

**EDUCATION, FREEDOM, INTERNATIONAL
DEVELOPMENT AND QUALITY OF LIFE,
2001-2023. ECONOMIC STUDIES OF AMERICA,
EUROPE, AFRICA AND ASIA**

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EDUCATION, FREEDOM, INTERNATIONAL DEVELOPMENT AND QUALITY OF LIFE, 2001-2023: INTERNATIONAL. ECONOMIC STUDIES OF AMERICA, EUROPE, AFRICA AND ASIA

Maria-Carmen GUISAN

Chapter 1. Education, World Development and Quality of Life, 2001-2023. Maria-Carmen Guisan

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**CHAPTER 1
EDUCATION, WORLD DEVELOPMENT AND QUALITY OF LIFE,
2001-2023**

GUISAN, Maria-Carmen

1.1. Studies of 2014-2017: Investment and Manufacturing in 132 countries.

In this chapter we analyze the evolution for the period 2001-2023. The most outstanding finding of these studies is the great importance of Schooling for World development.

Guisan(2014): Production and Investment in 21 Areas for 2000-2010

The article, entitled World Development, 2000-2010: Production, Investment and Savings In 21 Areas of America, Africa, Asia-Pacific, Europe and Eurasia, was published in journal RSES 14-2 by Guisan(2014), and includes an econometric model estimated with data of 132 countries.

There are big differences in investment and savings per capita (IH and SH) between areas with low average level of schooling and areas with high average level. Low levels of Investment per capita usually imply low levels of Industrial and Manufacturing production per capita. Low levels of Manufacturing per capita usually imply low levels of Non Manufacturing per capita and thus, a low level of real Production per capita (GDPH).

Table 1.1. Real values per capita of Manufacturing (QMH), Gross Domestic Product (GDPH), Investment (IH) and Savings (SH) (Dollars at 2005 prices and parities)

| Area | QMH 00 | QMH 10 | GDPH 00 | GDPH 10 | IH 00 | IH 10 | SH 00 | SH 10 |
|----------------|-----------|-----------|------------|------------|----------|----------|----------|----------|
| Africa | 278 | 282 | 2080 | 2638 | 413 | 620 | 733 | 578 |
| Asia & Pacific | 903 | 1443 | 4004 | 6333 | 1093 | 2115 | 2625 | 2315 |
| America | 3312 | 3052 | 19865 | 21908 | 3977 | 3811 | 3471 | 3094 |
| Europe&Eurasia | 3220 | 3191 | 17408 | 20828 | 3722 | 4151 | 4310 | 4195 |
| World | 1494 | 1728 | 7905 | 9852 | 1788 | 2403 | 2746 | 2422 |

Source: Elaborated by Guisan(2014), in RSES, from World Bank(2014), for year 2000-2010. In case of unavailable data, we included our own estimations.

Areas of America and Europe and Eurasia in 2010, had GDPH more than twice the World average of GDPH , while the average of the group of African countries was very low (2638) and the average of Asia Pacific was low (6333).

Maria-Carmen Guisan, Honorary Professor of Econometrics, University of Santiago de Compostela, Spain. <https://www.usc.gal/economet/guisan2.htm>

World average of QMH experienced and increase from 1494 in year 2000 to 1728 in year 2010. Asia Pacific experienced an important increase, from an average of 903 in year 2000 to an average of 1443 in 2010.

Table 1.2 presents data of 21 geographical areas for the following variables in years 2000 and 2010, expressed in Dollars per inhabitant at 2005 prices and Purchasing Power Parities (PPPs):

qmh = Manufacturing Production per capita

gdph = Gros Domestic Product per capita

ih = Investment per capita

sh = Savings per capita

Table 1.2. Manufacturing, GDP, Investment and Savings, per inhabitant in 21 areas, years 2000 and 2010. (US Dollars at Prices and Purchasing Parities of year 2005)

