas with the best public transport performance in Europe, such as Helsinki, London and Oslo, display the highest levels of labour productivity, the metropolitan areas of Athens, Nottingham and West Midlands report a low public transport performance and have the lowest labour productivity. On average, the labour productivity gap between the top and bottom metropolitan areas in terms of public transport performance in Europe is close to USD 28 000 per worker (in 2015 PPP)

Transport performance is the ratio between the accessibility to certain amenities (including the number of people) by a mode of transport (i.e. how many amenities can be accessed by 30 minutes of a specific mode of transport) and the proximity of these amenities (i.e. how many are located in a radius of 8 km).

The share of people living in cities and their commuting zones changes significantly across income levels, being significantly larger in high-income countries, compared to other income groups. While 71% of the population in high-income countries live in FUAs, this rate drops to 34% in low-income countries. The average city size varies depending on the income level of the country. When moving from high- to low-income countries (i.e. from the left to the right of Figure 4.8), the population share in FUAs between 250 000 and 1 million inhabitants halves (from 17% to 8%). In contrast, the average share of people living in FUAs with less than 250 000 people increases from 7% to 11%. Classification of countries by income levels: According to the World Bank, low-income economies are defined as those with a gross national income (GNI) per capita of USD 1 025 or less in 2018; lower-middle-income with

a GNI per capita between USD 1 026 and USD 3 995; upper-middle-income economies with a GNI per capita between USD 3 996 and USD 12 375; high-income economies with a GNI per capita of USD 12 376 or more. The OECD classifies small regions (Territorial Level 3, TL3) according to two different but complementary classifications.

The urban-rural typology classifies regions in predominantly urban, intermediate or predominantly rural. The access to metropolitan areas typology considers the extent to which the majority of the regional population lives either within or in proximity to metropolitan areas of different sizes. Classification of countries by income levels: According to the World Bank, low-income economies are defined as those with a gross national income (GNI) per capita of USD 1 025 or less in 2018; lower-middle-income with a GNI per capita between USD 1 026 and USD 3 995; upper-middle-income economies with a GNI per capita between USD 3 996 and USD 12 375; high-income economies with a GNI per capita of USD 12 376 or more.

Delineation of cities and their commuting zones: Cities and commuting zones were consistently delineated without relying on any local administrative definition and using gridded population data only. The method to delineate commuting zones surrounding cities does make direct use of commuting flow data, as such data would not be available for the entire world. Instead, commuting zones are defined through a probabilistic approach which is trained using the information on the boundaries of FUAs. Access to metropolitan areas typology: The proposed classification distinguishes TL3 regions based on the level of access to metropolitan areas (Fadic *et al*., 2019). To capture the boundaries of metropolitan areas, the classification relies on the concept of FUAs (Dijkstra *et al*., 2019; OECD, 2012) which are composed of cities and their respective commuting zones. Subnational governments play a significant role in public spending. Education, health and protection amount to 57% of total subnational government expenditure.

In 2018, subnational government (SNG) expenditure in the OECD accounted for 40.5% of total public expenditure, corresponding to 16.2% of gross domestic product (GDP) (Figure 5.1). SNG spending varies according to country size, territorial organization, federal or unitary status, and the nature of responsibilities assigned to different government tiers. In federal countries, SNG expenditure accounted for 50.1% of total public expenditure and 19.3% of GDP in 2018. In contrast, in unitary countries, the share of SNG expenditure stood at 28.6% of total public expenditure and 12% of GDP respectively. The share of public spending by SNGs is not homogeneous across countries, even considering federal and unitary countries separately. While in Austria, SNG spending represented 35.6% of total public expenditure, in Switzerland, this ratio amounted to 61.8% in 2018. Among unitary countries, the Nordic ones (Denmark, Finland, Sweden), as well as Japan and Korea stood out for their high share of local public spending. Spending indicators must, however, be interpreted with caution. While they provide valuable insights into the level of decentralization, they do not convey the degree of decision-making power of SNG authorities, which can be limited due to mandatory expenses in case of shared or delegated competencies.

