

## **Seminar**

### **Measuring economic and human development in the Anthropocene – bringing climate change in**

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**Renu Kohli:**

Hello everyone. Welcome to the CSEP. I am Renu Kohli, senior fellow here. Today we are here for a presentation by Dr Ajay Chhibber, who is a distinguished visiting scholar at the institute for international economic policy, George Washington university. And also, a non-resident senior fellow at the Atlantic council. He will be arguing here today for a case for incorporating ecological and climate change related variables into the human development index. And creating a vulnerability adjusted HDI that also measures resilience to ecological, health and economic shocks. This is a great opportunity for us to engage with a scholar who has held many, many distinguished posts. We are proud to have Ajay speak on this here at the institute and share with us his insight which draw upon his former engagement as an official with the UN as an advisor, as a researcher with the World Bank bringing in lot of analytical and grasp to grapple on these issues. Critically as well as constructively. I also welcome Shubhashis Gangopadhyay who will be the chair and moderator for this engagement. Shubhashis has also a very long and distinguished career as a researcher, as a teacher, as a policy advisor and also amongst others founder of many institutions, academic, quasi academic and research. And he continues to be engaged with monitoring outcomes in real times. So, he brings in a lot of perspective on the construction of these indices. We have a power packed panel here for discussion which will happen after Ajay has made his presentation. First off, the list is Rupa Chanda who I have known, who will be joining us online. I have known Rupa for a long time and have considerable admiration for her as well. She has an exceptional academic record and both academic as well as a professional record. Having had stints with the IMF, the UN ESCAP and long teaching career at the IIM Bangalore. And currently with the UN. She also serves in many advisory and review roles. So, we are very happy to have her share her insights and offer her comments on Ajay's work. We have also two inhouse people. Laveesh is the president of CSEP and we have in him a lot of expertise and experience on sustainability and climate change issues. He is also a successful builder of institutions. Research based ones, analytical and data analytics ones. He no doubt brings these aspects into his insights on the discussion. And we have Priyadarshini who is a fellow at the CSEP in our human development research program. She focuses on education, history of public institutions, politics and policy political ideas at the grassroots level. So, that will further Enrich this engagement. And with that I will handover to Shubhashis to chair this session and take it ahead. Thank you.

**Shubhashis Gangopadhyay:**

Thank you very much. Thanks to CSEP for inviting me over here and grateful to Chhibber for agreeing to talk about this new thing here. My relationship with environment has been mostly at the micro level. At the theoretical micro levels. But of late, some colleagues of mine and I are working out something on what we are calling GEP Gross environmental produce. And we are trying to do it in the state of Uttarakhand. So, therefore when this invitation came and I saw the topic, I was quite excited. And said yes, I would come and see what new ideas I can steal from you. But my job over here is as chair and moderator. And as chair and moderator it's not my place to speak a lot. So, I am going to not talk much, just make sure that everything happens on time and we have a vibrant discussion. So, I will call upon Professor Chhibber, to please present. Thank you.

**Ajay Chhibber:**

Thank you very much, Shubhashis, for that kind introduction. And thank you Laveesh and Rakesh and all for inviting me. This is the first time actually I have ever been to CSEP. Although I have, for all my sins, I have served on your advisory body of some sorts. I don't know why I am there, but I am glad to be there. So, this piece of work is not focused on India. But I will end with some interesting things to say about India. Perhaps interesting things to say about India. In a way the paper is a long paper. But its in two parts. So, one deals a lot with climate change. And the other part I will end with deals a little bit with the concept of vulnerability which is still a piece of work in progress if you like. So, I thought I will expose it here also to get some ideas from you all on that. I have been pushing this train of thought that the human development index was a great achievement that professor Amartya Sen got us out of thinking only about GDP. Added the human dimension to it. But then, it sat there for a very long time with no change. Especially after the SDGs came into being in 2015 it became quite untenable that we are measuring human progress without factoring in any concept of climate change or sustainability into it. So, I have been pushing for about 15 to 20 years perhaps, I was joking with Renu that that was way ahead of when people were willing to accept it to some extent we needed to start thinking. But I will show... so, the human development index looks at low human development, medium human development, high human... very high human development. As you can see, when you start to enter very high human development and even high human development, you start putting an ecological footprint on the globe which is much higher than the sustainable bio capacity level which is roughly two global hectares per person. So, the average is 1.7. the limits are about 2. If you go to these very high levels of economic and human development you start putting a lot of pressure on the environment. The same... pretty much when you look at the energy consumption per head, you get an increase in human development. With an increase in human development, you need to use more energy. But at some point, you start getting some sort of decreasing returns to that. That at very high levels of human development, you end up with using lot more energy than you need. So, when you look at any level of human development say beyond 0.8, which is an indicator of HDI, then you can see that the Gigajoules per head that are required are getting you much less improvement in human development for very high levels of energy intensity. So, as I said Amartya produced the HDI which was an excellent progress in how we measure development, but then the index just stalled there. And if you go back to Sen's original writings especially his work with Sudhir Anand, you do find that intergenerational issues, equity issues, are very much there. Amartya quite explicitly talks about environment and sustainability and access to things like sanitation and even clean water. So, people think he had ignored these issues. But actually, that is not true when you do go into the original writings. While the HDI got stuck, many other people started producing other indicators. The 'gross happiness index', 'sustainable development goals index' has come about, a 'social progress index' based on the work that was done by the commission headed by Joe Stiglitz. That is social progress index. Then some private sector people also started producing indicators. The 'legatum prosperity index' etc. And then two very interesting indices which I will review here, called the 'happy planet index' and the 'sustainable development index'. Now, in this paper that is there, what I have done is first done a review of these indices that developed while the HDI remains stuck where it was. One interesting feature that is quite clear with these is that with the first four indices there is a very high correlation between them and the human development index because each one of them does contain environmental and climate related variables. But they are part of a cluster of very large number of variables. So, if you have an index with 25 or 30 variables and you throw in two or three

environmental and climate variables, then by itself its not going to show up. So, these are called indicators where there is weak sustainability or weak substitutability as it were. Because the climate change and the environmental variables don't really bite because they get lost in the shuffle. So, you end up with very high correlation between those indicators and I am happy to go into each one of them if you want to, but for interest of time I will move on. Now, there are these two indicators the 'happy planet index' and the 'sustainable development index' which do not. That is there you find in the case of happy planet index very low correlation between that and the human development index and in the case of the SDI you will find negative correlation. Next. Let me dwell a bit on these. What is the happy planet index? It's a very simple index. It says it measures well-being times life expectancy times inequality of outcomes and divides that by that ecological footprint. The first chart that I showed you. Wellbeing is measured by a perception index. It's not a numerical index. It's a perception index. But, anyway, if you use this indicator, you can see how the rankings change. So, Costa Rica, which is 68 on the HDI is number one on the happy planet index. Columbia which is 79<sup>th</sup> the third etc. and then you get the reverse. Countries like Australia which are 6<sup>th</sup> in that year on the HDI, they dropped to a 105<sup>th</sup>, the United States goes from 15<sup>th</sup> to 108<sup>th</sup> etc. So, this is clearly an indicator because you are dividing it by that ecological footprint. There aren't too many variables. You get it to bite and you get strong sustainability in this indicator. Next. Now, there is another indicator called the 'sustainable development index'. Which is basically the human development index, the numerator divided by an ecological impact index which is measured by both CO2 emissions and material use over planetary boundaries. This is material used in production. This is data that comes from UNEP. And they also added this extra requirement that they don't count any extra benefit for income above 20000. But as you can see from the chart it peaks well before 20000 dollars. So, that means that the income of 20000 dollars doesn't really bite in this index. It's really the ecological impact index which creates this negative correlation with the HDI. Next. Here, we again plot the sustainable development index with the HDI and you can see it peaks at an HDI level of roughly 0.8 which is high human level development. If you try to go beyond high human level development, the ecological impact is so strong that it starts to give you negative outcomes. Again, you can see countries like Costa Rica and even Cuba that score very high on this SDI index. And these are top ranking countries on the sustainable development index. Now, the World Bank and UNEP... these are flow indicators. You measure these every year. They have also calculated a stock of sustainability. The World Bank calls it adjusted net savings and UNEP calls it inclusive wealth index. They are not exactly the same. There are some variations between them. But these are also available as measures of how sustainable is development in different parts of the world. Now the UNEP measure is slightly better than the World Bank measure because it has strong sustainability. In that it can tell you what is the loss of ecological capital in a country due to the development that's taking place. Next. After many years UNDP finally decided that it had to do something. It could not with all these other indicators out there and two of them at least showing very strong sustainability effects, the happy planet index and the SDG index. The UNDP finally decided that we have to make some adjustments in the HDI, at least on an experimental basis. So, using some of the analysis that I had done, what they did was they created something called a planetary pressure adjusted HDI. What that is is that they take these two variables that are in this sustainable development index, the CO2 emissions and the material used in production and they create an average of those two and then they take 1 minus that as an adjustment factor like they do with the inequality adjusted index. And they multiply that with the HDI to create these

