# Equity profile North Macedonia

This analysis is based on a methodology developed from 2010 and 2020[[1]](#footnote-1) [[2]](#footnote-2) [[3]](#footnote-3).It uses international data sources to identify global wellbeing references, identifies the levels replicable to all and estimates the deficit from those by country, time-period, sex and age group.

This new way of looking at a country’s performance on ecology, economy and wellbeing within the feasible and sustainable parameters, can stimulate further subnational analysis and more precise and useful elements to drive local, national and international policies towards equity.

**Methodology**

The only global health objective agreed by all countries is the constitution of the World Health Organization, which aims at the “*best feasible level of health for all*”. With international data - from 1960-2020- we identified such “best feasible level of health” and selected countries with good health (life expectancy above world average) with “globally feasible” economic (GDP and wealth pcy < world average) and ecologic conditions (bio capacity < world average and ecological and carbon footprint < sustainable threshold) sustainable in time, hence safeguarding intergenerational equity.

Using those *healthy, replicable and sustainable* (HRS) models[[4]](#footnote-4), we adjusted mortality rates by age and sex published by the UN Population Division every five years. We call the excess mortality above that from the HRS models, the *burden of health inequity*. The analysis also allows setting the “*dignity threshold*” (below which no country has achieved that best feasible health) and the “*upper threshold*” (above which wellbeing does not improve). Those thresholds frame the *equity curve* between both and the level of *redistribution required* for those under the dignity threshold (in need of net support) or from those above the upper threshold (ethically responsible for net contribution).

Taking into account the negative impact on third countries by excess income pc or excess carbon emissions pc, we estimated the *Sustainable and Equitable Wellbeing (SEW) Index[[5]](#footnote-5).* The methodology we hereby propose challenges XXth century concepts such as high income-development models, constant GDP growth, poverty, ODA and the human development index. The hereby suggested “*equity lenses*” provide a useful tool to identify *alternative wellbeing models*, subnational analysis and policies towards territorial and fiscal equity and individual and collective conscious responsibility based on the ethical principle of equity.

Figure 1 Global equity curve between dignity and excess thresholds allowing best feasible level of health for all



Our analysis reveals that the best levels of wellbeing (through proxy life expectancy) can be achieved within the equity curve, which accommodates all countries, and within them, all peoples above the dignity threshold and below the upper threshold. In 2020 the equity scope was from 4,000-18,000 GDP pc CV, below which no country could achieve best feasible levels of health (right to health) and above which wellbeing did not improve any further while no country was ecologically sustainable and the excess income prevented others from the right to health.

## Comparison with neighbour countries and other with similar natural and economic means

The first attempt to assess a situation is to compare with others in similar situations and identify the potential to improve. The following table compare the ecological, economic and wellbeing indicators (including the burden of health inequity) with the closes countries (geographically and with historical and cultural links) to North Macedonia:

Table 1 Comparative analysis with neighbouring countries

The above table shows how North Macedonia has a bio capacity above its neighbour countries neighbour countries, Greece and Albania, and economic power (estimated though GDP CV) lower than both. It uses natural resources (measured by the ecological footprint) at a rate between the two. The level of life expectancy at birth is lower than both neighbour countries.

Table 2 Comparative analysis with countries of similar natural and economic means

The countries with closest levels of GDP CV pcy (proxy of average income, subject to subnational inequities) and bio capacity pcy, are Bosnia and Herzegovina and Ecuador. North Macedonia has a life expectancy at birth lower than both mentioned countries.

Table 3 Comparative analysis with the international average and the HRS reference indicators

The table above shows the relation of the ecologic, economic and health main indicators of North Macedonia with the international average and with the Healthy-Replicable-Sustainable standards.

It reveals that the bio capacity of North Macedonia is 99% of the world average, hence being replicable at global level. The ecological footprint of North Macedonia is 105% of the international average and 179% of the recycling threshold, hence ecologically non-sustainable. As regards the balance with its own natural resources, the ecological footprint of North Macedonia is 181% of its average bio capacity pcy, therefore it is non-sustainable at national level. The level of CO2 emissions pcy is 65% of the international level and 167% of the ethical threshold, therefore contributing to global warming.

As regards the economic indicators, North Macedonias GDP CV pc is 52% of the international average (hence economically replicable) and 145% of the HRS reference. Its cumulative wealth pcy is 0% of the international average and 0% of the HRS reference.

In terms of health, the life expectancy in North Macedonia is 3.15 years above the international average (2.95 in women and 3.34 above in men) and 0.92 years below the HRS level (2.34 below in women and 0.49 above in men) with a proportional sex difference of 5.28%, lower than the world’s average.

