Economic Growth and Development

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Lecture - 20
Other Human Development Indices

Hello and welcome to lesson 3 of week 7, this is lecture 20 of the NPTEL MOOCS course on Economic Growth and Development. In this week we are discussing the Human Development Indices. In the first two lessons of this week we started with the significance of what is the human development index. And we looked at the various components of human development index. So, what we know as of now is it is a composite index, composed of a number of indicators primarily three dimensions three important dimensions of human life education, health, and income or standards of living or command over resources.

And following the human development index we also looked at a few illustrations of how the human development index is calculated. And in the last class we also got introduced to a few other indices apart from the human development index, which is regularly reported through the human development reports of the UNDP or the United Nations Development Programme. In today's class we will look at a at those other associated human development indices, which are also calculated along with the HDI. And it is important that we look at these indices also because there are various aspects of human life which are calculated which are estimated and then put in the form of a composite index in all of these indices, which helps country comparisons and also for a policy making.

So, let us begin with these other associated indices. One of the first index that we will be discussing in today's class is the gender development index. The gender development index as you saw in the last class was introduced in 1995 and since then the gender development index has is being calculated is being estimated regularly since 1995, and through the gender development index the lens through which we look at development policy and making of development policy has changed because that is why that is one of the first steps which was taken towards making development policies gender we look at through gender lens.

Till the coming in of these gender related development indices, one of the limitations of development policies whether at the national levels or at the international levels is that they were gender neutral. For example, many of you must have heard of development policies such as gender based budgeting or looking at various financial policies after taking after addressing gender concerns. So, most of the beginning of these the concerns gender concerns being addressed can be trace to the coming in of the gender development indices through the UNHDR's which are shifted the attention of policy makers towards the fact that women and girls continue to be more deprived than their male counterparts in both the developing and developed countries.

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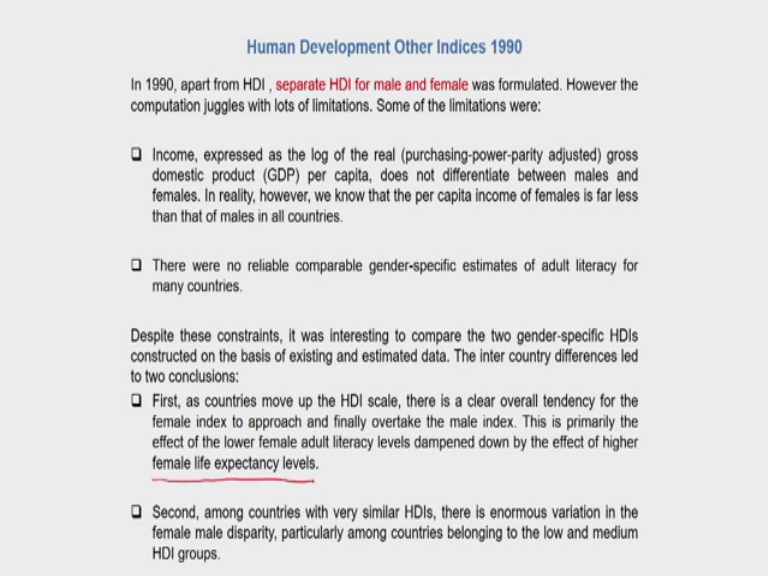

So, let us begin with today's class with gender development index and also an introduction to the gender development index. We know now that in by 1990 apart from the HDI, the separate human development index were also calculated for male and females or men and women. So, the HDI of 1990 even though it did not come up with the index which is now known as the gender development index, HDI was calculated separately for men and women but there was one serious limitation in that calculation. And that was the limitation of the income indicator because separate incomes for men and women were not available, the average income that was available was taken as a proxy for calculation of HDI for both men and women.

So, one of so as being shown on your slide income which was expressed as the log of the real gross domestic product per capita, that did not differentiate between males and females. And in reality we know that the per capita income of females is far less than that of males in all countries. And because there were no reliable comparable gender specific estimates of adult literacy for many countries that continued to be the case.

But despite these constraints it was interesting to compare the two gender specific HDI's constructed on the basis of existing and estimated data in 1990; because that lead to two major conclusions. One of the first being that countries move up the HDI scale, as countries move up HDI scale there was a clear overall tendency for the female index to approach and finally overtake the male index. In other words as the human development index showed an improvement in different countries the female indices started showing better performance than the male than the male counterparts.

And this was primarily the effect of the lower female adult literacy levels which was dampened down by the effect of higher female life expectancy level. And this is what I would like to draw your attention to in the slide that in general the female life expectancy levels are much higher than that of males. Women live longer than men do and a partly, and this a there is a lot of discussion with regard to this fact this indicator of female life expectancy. Whether it is in the developing countries or the developed countries of the world biologically women out women live longer than men.

And there are in as I said there is a lot of economic and scientific discussions surrounding this fact. For example, if we look at some of Amartya Sen's writings; he has even gone to the extent of estimating the number of missing women going by this trend, that women live longer than men. He has estimated the number of missing women in South Asia, who never got a chance to a survive beyond their first year or beyond birth. at birth it is said that boys out number girls everywhere in the world. There are about 105 or 106 male child that are borned for every 1 girl child, but after conception biology it seems favours women on the whole than a men do. And considerable research has shown that if men and women receive similar nutrition and medical attention and general healthcare women tend to live noticeably longer than men.

So, women on the whole seem more resistant to diseases and are hardier than men. So, when given the same care as males, female will tend to have better survival rates. So, in

this context what send that was to estimate the number of missing women in country say India, China and also in a countries which as North African countries or West Asia and so on. And he estimated that about given the ratios of men and women survival rates, he estimated that about that there are about a 100 million missing women in the world that who we are not talking about. And that also shows the levels of inequality a terrible levels of inequality that exist, where women face mortality conditions even when naturally they should not be facing mortality conditions because science expect otherwise that women should live longer than that of men.

So, that is the first conclusion that can be drawn from the calculations of HDI that was done for men and women separately in 1990. So, even though there were data limitations female life expectancy estimate actually pull the female HDI levels up even if the adult literacy a rates a ratios showed very low levels of achievement for a women. The second conclusion was that among countries with very similar HDI's there was enormous variation in the female male disparity particularly among countries belonging to the low and medium HDI groups.

So, lower the HDI levels of countries or lower the HDI ranks of countries in the overall ranking of countries, the male female disparity was seem to be much higher. So, as HDI levels improve or the rankings of countries improve based upon the human development index, the female male disparity also tends to lower down. So, it is desirable that there are sufficient investments made on a different dimensions of human development. Such that both men and women are empowered and we move toward towards a more equitable form of society.

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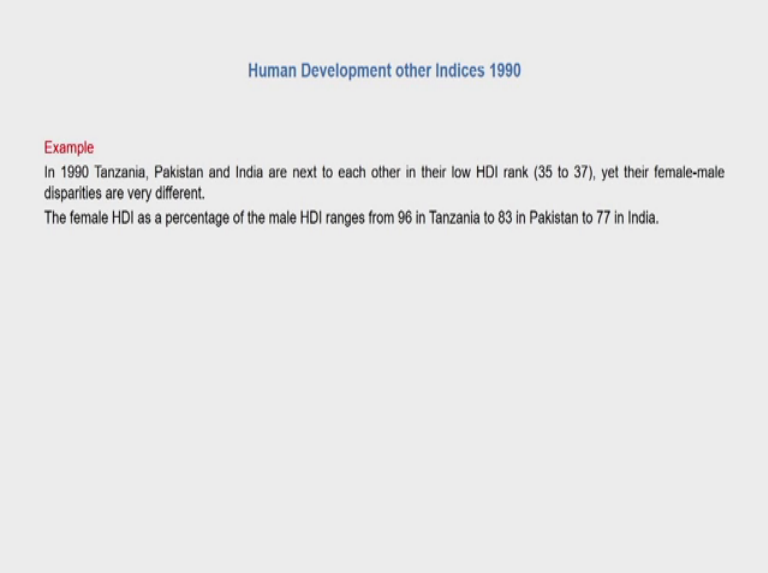

So, given this background one of the examples that we find quoted in the 1990 technical notes of human development indices is that, if we compare Tanzania, Pakistan, and India which were next to each other in their low HDI ranks; 35, 36, and 37, but their female male disparities are very different. So, female HDI as a percentage of male HDI range from 96 in Tanzania, to 83 in Pakistan, to 77 in India. So, which so while the while India was ranked better in terms of HDI than Tanzania and Pakistan. If you note the female HDI as a percentage of male HDI was much better in Tanzania and Pakistan and then it was in India and that could be attributed more to the indicator of life expectancy and the adult literacy rates.

