**Lecture 1 Chapter 2**

One crucial aspect of sustainable development is economic well-being, prosperity. There have been great gains in material well-being, in average income per person in other indicators of material life such as health and life expectancy over the course of recent decades. We’ll see of course that these are not gains enjoyed by everybody within a country, certainly not in all parts of the world but on average there have been very notable gains in economic well-being achieved through decades of economic growth and this is a phenomenon that is of crucial importance for those countries that are still poor today. Perhaps their greatest goal is to achieve economic growth so that they can narrow the gap in material conditions that they face today with respect to richer countries.

Those countries living in extreme poverty today where they can hardly meet their basic needs, are aiming to live like more of the world that increasingly has more of the assurances of basic needs and many parts of the world live with remarkably high standards of living.

Another aspect of this material changes is that in a world of greater production, greater ability to grow food, greater productivity in manufacturing, in transport, in power and in other key parts of the economy, the population has risen alongside that. From the middle of the last century in 1950, the world's population at the time was about two and a half billion people. It’s roughly tripled since then, absolutely extraordinary, to around 7.2 billion people today, and the numbers are continuing to rise, a roughly, an increase in 75 to 80 million people added to the world's population each year, meaning that it won’t be long, probably around 2024, 2025, when another billion people will be on the planet, when we reach the eighth billion person.

Let's look at what growth really means. There has been no exemplar of economic growth more remarkable than China. Of course, it’s the world’s most populous country with 1.3 billion people so anything major that happens in China is earthshaking. But also, China has been among the fastest growing economies in world history. Since China undertook some basic market reforms, after 1978 until just about the last couple of years when growth has begun to slow a little bit, China was averaging roughly 10 percent per year economic growth. Absolutely astounding.

And it’s very handy, something that I refer to many times, to use what we call the rule of 70. Take the number 70 divided by the growth rate, in this case 10. 70 divided by 10 is 7. It means that China has been doubling its national income every 7 years. The rule of 70 says seventy divided by the growth rate gives you the number of years to double the size of the economy. Well, what does that mean? Take a look at Shenzhen, China. Shenzhen is a city very close to Hong Kong in southern China and in 1918 you’re so when you was seen this picture change n was a small village, mainly rural, not very many people, perhaps 30,000 people living in Shenzhen. Now take a look at Shenzhen today. Nearly 10 million people Shenzhen has become a modern metropolis, it’s a major manufacturing hall for the world. Not only did population rise, incomes per person soared, but also how people live has clearly fundamentally changed from rural, agricultural livelihood to modern manufacturing and services and in a matter of three decades.

Well, most of the world's not gonna work experience Shenzhen like change but that basic pattern on economic growth I a transition from poor smallholder farming to with modern manufacturing especially modern service economy is part of the normal pathway of economic growth, and while very few places grown with the rate of 10 percent per year with a seven-year doubling time, it's still was the case that many parts of the world even many of the poorest parts of the world todayare experiencing significant economic growth and went bad a significant transition to urbanization and a significant transition from agriculture to manufacturing and especially to services.

If you look at the next graph you see something also absolutely astounding when you really need to keep in mind and that's democracy the words change world population now this is a graph that shows you a long long haul over the last couple million years even before there was the modern human species, but let's just take the human part of this, what we call the Neolithic era that sense the change agriculture began around 10,000 years ago well the human population for a long time if you look at the picture from 10,000 years ago maybe seven or eight thousand years NBC once less than a half a billion people course nobody knows about it baby 300 million people of all the people on the planet.

That number did not change very much for a very very long time the graph is quite flat a numbers rising maybe to four or five hundred million people 1 AD, and that tells you that over much of human history since the beginning and agriculture human population did not change very much. But take a look at the right hand side of the graph all aside the population begins to soar just about the time of major breakthroughs in technology around the Industrial Revolution I'm me beginning and be the era of the steam engine 1750 or so we see the population curve turning up and turning up remarkably steeply

Around 1830 humanity range a great milestone of a billion people on the planet, so for thousands and thousands of years the population was under $1 billion then from 1830 to 1930 just in one century the second billion was added. But then the numbers really started to soar because from 1913 to 1916 just thirty years the third billion was added we're on track to go from seven billion reached in the year 2011 to eight billion probably around 2024 or 2025. Nine billion sometime in the twenty forty, so this change a population is absolutely astounding are change is an age up economic grope combined with rapid population growth and together does too dynamics had meant any massive expansion up economic activity of total output produced on the planet each year and of course alongside dad a massive increase of humanity’s impact on the planet and that is one thing grade challenges sustainable development

Now another bright spot on recent development instead alongside an economic growth and alongside rice population numbers has also come improved health. Around 1950 for every 1000 children who were born an estimated 134 out of the one thousand would not survive until their first birthday. That number 134 per thousand is called the infant mortality rate that tells us how many children won't make it to the first birthday. what's very heartening use that number is coming down and coming down sharply so that the 134 per thousand I ap are or infant mortality grade is down to an estimated 37 per thousand today. 37 children still don't make it to the first birthday, dying of malaria or pneumonia, other preventable diseases millions of children dying before their first birthday still of preventable and treatable causes. We'll talk about that, we'll see what can be done will show how even more progress can be made it can be made rapidly. But taking me historic trends drop from a 134 to 37 is a real accomplishment and one that has improved the quality of life certainly I eliminated a lot the tragedy and anguish that was part of humanity’s existence internal and the improvements public help and modern medical care or with more children surviving and with health improving I at or regions as well

The good news is that our life expectancy is also rising and rising vary considerably take a look at what's happened to what we call life expectancy at birth that is artistically me average as blame them for a life span I taking into account me risks and death each age in the middle of the last century good in the period 1950 to 1955 and the average life expectancy for people on the planet was around 47 years—pretty short. As of today the estimated life expectancy at birth is more than 70 years or roughly 71 years and in the high-income countries around 80 years. This is another example of economic growth and material progress, and an example of the kind of progress that is being achieved in most parts of the world.

What’s the lesson? The lesson is that this first pillar of sustainable development, economic well-being, is something that's achievable and being achieved on large parts of the planet. There are fewer tragic deaths and young children and greater health and longevity for most of us with life expectancy rising several decades from what was experienced in the middle of the last century until now. This shows how economic development can improve lives, lives in which one can have the confidence that their children will also grow up healthy, and survive and have good prospects in life what we need to do is to ensure that an economic growth means in close it that it's not leaving millions and millions of people behind, and that is environmentally sustainable so that the progress itself doesn't cut our natural life support systems of biodiversity, food productions, safe climate, productive oceans, because if we do gains made turn out to be leading an acid could lead to real tragedies so what's that holistic approach show rings economic times growing and material improvement socially inclusive and environmentally sustainable. That is the great challenge.