## HRS indicators 1961-2020

### Ecologic indicators:

The following graphs represent the annual average levels of the nature’s recycling capacity in hectares pcy (bio capacity), the rate at which such resources are used (ecological footprint) and the level of CO2 emissions pcy in North Macedonia. These indicators are compared with the international average and the recycling threshold above which the level is not replicable (bio capacity pcy) or not sustainable (ecological and carbon footprints), leading to nature’s depletion and (in the case of CO2 emissions) global warming.

Figure 2 Bio capacity pcy vs. world average 1961-2020

Figure 3 Ecological footprint pcy vs world average and recycling threshold 1961-2020

Figure 4 CO2 emissions pcy vs world average and ethical threshold 1960-2020

As the graphs above show, North Macedonia has a bio capacity pcy replicable at global level, regarding its ecological footprint it is ecologically non-sustainable at global level and its present level of CO2 emissions is contributing to global warming above 1.5 degrees during this century. The use of natural resources is also non-sustainable at national level.

### Economic indicators:

The graphs below the annual average levels of economic flows measured by GDP constant value (CV) and Purchasing Power Parity (PPP) pcy.

Figure GDP CV pcy vs international average, dignity and excess thresholds 1961-2020

The above figure shows the trend of the GDP CV pc in North Macedonia in relation with the levels of the international average, the HRS reference (below which no country in 60 years has achieved the feasible best level of health for all –hence named “dignity threshold”-) and the upper limit (symmetrical level above which wellbeing does not increase further while it hampers others’ reach of the dignity level and is not compatible with respecting planetary boundaries –hence named “excess threshold”-). The overall GDP of North Macedonia is $11323000791, *0.0139%* of the world’s GDP (while being *0.0277%* of the world’s population), which translates in GDP pc $5678pcy, as mentioned above, 52% of the international average and 145% of the HRS reference.

 Figure 6 GDP PPP pcy vs equity thresholds 1986-2020

The graphs above show that the level of GDP CV and PPP pcy during the study period (1961-2020 for CV and 2000-2020 for PPP) in North Macedonia is replicable globally considering the level of global economic resources.

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### Health indicators:

The graphs below represent the level of life expectancy at birth evolving over time from 1961 until 2020, and comparing the levels of North Macedonia with those of the international average and the HRS reference.

Figure 10 Life expectancy by sex and time periods vs. international average and HRS reference, 1961-2020

The graph above shows the relation of life expectancy in North Macedonia, between 1961-2020; with the international average and the HRS reference. Such gap is today 2.95 above the international average in women and 3.34 above in men, and 2.34 years below in women and 0.49 above in men than the HRS reference.

Figure 11 Healthy life expectancy vs international average and HRS standard, 1996-2020

The estimates of the World Health Organization, of the healthy life expectancy (HALE), accounting for disability as well, reflect that the trend of HALE in North Macedonia, in relation with the international and HRS average. At present, the estimated level of healthy life expectancy in North Macedonia is 104% of the international average and 99% of the HRS level.

Figure 12 Life expectancy gap by sex, vs international average 1961-2020

Figure 13 LE % lower in men than in women, vs international average 1961-2020

What the graphs above show is the trend in the difference between life expectancy between men and women in North Macedonia. It stands today at 4.10 years lower in men, which is lower than the world % difference (at present some 6%).

## Burden of health inequity

### Burden vs. HRS reference:

As mentioned in the methodology, we selected the country (Sri Lanka) which has maintained the ecological sustainability, economic replicability and the health above average as the reference to compare mortality rates by sex, age group and time period and estimated, through adjust mortality rates the excess mortality from those feasible standards.

Figure 15 nBHiE ref HRS by sex and time period 1961-2020

The above graph represents the excess mortality in North Macedonia, (with 145% GDP CV pc of the HRS reference), that is, the net burden of health inequity (nBHiE). Today it stands at 2705 in women and 1449 in men, a total of 4138, which is *0.0257%* of the world’s total (compared with North Macedonia ‘s *0.0277%* of the world’s population).

Figure 16 nBHiE by sex and age group 2016-2020

The above figure represents the age distribution of the excess mortality in reference to the HRS feasible-for-all levels. It affects adults increasing with age in women up to highest levels in the 75-85 year old group and to a lower extent in men.

Figure 17 rBHiE by sex and time period vs international average, 1961-2020

The share of all deaths that was in excess in North Macedonia when compared with the feasible mortality rates in the HRS reference, allows comparison in time and with other countries and the international reference as it is not influenced by the size and/or shape of the demographic pyramid.It is today of 27.01% in women and 13.37% in men, an average of 20.19%, 71% of the world’s average.

Figure 18 rBHiE by sex and age vs international average, 2016-2020

The above figure represents the age distribution of the share of excess mortality in reference to the HRS feasible-for-all levels and reveals it affectschildren under 5 (30%), women from 60 to 85 years (20 to 40% of deaths) and men older than 80 years (30-30% of deaths).