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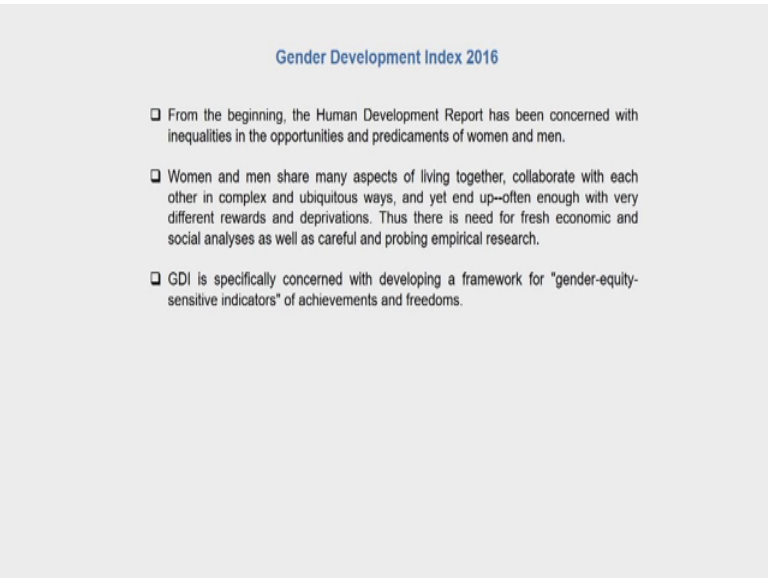

So, that brings us today's discussion on the gender development index. though the GDI or the gender development index was introduced in 1995; the discussion here in this class pertains to the latest calculations that were done based upon the HDI report of 2016. So, as I have already said that the HDI has been largely concerned with inequalities in the opportunities and predicaments of women and men. Women have lesser opportunities than men women face more vulnerabilities than men and, but they share many aspects of living together. They collaborate with each other in complex and ubiquitous ways;however, they often end up with very different rewards and deprivations.

And therefore, women's achievements or women deprivations are one of the important indicators of how badly a country is doing or how good a country is doing. So, there is a need for fresh economic and social analysis as well as careful and probing empirical research on the achievements and deprivations of women vis-a-vis of men. So, GDI was specifically concerned with developing a framework for gender equity sensitive indicators of achievements and freedoms.

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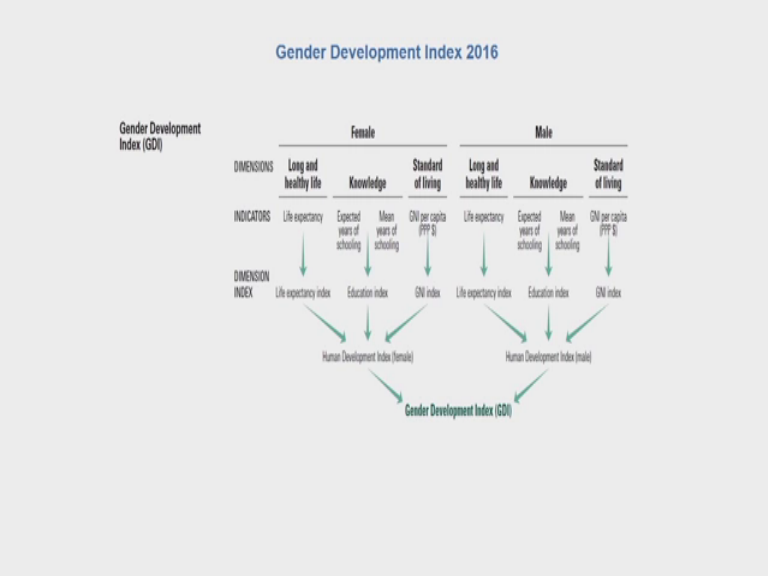

So, what is the GDI measure? If you look at the slide here it gives you the map of what the gender development index measures. It measures the gender gaps in human development achievements by accounting for disparities between women and men in three basic dimensions of human development the same as that of HDI health knowledge

and living standards. And in the report of 2016 the UNDP is and there were was to use the most recent reliable and internally consistent data. So, they collected more extensive and more reliable gender disaggregated data as a challenge that the international community should scarily face.

And they continued to publish results on the GDI estimates in the expectation that it will help increase the demand for such a data. And there are possibilities that they will be more demands for strengthening the need for such data because of policy considerations. So, as I was saying the GDI uses the same variables as the HDI. The difference is that the GDI adjusts the average achievement of each country in life expectancy, education attainments, and income in accordance with the disparity in achievement between women and men.

So, if you look at the dimensions here; the dimensions are the same long and healthy life which can be which is equivalent to longevity or the duration that women and men live. Knowledge the education dimension and income or the standard of living dimension. Similar the same dimensions for men indicators the indicator for life for long and healthy life being life expectancy for knowledge expected years of schooling and many years of schooling and for standard of living the GNI per capita and purchase in per dollars.

And in the next step is of course, to construct the dimension index, the life expectancy index, education index, and the GNI index. And similarly dimension indices are constructed for the male counterparts. So, accordingly we have the HDI for females and the HDI for males. The female human development index and the male human development index; and then the GDI is calculated by looking at what is the HDI of females compare to that of the males. Let us look at this with with the formula that is used for GDI construction based on the 2016 technical report and an illustration followed by that.

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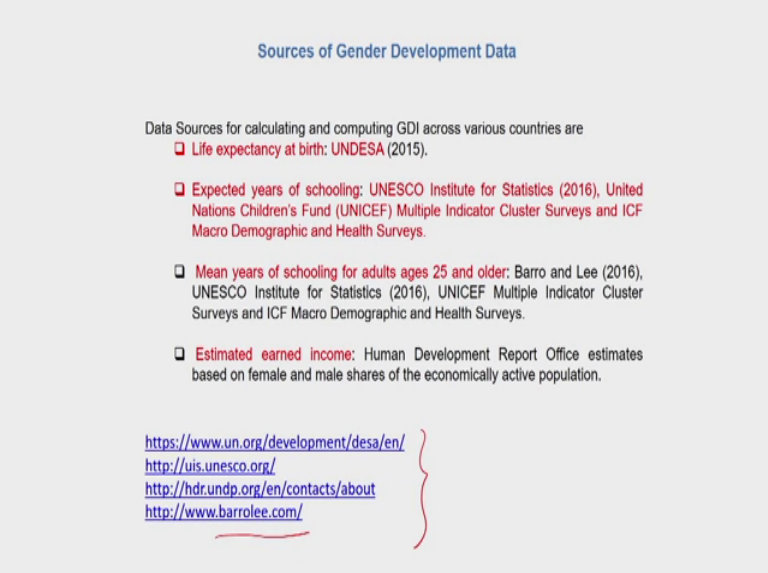

So, these are the sources of the gender development data the United Nations department of economic and social affairs that turns out a lot of economic and social statistics on important indicator such as life expectancy at birth. That is the source for life expectancy at birth. And this a source of data is kept the same over the years for consistency in comparison of countries across time. Expected years of schooling data is collected from the UNESCO institute for statistics and then there are various service carried out by the UNICEF and the ages of the UNICEF.

There are various demographic and health service which are carried out and those data relied upon for getting data unexpected years of schooling the data on mean years of schooling a very meticulously calculated by Barro and Lee which is also available on their website barrolee dot com. And also the UNESCO institute for statistics and the UNICEF service. And the estimated earned income is calculated by the human development report office which estimates they provides estimates based on female and male shares of economically active population.

For a those students where interested in looking at the details of these data how they are collected to gather information over a period of time and use it for their own research purpose or dissertation purposes, I would urge you to look up these websites that I have listed out here. For those working on education data, one of the most reliable is to visit this website barrolee dot com that will give data country wise and over a period of time a very meticulously done data which can be used for research purposes. So, these are the

sources of gender development data which are used by the HDI of 2016 for calculation of the gender development index.