Spending responsibilities across levels of government

More than 59% of public spending in the areas of housing and community amenities, environmental protection and culture and recreation fall under the responsibility of SNGs.

The share of SNG expenditure in public expenditure by economic function reflects the distribution of responsibilities across levels of government. However, such an assignment does not imply that SNGs have full autonomy in exercising them. SNGs in OECD member countries carry out a large share of the total public spending related to housing and community amenities, a sector that represents one of their key assigned responsibilities. Environmental protection covers activities related to waste management, sewerage, parks and greens spaces, which are often devolved to local governments or undertaken by decentralized functional bodies. Education is a shared competency across levels of government in a relatively equal manner. As a share of total public spending on education, subnational expenditure on education represented 48%. In many countries, SNGs are in charge of the construction and maintenance of education infrastructures, and the financing of school-related activities, especially at the primary level. Expenditure comprises: "current expenditure" and "capital expenditure". Capital expenditure is the sum of capital transfers and investment. Gross fixed capital formation is the main component of investment. The COVID-19 crisis has affected more significantly SNGs in countries where taxes, user charges and fees represent a high share of SNG revenues.

Fiscal balance is the difference between government revenues and expenditure. Gross debt includes the sum of the following liabilities: currency and deposits + debt securities + loans + insurance pension and standardized guarantees + other accounts payable. The SNA definition of gross debt differs from the one applied under the Maastricht Protocol. Tax indicators offer an incomplete gauge of tax autonomy as SNG tax revenues include both shared and own-source tax revenue. Shared taxes are national taxes, often based on personal or corporate income tax, value-added or excise tax, which are redistributed to subnational authorities according to nationally defined allocation criteria, leaving SNGs with limited or no decision- making power over such taxes. Own- source taxes, on the other hand, provide some leeway for SNGs to set the tax rates or bases even if the taxing power may be restricted (imposition of caps on rate, constraints on exemptions or tax reliefs, etc.). Property tax is the cornerstone of local taxation. It is par excellence a local own-source tax, particularly for the municipal level. Municipal governments have a relatively greater responsibility in spending than in raising revenues. Municipal governments in EU and OECD countries have an important role in public expenditures and revenues. Specific spending items are particularly important for municipal governments. Data for 18 EU and OECD countries disaggregated by 10 categories (COFOG classification) reveal that education, general public services and social protection represent the most important spending categories for municipal governments. The main exception to this is Finland, where healthcare is the most important municipal expenditure category, followed by social services. A high share of tax revenue in subnational revenues does not imply, however, a high level of tax revenue. While subnational tax revenue accounted for 7% of GDP in the OECD and 31.7% of public tax revenue in 2018, there is great variation across countries (Figure 5.8). The share of subnational tax revenue relative to total public tax revenue and GDP is particularly high among federal countries, where SNG tax revenue accounted for 43.5% of public tax revenue and 8.9% of GDP in 2018, compared to 18.3% of public tax revenue and 4.4% of GDP in unitary countries. Tax indicators offer an incomplete gauge of tax autonomy as SNG tax revenues include both shared and own-source tax revenue. Shared taxes are national taxes, often based on personal or corporate income tax, value- added or excise tax, which are redistributed to subnational authorities according to nationally defined allocation criteria, leaving SNGs with limited or no decision-making power over such taxes. Own-source taxes, on the other hand, provide some leeway for SNGs to set the tax rates or bases even if

the taxing power may be restricted (imposition of caps on rate, constraints on exemptions or tax reliefs, etc.). The level of subnational debt is expected to increase further in 2020, as the COVID-19 crisis is putting pressure on subnational government finances through higher expenditure and reduced revenues. While the COVID-19 crisis has already put short-term pressure on health and social expenditures and SNG revenues (tax revenues, tariffs and fees), strongest impacts are expected in the medium term. A composite measure based on different indicators of municipal finance can provide an overarching picture of differences in the degree of municipal decentralization across countries. This measure rests on three sub-indicators: municipal share of general government spending, municipal own revenue share and the portion of non-shared municipal tax revenues (OECD, 2020).

