# Sustainable Planning and Architecture
# Lecture 2

**One planet, How many people?**

This is like a rising question that we have presently; we travel together, passengers on a little spaceship, dependent on its vulnerable reserves of air and soil; all committed, for our safety, to its security and peace; preserved from annihilation only by the care, the work and the love we give our fragile craft. We cannot maintain it half fortunate, half miserable, and half confident, half despairing, half slave - to the ancient enemies of man - half free in liberation of resources undreamt of until this day. No craft, no crew can travel safely with such vast contradictions. On their resolution depends the survival of us all

- Adlai Stevenson, speech to the UN Economic and Social Council, Geneva, Switzerland (9th July 1965)

It's like when we are all traveling on this spaceship that has this certain amount of reserve of air and soil. We depend on these resources that must be utilized very carefully since it can take care of needs of several people not for today alone but for the future as well. We must understand the past and current scenarios in order to plan on how to maintain such resources for the future as well.

Earth can be conceived as this vast space, especially when you are standing on top of a mountain, or even a huge landscape, but is this true? Currently the world's population is about 7,000,000,000, in the past, by 1804 it was 1 billion and it started growing gradually. In 1927, we were twice the previous number, in 1960; thrice the number. We have been growing ever since and by 2011, we already reached 11 billion. We need to look at how this growth has been happening when compared to the past.

**The overall growth;**

From the picture above, it is evident that China alone contributes to 19.4% of the world's population, while India being second contributes to 17.5% of the world's population, the second largest number of people. Only then comes, US - 4.5 and Indonesia - 3.4 and other countries that contribute to high population but not significantly are; Brazil, Pakistan, Bangladesh, Nigeria, Russia and Japan. But compared to any of these, China and India contribute the most. The other countries such as; other European states and UK all contribute to a population of 41.2 percentage. It has been estimated that, on an average of 4.2 days, we ( India ) add about 1 million population to the already existing 7 million population and it has

also been estimated that, per year, we add about 87 million people to our present 7 billion population. This has been increasing ever since, and each year we are accounting to 87 million. All this, is due to the medical advancement that has taken place across the years in India. Back then, people died at the drop of a hat for a small minor viral infection, but with today's medical advancements, the average life expectancy has increased to 75/80 years of age. It is like people are getting added and added into this world and there is no space left for people, for the land usage, for the new ones. So, we are adding people to existing planet, the land is not growing in any more, the glaciers are melting and the land is actually depleting. The rising question is;

**How many people can we fit on a spaceship Earth?**

The land that we have is limited and it has been depleting, the resources are depleting day by day as well. Hence, we need to calculate as to how many people can fit on this Earth upto a maximum threshold for it to reach and for us to be safe on a safer limit. It is like we are already travelling on this overloaded bus which is completely filled and you won't know when one passenger is added until there is a threshold point which are added by the passengers on top and only when there are few more passages added, this whole system will collapse. So, we need to find the limit and work towards it and how these resources can be used by the population that we have and which has been growing every day.

One of the ideas most emphasized by the Stockholm Resilience Center is the susceptibility of key Earth System processes to "tipping points". They believe that exceeding these threshold risks triggering abrupt environmental change. Think of the Earth system as a bus that is overloaded. Up to a point each new rider has a "Linear" impact - causing the bus to tilt a little more and more when it turns.

So at a certain point, when people are just piling up on to the truck, there is a little linear impact, but we never know at which point, it the entire bus going to collapse. So it is the same way, with regard to planet Earth. The population simply piles up by 87 million per year, we are still in the comfort zone, unaware of the fact that, the Earth is going to collapse, not knowing when. This also leads to the depletion of resources, thereby leaving the Earth bare of all its resources for the upcoming generations.

Earth's carrying capacity has been measured by several U.S census Bureaus. Some say, 2 billion, some say, more than 4 billion, this goes on to 34, 68 etc. In a survey of estimates of the Earth's carrying capacity, the majority of the estimates put the Earth's limit at or below 8 Billion people, which we are to exceed in about 15 years. So we are already 7 billion people. According to 65 different estimates, so what happens to the resources we have? Will it deplete in 15 years as well? It is also said, by the Calculation Methodology for the National Footprint Accounts,

2010 by Eing. B, Reed, A.Galli, K.Kitzes, J and Wackernagel that " If everyone lived the lifestyle of the average American, we would need five planet Earths to provide the needed land and ecosystem goods and services."