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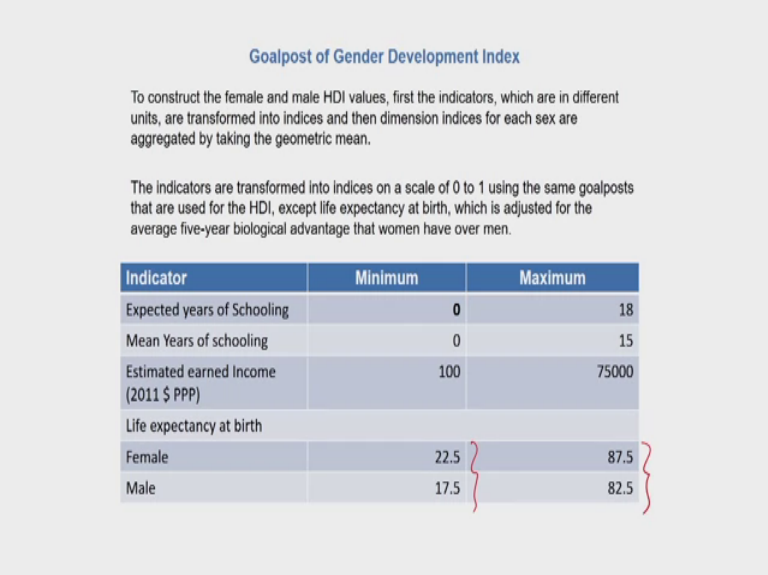

As like the HDI goalposts are fixed for the gender development index, as well so there is a minimum level of achievement and there is a maximum level of achievement based upon the countries that have been taken for GDI and HDI rankings in that report. So, in the 2016 report these are the goalposts that were reported for expected years of schooling 0 and 18, mean years of schooling 0 and 15 estimated earned income 1750 USD, life expectancy at birth for females 22.5 and 87.5 for male 17.5 and 82.5.

And in the context of life expectancy at birth for male and female population that I just discussed. Note the goal posts for male and female life expectancies the goal posts are relatively higher for females than males. So, in the minimum females live on an average 5 years more than that of males and the in the maximum also the number of years by which the female population is suppose to live longer than the male is about 5 years. So, these are the goalposts based on which the index is calculated. Now, let us have a look at the steps for calculation of the gender development index.

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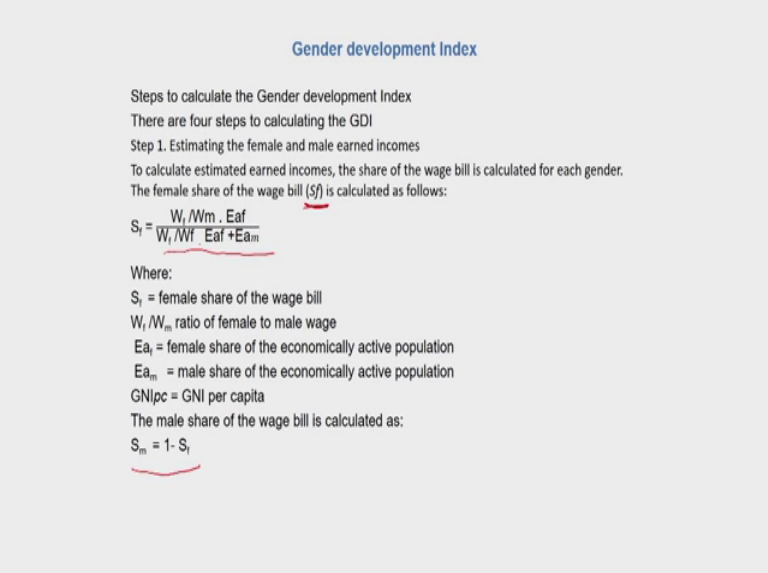

The first step is to estimate the female and male earned incomes and to be able to calculate the estimated earned incomes the share of the wage bill is calculated for each gender. The female share of wage bill is first calculated which is given by Sf here the share of wage bill is nothing, but what is the total amount of wages that accrued to the female population when we take the entire economically active male and female population in to account. So, the female share of the wage bill is given by this formula which is Wf by Wm into Eaf divided by Wf by Wf into Eaf plus Eam. Here Sf is a female share of wage bill.

Wf by Wm is the ratio of female to male wage Eaf is the female share of economically active population. And Eam here is the male share of the economically active population and the male share of the wage bill is calculated as 1 minus Sf. So, we first calculate the female share of the economically active population female wage share of the wage bill. And based upon the female wage share we calculate the male wage shares so that is the first step.

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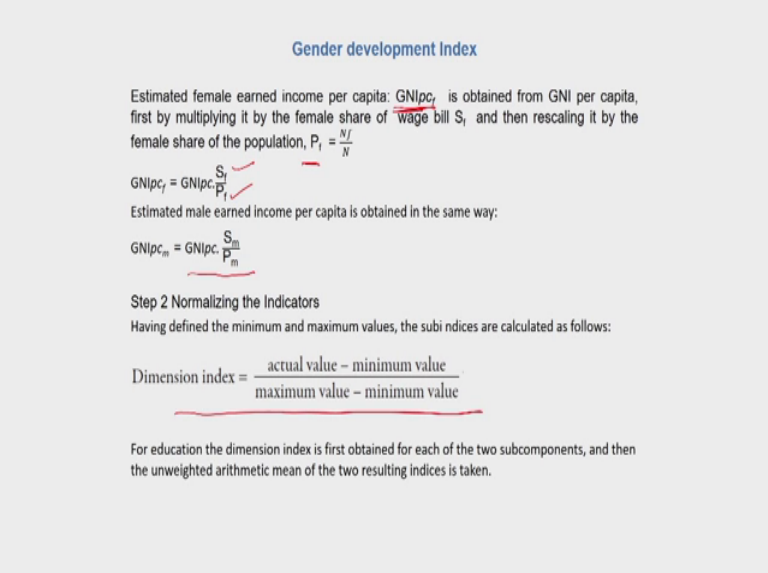

And then we also calculate the estimated female earned income per capita. So, note that this is GNI per capita, but only for females. So, this is the estimated female earned income per capita. So, far till 1995 the GNI estimates were gender neutral. So, it was only a single estimate without making allowances for what is the share of the female economically active population in the total wage bill.

So, the first time in terms of measurements we are moving towards the GNI per capita in terms of female about what is the female share in the total wage bill of the entire population this is one of its kind. So, it is obtained from GNI per capita first by multiplying it by the female share of wage bill Sf and then rescaling it by the female share of population. So, the GNI per capita for females is GNI per capita into Sf by P P f. Sf here basically refers to the female share of the wage bill and Pf refers to the female share of the total population.

So, if you look your Pf is given by the female share of the population divided by the total population. So, GNI per capita for females is calculated as GNI per capita total multiplied by the female share of wage bill divided by the female share of the population. Similarly the estimated male earned income per capita is given by GNIpc into Sm by Pm where Sm is the male share of the wage bill and Pm is the male share of the total population.

And in step two based upon the similar range equalization method as followed for construction of the human development index and because we have already defined the

minimum and the maximum values. T he sub indices are calculated based upon this range equalization method actual value minus the minimum divided by maximum minus minimum. And a dimension index is calculated for each of the dimensions education health and income ok.