planetary pressures adjusted index. And as you can see what that does to rankings is that, the United States drops 45 ranks. So, its not exactly the same as the SDGI but it uses similar variables. It does not put a cap at 20000 dollars. But uses this adjustment mechanism to create this planetary pressure adjusted HDI. And here you can see the change in rankings between the HDI and the planetary pressures adjusted HDI. Next. So, they have been some progress now that this indicator, the planetary pressure adjusted indicator. So, they give you the HDI now and they give you this experimental index as well. And you can see what happens when you make these adjustments. At the moment there are only two adjustments that they made. One is for CO2 and the other is for materials used in production. They do use a trade method for adjustment so that its consumption based. It is not just production based. So, if you are producing it in China, but you are exporting it to the United States, it will be attributed to the United States and not to China. So, those adjustments are made. So, that's where we are at the moment. And I am hoping that further adjustments will be made to this. This is a good start. But it is not good enough. Now, today I thought I'd also talk to you a little bit about this idea of vulnerability that I am experimenting with, if you like. So, here's a bit of data that is printed in the human development report tables. It's called vulnerable employment. This is what is the share of employment which has no access connected to your job, to a social safety net. So, anybody working on a daily wage, anybody working in agriculture, they may have access to free food, but its not connected to their job. They may have access to MGNREGA, is not directly connected to their job. So, the HDI gives the share of employment that is defined as vulnerable. Vulnerable to shocks of any kind, vulnerable to pandemics, vulnerable to economic or financial crisis. India, as you can see is a huge outlier on this. Something like 77% of India's employment is classified as vulnerable. In contrast you can see Bangladesh. Bangladesh is only roughly little over 50% that is vulnerable and Bangladesh is very much on the expected line. Whereas India is a complete outlier on this. So, apriori, India is doing better than Bangladesh on the human development index. But if your population is more vulnerable, then every time you are hit with a shock or with a pandemic, you are likely to suffer a much bigger drop in your level of development. Next. So, using this indicator to look at vulnerabilities, I applied different levels of shock. You can see a 2% shock, 5% shock to adjust the human development index, using the share of vulnerable employment as an indicator of vulnerability. And you can see that if the HDI has 47 countries in very high levels of human development. With a 5% shock they drop to 29. From high 32 countries drop to 13 etc. etc. And from at the low level of human development from 5 countries in the 102 countries that I took, it jumps up to 36. So, this, one can think of that if you have a pandemic or you have a global financial crisis, this tells you that if you have these shocks apriori ex ante, you should expect these kinds of drops in your level of human development that, people in these countries will be subjected to these shocks. There's another kind of vulnerability that I looked at, which is shocks due to climate related disasters or natural disasters. It could be earthquakes, it could be cyclones, greater intensity of rainfall etc. So, there is an index called the Norte Dame vulnerability index that comes with natural disasters. I use that indicator also to look at climate shocks and natural disaster related vulnerability and as you can see how countries change. Next, I want to end by just focusing on India a little bit. So, when you look at India alone the 5% shock given a very high level of vulnerable employment has a huge impact, immediate impact on our HDI. We go from an HDI level of 0.647 which is a medium human development country to 2.265 which is a very low level. And we saw this play out during the pandemic when millions of people had to go back to the villages, they had no direct social safety net, they were then of course, given free food and

they had to rely on MGNREGA. But there was no safety net directly connected to their jobs. And so, India's human development is very highly vulnerable to these shocks given our current state of safety nets. We are less vulnerable to human disaster shocks because we are a large country. So, if a cyclone hits Orissa or an earthquake hits Gujarat or somewhere else, or in the north in the mountains, these are localised in the sense that there is a huge shock where it happens. But then the country is large enough that it can cope and send help to these people. So, for a large country that shock is not that big. For say a small island country the disaster shocks would be quite large. So, this is a concept of vulnerability adjustment that I am playing with now. Because we can have... our average indicators can show considerable progress both on income or health or education, but if the employment is not secure in that sense that it provides you a safety net, then shocks will hit very, very hard. We have done surveys after these shocks. We did one after the GFC that the income recovery is quite rapid. But very many families pull their children out of schools, neglect their health care and particularly for girls, it is very hard for them to go back to school. Many of them drop out. Then this cyclical shock then has intergenerational effects as well. So, I think this idea of vulnerability needs to be, in addition to inequality where there is a lot of focus, I think the idea of vulnerability needs much greater attention and focus as we go forward. Thank you.

**Shubhashis Gangopadhyay:**

Thank you very much, Professor Chhibber. We are actually well before time which is good. So now I go straight to discussions and I will go according to the order mentioned here. So, we first go to Rupa Chanda.

**Rupa Chanda:**

(No audio from 35:20 to 38:30)

... which creates a lot of movement in the rankings of countries. It would be very difficult to accept such an index. And also, the paper points to the difficulties in incorporating certain areas for instance security conflict. These might be very important aspects of human development. But they are much more difficult to measure. And especially when you come to perception-based sort of measures then it becomes even more tricky. In the context of climate, I think the paper makes an important argument. It discusses the kind of trade-off that you see that you go to higher levels of development but there is a trade-off in terms of increased use of energy and why there is a need to include ecology and climate change. So, it's a nice way to motivate that if you incorporate these much more explicitly and you show the changes that happen in rankings of countries, how that could actually focus more attention on these trade-offs and therefore motivate more action on climate and environment. As was discussed in your presentation, of course, you need to create a new index which captures broader vulnerabilities and here the paper talks about the different sources of vulnerabilities. The employment one is shown in the experiment that Professor Chhibber has done. But also, the health-related shocks create another source of vulnerability as we saw with covid and ecological shocks. The paper also does a very good review of the various sources of vulnerability and the related literature. The impact simulation that is done is quite interesting as well. I would say just with that very simple simulation you get an idea of how you need to have a more targeted way of mitigating the human development impacts of shocks in the future. Because when you see that just by incorporating one particular measure of vulnerability how countries fall out of the high rank to a lower rank, lower on the development index. It means that clearly these are areas that one has