**Stockholm Resilience Centre**

Stockholm Resilience Centre has identified nine such key processes in the global ecosystem which they feel are being altered enough by human activity to put the stability of the Earth System at risk.

The graphic shows those nine Earth System processes. Several of these are global in scale, such as climate change, ocean acidification and stratospheric ozone.

The main concern of today is; climate change, Nitrogen cycle and Biodiversity loss. These three are major threat to the Earth, and we must look into these in order to find different ways on how to reduce the footprint of an average human being.

**Climate change, Rate of Biodiversity loss and Changes to the global Nitrogen cycle.**
Coming to the first point;
**Climate Change:**
"Increase the risk of irreversible climate change, such as the loss of major ice sheets, accelerated sea level rise and abrupt shifts in forest and agricultural systems." A second boundary already passed in loss of biodiversity. While it is clear that biodiversity is an important component of ecosystem resilience. As a provisional boundary they propose 10 times the natural rate of extinction.

For instance; those times when our senior citizens talk about how the weather has changed drastically over the years, it used to not be so hot and also how rarely unseasonal rains used to occur. It is estimated that by 2016, there will be a rise in temperature by 5 degree celsius, which will not cause increase in temperature but in turn will melt the ice sheets which simply increases the seawater level causing the depletion of land and the ozone layer will face defecation which affects the sea as well.

A second boundary already passed is the loss of biodiversity. While it is clear that biodiversity is an important component of ecosystem resilience. As a provisional boundary they propose 10 times the natural rate of extinction. Today, we use resources and live our lives like there is no tomorrow. We fail to remember that the entire planet is a constitution of different elements and that we are just a small part of it. The ecosystem constitutes organisms which help and we are mutually dependent on each other for our growth and our existence. Due to our increase in

our social and cultural lifestyle, we are going against nature (deforestation, more plastic consumption, etc.) and we have reduced the level of other biodegradable resources. For instance; due to the high usage of mobile phones, the radiations have in turn affected the life span of a normal bird. This is something we all know but seem to never curb the usage of such harmful resources. So, this is like a biodiversity that has been affected as such, so we need to have a closer look of how this can be protected, how we can go by a complete cycle and not just be ignored by other elements.

The third boundary that is estimated to have already been exceeded is the nitrogen cycle and more generally for the nitrogen and phosphorus cycles. These are important nutrients with central roles in both natural and agricultural productivity. Since we have exceeded the usage for nitrogen and phosphorus cycles, it is also affected by elements that we use every day like; refrigerators, washing machine that release carbon monoxide and carbon dioxide, which is creating adverse effect by depleting the agriculture and natural productivity.

The Earth is affected by various important elements such as; **Population growth causes; Solid Waste, congested Human habitation, Forest destruction, Water pollution, Human suffering and Atmospheric pollution.** We have been cutting down trees more than we ever did, it is because of the population increase.

It is estimated that in the year 1989, we have increased by 2.1 % with regard to population in just a year, which is a tremendous growth when compared to the past and since then; we have never stopped growing year after year. However, we cannot estimate each year, how much is being added, it has been differing every year and every day, it has been increasing constantly. On the contrary, there are some countries in Europe like Spain, Greece etc., who work towards lowering their growth aspect of GDP, thereby reducing the birth rate. So it is not just an incremental factor, it also reduces in some of the cities. So in these cities where the birth rate is decreasing, the cities are filled with people who belong to their old age, varying from 50’s to 70’s, thereby reducing their growth rate economically as well since there is nobody earning in their city. The people in their old age, who cannot work and rather should be taken care by someone else, the people who are more dependent on others. But we need people to develop the country and people who can take care of their resources and who can guide us and teach us how it can be used for. So, population growth cannot be classified to be an incremental factor on a global scale.

**So, one planet, how many people?**

The human footprint has grown to such a scale that it has become a major geophysical force. Earth's carrying capacity, has been estimated by 2012 to be the greatest concentration of

estimates fall between 8 and 16 billion people. It is also estimated, that by the end of the century, we will be in the lower limit of eight billion people. Even though we might be in a safer zone,

So by 2011, we have already reached 7 billion people. It has also been predicted that, by the end of this century, we will be in the lower limit of 8 billion people. Though, we might be in the safe zone currently, we have to look at what might happen if we do reach, 16 billion people. We need to find different solutions on how to curb the increase in population and depletion of resources.