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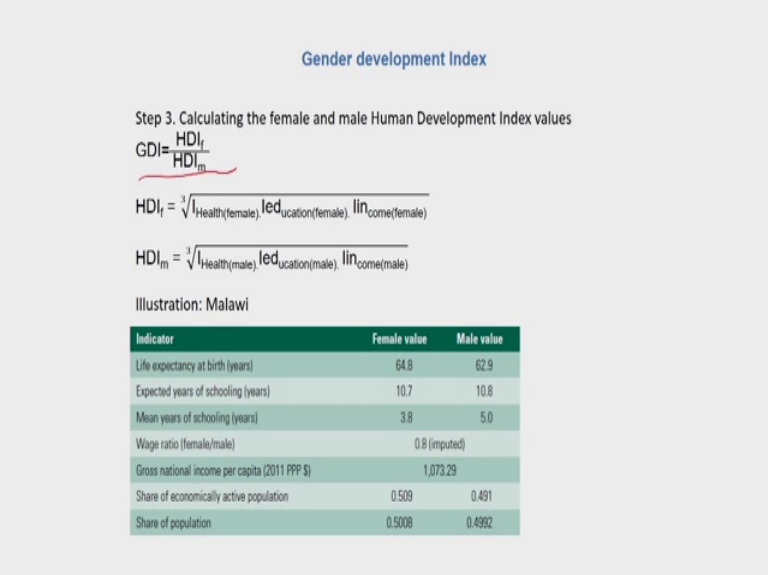

Indicator	Female value	Male value
Life expectancy at birth (years)	64.8	62.9
Expected years of schooling (years)	10.7	10.8
Mean years of schooling (years)	3.8	5.0
Wage ratio (female/male)	0.8 (imputed)	
Gross national income per capita (2011 PPP $)	1,073.29	
Share of economically active population	0.509	0.491
Share of population	0.5008	0.4992

So, the GDI in the final step is calculated which is the HDI for females upon HDI for males. And the calculation for HDI females and males is nothing, but the geometric mean calculation. This is the dimension index health dimension index education I health, I ed or education, and then I income for females. So, first the HDI for females is calculated which is the geometric mean of the three dimension indices. And similarly the HDI males are calculated geometric mean of the three dimension indices.

And in the final calculation GDI is HDI f by HDI m. So, this is an illustration here for Malawi this illustration is taken from the technical report of the HDR 2016. For those who are very new to this discussion on human development indices and the human development concept itself, I would urge you to look up the United Nations development programme human development report websites which I have mentioned here in this slide hdr dot undp dot org. This website is a rich repository of resources on the human development indices and human development report.

And those of you are interested although there the as a part of this course we I am not introducing worksheets on human development calculations. However, for those of you

were interested in taking up research in these areas are strictly requested to take up some of these reports and collect the data from these reports and work we work out all of these are formulas based upon the data of various countries on excel sheets. And that will help you come up with ideas on human development research.

This is an illustration for Malawi every HDR comes up with technical reports a technical notes in each of which reports. And I urge all of you to look up the technical notes of each of the human development report which is also a very rich repository of the significance of carrying out these calculations the significance of taking up different formulas for HDI calculations, which can go a long way in strengthening your understanding about human development issues.

So, for the life expectancy indicator the female and male values are given as such expected use of schooling mean years of schooling. The wage ratio has been calculated based upon the formula that I just discussed, which is female the wage ratio of female to male and the share of for female and male population share of economically active population for Malawi has been given in the form of a table here.

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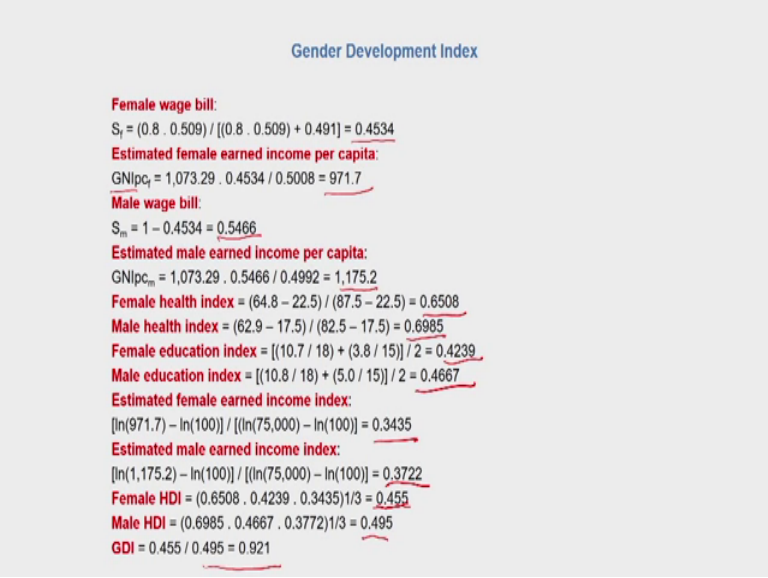

And then the first step is to calculate the female wage bill. If you look here the wage ratio is given by 0.8. So, Sf is 0.8 into female share of population which if you see here is 0.5 ah09. So, 0.509 is the female share of economically active population divided by 0.8 into 0.5, 0.9 plus 0.491, which is the male share of population and that gives us the

female wage bill which is 0.534. Similarly the GNI per capita for females has been calculated which gives us the value 971.7 the male wage bill or Sm 0.5466 and then GNI per capita for males which is 1175.2. If you note here the GNI per capita for females is substantially lower than that of GNI per capita for males.

So, what does this mean this means that if as a share of a total per capita incomes lesser incomes are accruing to females or females are in lesser are in a lesser ownership of income resources compared to the male counterparts. Then; that means, there spending on female levels of human development are also or while not necessarily, but maybe much lower than that of their male counterparts. So, the levels of human development achievements will also be lower.

Similarly, the held indexes indices are calculated. In this case here if you look at the values again life expectancy at birth 64.8 minus the minimum 22.5; so, actual minus minimum divided by maximum minus minimum. This is the female health index, this is the male health index, female education index, male education index, and the estimated female earned income index; which is the log transformation of the incomes that have been taken that comes to 0.3435 for females and 0.3722 for males.

So, based upon all of these arithmetic that we have just done the female HDI is calculated which is the geometric mean of all these indices the dimension indices the male HDI and the GDI given by the female HDI upon male HDI which is 0.921. And the gender development index actually for Malawi shows us to shows up to be much higher than what the human development index itself came up to be in 2016.

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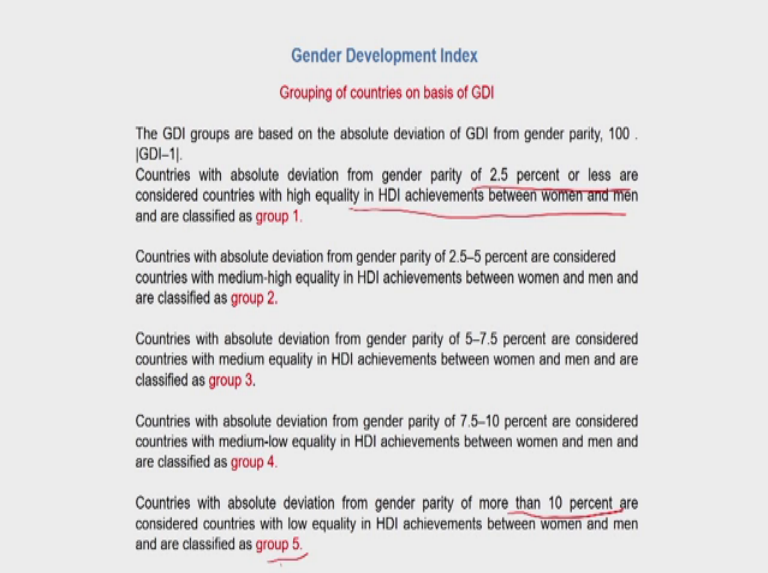

And then once the gender development index has been calculated based upon the methods that we have just discussed a grouping of countries has made based on GDI and there are five groupings that are followed based upon the latest report of HDR. So, it also make sense to look at how these groupings are translated and what is the implications of grouping the countries as such. So, the GDI groups are based on the absolute deviation of GDI from gender parity 100 so GDI minus 1. So, countries with absolute deviation from gender parity of 2.5 percent or less are considered to be countries with high equality in HDI achievements between women and men.

So, that is group one group; one are the high HDI countries high HDI achievements in among both women and men and there is more gender parity among them. So, the gender absolute deviation from gender parity of 2.5 percent or less countries with the absolute deviation of 2.5 to 5 percent are considered as medium high equality in HDI achievement so they are group 2, 5 to 7.5 percent group 3, 7.5 to 10 percent group 4. And deviation from gender parity of more than 10 percent, are countries with low equality in HDI achievements between women and men. It is very interesting to look at which are those countries that falls into each of these group classifications.

And in the context of the global north, global south, debate that we were discussing in the beginning of this course; if it will really make a lot of sense to look to know that the global south is generally in the lower groups 3, 4 and 5 and the global north is found to be in groups 1 and 2. And you would see that although income as I have already said does not have a straight forward relationship with human development achievements,

still we do see that a lot of countries in the global south are found to be in the lowest are seen to have more gender disparity than the global north.