to act upon in terms of policy targeting. Now, I will just share some of the things that I found quite interesting. As I said the impact of the shocks on vulnerability adjusted HDI versus the simple HDI versus the inequality adjusted HDI. Really the sensitivity of the indicators to what was included, how it was included, whether it was directly included with the Norte Dame index or whether it was done with an adjustment, that was quite interesting to see that the issue of robustness comes up. How you measure something, how you incorporate it, whether you do it directly or in an adjustment manner does affect how the rankings are. So, if there is too much variability in the rankings, then again it calls to question how good is one measure versus another. But as I said earlier it is useful for highlighting that there are specific challenges to human development and that you need much more focused policy targeting. Now, here are some of the points that would be in favour of incorporating vulnerabilities. Here I am just focusing on the climate one in particular. If you look at some of the recent disasters or for instance Thailand 2011 floods or California wildfires. The sort of the estimates that you see in terms of loss of GDP, the direct losses, the indirect losses, etc. clearly, I don't think its hard to argue that this needs to be incorporated in some way and climate change is making these kinds of disasters much more frequent, in terms of sea levels, it could be wildfires, it could be rising temperatures. There are so many different kinds of disasters which are getting precipitated because of climate change. I think there's more and more evidence of it. So, this is one clear reason why there is a need to incorporate vulnerabilities related to climate. I think another area which is interesting is the impact of climate on migration. There is some empirical evidence on this as well on how temperature rise is leading to more migration in low-income countries. The impact on agriculture and food security, extreme heat, low precipitation and the impact it has on agriculture activities makes certain economies more vulnerable. And we all know that migration has huge economic and social costs. So, climate migration and related sort of need for services, resource allocation and the implications that it has for human development could be another way of arguing why it is important to incorporate climate related vulnerabilities. I'd also like to point to some issues to consider when we incorporate climate specific vulnerabilities. So, the paper says for instance if we now want real action on climate in ecology, we need to include damage to the environment and depletion of natural resources, conflict, security as factors in measuring development. Now, the question is if you incorporate climate related measures, for instance energy use per capita, how much would it alter the rankings of countries which may not be as industrialised to produce or lack of technology to exploit natural resources. To what extent would the rankings get sufficiently counterbalanced by poorer performance on other parameters of the HDI, because again the issue becomes of how much of a shifting in rankings happens. So, how credible would be these movements. So, one caution is how careful we need to be about overestimating maybe human development in underdeveloped, non-polluting, less energy intensive states. Covid 19 is another example. Emissions decreased, the poverty increased. So, might adding climate into human development measure obscure living standard issues is might we end up conflating effects of different kinds of shocks by ignoring interdependencies. In terms of energy use per capita, I think its not a one directional relationship. Its bi-directional. So, just as with higher levels of development you get more energy use per head, but greater energy use per head also has a bearing in terms of accessing better standards of living, more amenities, more services etc. Also how do we differentiate between the different sources of energy and their impact on the environment. Clean versus polluting. On the methodological front, of course, it's good to be comprehensive, but as was also mentioned during the presentation when you have many, many components in an index, it



becomes much harder to interpret the movements. So, what for instance, would be driving a particular higher value, how do the different factors counteract or reinforce one another, how do you ensure that you have independence or appropriate adjustment when there are dependencies amongst factors. So, even when we look at vulnerability for instance, you are taking one dimension, but there is the economic, that's the health, the climate, the three that are mentioned in the paper, but these are also interdependent vulnerability. So, if you incorporate more than one kind of vulnerability, how do you account for those interdependencies. Next, vulnerability itself is a function of education, health and income levels. So, for instance if you take share of vulnerable employment, it is related to a country's educational status and skills. Share of population without health insurance is related to health status and conditions. So, I am just asking a broader methodological issue, how do we extricate vulnerability measures from other components of the HDI, don't overestimate or underestimate. And I think one thing the paper could do is, perhaps provide an exposition of some of these dependencies and how you would account for them to avoid biasing results one way or the other. Another area that I think maybe a little bit more discussion would be helpful is to ease out the channels through which vulnerabilities of different kinds including climate can impact human development. What is important here is to what extent they are intermediated through the channels of health, education, income per capita, for instance. So, if you take climate related vulnerability, its quite easy to see the linkage with health outcomes. It could be through natural disasters, could be because of rising temperatures and therefore greater incidence or higher incidences of vector borne diseases or through emissions and pollutions. There are many, many channels through which climate related... climate change is affecting health and therefore would be affecting human development. How then do we capture these interdependencies and measure them? So, I think it is important to give a bit more thought about the channels of the impact and the relationships because they can be quite complex and they are not necessarily well understood. And if they are to be incorporated, given that there are multiple pathways, which channels should be focused on, which would be easy to incorporate into an index. So, I think some examples, some discussions on ways to incorporate climate change given these channels of dependency would be interesting to have. I give an example here for instance. You could explicitly consider climate impact on specific parameter like health, then conduct a vulnerability and health systems assessment to see the nature of the climate change or how the nature of climate change has an impact on the health system of a country. So, basically what I am saying is that I think we need more focus on understanding these linkages, gauging their significance for human development outcomes and then deciding which are the ones that are relevant to incorporate, to what extent they are important to incorporate. I think measure of vulnerability will be a challenge still. An additional thing to consider is, if we believe that incorporating these factors helps us in better understanding, in better targeting policies, in the context of climate change it's a little complicated because climate change impacts really quite a bit, they have local, regional and global dimensions. Even within countries. Especially larger ones. Can we really capture the differential risk vulnerabilities that exist between urban and rural, between geographies and regions and so on? Then ultimately whether incorporating them will necessarily translate into having more climate action-oriented resource allocation or lead to more climate risk management focus. That really is a larger question. I am just raising this because one of the reasons we want to incorporate these measures is to better understand the impact of different factors on development and therefore target them through policies. But then, ultimately if climate has so many levels of impact, linking the local development priorities with

the national priorities and so on may not necessarily happen. So, this is just a side point. Its not key to the paper, but I think it is important to think that not all vulnerabilities can be captured that well for especially for a large country. So, I will just end here. Thank you very much, for this opportunity.

**Shubhashis Gangopadhyay:**

Thank you very much Rupa. We now move on to Laveesh Bhandari.

**Laveesh Bhandari:**

Thank you Shubhashis. Its indeed really nice to read this paper. I have been wondering about these issues for some time now. And in the past, I have been involved in many indices creation attempts. The problems with indices are that of course, aggregate everything. Normalise and they make, just remove the colour and the richness from underlying processes. So, after having done I think perhaps 100 different indices I just completely got sick of it and I just left it aside. Having said that it is really important to have these indices. Because they do tend to focus attention. They bring public attention, political attention and social attention to certain problems which otherwise become too complex for lay persons to perhaps deal with. I am very glad that these attempts have been made and I am very glad that you were able to come and share some of these experiments with us. So, I am going to not... I mean Rupa has already talked a lot about some of the specific issues related to indexation. I am going to talk about two or three issues which I've felt or I have had to deal with in the past and I feel that they are really critical to the problem that we are trying to do. The first, the really important part which when we deal with environment is, we have to appreciate and respect the power of nonlinearities. Now, between any human action and its impact, there are many nonlinearities. Between the impacts and the economic impacts there are nonlinearities. Between those impacts and our experiences there are nonlinearities. Between our experiences and the measurement there are nonlinearities. The whole process has a lot of nonlinearities. And I will give you one or two examples. A simple one. The process of all this CO<sub>2</sub> creation started 100 years back or 150 years back, which was much more than was normal, it took us 150 years to observe these impacts. The impacts are only observable now. So, there is a clear nonlinearity here. Between the time that we are observing these impacts and people are actually realising and building it into their decision making is also there is a nonlinear process. Indices however, at the ones that we generally tend to deal with are all linear. They take a nonlinear process, if there is one and they squeeze it, they normalise it, they remove all the richness and then they linearise it. So, I feel the one problem... I don't have solutions right now... but something I think we should be aware of is that these nonlinearities if not addressed well may force us into introducing downward biases in many of our measurements of at least related to environmental issues. Now again, I will give you one example. A very simple one. I lose 10% of a forest, there is some sort of an impact on biodiversity. I lose the next 10%, there is of course, a greater impact. Okay. Those two 10% are not the same. Now suppose, I am taking three different forests or two different forests losing the first 10% is a different impact, than one forest lose the first 10% and another forest loses the second 10%. Now in these aggregations we actually lose out a lot of the loss. So, indices unfortunately are meant to aggregate. And in that aggregation, there are solutions that are possible, it's very difficult. Because those data typically are not there. So, that's another issue related to nonlinearity that comes up in indices. So, that's one class of problems. The other class of problem has to do with the issue of irreversibility. Now, of course, the environmental