| Area | qmh 00 | qmh 10 | gdph 00 | gdph 10 | ih 00 | ih 10 | sh 00 | sh 10 |
|---------------------|-----------|-----------|------------|------------|----------|----------|----------|----------|
| 1. North Africa | 659 | 752 | 4412 | 5851 | 1012 | 1657 | 1684 | 1427 |
| 2. NW Africa | 94 | 144 | 1359 | 1894 | 80 | 412 | 733 | 567 |
| 3. Central Afri. | 87 | 86 | 729 | 878 | 118 | 170 | 159 | 120 |
| 4. NE Africa | 33 | 38 | 534 | 907 | 108 | 193 | 190 | 146 |
| 5. Eastern Africa | 100 | 124 | 965 | 1246 | 168 | 293 | 280 | 213 |
| 6. Southern Afri. | 645 | 529 | 3924 | 4859 | 659 | 931 | 973 | 810 |
| 7. Western Asia | 1149 | 1262 | 10800 | 12237 | 2005 | 2172 | 2926 | 2303 |
| 8. SW Asia | 513 | 646 | 3741 | 4836 | 1023 | 260 | 451 | 368 |
| 9. India & South | 245 | 411 | 1635 | 2887 | 393 | 983 | 1168 | 975 |
| 10. China & NE | 1444 | 2648 | 5547 | 9606 | 1657 | 3671 | 4333 | 4109 |
| 11. Indochina | 708 | 1044 | 2555 | 4039 | 614 | 1169 | 1370 | 1257 |
| 12. South Pacific | 1207 | 1278 | 5320 | 6978 | 1281 | 1882 | 2436 | 2054 |
| 13. US&Canada | 6249 | 5617 | 38456 | 41594 | 7691 | 6511 | 5269 | 4801 |
| 14. Mexico&C. | 1858 | 1764 | 9237 | 9848 | 2155 | 2344 | 2539 | 2172 |
| 15. Andean | 1219 | 1217 | 7064 | 9181 | 1421 | 2089 | 2483 | 2189 |
| 16. SE America | 1544 | 2442 | 8748 | 11921 | 1443 | 2117 | 1544 | 2442 |
| 17. North Europe | 5109 | 3819 | 30081 | 33474 | 5634 | 5458 | 5705 | 5428 |
| 18. Central West | 6387 | 6668 | 31306 | 34227 | 6949 | 6229 | 8389 | 8260 |
| 19. West Latin | 4761 | 3562 | 27173 | 27659 | 5995 | 5698 | 5216 | 4792 |
| 20. Central & EM | 2150 | 2695 | 10812 | 15093 | 2522 | 3213 | 2573 | 2524 |
| 21. Russia & former | 1052 | 1527 | 6038 | 10208 | 1172 | 2435 | 2729 | 2745 |

Source: Elaborated by Guisan(2014) in RSES. Note: Data of IH of area 16 updated on 5th October of 2015.

Figures 1.1 presents the list of areas and figures 1.2 to 1.5 shows countries by area and Population (Pop) in years 2000 and 2010.

Figure 1.1. List of areas: Africa (areas 1 to 6). Asia-Pacific (areas 7 to 12), America (areas 13 to 16), Europe and Eurasia (areas 17 to 21).

| | |
|--------------------|--|
| Africa | 1. North Africa: Northern Africa |
| | 2. NW Africa: North West Africa |
| | 3. Central Afr.: Sahel-Central Africa |
| | 4. NE Africa: North East Africa |
| | 5. Eastern Africa |
| | 6. Southern Afri. : Southern Africa |
| Asia and Pacific | 7. Western Asia |
| | 8. SW Asia: South Western Asia |
| | 9. India & South |
| | 10. China & NE = China and North East |
| | 11. Indochina |
| | 12. South Pacific |
| America | 13. US & Canada: United States and Canada |
| | 14. Mexico & C.: Mexico and Central America |
| | 15. Andean: Andean America |
| | 16. SE America: South Eastern America |
| Europe and Eurasia | 17. North Europe: Nordic and British Europe |
| | 18. Central West: Central West Europe |
| | 19. West Latin: West Latin Europe |
| | 20. Central & E.Med.=Central Europe and East Mediterranean |
| | 21. Russia and East |

The article includes data of 132 countries. The lists of countries by area are presented in the following figures. The number of each country corresponds to its position in a general alphabetical order.