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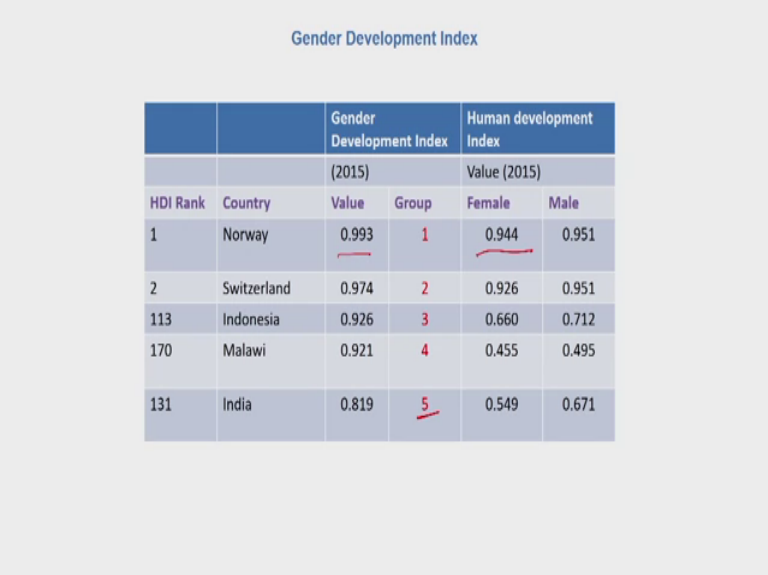

		Gender Development Index		Human development Index	
		(2015)		Value (2015)	
HDI Rank	Country	Value	Group	Female	Male
1	Norway	0.993	1	0.944	0.951
2	Switzerland	0.974	2	0.926	0.951
113	Indonesia	0.926	3	0.660	0.712
170	Malawi	0.921	4	0.455	0.495
131	India	0.819	5	0.549	0.671

In terms of some examples Norway is in group 1 this is based upon the value of 2015. Note the value of GDI and the value of HDI here in Switzerland in group 2, Indonesia in 3, Malawi in 4, and India in group 5, which has heard of gender disparity in terms of human development achievements among men and women.

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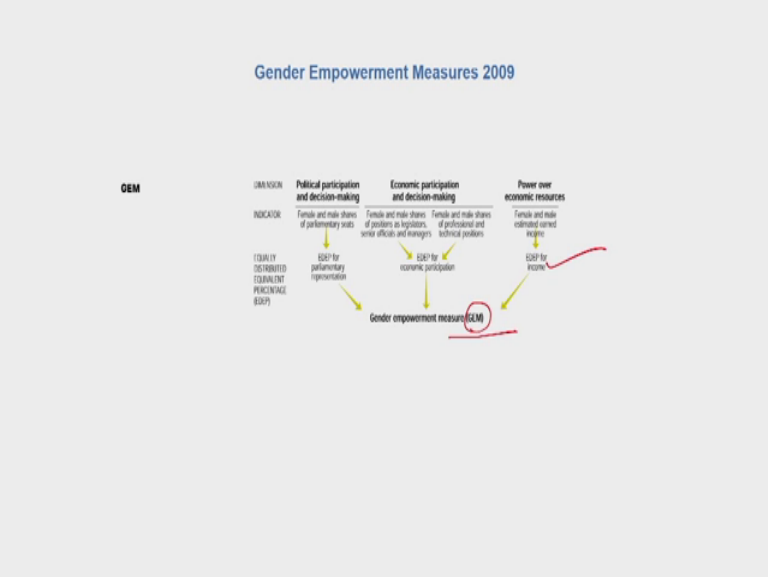

Now, apart from the gender development index there are there is another measure which was introduced in the report of 1995 and that was referred to as the gender empowerment measure. And this is much different from the gender development index and a little discussion on, what is the gender empowerment measure? What are the implications of gender empowerment measure? Although the calculation of gender empowerment measure discontinued since 2000 because of also the coming in of inequality adjusted gender development indices and so on.

It make sense to look at what were the main characteristic features of the gender empowerment measure. If you look at the gender empowerment measure slide that is showing on your screen now, you would see that the dimensions are much different from what we have done in the case of the human development index or the GDI. You could say that in developing countries as women are subject to various forms of inequality they are caught in some kind of an inequality trap. And this gender inequality being undesirable leads to be very closely watched. And this requires empowerment of women and therefore, there is a need to look up the to lookup or measure the extent of a gender empowerment or the degree of gender empowerment based upon certain dimensions.

Now, this was the first time that gender empowerment was being measured and of course, there are various criticisms of this measure which there are various political scientists and other social scientist that go a long way in and rightly. So, in criticizing that the gender empowerment is cannot be so easily measured based upon a few indicators. However the given the fact that there are there is limitations of data. Even if we put together some important data to be able to tell us, what is the participation of or what is the share of participation of men and women in economic and political decision making? Even then we can go a long way in terms of a policy making so even.

So, while in terms of academic orientation there is a lot of criticism and debate with regard to the gender empowerment measure in terms of actual policymaking gender empowerment measure is very important because it helps us to give us some numbers with respect to how men and women are performing differently based upon certain select dimensions. So, the dimensions that have been taken for the gender empowerment measure are first is political participation and decision making, then second is economic participation and decision making, and third is power over economic resources. The indicators that have been considered are as follows; the first is for the dimension political

participation female and male shares of parliamentary seats, for economic dimension female and male shares of positions is legislative, senior officials and managers, female and male shares of professional and technical positions, and the power over economic resources, female and male estimated earned income.

Now, the first two variables are chosen to reflect economic participation and decision making power women's and means percentage shares of administrative and managerial positions. And their percentage shares of professional and technical categories these are broad loosely defined occupational categories because the relevant population for each is different we calculate a separate index for each and then we add the two together.

This is for economic participation and decision making. The third variable women's and men's percentage shares of parliamentary seats is chosen to reflect or other the first variable the women's and men's percentage shares of parliamentary seats is chosen to reflect political participation and decision making.

And for all of these variables the methodology that is used is a population weighted averaging to derive what is called an equally distributed equivalent percentage or the Ed E p percentage and each variable is indexed by dividing the Ed Ep by 50 percent. And it is chosen to be 50 percent so as to represent equal weight age being given to both men and women. An income variable is used to reflect the third variable power over economic resources is basically an income variable here Ed Ep for income.

So, an income variable is used to reflect power over economic resources and it is calculated in the same way as for the GDI except that unadjusted rather than adjusted GDP per capita is used. And these three indices are then added together to derive the final GEM value unlike that in the case of GDI and HDI where we were averaging out the dimension indices for calculation of an index. Here if you note here this is not an index, but a measure. So, we are trying to see what is the level of empowerment, that has been received by females vis-a-vis the males. So, in this case here we simply add up all of these Ed Ep to come up with a gender empowerment measure, unlike the in the case of indices in the previous cases.

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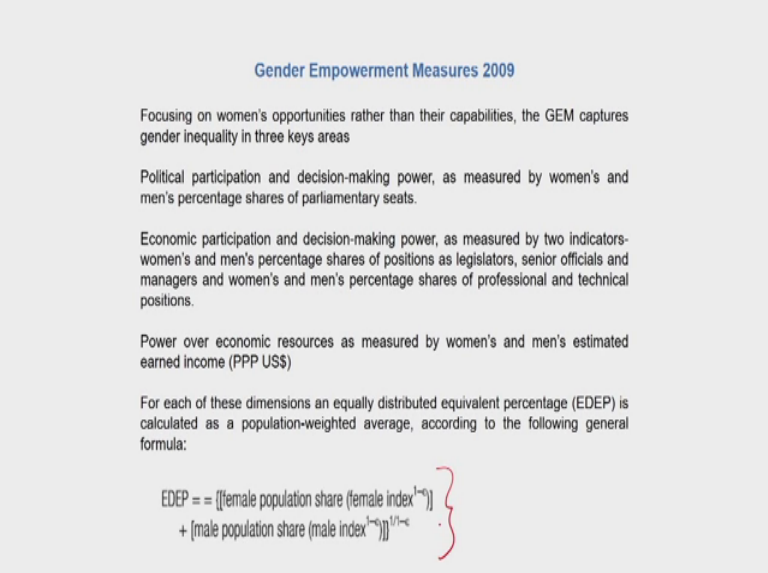

So, these are some of the things that I have just discussed focusing on women's opportunities rather than their capabilities is what GEM captures it captures gender inequality in the three key areas of political participation, economic participation, and power over economic resources. And for each of these dimensions and equally distributed equivalent percentage is calculated as a population weighted average. This is the formula that is used to calculate the Ed Ep the equally distributed equivalent percentage.