Back in the year 1950, the birth rate and death rate were in equilibrium. However, as years passed, the birth rate differed from death rate by a slight variation. As we move further, at stage 3, the birth rate rose to a larger scale, while the death rate began to soar much lower than ever before. Which basically increased the population. As we move on to Stage 4, the birth rate dropped to the same level as the death rate, because of medical advancements. Is this the balance we can maintain? No, since the death rate is very low and the birth rate is low as well, we need to find a balance that is useful for global development.

**How to save "the PLANET"?**

**Population growth remains a major concern for future wellbeing**

Even though if we can reduce the growth of population, the basic population is multiplied by amount of psychological footprint each human being is making. So population cannot be completely ignored, or completely rebuked, that is not the right way to do it or go about it. So population growth is a major concern, so population growth must be made into a positive aspect of how to make new initiatives to preserve and create new alternatives for depleting natural resources. So, that is one of the most important points that we need to discuss about.

**Material consumption is a major concern.**

How much one person is consuming from the psychological footprint is important. Though the, developed countries are making a huge psychological footprint, even though their population is less, developing countries like India, China, are all contributing to less psychological footprint. Population is almost contributing to 40 - 50% of the overall world population; we need to stabilize usage which can be found out by different alternative methods to reduce the material consumption we have. For example; In USA, we can find four wheelers used on an everyday basis, even to commune for a short distance. But when you compare it to India or other smaller Asian countries, we are more dependent on our public transportation system. These are some of the aspects that must be looked into, which can be clubbed together, can be improved in

other countries like usage of public transportation, carpooling or combining people to combine and use energy sources, which in turn will be used for other people in need like the people in Africa suffering due the less amount of resources they get and they don't even have good water to drink, So, these are some of the aspects which need to be looked at on a global scale, not just in your country/ state/ street. These are some of the factors and resources which are available for the whole world. So, we need to find ideas and policies which can stabilize this.

**Demography is not destiny**

Which means there are different UN statistics that say 8 billion or 16 billion, that is the limit. But nobody actually knows what the limit is. So, we cannot completely rely on demography as one tool but it cannot be completely ignored as well. This has to be waited and looked about. We need to make some of the policies and measures to control, we have to be prepared if it is the worst condition that is about to happen.

**We must all play a role in finding human centered, rights based policies.**

Which means, it is just not concerning your own country, it has to be globally looked at. We must have new policies that say human policies to be centered and other things have to be. Human based policies what they mean is that every human should get what they need, their basic needs like food, good water to drink, good air to smell. These are basic human rights that have to reach everyone around the globe. We need to find policies which will satisfy this need to all the 7 billion people, not just the US or UK, which contributes to 4.5% or even less to the global population.

**This requires a three - pronged approach**

This means that we must find good policies, the government must take good political decisions, maintain and curb usage of resources. This can happen only when political issues are sorted out. Also, the usage, the present reserve, the air and soil, the spaceship of Earth has to be considered and that has to be taken care of along with other policies that is being made. So, it has to go, hand in hand with the reserves we have and the policies that we are going to make.

**We cannot simply rely on technological innovation (the "bigger pie") and demographic transition ( "fewer forks") to eliminate or solve the population problem.**

It is not just depending on this or that but we also need to take other initiatives, like we need to educate women on sexual and social education to every part of the country, to every person in order for them to understand the importance and need for understanding political issues and preserving the resources we have. So, we need to educate everyone to know and understand

this global problem and what's the big deal about this. So, do we need to, increase the population every day by 4.5 million, we need to educate everyone to help them understand that this type of a situation is prevalent.

**We have existing methods that have proven to be effective sustainable development tools.**

They are development tools which are empowering women, which is being used in some of the villages in Africa and India as well, to teach women with skills that aid in the development of resources, thereby, causing a women to be more independent and a person who can do well for herself. It is one of the aspect to reduce the depletion of resources. Hence, the rise in Self Help Groups across the country.

**We also have new tools and better models that can be used to develop tools**

There are some of the tools which have been developed by the Massachusetts institute of technology (MIT) in US, which can be used to test, it is a complex model by medicines which is used to test the holding capacity of the Earth and the available resources we have and how much it can get to everyone and how self-sustaining it is. These are references that you can find in the book, 'The limit of growth', published by MIT as well.