Population by area was calculated by Guisan(2014) from World Bank statistics. For the period 2000-2010 World Population increased as follows

In Africa, from 748 to 946 million, with an increase of 26.47%.

In Asia and Pacific, from 3453 to 3913, with an increase of 13.32%

In America, from 813 to 912 million, with an increase of 12.18%

In Europe and Eurasia, from 851 to 876, with an increase of 2.94%

The sum of the 132 countries of the 21 areas, evolved from 5865 in year 2000 to 6647 million people in year 2010, with an increase of 13.33%.

Figure 1.2. Africa: areas, countries and population (million)

| Area | Countries and territories | Pop 2000 | Pop 2010 |
|------------------------|--|----------|----------|
| 1. N Africa | 2 Algeria, 37 Egypt AR, 77 Mauritania, 81 Morocco, 119 Tunisia | 138 | 162 |
| 2. NW Africa | 12 Benin 31 Cote d'Ivoire 46 Ghana 49 Guinea 90 Nigeria 104 Senegal, 105 Sierra Leone 118 Togo | 190 | 246 |
| 3.Sahel-Central Africa | 17 Burkina F. 18 Burundi 20 Cameroon 22 C.African R 23 Chad 28 Congo DR, 29 Congo 76 Mali 89 Niger 102Rwanda | 130 | 172 |
| 4. NE Africa | 39 Eritrea 41 Ethiopia | 68 | 88 |
| 5. EasternAfrica | 63 Kenya 73 Madagascar 116 Tanzania 122 Uganda | 106 | 139 |
| 6.Southern Africa | 3 Angola 14 Botswana 70 Lesotho 74 Malawi 82 Mozambique 84 Namibia 109 South Africa 131 Zambia 132 Zimbabwe | 116 | 139 |
| Africa | Areas 1 to 6 | 748 | 946 |

Source: Elaborated by Guisan(2014) with World Bank statistics.

Figure 1.3. Asia and Pacific: areas, countries and population (million)

| Area | Countries and territories | Pop 2000 | Pop 2010 |
|-------------------------|--|----------|----------|
| 7. Western Asia | 57 Israel 61 Jordan 65 Kuwait 69 Lebanon 103 Saudi Arabia 114 Syrian, 130 Yemen | 73 | 93 |
| 8. SWAsia | 55 Iran 92 Pakistan | 202 | 248 |
| 9. India and S. | 9 Bangladesh 53 India 85 Nepal 111 Sri Lanka | 1189 | 1424 |
| 10.China and NE | 25 China 26 H-K cn 60 Japan 64 Korea R 80 Mongolia | 1446 | 1524 |
| 11.Indochina | 19 Cambodia 67 Lao PDR 83 Myanmar 117 Thailand 129 Vietnam | 206 | 224 |
| 12.South East & Pacific | 6 Australia 54 Indonesia 75 Malaysia 87 N. Zealand 94 Papua N.G., 97 Philippines 106 Singapore | 337 | 400 |
| Asia&Pacific | areas 7 to 12 | 3453 | 3913 |

Source: Elaborated by Guisan(2014) with World Bank statistics.

Figure 1.4. America: areas, countries and population (million)

| Area | Countries and territories | Pop 2000 | Pop 2010 |
|---------------------------------|---|-------------|-------------|
| 13. USA&Canada | 21 Canada 125 USA | 313 | 343 |
| 14. Mexico & Central America | 30 Costa Rica 35 Dominican R. 38 El Salvador 48 Guatemala , 50 Haiti, 51 Honduras 59 Jamaica 78 Mexico 88 Nicaragua 93 Panama | 152 | 178 |
| 15. SW: Andean America | 13 Bolivia 24 Chile 27 Colombia 36 Ecuador 96 Peru 128 Venezuela | 128 | 146 |
| 16. SE America | 4 Argentina 15 Brazil 95 Paraguay 126 Uruguay | 220 | 245 |
| <i>America</i> | Areas 13 to 16 | 813 | 912 |

Source: Elaborated by Guisan(2014) with World Bank statistics.