processes are irreversible or so we believe. Well, at the very least, they are irreversible for a few hundred or a few thousand years. So, if we have let's say global warming happening and even if you were to correct everything, this process will continue for perhaps 10000 or 20000 years. So, it is an irreversible process for 20000 years. We introduce plastics into the environment. Irreversible process for again 20000, 30000, 40000 years. So, there are irreversible processes. Now, that actually is the crux of the problem. Because it is irreversible the problem that we are dealing with, the measurement has very extreme values. And indices typically of the kind that we deal with are very good at mid-range values. They go haywire when you start to introduce infinity, close to infinity kind of values in it. So, again example, I have an HDI problem. India let's say has literacy rates of 70 to 80%. Another country has literacy rate of 60-70%, a third has 40 to 50%. That is fine. But if a country has a literacy rate of let's say 1 or 2% and you introduce that country also into the same equation, it will squeeze up all the countries together. So, the country that has 50 to 60% literacy rate shows up very similar to the country that has 80 to 90% literacy rate. So, having these extreme values also tends to have an impact in index creation. And the environment is all about extremities. There's that another challenge that we need to address. I think there are solutions possible. I don't think HDR has the capacity to do that. But I think that conversation would be nice to have. And to see what the solutions might be. There is another part to this. This whole issue of how are we introducing future generations into this. Again, tie this on with the problem of nonlinearity. So, some amount of carbon dioxide is released in the atmosphere now, or let's say plastics are released in the atmosphere now, in the oceans now. Its really not that much of a problem for us, right now. The problem is the impact that they will have in the future. So, in a sense what we are trying to build in is the negative impact that these human activities will have in the future. And we are trying to build those into the numbers right now. But it is also true that there are a whole lot of future possibilities. So, if you just break up the environmental issue into the mess that we are creating and the mess that we can potentially... and our ability to handle the mess in the future. So, the mess that we are creating etc. I've already spoken about, a capacity to handle the mess later is essentially all about our ability to store energy, how can we deal with plastics and so on and so forth. Now the way I understand it, we've actually been not too bad in our ability to handle the mess in the future. We know that 10 or 15 years from now in all probability we'll have very low-cost storage. Electricity storage possible. We know that we would be in all probability be able to develop plastics that are highly biodegradable. And we know that we will be able to develop other forms of organic compounds that can address some of the other kind of pollutions. So, we know that there... by know I mean there is a high degree of probability that we will find those answers 10 to 15 years from now. The question that I ask is that if I am building a cost element into my current decisions from the future, should I also not be building in the possibility of those successes into the future. Its not something which will be easy to do, but it's just something that I think we do need to recognise. It is about future generations and we need to look at both sides of the point. There were couple of other points that I wanted to make. But I will just like to end with, I feel that it is really important that we do come up with, if not indices, other kinds of measurement mechanisms. Perhaps an index if not found to be the right way, at least simultaneous consideration of three or four different kinds of measures which also incorporate environment related ones. Maybe one possibility. But it is high time that in all economic activities the impact on the environment is actually built in. Unfortunately, we have spoken about natural capital and the measurement of natural capital a lot, for at least a decade I have been hearing of this. But apart from an attempt here or there we

really haven't gone all the way. And I think it is possible. Its not something which can't be done. So, with that I like to end. Thank you.

**Shubhashis Gangopadhyay:**

Thank you Laveesh, we now move on to Priyadarshini Singh.

**Priyadarshini Singh:**

Thank you so much. This is truly in every way a very fascinating paper for somebody who is actually not trained in climate change, development of indexes or international development. I actually come from a perspective of ethnography of politics. Political ideas and public policy making. It is actually interesting that we are sort of discussing in some ways the history of indices in an era when we are in the middle of politics of Vikas or development. And while I was reflecting on this paper, this song was playing in my mind. Its “छोड़ो कल की बातें, कल की बात पुरानी, नए दौर पे लिखेंगे हम मिलकर नयी कहानी” (meaning – leave talks about yesterday. Yesterday is old. Let us together write a new story in this new era) which is a Hindi song, patriotic song. And in some ways, I felt that the narrative in story that professor Chhibber has laid out in his paper was somewhere calling for in some kind continuities, but also a break from the past to move ahead and deal with the challenges of the future. My comments today are going to be really focusing on the idea of a human development index politically and the success of any index is dependent on how successful it can be implemented at the national and sub national level to actually improve human development outcomes and I am going to share some of my reflections on that. I am going to start with some of the key takeaways for me and then some I think important questions that I think the paper raises. So, I think the first big thing that I took away from the paper was just looking at the journey of all these various indices and the important point that there is a correlation between the indices and increase in human development outcomes, the paper quotes certain percentage points and I am thinking very closely about the history of the idea of the nation. And how the idea of nationalism changed decades after decades earlier from being this entity of social cultural uniformity and unity to then sort of a container of growth and development and economic prosperity which is so brilliantly talked about by professor Ravinder Kaur, in her book ‘brand new nation’. And in that sense the idea of human development as discussed in the index closely also parallels some of the narratives of... the meaning of “**Desh**” that I encountered when I was doing ethnography of nationalism in India. The idea of being Indian nation is movement towards an ideal future defined by development, defined by socioeconomic progress. And I can't draw a direct correlation but I think some ways it shows the power of what these global conversations and institutions can do. The other thing that I found exceptional for me is the comparative sweep across different indices and what it does when you introduce a new set of indicators and what it does to the image of the model of development of particular countries. So, the 2018 HDI there are 51 countries in very high human development category. And in the inequality adjusted HDI, 2018, there are 26 countries. And Cuba ranks very high on sustainable development index. And this ranking changes the perception of these countries politically in terms of model of development. When I think about it in light of how development is discussed in the everyday. To give you an example, “हमारे देश में, कोविद ने अमेरिका को भी पीछे छोड़ दिया”. (In our country, covid has left even America behind/lagging) That idea comes from a certain model of development that certain countries signifies being better than India. And then you have an index, a globally recognised index that says maybe not. Then your political conversations around some of these