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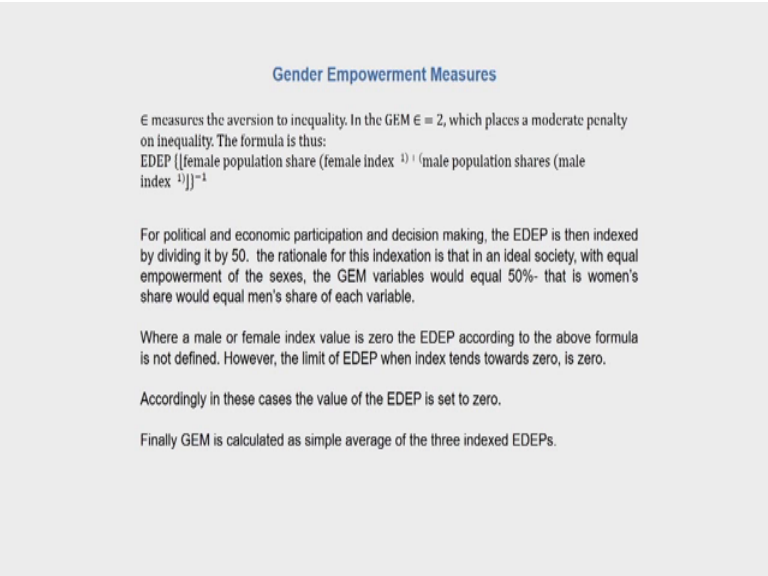

And the Ed Ep values are then added up to come up with the gender empowerment measure.

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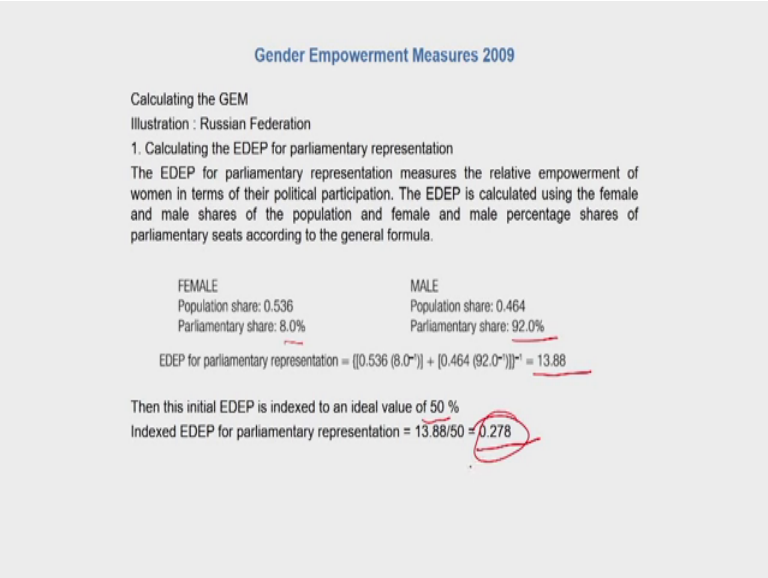

So, here let us look at a small illustration based upon the data for Russian federation. So, we have first calculated the Ed Ep for parliamentary representation. It measures the relative empowerment of women in terms of their political participation. In terms of population share females 0.536, male's 0.46. Parliamentary share if you look as is only 8 percent compared to male 92 percent. And based upon this data the Ed Ep for parliamentary representation comes out to be 13.88.

So, this initial Ed Ep is an indexed to an ideal value of 50 percent. So, 13.88 divided by 50 which is 0.278. So, Russian federation the first variable parliamentary representation otherwise we are looking at political participation of women compared to men. The share of population the female share is much higher in population. If you see 0.53 compared to 0.46. Whereas, parliamentary share is only 8 percent and in case of males 92 percent, Ed Ep 13.8 percent which is an index to an ideal value of 50 percent to 0.278. So, this is the value that we are finally, concerned with for parliamentary representation.

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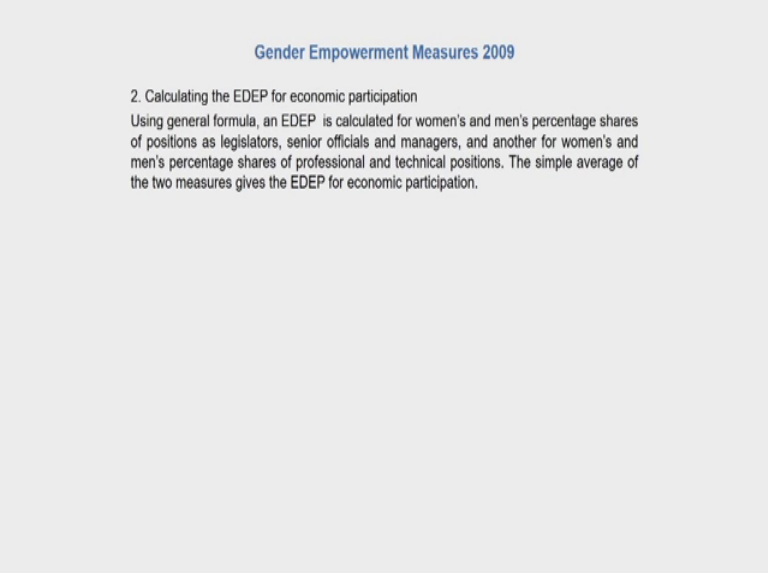

Then we calculate the Ed Ep for economic participation in a similar ways.

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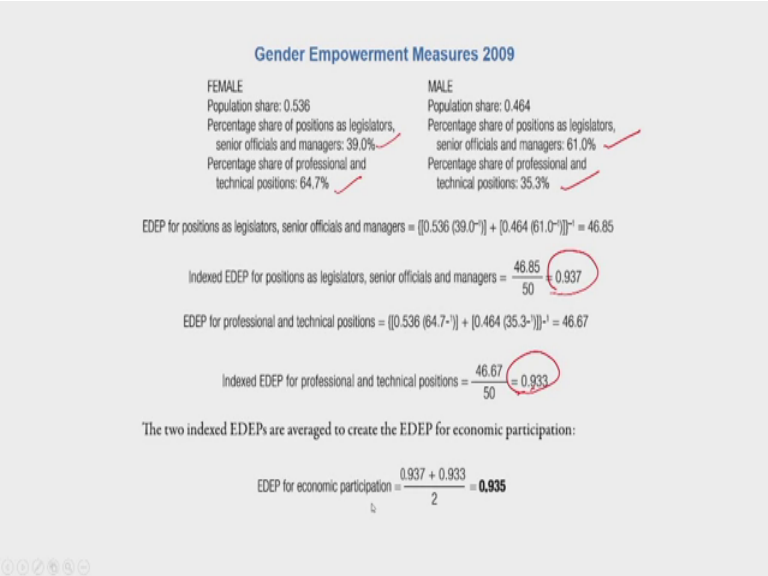

So, if you look at the economic participation which loosely is put together in terms of occupational categories. Population share 0.536, 0.46, percentage share of positions as legislator senior officials and managers 39 percent, 61 percent; percentage share of professional and technical positions 65 percent, 35 percent. So, the Ed Ep is calculated for each of these and then indexed to the value of 50 percent which comes out to 0.93 3. And this is Ed Ep for legislator senior officials and managers 0.937 and then a simple average averaging out is done for Ed Ep for economic participation because you have so many indicators here so that comes out to 0.935 ok.