How to calculate - Composite indicator on municipal decentralization: In order to get an overview of the degree of decentralization at the municipal level using several fiscal aspects, we constructed a composite indicator using three sub-indicators: municipal share of general government spending, municipal own revenue share and the portion of non-shared municipal tax revenues. Our methodology assumes that the degree of decentralization at the municipal level is higher when: i) a large share of public expenditures is decentralized; AND ii) municipalities have a low dependency on central government transfers; and iii) municipal tax revenues are mostly based on non-shared taxes. Using the following formula, we calculate the decentralization indicator, for which the values range from 0 to 100:

MDI=100 × MSS0.5 × (1−VFG)0.25 × (1−STR)0.25MDI=100 × MSS0.5 × (1-VFG)0.25 × (1-STR)0.25

where MDI is the municipal decentralization indicator, MSS is the municipal spending share, VFG is the vertical fiscal gap and STR is the portion of shared taxes in municipal incomes. The weighting of each term ensures that municipal spending share gets the biggest weight but that revenue side is also taken into account.

Index and Measurement Techniques for quantifying disparities

Regional disparities are measured by Theil entropy index, which is defined as:

Theil=∑Ni=1yiy−ln(yiy−)Theil=∑i=1Nyiy-lnyiy-
where ***N*** is the number of regions in the OECD, ***yi*** is the variable of interest in the ***i***-th region (i.e. household income, life expectancy, homicide rate, etc.) and y−y- is the mean of the variable of interest across all regions.

The Theil index can be easily decomposed in two components: i) the disparities within subgroups of regions – where for example a subgroup is identified by a set of regions belonging to a country; ii) the disparities between subgroups of regions (i.e. between countries). The sum of these two components is equal to the Theil index. In order to decompose the Theil index, let us start by assuming **m** groups of regions (countries). The decomposition will assume the following form:

Theil=∑Mj=1∑Ni=1sjyijyj−ln(yijy−j)+∑Mj=1sjln(yjy−)Theil=∑j=1M∑i=1Nsjyijyj-lnyijy-j+∑j=1Msjlnyjy-

Where the first term of the formula is the **within** part of the decomposition equal to the weighted average of the Theil inequality indexes of each country. Weights, **si,** are computed as the ratio between the country average of the variable of interest and the OECD average of the same variable. The second term is the between component of the Theil index and represents the share of regional disparities that depends on the disparities across countries.

Interpretation: The Theil index ranges between zero and ∞, with zero representing an equal distribution and higher values representing a higher level of inequality.

The index assigns equal weight to each region regardless of its size; therefore, differences in the values of the index among countries may be partially due to differences in the average size of regions in each country.

Methodology to estimate the potential for remote working – during Pandemic

The assessment of regions' capacity to adapt to remote working is based on the diversity of tasks performed in different types of occupations and is structured in two steps.

The first step requires classifying each occupation based on the tasks required and according to the degree to which those tasks can be performed remotely. Such a classification is based on a recent study by Dingel and Neiman (2020). The second step relies on data from labour force surveys and consists of assessing the geographical distribution of different types of occupations and subsequently matching those occupations with the classification performed in the first step. Combining the two data sets allows assessing the number of workers that can perform their task from home as a share of the total employment in the region.

Methodology to estimate cooling degree days at the FUA level

The data used to compute cooling degree day (CDD) indicators at the FUA level comes from the historical global gridded degree days database of CDD and heating degree days (HDD)The database includes three types of indicators corresponding to CDD, HDD, and CDD computed using wet-bulb temperature (CDDwb). Each indicator is available at 6 different threshold temperatures: 18, 18.3, 22, 23, 24 and 25°C for CDD and CDDwb and 10, 15, 15.5, 16, 17 and 18°C for HDD. The database provides these three indicators both by year and by month over the period 1970-2018.