ideas change very dramatically. For me the index also sort of sets a certain contour to the idea of development as necessarily consisting of certain things, health, education, meaningful work, whereas in national and subnational context all people may not be valuing them equally. So, between meaningful work and gender equality, I am quite sure development is seen in terms of meaningful work. And gender equality is somehow not as much a priority. So, what something like this an index done politically is to sort of shape what at least a recognised idea of development is like. And also, in the end the power of global discourses around development, the power of global institutions and the sorts of elites, platforms, data sets, this is created over the various decades. But as a paper also says despite the index, the world increased defence spending while reducing health spending and it wasn't prepared to deal with the pandemic. So, it is at this point I sort of want to bring in some of my reflections on the politics of index making and the politics of human development in which the implications of both an HDI, a sustainability and vulnerability adjusted HDI or any index at the end of the day sits. Within the context of national policy making, there will always be certain models of development that will get... end up getting prioritised over others in order to meet the development goals. That in the short and the medium run can actually create very lopsided sort of trajectories of development. To give you an example the gender related education challenges in Rajasthan are very different from Tamil Nadu. And this is not to say that a progressive state like Tamil Nadu doesn't have gender related challenges. Its just that within the development framework the problems will be seen in a state like Rajasthan. I think a closer examination is required of the political consensus needed and generated to prioritize certain development outcomes. At the end of the day if you look back to professor Sen's discussion on the idea of human development, it's about expanding the choices, meaningful choices that people have and expanding the capabilities and capacities of humans and societies to achieve certain meaningful goals. But what is meaningful at the end of the day nationally, sub-nationally is arrived at politically. And the need to sort of factor in the political context is I think quite important if one is to sort of understand what indexes do. So, to give an example, during the late 1980s and 1990s, there was this global conversation around universalising primary education and India benefitted or sort of participated very strongly in it. But according to some accounts what participation in that conversation and speaking to that audience also did was India somewhere lost the sectoral approach to education. School education as a whole and we focused a lot on primary and elementary education. And that in some way was shaped by the broader politics on education at that time. Couple of quick last points. These sorts of global initiatives also then create subnational and national level cults of index making, of certain data sets of certain kinds of elites who think of development and policymaking by analysing, assessing certain sorts of knowledge and certain sorts of data. And that in turn sort of feeds into the kind of development outcomes, one kind of ends up seeing. Lastly, when we think of sustainable development, I think taking off from what Laveesh has also mentioned, who is paying the price for sustainable development nationally and sub-nationally. To give you an example, we went back to using Kulhad, which is clay teacups at railway stations very recently, the policy was implemented earlier as well. But Kulhad tea cups are not necessarily more environmentally sustainable options and it creates all sorts of other related issues in terms of sorts of communities get empowered and disempowered in this sort of mass, across railway station policy measure to introduce this. To give another example, the use of plastic teacups at stalls especially places where there are political discussions. I was often told that in earlier times lot of members of the marginalised communities would not come to certain Tea stalls because they were run by members of the upper caste. And once the plastic

teacups were introduced, because they were disposable, it kind of opened the space of the tea stall for various other people. Similarly, the use of scotchbrite mops. Some of my women respondents at field site said sort of enables men to also clean up the kitchen. It is a dirty used cloth that they have to clean themselves. The women have to clean themselves. They don't use it. Or the role that the synthetic sarees have played in expanding choice and meaning of beauty and to women is also sort of a thing we need to think about when we talk about prioritising sustainable development over other sorts of outcomes. Which is not to say indices are not important. I think they are critical for lots of social and political goods such as say, civil liberties. Globally approved indices are possibly the only ways through which non-political actors can actually act upon their governments to improve outcomes. But what we need to sort of think about is what sort of spaces at the nation, state levels, what sort of actors need to be strengthened to enable full meaningful possibilities of human development. So, thank you.

**Shubhashis Gangopadhyay:**

We are now done with the discussants. So, I will give Professor Chhibber, if you want to address any of your responses to them?

**Ajay Chhibber:**

Thank you. Thank you very much for that discussion. I won't answer all of them but I will just pick and choose a few that I think are pertaining to and I can answer. You know, GDP itself is an index if you realize that. When depression was there, there was no measure of overall economic progress till Simon Kuznets was appointed by the president of United States to tell us how we are doing. And he developed the GDP. And that was over a 100 years ago. He won a Nobel prize for it as well. So, whether we like it or not, industries are with us and people... today in India the dream is 5 trillion for GDP or 10 trillion. That's how we still want to measure progress. Amartya Sen said, well this is a vulgar index and so he tried to improve it a little bit with health and education factored in. Some people think it's a very crude index, the HDI as well. But then it got a lot of focus because then people focused on health and education. So, today we do need, whether you like indices or not, you are not going to be able to do without them. And you will have to. And what all this body of work at least tells me is, that there is a group of countries out there such as Costa Rica, I would say a large number of middle-income countries in Europe, even in eastern Europe that have reached pretty high levels of human development without having a very high ecological impact on the environment and without emitting too much CO<sub>2</sub>. So, there are outliers out there. There are very poor countries that need to move up and they will be consuming more energy. But there are large number of very high-income countries that are living hugely unsustainably. That's the picture that these numbers tell me at least. Now, that's important because we say when you cross that threshold and you start imposing so much, you reach the Anthropocene as it were you are beginning to change the earth's sustainable biosphere in such a significant way that you are now a threat to humanity. That's what these pictures are telling me. That's the message I took away from the numbers. Now as far as your point about nonlinearities and all, I am saying... I don't know how many of you are statistical people... but even if you take a normal distribution, we are not measuring it properly. Of course, if you add tipping points and irreversibility, I can think of a fat tail distribution. Where the probability of irreversible tipping points are now so high, low probability events are but not so low anymore. If you take a fat tail distribution the probability of an irreversible at least five big irreversible tipping points are out there that will destroy the

planet. So, I am saying, okay. Let's leave that aside for now. Let's even take what we can measure at this point and say. On that alone we are not measuring it right. That's what the message of this set of results is. So, at least, you can see that if you take even the normal distribution that we know today, the United States is living very unsustainably and Canada is living very unsustainably. Singapore is living very unsustainably. And Singapore at least realises that probably. But there are a group of 30-40 countries somewhere in close to higher human development level where they have not gone beyond those tipping points. And yet have a fairly decent standard of living. Is that what we want to aspire to... I don't know. Those are coming to your point. Those are the political debates one needs to have. But I don't think you are going to get away from measuring and without measuring you are completely lost anyway. So, you'll have to make some judgements on that. On different types of vulnerabilities and the point that Rupa was making, of course, that's right. I had lunch with the secretary for social welfare. A friend of mine called Sourabh Garg. He was telling me the different types of vulnerabilities that they deal with. Gender vulnerabilities, tribal vulnerabilities, LGBTQ vulnerabilities, I mean when you talk about vulnerabilities, I am talking here more about systemic vulnerabilities arising from the nature of the development model itself which is in our case very weak safety nets, social security systems, very high vulnerability in the employment model that we have. We don't have enough employment, but the employment that we have is very highly vulnerable to shocks. And can we do better than that. That's the focus of this paper, I don't mean to delve into may be micro vulnerabilities. You can go deeper and deeper and design programs to deal with them as well. So, let me stop here.

**Shubhashis Gangopadhyay:**

Thank you. Are there any questions from the audience? If you could just identify yourselves because I don't know if others know you, I don't.

**Audience (Praveen Kumar Singh):**

Very insightful conversation. I am Praveen Kumar Singh from world intellectual foundation, sir. In the geopolitical... concurrent geopolitical tension we can see in different pockets of the world there are conflicts and war. And there is huge environmental cost of each and every conflict. So, sir, if there any study or approach regarding the same adjusting with the human developmental indices. Since be it USA or be it five other alliance country, be it UK, New Zealand, France, they are very good in terms of performance on the HDI, right? But they are somehow actively or passively fuelling the war and the conflict. So, is there any approach regarding the same to adjust with the developmental indices?