Figure 1.5. Europe and Eurasia: areas, countries and population (million)

| Area | Countries and territories | Pop 2000 | Pop 2010 |
|--|--|-------------|-------------|
| 17. Nordic and British Europe | 34 Denmark 42 Finland 56 Ireland 91 Norway 112 Sweden 124 UK | 87 | 92 |
| 18. W Europe Central | 7 Austria 11 Belgium 45 Germany 86 Netherlands, 113 Switzerland | 124 | 126 |
| 19. W. Latin Europe | 43 France 58 Italy 99 Portugal 110 Spain | 167 | 182 |
| 20. Central, Baltic, East Mediterranean | 1 Albania 16 Bulgaria 32 Croatia 33 Czech R. 40 Estonia 47 Greece, 52 Hungary, 68 Latvia 71 Lithuania 72 Macedonia 98 Poland 100 Romania 107 Slovak R. 108 Slovenia 120 Turkey | 192 | 196 |
| 21. Russia and East | 5 Armenia 8 Azerbaijan 10 Belarus 44 Georgia 62 Kazakhstan 66 Kyrgyz R. 79 Moldova 101 Russian F. 115 Tajikistan 121 Turkmenistan 123 Ukraine 127 Uzbekistan | 281 | 279 |
| Europe&Eurasia | areas 17 to 21 | 851 | 876 |

Source: Elaborated by Guisan(2014) with World Bank statistics.

Europe includes areas 17 (North), 18 (Western Europe Central), 19 (Western Latin Europe) and parts of areas 20 and 21.

Eurasia is considered as a group of 6 countries that geographically belong partly to Europe and partly to Asia: Russia, Turkey, 3 Caucasian countries (Armenia, Azerbaijan and Georgia) and Kazakhstan.

Cyprus is included in the group of Europe and Eurasia although geographically is assigned to Western Asia, because its cultural relationships with Greece and its membership of the European Union.

Area 21, Russia and East, includes 5 Eurasian countries (Russia, Armenia, Azerbaijan, Georgia and Kazakhstan), several countries of East Europe (Belarus, Moldova, Ukraine) and several not geographically European nor Eurasian countries of Central Asia that have or have had a close relationship with Russia (Kyrgyz R, Tajikistan, Turkmenistan and Uzbekistan)

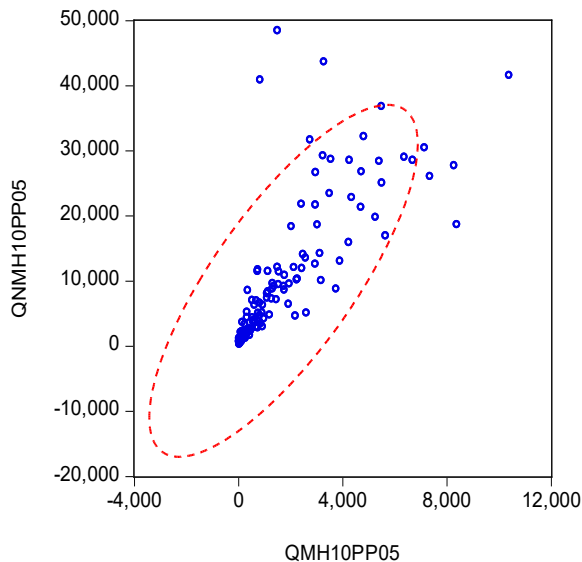
Impact of Education

The countries and areas with high level Education have moderate average fertility rates and reach high levels of Savings and Investment per capita, with positive impact on QMH and GDPH. There is a great difference between the rates of Savings per capita from the low value of Africa (578 Dollars in year 2010) to the highest average by continent in Europe with more than 4000.

Impact of Manufacturing on Manufacturing for the period 2000-2010

Graph 1.1 shows the positive relationship between Manufacturing per capita (QMH) and Non-Manufacturing Production per capita (QNMH) in 132 countries of the World in year 2010.