The dataset used to compute indicators at the FUA level is the CDD raster corresponding to a threshold temperature of 22°C. The 49 bands of the raster correspond to the annual CDD values from 1970 to 2018 included. Indicators were computed using the geopandas, rasterstats python libraries and by intersecting the raster file with the shapefile corresponding to the FUAs' boundaries. For each FUA, the average cell value is calculated. All cells having an intersection with the FUA are included in the mean value calculation. The cells with missing values are ignored.

Electricity generation estimates

In order to remain consistent across countries and energy sources, electricity generation was estimated at the power plant level based on the relative capacity of each power plant (from the GPPD) and on the total national electricity generation form each energy source (from the IEA). The methodology follows the four steps below:

Map energy sources from the IEA to the GPPD classification.

The IEA electricity production data provides a higher level of detail in terms of breakdown by energy source compared to the GPPD data. For this reason, each energy source type recorded in the IEA database was matched to a source category in the GPPD.

Determine the share of national capacity for each power plant.

For each power plant ***p***, located in the country ***c*** and generating electricity from the energy source ***f***, the share of the capacity of the power plant in the national capacity for the source *f* is calculated as:

Share p,c,f=capacityp,c,f∑icapacityi,c,fsharep,c,f=capacityp,c,f∑icapacityi,c,f

Where *i* ∈ power plants located in the country *c*, and generating electricity from the source *f*.

Allocate a part of the national generation to each power plant.

For each power plant *p*, generating electricity from source *f*, in the country *c*, the estimated generation is calculated as:

generationp,c,f=sharep,c,f*national generationc,fgenerationp,c,f=sharep,c,f*national generationc,f

Electricity generation indicators

For each region *r*, generation data was aggregated into each category *i* as:

Generation r, i= ∑k ∈ ipower plant generationr,kgenerationr, i= ∑k ∈ ipower plant generationr,k where *k* ∈ {coal, gas, oil, petroleum coke, cogeneration, nuclear, hydro, wind, waste, biomass, wave, geothermal, solar}, *i* ∈ {fossil fuels, coal, nuclear, renewables},

and power plant generationr,kpower plant generationr,k is the electricity generation of a power plant located in the region *r*, generating electricity from the source type *k*.

Energy mix indicators

For each region *r*, the share of each energy source category *i* (fossil fuels, coal, nuclear, renewables) is calculated as:

sharer,i= generationr, i∑jgenerationr,j*100sharer,i= generationr, i∑jgenerationr,j*100

where j ∈ {fossil fuels, renewables, hydro, wind, nuclear}.

Greenhouse gas (GHG) emissions from electricity generation indicators

GHG emissions indicators are derived from both the electricity generation by energy source and the emission intensity of each energy source. Electricity generation was estimated at the power plant level for each energy source included in the GPPD as described above. Emission intensity by energy source comes from the IPPC estimates on GHG emissions of supply technologies.

For each region *r*, the GHG emissions (in tons of CO_2 equivalent) are calculated as:

emissionsr=∑k ∈ f generationr, k*emission intensitykemissionsr=∑k ∈ f generationr, k*emission intensityk

where the emission intensity corresponds to the median value of the lifecycle emissions (in gCO_2eq/kWh), f ∈ {coal, gas, oil, petroleum coke, cogeneration, nuclear, hydro, wind, waste, biomass, wave, geothermal, solar}.

Emission intensity indicator - For each region r, the emission intensity (in tons of CO_2 equivalent GWh) is calculated as:

emission intensityr= emissionsr∑igenerationr,iemission intensityr= emissionsr∑igenerationr,I where *i* ∈ {fossil fuels, renewables, nuclear}.