**Shubhashis Gangopadhyay:**

Anyone else?

**Audience:**

If we have time, I have a preface to what I want to say. 3 to 4 minutes. If you don't have, I won't ask the question. I just want to say that reference was made to Amartya's contribution to developing the HDI and so on. You know, he said this in private conversation and also written about it that, he was very reluctant to produce the HDI. And his point to Mahbub ul Haq, that it is ridiculous to try and squeeze all this into this one thing. And so, why don't we have GDP and separately about education, health, etc. etc. And Mahbub who is a much more politically

savvy guy, having been in politics in Pakistan and elsewhere, said no, no. that won't work. Because you want one number to counteract with the GDP. And that's why... anyway so, then the rest is history. I am mentioning this because when Kuznets came up with the GDP as you correctly said it's an index, but an index where you had an aggregation rule based on market prices. In the case of everything else and what you talked about, is this hierarchy of improving. What you today talked about is vulnerability, certainly improvement on what we have so far. But in all of these I find and I suspect Laveesh would agree with me because he has done much more on this. I have also been struggling with building these indices to measure performance of states and so on, is the aggregation rules that you use which are much... I mean at least market price have some principle. In this case you don't have anything and indices are very sensitive to that. Now the reason why I am saying all this is that is there another way of... I am just thinking aloud... that you look at trade-offs. What will it cost you to get that extra... and I am not getting linearity much more complicated to get that extra... 10 units of GDP in terms of climate, in terms of inequality, in terms of gender, whatever it is? And then deduct all that from your GDP number so you still have a GDP, but one number corrected for all these distortions and the costs the GDP lead. You can also build in the benefits. Because we are building a new technological scientific progress which can improve probability of dealing with a problem, even that. So, what I am saying is can we think of a differently as trade-offs, between what you all already have and these new things that are coming and still end up with one number, which is understandable to people. Because really you have something HDR an improved version of it, people just look at it and say oh, we are doing badly, we are doing well, but don't really get it what this is all about. This is just a question I am grappling with these issues myself.

**Ajay Chhibber:**

Sorry, I don't have a good answer to your question, except to say when you have a war, the reversal, that the cost of war is huge, right? And the reversal that takes place in any measure of development is enormous. So, I having worked at the UN also, I work on a principle that whatever can be done to avoid actually going into a conflict is the best outcome for human development. Because once you enter the conflict as we have seen everywhere, then the reversal is huge. And the recovery takes huge amounts of time. But that's a partial maybe answer to your question. On your point, actually since I was in UNDP, I do know the exact quote of the dialogue between Mahbub ul Haq and Amartya Sen, which was... this is somebody who was in the room with them. Which is Megnath Desai. When Amartya said this is a very crude way because initially, they used an arithmetic mean. Later on, they did the geometric which is slightly better. The response was, but its less vulgar than GDP. From Mahbub ul Haq. So, we are going from a more vulgar index to a less vulgar index. So, its an improvement. That's how he convinced Amartya Sen to move ahead. And your other point was on trade-offs. Yeah, trade-offs are everywhere. And some of the initial charts I showed you, you see that as HDI goes up, energy use per head required to go up, right? So, you can't deny poor countries the right to increase their energy use. After all we need electricity, we will need a lot more energy per head to go up our development ladder. But you can also see the trade-off in that chart. If you can show that chart again. That at certain points you are not getting much improvement in your human development index or huge increases in joules or gigajoules per head. So, that's the trade-off right there. Now technology might fix or change the shape of that curve a little bit. But those trade offs are there. Very obvious trade-offs are there. If you look at the SDGs, its different goals and they are riddled with trade-offs. But there are also lot of synergies. And this



may be going back to Rupa's point that an improvement in girls' education has huge synergies also on health, on children's education, on income of the household. You can think of so many synergies as well as trade-offs. So, you have to sort of recognise that those trade-offs are there and now say, what do we do about them. Do we adjust our what level of consumption we aspire to, for some of those? And where the synergies are, that can we work on these synergies to amplify the benefits for every dollar that you are spending in your budget... that's the way I look at it.

**Shubhashis Gangopadhyay:**

If I may. Continuing on what \_\_\_ said. It's just that I think the problem with the index that we are discussing here is that the trade-offs themselves are not constant. Even if you work out the trade-offs. In GDP it works because the prices are market prices, it's not fixed. So, today this relative... not just nonlinear, the prices are high for something and low next year. That's all taken into account when we are computing the GDP. Whereas for these indices even if we do empirical work, which is the problem with price indices. We have the same problem with price and many of the things that we are discussing, we have the same problem with very simple things like the price index. I think for economists and we are unfortunately, thanks to you by the way, we were unfortunately trying to completely hijack the discussion. But that's a problem because and Sen himself has worked so much on inequality index, right? So, he would obviously not want to do what he was made to do. But I have one question that I want to ask you, which is, you talked about vulnerability. But most of the things that you were doing were trying to focus on things that cause vulnerability. Why don't we define vulnerability? For example, since you gave that example of disasters and all, there is some loss. Let's take the GDP because it is easier to think, right? And we did that... you mentioned California fires or Rupa mentioned California fires and all of that. So, we now look at the destruction of value. We can have a very simple measure that how quickly you recover that value. The reason why I am saying that is because we did some work with the cyclone in Odisha this Phailin cyclone. And there we tried to see how quickly different communities came up to the level that they were when the cyclone hit. And what were the organisations at work at that time when the cyclone hit. And we found that the one that reduce vulnerability the most are actually MFIs. Micro finance institutions. Its not because they give more loans after the flood or after the cyclone. It is simply because a community support system was built up. Which is not observed, it is very difficult to measure. But if I look at the outcome, that is easier to measure. And therefore, if we look at... and that's what in finance that's what we do, right? We try to nowadays especially after covid, there is a huge movement in the finance literature. Trying to measure not just profitability and productivity in firms or companies, but also the resilience. And the way they measure resilience is how quickly they overcome the shocks that they get hit with and not just by market but also by things like covid, climate change and all of that. It maybe an easier exercise and could probably draw less criticism or finer points of what you are trying to do. Because correlations are bound to change as society changes. So, trying to find that relationship maybe a bit... so, I am with you.

**Ajay Chhibber:**

By the way the paper has a discussion of all the theoretical literature on defining vulnerability. So, we are going beyond just a poverty measure. We are looking at you know a drop in your standard of life, it maybe you maybe above the poverty line, but a shock will still drop you and

we consider that vulnerability too. But on your point, I think... of course, here there was a data set available called share of vulnerable employment. So, I wanted to illustrate just using that one piece of information, how large a difference it can make to your perception of what your level of development is. But you could have many other ways of looking at...

**Shubhashis Gangopadhyay:**

The reason... you are prompting me to say this, I am sorry, that's precisely the reason why I made that point about what you said. Because in many countries in a proper welfare state, the social security system is not connected to employment. It's in the US that it is. But in most welfare states its not. So, if I am measuring vulnerability, in that again if I look at the outcome, which is social security.

**Ajay Chhibber:**

That is not correct. If you look at the European system you are very much going to get transfers if you lost your job.

**Shubhashis Gangopadhyay:**

You will get transfers even if you don't have a job, if you have lost your job for more than ten years, if you are not working, still you get those transfers in northern European countries. I found Sweden was very much low and good in some sense in your measure. But high in HDI.