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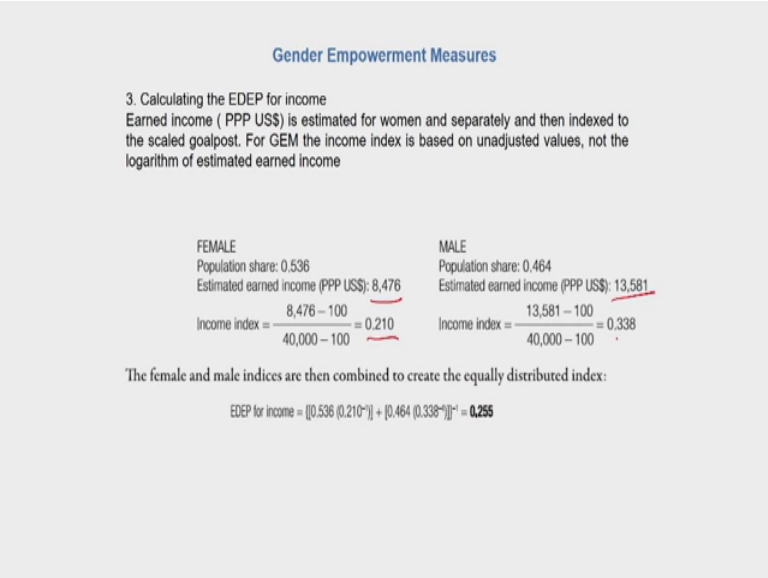

And then the final the income dimension female and male share this is the estimated earned income in terms of purchasing power parity 8,476 females, males 13,581. Income index based upon the range equalization method; actual minus minimum divided by maximum minus minimum. This data is taken from pre 2016 which is why you see the difference in maximum income which was 40,000 for a large part of the 2,000. So, the income index 0.210 income index for males 0.338 and then the Ed Ep is calculated as 0.255.

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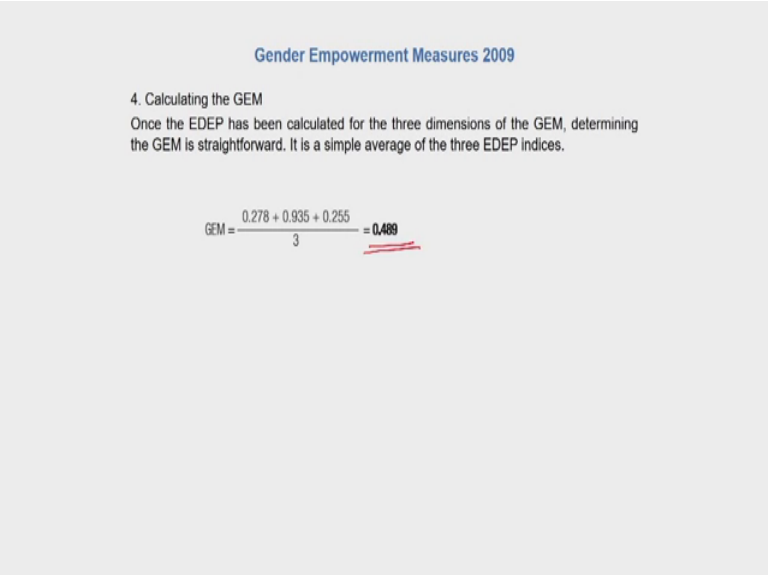

And then we calculate the GEM as simple average of all the three Ed Ep indices which comes out to 0.489. So, this is how the gender empowerment measure is estimated and one of as I have just discussed in respect activities of women's organisations and other forms of agencies that promote say female labour, force literacy, female literacy, demographic change, etcetera are of crucial importance for the empowerment of women is concerned.

And therefore, a lot of interventions need to take place of the grass root level to ensure that women's empowerment has taken place. However, the HDR made an attempt towards measuring the GEM in terms of providing appropriate policy attention towards women's issues at the grassroots level.

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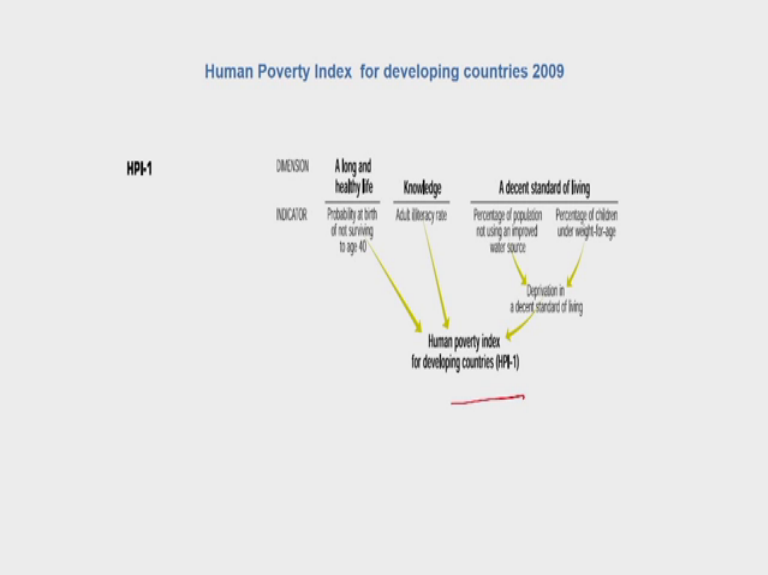

Now, let us move on to the rest of the indices in the last class I introduced you to the human poverty index. And the human poverty index has two variants, one for the developing countries and one for the developed countries; HPI-1 was constructed for the developing countries, which is showing on your screen now.

Dimensions are just the same the indicators worked out for HPI-1 and HPI-2 are different than in the case of the other HDI indices. for HPI 1 the indicator is we are basically measuring deprivation here. That is one of the important things to remember in the case of human poverty index compared to the gender development index or the HDI or the GEM. They all achievement indicators they are all measuring achievement indicators for

the dimensions that have been considered after a lot of thought and deliberation. But the HPI indices the human poverty indices are measuring deprivation here.

So, the indicators here are probability at birth of not surviving till age 40. Adult illiteracy rate and percentage of people not using an improved water source, percentage of children under weight for age, and then a deprivation in a decent standard of living based upon which the human poverty index for developing countries is calculated. Since we by now are very comfortable with the or I would like to assume so that we are at least comfortable with understanding the different dimensions and indicators here.

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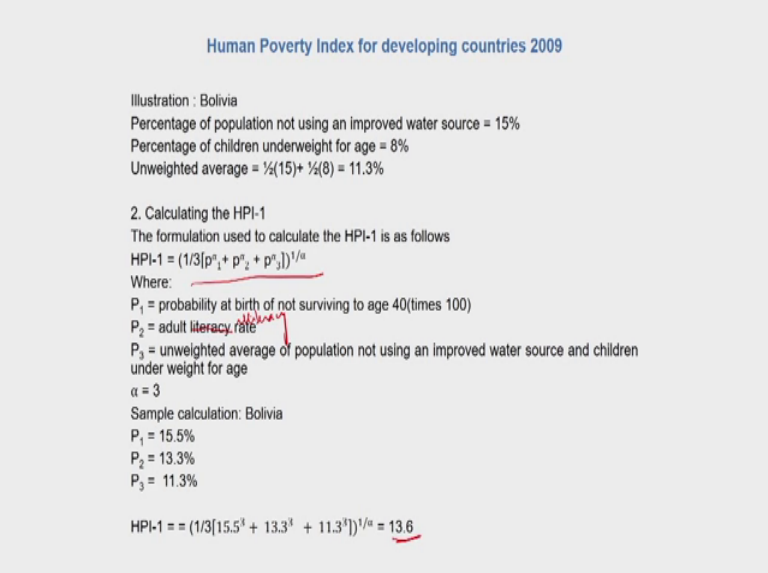

We can just move on to the an illustration of the HPI-1. So, the illustration here that I have considered is that of Bolivia and if you look at the indicators here the percentage of population not using an improved water source is 15 percent, percentage of children underweight 8 percent, and unweighted average is taken of this indicator here this indicator belongs to the dimension of a decent standard of living.

So, and then the HPI-1 is calculated using the following formula where and these are the three indicators here P1, P2, P3. P3 has the two indicators which is calculated by an unweighted average of the two indicators. P1 here is the probability at birth of not surviving till age 40, P2 is adult illiteracy rate I am sorry there is a mistake here this is adult illiteracy rate P3 is the unweighted average of population not using an improved

water source and children under weight for age. So, based upon this the HPI-1 is calculated as 13.6.