Methodology to estimate protected areas at the regional level

The World Database on Protected Areas (Annex B) is a worldwide record of marine and terrestrial protected areas. Launched by the International Union for Conservation of Nature (IUCN) and the United Nations Environment Programme (UNEP), the geospatial database has been compiled and is updated monthly by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). The database is made up of about 242 000 records of protected areas, split into 2 shapefiles. Each protected area is recorded either as a polygon, delimiting the boundaries of the area or as a point with a reported area providing information on the extent of the protected area. One shapefile contains all the protected areas recorded as polygons and the other one is for protected areas recorded as points.

Non-geospatial information is also available for each record, giving more details on the protected areas. Among the 28 fields accessible through the attributes table, 5 are useful for the analysis

IUCN management categories (IUCN_CAT): The different categories of protected areas made by the IUCN correspond to the management objectives within the areas. Seven different categories can be distinguished, going from the most restrictive natural zone management to a zone with sustainable use of natural resources (Ia: Strict Nature Reserve; Ib: Wilderness Area; II: National Park; III: Natural Monument or Feature; IV: Habitat/Species Management Area; V: Protected Landscape/Seascape; VI: Protected area with sustainable use of natural resources). This variable can also take the following values: not applicable, not assigned or not reported.

Status (STATUS): Refers to the administrative status of the protected areas: “Designated”, “Inscribed”, “Adopted”, “Proposed” or “Established”.

Status year (STATUS_YR): Year corresponding to the entry into force of the current status of the protected area.

Designation (DESIG): Corresponds to the subnational, national or international framework or agreement the protected area is part of.

Reported area (REP_AREA): Protected area extent (useful for protected areas recorded as points).

Following the methodology developed for country-level indicators (Mackie, A., et al. (2017), «Indicators on Terrestrial and Marine Protected Areas : Methodology and Results for OECD and G20 countries», *OECD Environment Working Papers*, n° 126, Éditions OCDE, Paris, https://doi.org/10.1787/e0796071-en), protected areas with “not reported” or “proposed”

status, and UNESCO Man and Biosphere Reserves are excluded for the analysis as well as protected areas recorded as points without a reported area. The shapefile containing protected areas recorded as polygons was dissolved to avoid overlaps between protected areas and converted afterwards into a 300 meter-resolution raster file. The raster does not take into account IUCN management categories.

Two indicators (share of regional protected area and share of regional coastal protected area) are computed from this raster file, following the steps below:

1. Share of regional protected area

- The regional area (RA) is calculated from the regions' shapefile.
- The regional protected area extent (PA) is calculated from the protected areas raster, the protected areas recorded as point's shapefile and the regional boundaries' shapefile. The first part of the regional protected area extent (PA1) is calculated as the sum of the reported areas of all the points located within the region. The second part (PA2) is calculated as the protected zones extent within the regional boundaries measured from the raster. The regional PA is thus calculated as PA1 + PA2.
- The share of protected area within the region (%) is calculated as 100*PA/RA.
- Share of regional coastal protected area
- A 50 km-buffer is created around the coastlines.
- The regional coastal area (CA) is calculated for each region as the area of the intersection between the 50 km-buffer and the regions' shapefile.
- The coastal protected area extent (CPA) is calculated from the protected areas raster, the protected areas recorded as point's shapefile, the 50 km-buffer and the regional boundaries' shapefile. The first part of the coastal protected area extent (CPA1) is calculated as the sum of the reported areas of all the points located within the intersection between the buffer and the region. The second part (CPA2) is calculated as the protected zones extent within the intersection between the buffer and the region measured from the raster. The CPA is thus calculated as CPA1 + CPA2.
- The share of coastal protected area within the region (%) is calculated as 100*CPA/CA

Way Forward

- Quasi-fiscal and monetary support be restructured.
- Targeted and strategic policy actions rather than common SOPs, it shall strengthen productivity, resilience, labour market and health care system.
- Reallocating resources – dealing with debts and insolvencies.
- Creating pandemic preparedness portfolio for better upkeep of future uncertainties – with sectoral, industry and infrastructure framework.

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