**Ajay Chhibber:**

If you are working, you are not going to get it. You have to be out of the job to get it. So, there is a defined criterion, you lose your job, you may be getting some transfers if you are permanently unemployed as well. Or in some other category of transfer. Since you raised this... if you lose your job, you can apply for a dole and a transfer, right? You don't have that system here in India. You can be given free food by some government decides, ok, now I am going to give free rations or you can go to this work program called MGNREGA and then dig ditches and get some employment there and earn some income. But in most western societies you have a well-defined criterion that if you lost your job and you declared unemployed, you will get a transfer, wouldn't you?

**Shubhashis Gangopadhyay:**

Yeah, but you are focusing on GDP only, but I am saying... many of the things that you said in terms of health, education which are part of social security because that's the biggest hit when you lose your job. Those are all free. Those have nothing to do with whether you have a job or not.

**Ajay Chhibber:**

But in the United States...

**Shubhashis Gangopadhyay:**

Anyway, we will take this up later.

**Audience:**

In Switzerland you will get that transfer if you are asked to leave a job. If you voluntarily resign from a job, you don't get anything any such dole or transfer.

**Shubhashis Gangopadhyay:**

Any other questions?

**Ajay Chhibber:**

I was going to answer a question on natural capital. That there is a lot of work done by Partha Das Gupta at UNEP and that I didn't have time to go into detail. But in that UNEP index that I was talking about or shock measurement of the stock of capital, they measure physical capital, human capital, natural capital and then they show that if you look at countries and how they are depleting natural capital and measured sustainability using that as well. So, there are now measures on natural capital. I don't know how good they are, but Partha has been working with UNEP on this for long time and now he has a whole book on it. Sorry sir...

**Audience (Rajesh Chadda):**

Thank you. I am Rajesh Chadda. I actually really enjoyed the presentation and the discussions. One thing that you said, that we will be saying something about India. I just wanted to emphasise that what I am getting and what makes me very interested in the vulnerability index and the covid scene that we had seen with people walking away. Just wanted to say that the growth that we are thinking of, which you said 5 trillion or 10 trillion, we will grow faster, will become developed very soon or maybe by 2047, I think one thing that is well known to us, but I am just putting it forward once again that not more than 10% or maybe 15% are formally employed with a letter. Organised sector versus unorganised sector and the share of manufacturing remaining at 16% or so for multiple decades I think, it has a lot to tell for the future policies that the government has to adopt. Or corrections that need to be done so that... because I am taking from your vulnerability index, which I really liked very much... so how do we proceed forward. As I said, what I am saying is very well known. But that gives me another reason to put it forward that vulnerability index inclusion, I know the limitations that have been discussed about. But I think the policy needle moves to somewhere providing the secured jobs a lot more than what is under discussion today.

**Laveesh Bhandari:**

I have a question for Priyadarshini. Which is, do you feel that adding environmental variables in an HDR updated concept can actually have an impact in terms of greater appreciation on the field. Amongst the people. Can it actually really spread greater awareness on the environment just by having an index which is something like this?

**Priyadarshini Singh:**

I think it again definitely will spur conversations among national elites. It will give or it will bring greater focus on the whole idea of trade-offs between development and sustainability which for me is the biggest most important takeaway from the paper. How that actually plays out at the grassroots is something we will have to see. Because some sense of trade-offs between development and actual social and political living, that awareness already exists. I remember many of the older farmer groups that I used to speak to used to say that oh, all these government

policies are saying send young people to college and university etc. They come back, they know nothing about agriculture, they don't know how sustainable systems are done. We can't teach them. All they want to do is wear jeans and live in the cities. I, during my early years as a researcher, I was 24 and I was like oh my god, what a horrible thing to say. But in the longer run I feel that somewhere that awareness of what policy trade-offs can impact at the grassroots. Yeah, it is there but.

**Shubhashis Gangopadhyay:**

Any other questions from the audience?

**Ajay Chhibber:**

You are absolutely right. Of course, we are a poor country. So, we can't have the social welfare system of the developed world right away. Yet, I think what it's telling us is that even among the developing countries at our level of development we have a much higher level of vulnerable population than most of our neighbours seem to have. Like Bangladesh or I have lived in Vietnam and they certainly have a far better system. Now of course, the government is trying to introduce schemes like the health insurance scheme, that's a start. The Ayushman Bharath. I think it will also help a lot of people say for a certain injury, health problem in the family, which will drain your entire budget. Even if you are middle class, it can destroy your family's savings completely. So, I think we need more of these kinds of schemes of course, but basic problem here is the nature of employment. It's this casual labour we have the highest proportion of casual labour, daily labour in the world. And then so, such a large proportion because manufacturing hasn't taken off, such a large proportion of people are still stuck in agriculture. So, that's another big issue here where almost I think 40-45% of the people are still dependent on agriculture. So, there is no welfare scheme there. I guess, PM Kisaan can be considered a kind of an insurance scheme because at least you get a certain amount of cash per hectare. But that's only for people who own the land, but for all the landless people there that's not even there. So, it's a nature of the employment that we have and the nature of development process that we have is that has created this vulnerability. Much more than even other countries at our level of development. The chart I showed you we are a complete outlier. So, while we address these, bring in these schemes of insurance, we also have to somehow find a way to change the nature of employment itself. Because without that we are not going to be able to have less vulnerability.

**Audience (Nalin Kohli):**

Thank you. My name is Nalin Kohli. My question is very simple. I am not an economist. Somebody lay person with no economics background, you look at GDP and it makes sense to you because we all understand what is GDP. So, based on the indices, trade-offs, vulnerability, can we develop some kind of an adjustment factor that if a country or a state is not providing for all these vulnerabilities or for the climate part of it, then the GDP gets derated to some extent. For an adjustment, which makes sense to a lay person that look this country may have a high GDP but then, like an auditor who puts notes on the balance sheet, on contingent liabilities. Can we capture some of this, which gives you a good feel of if the adjustments are made then you derate the GDP by certain amount.

**Audience:**

Non economist put much more articulation exactly on what I was trying to say.

**Ajay Chhibber:**

So, first let me say, there are two great economists here who seem to think GDP is a great thing. But actually yes, there is market prices that put it together. But then there is a large number of variables that have no market price like air and water and various things which then get missed out. And now people are spending huge amount of energy trying to generate the concept of green GDP, right? So, how do you factor in all the pollution that you have created and for which you have not paid for. By itself it's a very poor measure. But I think your point is well taken because that's exactly what these adjustments are trying to do. Which is, let's start with the GDP and then say, ok, now this is not telling us how well we are doing as in terms of wellness, your health, your education level, but it is also not measuring all the damage we are doing, right? So, these adjustments that I tried to show you are all adjustments to GDP to try and at least crudely try and assess where we are. If you see these... the way these rankings change, I showed you some tables with rankings... a lot of it is not much happening at the very lower end of development ladder level. There are countries that are struggling and they are also not polluting too much because the economic activity is not that heavy. So, what you see is a lot of changes taking place between very rich countries dropping because they are imposing... their GDP generation is imposing such a huge cost on the planet. Then there are a bunch of countries that are managing to go to a pretty high level of income and development and education and health like Cuba for example on mostly on health and education... of course, the best example they always give is costa Rica. But even places like Serbia or Slovakia, people live quite well and they don't impose such a huge cost on the planet. That's the point. So, we are taking GDP and then we are adjusting it. That's the purpose of all these indices. Crude as they are, Laveesh is right. He has dabbled more in indices probably than I have. So, he knows all the what's and all. But he is absolutely right in his worry about them. But this is where we are. As you said Priyadarshini, people do pay attention in the end. Like people say well if I factored my CO2 emissions and then suddenly the US ranking drops 45 ranks. India's doesn't change very much. India actually goes up a little bit. But that is what we are trying to do here. We are taking GDP, the 100 year old concept, and then we are saying ok, now how do we adjust it, crudely maybe as the dialogue between Amartya Sen and Mahbub ul Haq showed us. Now I am adding even more cruder adjustments to it through these indices. But that's the idea here to shock people into saying look, getting to 5 trillion is a great thing. But if you did a lot of damage along the way. China did, now China grew very rapidly, right? We all envy China, but the amount of damage China did to the planet and is continuing to do so. If you look at coal production in China, 55% of coal plants and thermal plants today are in China. If you look for the next 10 years China will add more coal thermal capacity than India has today in stock. They will add that much more. So, China is doing huge amount of damage to the planet in their development. And all these countries grew like that. We are being asked now to grow to our... we want to be an advanced country by 2047, but everybody is telling us you can't put that kind of footprint that China did or the United States did or Europe did on this planet. There is no space for it. So, we have to find different ways, but we have to also shock people into saying look at what you guys did. So, you need to adjust your consumption, you need to adjust your lifestyle, you need to think of different ways of how we will bring this planet together. And that is the purpose of these indices basically. They are not anything more sophisticated than that.