Graph 1.1. Manufacturing and Non-Manufacturing: 132 countries, year 2010



Source: Elaborated by Guisan(2014) from World Bank statistics. Note: Real values of QMH and QNMH in year 2010, in Dollars at 2005 Prices and Purchasing Power Parities.

Equation 1.1 shows the positive effect of manufacturing on non manufacturing production with a sample of 132 countries.

Equation 1.1. Effect of manufacturing on non manufacturing production

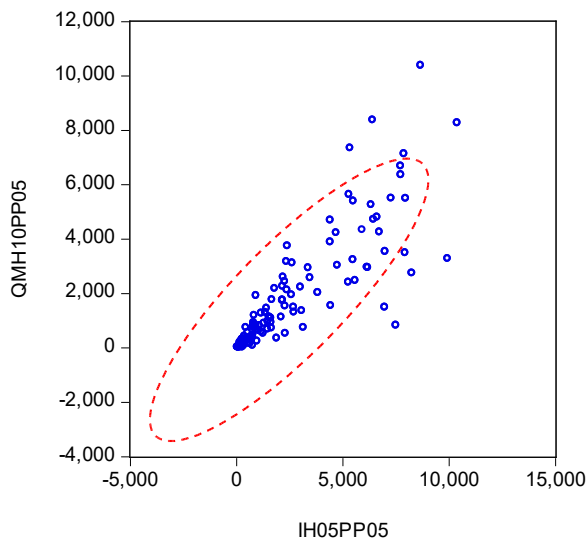
| Dependent Variable: QNMH10PP05. Method: Least Squares. Sample: 1 132 | | | | |
|--|-------------|-----------------------|-------------|----------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| QNMH00PP05 | 1.233731 | 0.014558 | 84.74536 | 0.0000 |
| QMH10PP05-QMH00PP05 | 1.478117 | 0.280626 | 5.267208 | 0.0000 |
| R-squared | 0.967429 | Mean dependent var | | 10044.67 |
| Adjusted R-squared | 0.967179 | S.D. dependent var | | 10911.97 |
| S.E. of regression | 1976.877 | Akaike info criterion | | 18.03146 |
| Sum squared resid | 5.08E+08 | Schwarz criterion | | 18.07514 |
| Log likelihood | -1188.076 | Hannan-Quinn criter. | | 18.04921 |
| Durbin-Watson stat | 1.964938 | | | |

Source: Estimated by Guisan(2014) with data of 132 countries.

Impact of real Investment per capita on real GDP per capita

Graph 1.2 shows the positive impact of Investment per capita (IH) on Manufacturing Production per capita (QMH)

Graph 1.2.. Investment and Manufacturing per capita in 132 countries, year 2010



Source: Elaborated by Guisan(2014) from World Bank Statistics. Real value of IH and QMH in Dollars at 2005 Prices and Purchasing Power Parities.

Equation 1.2 shows the positive effect that investment per capita, usually has on economic development. The equation relates real GDP per capita of each country in year 2010 (expressed in USD at 2005 prices and purchasing power parities) with its lagged value in year 2000, and the value of investment per head for the period 2001-2010.

Equation 1.2. Effect of Investment on real Production per head

| Dependent Variable: PH10PP05. Method: Least Squares. Sample: 1 132 | | | | |
|--|-------------|-----------------------|----------|----------|
| Variable | Coefficient | Std. Error | t-Stat | Prob. |
| PH00PP05 | 0.835181 | 0.063063 | 13.24359 | 0.0000 |
| Investment per head (accumulated)* | 0.141855 | 0.025679 | 5.524061 | 0.0000 |
| R-squared | 0.968362 | Mean dependent var | | 11767.71 |
| Adjusted R-squared | 0.968119 | S.D. dependent var | | 12598.27 |
| S.E. of regression | 2249.449 | Akaike info criterion | | 18.28979 |
| Sum squared resid | 6.58E+08 | Schwarz criterion | | 18.33347 |
| Log likelihood | -1205.126 | Hannan-Quinn criter. | | 18.30754 |
| Durbin-Watson stat | 1.790740 | | | |

Source: Guisan(2014). *Note: Investment per head (accumulated) for the period 2001-2010 is the sum of IH for those years. Variables in US Dollars at 2005 prices and Purchasing Power Parities (USD at PP2005).