### Burden vs. best SEW reference:

While the minimum aspiration of feasible health for all is the HRS reference, which uses 40% of the world’s average resources per person, the comparison with the best level of sustainable and equitable wellbeing (see below), Costa Rica, challenges to higher levels of wellbeing within the equity curve and void of negative impact from excess income or CO2 emissions.

Figure 19 nBHiE ref best SEW, by sex and time period 1961-2020

The above figure reveals how the comparison of mortality rates by sex, age group and time period between North Macedonia and the best SEW reference (with 47.74% of its GDP CV pc). The trend reflects socioeconomic and ecologic conditions over the last 60 years in North Macedonia and in the best SEW country (Costa Rica). It increased from 1961 and stands today at 4550 in women and 4247 in men, totalling 8711 excess deaths (*0.0388%* of the world’s total burden ref. best SEW vs. being *0.0277%* of the population).

Figure 20 nBHiE vs best SEW reference by age and sex, 2016-2020

The above figure represents the age distribution of the excess mortality in reference to the best SEW reference. It reflects excess mortality in adults older than 30 years, higher in 70-85 year olds, more in women than in men.

Figure 21 rBHiE by sex and time period vs international average, 1961-2020

The figure above shows the share of excess mortality ref. best SEW in relation to the total number of deaths, that is, the rBHiE. It evolved during the 1961-2020 period until today’s level of 41.78% (106% of the world’s level-close to 40%-), 45.45% in women and 39.19% in men.

Figure 22rBHiE ref best SEW by sex and age group vs international average, 1916-2020

The above figure represents the age distribution of the share of excess mortality in reference to the best SEW reference and reveals higher shares in older than 75 years (30-60%).

## Sustainable and Equitable Wellbeing (SEW) index

Figure LYL on others by excess emissions and excess income, 1961-2020

Figure Sustainable and equitable wellbeing index, 1961-2020

This last figure of our analysis of the equity profile in North Macedonia reveals the sustainable and equitable index, that is, the average life expectancy at birth after deducting the damage on other countries through excess income (in the present generations) and through excess CO2 emissions (in the coming generations). We estimated one week life lost per annual GDP pc 1000$ above the excess threshold and two life days lost per annual excess CO2 mTon above the ethical threshold[[6]](#footnote-6) [[7]](#footnote-7). With -0.42 impact through excess carbon emissions and 0.00 by excess income, it stands today at 75.59 life years, and ranks 36 in the world, 46 positions above the Human development Index (which does not limit CO2 emissions or excess GDP pc income).

In summary, the equity profile of North Macedonia, reveals that with 99% of the world average bio capacity pcy, its ecological footprint is 179% of the global recycling threshold (non-sustainable) and also 181% of its national recycling capacity (non-sustainable). The level of CO2 emissions pcy is 167% of the ethical threshold, therefore contributing to global warming. North Macedonia ’s GDP CV pc is 52% of the international average and 145% of the HRS reference. Life expectancy is 3.15 years above the international average (2.95 in women and 3.34 above in men) with a proportional sex difference of 5.28% higher in women, lower than the world’s average. The present annual excess mortality in North Macedonia, in relation to HRS reference (feasible for all), is of 4138 (2705 in women and 1449 in men), meaning 20.19% of all deaths (27.01% in women and 13.37% in men). When compared with the best level of sustainable and equitable wellbeing, the present annual excess mortality rises to 8711, 41.78% of all deaths. The Sustainable and Equitable Wellbeing index, that is, life expectancy at birth after deducting the damage on other countries through excess income (in the present generations) and through excess CO2 emissions (in the coming generations) stands today at 75.59 life years, and ranks 36 in the world.

1. https://www.sciencedirect.com/science/article/pii/S0033350617301610 [↑](#footnote-ref-1)
2. https://oxfordre.com/publichealth/view/10.1093/acrefore/9780190632366.001.0001/acrefore-9780190632366-e-62?rskey=fNaAhA&result=2 [↑](#footnote-ref-2)
3. http://www.peah.it/2021/04/9658/ [↑](#footnote-ref-3)
4. From 1960-2010 the countries which met all criteria constantly were Albania, Armenia, Belize, Colombia, Costa Rica, Cuba, Grenada, Saint Lucia, Saint Vincent, Georgia, Paraguay, Sri Lanka, Tonga and Vietnam, from 1960-2015 they were reduced to Armenia, Colombia, Costa Rica, Paraguay, Sri- Lanka and Tonga and from 1960-2020 only Sri Lanka remains. [↑](#footnote-ref-4)
5. The country with best SEW index, within the equity curve is Costa Rica. [↑](#footnote-ref-5)
6. <http://www.peah.it/2021/04/9658/> [↑](#footnote-ref-6)
7. <http://www.peah.it/2018/07/5498/> [↑](#footnote-ref-7)