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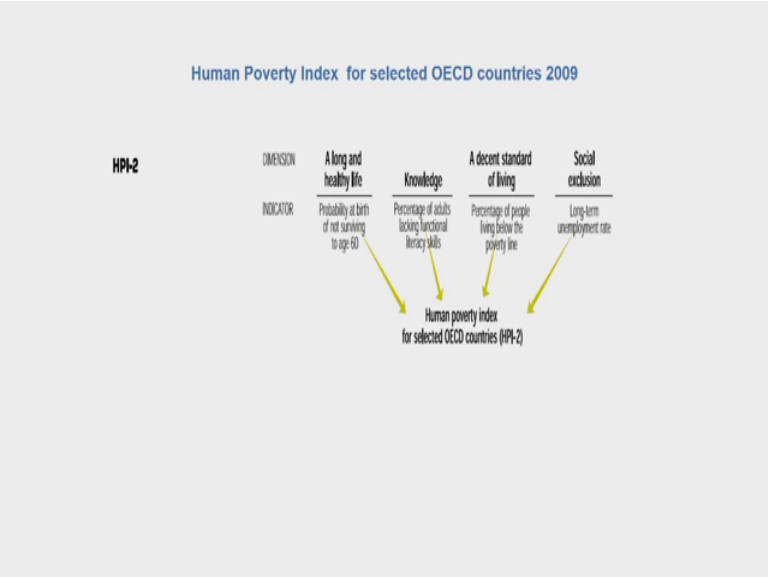

Similarly, HPI-2 it is calculated for is constructed for the developed countries and for select OECD countries this is taken from the 2009 report. There is an addition of dimension as far as the HPI-2 is concerned and along this a long and healthy life knowledge and a decent standard of living the social exclusion, which have been added to HPI-2 calculation.

So, this basically relates to non participation or exclusion of population from the overall levels of human development. It is represented by those that have been unemployed for a very long period of time particularly for 12 months or so. And since employment is one of the important indicators of development for the OECD countries therefore, it shows up as an important indicator here.

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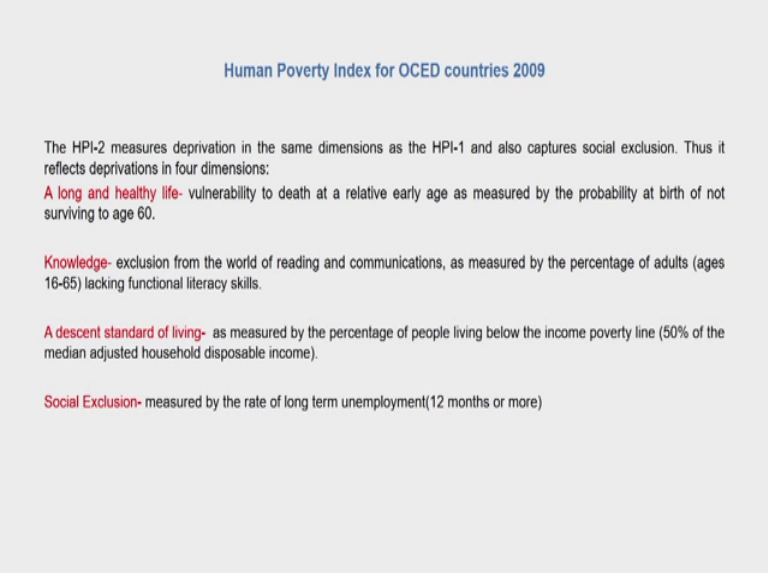

The similar method is followed for the calculation of the HPI, but let us have a brief look at what do these indicators mean here. So, in the case of developed countries or HPI-2 vulnerably long and healthy life is defined as vulnerability to death at a relatively early age as measured by the probability at birth of not surviving till age 60. In the case of HPI-1 it was 40 and for HPI-2 it is 60.

Knowledge it shows deprivation occurs when there is exclusion from the world of reading and communications as measured by percentage of adults. Lacking functional literacy skills deprivation in terms of decent standard of living all those people who are below the poverty line of 50 percent of the median adjusted household disposable income in the case of developed countries. And social exclusion as I just mentioned measured in terms of rate of long term unemployment.

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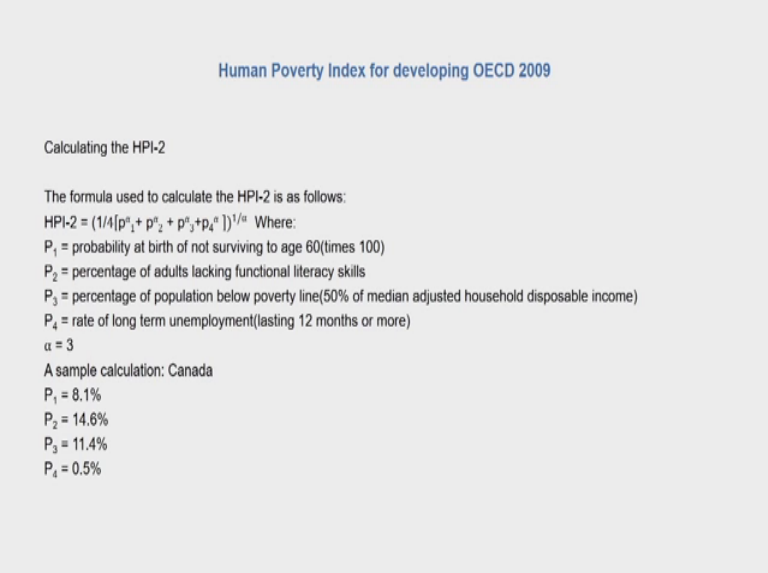

And then the similar formula is used for calculation of HPI-2, this illustration here shows the calculation for Canada which is which is a developed country.

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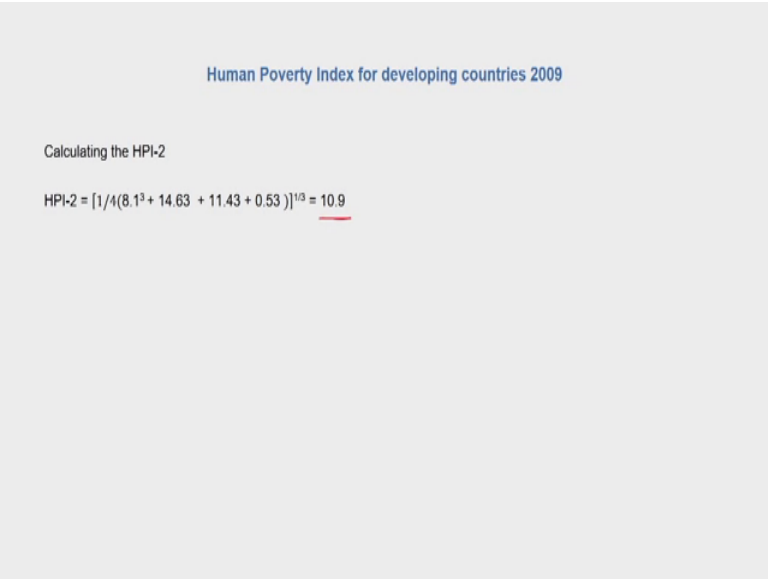

And then the HPI-2 shows a value of 10.9. So, that concludes most of the indices that have been considered as part of the human development index calculation in the recent times some new indices have also come up such as the multidimensional poverty index. In the next class we will look at the multidimensional poverty index we will spend at least 10 minutes on the multidimensional poverty index. Because in the recent times a lot of comparisons cross country comparison have been have taken place based upon the multidimensional poverty index or the MPI so much so that the MPI has come to replace

the HDI on many counts. Because it shows what are the different what is the multidimensionality of poverty or vulnerability of people in both the developed and the developing countries.

So, while income poor or so while many countries may not be income poor may not be may have made substantial achievements in terms of human development indices, there may still be various other indicators based upon the same dimensions of human development which are not getting accounted for in the human development index and that can be held that can be estimated based upon the multidimensional poverty index so, much so that there are various initiatives, such as the oxford poverty human development initiative which has calculated MPI over a period of time.

So, in the next class we will conclude the indices discussion by looking at the multidimensional poverty index. And along with that we will also look at two additional indices which accounts for inequality while constructing the development index. And within that we will look at the gender inequality index and the inequality adjusted human development index. So, I will see you in the next class.

Thank you.