**Shubhashis Gangopadhyay:**

I want to ask one quick question. How important is the global population here? Because if instead of 8 billion, we had 4 billion, would any of these problems have come up. Would India be able to grow as rapidly as it is planning to grow?

**Ajay Chhibber:**

Of course, all the human development index and all our indicators here are per head, per capita. One response from the developed world is well, if you didn't have so many people in your country, you could be quite different. So, that's why there are also measures of total CO2 emissions by country. By that logic by per capita we are a very low CO2 producing country. But when you add it all up, we are probably in the top four or five... third? Third counting what? I always think of EU as like the Indian union. So, I put EU ahead of us. And then you look at conglomerates of countries like ASEAN as a whole has less population than us. But produces for more CO2 than we do. Anyway, the point is population. Yes, of course, there are less population and that's the argument they make. You have less people then, you could be able to emit less, which is true to some extent. But we have what we have and that's how we are going to have to develop from now on.

**Shubhashis Gangopadhyay:**

There is a wicked thought that came to my mind when you made that comment about the war. Because if you look at all the war in the last 100 years or more, there have always been more civilians killed than actual soldiers. Many of us don't use this fact at all. But that's why I was asking this question.

**Audience:**

Where are you going with this?

**Shubhashis Gangopadhyay:**

Maybe if population is the problem maybe... (laughter) No, the reason why I am raising this issue is because I think we are not trying to correct something. By the way are there any more questions. We have the last 10 minutes. I promised as the chair I will not take any time. If not then I want to say something. Which is that, one of the things that we have missed in the environmental thing is we have written history with humans as the center of everything. And we had always taken the planet as a given. We have to rewrite history where the planet is an integral part of the story that we are saying. Because the moment we start doing this, all these things that we have about war, nationalism, all of those will come out. And that will be a much better attack than all the things that we can say now. That how with each of these, even mercantilism, everything that we have done, how we have systematically destroyed the planet. If we start... and that's why the term Anthropocene, right? If you are going to use that term lets understand the implications of that. And once we start thinking from there, then we will have to think about an entirely different way of development as you were saying. But the more important thing to understand is that when we talk about climate change, nobody on the ground appreciates that. You go to Sundarbans and say all things are happening because of climate change, they don't care. She is right that you have to get down to the local issues. If you go and talk to them about the effect of climate change on their livelihoods, they understand that more and if you can develop an index for that on the outcomes its much easier to do that. And I think the reason why the climate movement is not taking effect in India and its among us only is

because we are in this highly upper environment talking about all these big global indices. Which no one on the ground... agriculture is probably the most affected in India. We don't talk to them about how... what is happening in Punjab. I don't think any of the farmers there are even aware of what's going on in Punjab and how it will hit them. Forget climate change, it will still hit them. So, these are we need to come down from where we are and start really that's why... you know that was a breadth of fresh air what Priyadarshini was talking about. Because we tend to get too caught up in our measurements which is understandable because economists can't deal with anything that they cannot measure. We have a big problem there. So, the first as soon as we get a problem, we try to figure out what is there to measure which we can work with. But that's the thing I wanted to say that this was... maybe we should not start from GDP to begin with.

**Ajay Chhibber:**

I just will say something on this. I live in north America. And I think you were right say, 5 years ago. For example, the joke among all my friends used to be, let's go buy some land in Canada because when the world heats up, that'll be the best place to live. But now, what's happened is huge forest fires, and there are days when the air in New York is worse than New Delhi. Because all of that smoke comes down from Canada. California which used to be the golden state, is devastated with... so Europe large parts of Europe have had very heavy flooding. There is no... what people are beginning to realize is... because earlier people thought oh, India and some parts of Africa will be badly affected, but we will be fine in the temperate zone. All that perception is changing now because people realize that there is nowhere safe. I was in Beijing at a conference when they used to have very dirty air. Al Gore was there. We were on a table together. And suddenly we said the floods in China. Floods in Vietnam. Floods here and floods there. I actually got a film produced called Hard rain with BBC showing how all this is. Also got a film made on the Himalayan glacial melt by the way which is beautiful film called the Himalayan meltdown. Worth watching. When I was at UNDP, I got three films made on this. Because the visual impact is far more important than any report you can write. But my main point was, I asked Al Gore. So, what's going on? He said, it is quite simple Ajay, all this heating means water is rising and it's coming down in unexpected ways everywhere. So, Pakistan has had another flood, more than 100 years old. Country after country after country you go to, you find now, nobody is unaffected. I bet you if really did a proper survey maybe, if CSDS did a survey or Punjab farmers, they will tell you that their crops are being affected by the temperature change and that they are having to adjust. I am sure it is happening. More and more of this awareness is going to grow. And like you said at the local level and people are now realizing we're not safe anywhere. There are insurance companies that are now refusing to write insurance policies in several provinces in states in America. California, Florida, they just left, the insurance companies. If you can't buy insurance imagine what will happen. So, I think some of that is going to come here as well. We don't have such developed financial markets but... we talked about it to Laveesh to do more work on this also. But anyway, I am just saying that awareness is going to be growing more and more and it will have political implications like you said Priyadarshini, also at the local level, I think.

**Shubhashis Gangopadhyay:**

Thank you on that happy and positive note. Let us complete today's discussion. As I said it, you know before, it was an important topic and a lot of things came up. I was happy to see a

non-economist view also because we tend to as I said, hijack everything that is being discussed. I will now hand it over to Kritima Bhapta.

**Kritima Bhapta:**

Good evening, everyone. On behalf of the entire CSEP team I would like to thank our distinguished guests for today, Dr Ajay Chhibber, Dr Shubhashis Gangopadhyay, our discussants Dr Rupa Chanda, Dr Laveesh Bhandari, and Dr Priyadarshini Singh, for this insightful seminar on the evolution of the human development index over the years and to the need to expand it further. Dr Chhibber in his presentation rightly has highlighted the limitations of the current HDI in addressing pressing challenges like climate change and other complex vulnerabilities. I found the notion of a major trade-off where they call ecology above a certain human development level, particularly striking. And it needs to be included in the composition of HDI. It is therefore clear that the time has come to embrace a more holistic understanding of human development which also takes into consideration the climate and ecological aspects. So, the proposed solutions of including a vulnerability adjusted human development index can therefore offer compelling strategies for moving forward. I am sure that the ideas presented here will spark vital discussions and inspire concrete actions. Thank you once again, for joining us today. Have a great evening. Thank you.