Both increases of manufacturing per head and investment per head, as well as other variables (like Agriculture, Energy, Tourism, Trade), are usually necessary to foster economic development and poverty diminution. Education is very important because contributes to increase investment per capita.

Study by Guisan(2017): Manufacturing and Development, 2000-2015

The study by Guisan(2017), in the RGE, analyses the evolution of Manufacturing and Development in the World for the period 2000-2015. The article is available at Ideas.Repec and includes data of Manufacturing and Non Manufacturing Production per capita (QMH and QNMH) of 132 countries.

QMH has usually an important positive impact on QNMH, although other industrial sectors (mining, energy), as well as Agriculture, Tourism and International Trade, have also a positive impact on Services and Building).

In this study, the equation relating QNMH with its lagged value and with the increase of QMH, was estimated separately for the countries of Africa, America, Asia-Pacific, Europe and Eurasia, and compared with the estimation with the sample of 132 countries of the World. The results appear in equations 1.3 to 1.7.

Equations 1.3 to 1.7. QNMH in year 2010: 5 estimations

| Equation | | Lagged dep.variable | Increase of QMH | R^2 |
|----------|----------------|---------------------|--|----------|
| 1.3 | Africa | 1.203965 | 3.582825 | 0.996992 |
| 1.4 | America | 1.201132 | 2.351296 | 0.991983 |
| 1.5 | Asia-Pacific | 1.253758 | 0.930252 | 0.996193 |
| 1.6 | Europe&Eurasia | 1.222405 | 2.541376 | 0.980595 |
| 1.7 | World | 1.222653 | 2.48 general (1.04 in Asia ¹) | 0.991372 |

Source. Guisan (2017). Notes: ¹ We have tested the homogeneity of the coefficient of the increase of QMH in the equation of QNMH among different areas, and we have found a significant difference, with a value for Asia-Pacific lower than in other areas.

There was a high degree of homogeneity of the coefficient of the lagged value of QNMH but a significant difference of the coefficient of QMH in the group of countries of Asia and Pacific, in comparison with other areas. The estimation with the full sample of 132 countries, allowing for a different coefficient for QMH in Asia and Pacific, provides 2.48 as the general estimator for Africa, America, Europe and Eurasia, and 1.04 for Asia-Pacific.

A most complete analysis should include other variables like the increase of Exports and Imports, as indicated in Guisan(2013), and in Chapter 2 of this book, but this simple model is enough to show the high degree of dependence of many non Manufacturing activities on the degree of industrial development:

$$QNMH = f(QNMH(-10), D(QMH))$$

Being $D(QMH)=QMH-QMH(-10)$. The lagged values of each variable, in $t-10$, are indicated with (-10) within parenthesis.

Kaldor (1957), (1967) and (1968) highlights the positive impact of Manufacturing on Production and Productivity of other sectors of the economy.

Tables 1.3 to 1.12 show several groups of countries accordingly to their levels of real Gross Domestic Product in year 2015. They include values of QMH, QNMH and GDPH for each country in years 2000 and 2015. We would like to include data of QIH (Industrial real value-added, with Manufacturing, Mining and Energy) but the World Development Indicators include Industry together with Building and not separate figures for Building. In case of unavailable data we indicate with NA (Nota Available). Column 1 is the number of each country in the alphabetical order of 132 countries, and the 2nd column indicates the geographical area: AF=Africa, AM=America,

ASP=Asia and Pacific, EUR=Europe and Eurasia. The area EUR includes countries of Europe, Eurasia and a few countries close to East Asia and Eurasia, geographically in Asia (Cyprus and Central Asia).

Table 1.3. Production per capita over 35000 Dollars at 2005 prices and PPPs

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|----------------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 6 | ASP | Australia | 3760 | 2290 | 25166 | 34209 | 28926 | 36500 |
| 7 | EUR | Austria | 6430 | 6582 | 25719 | 29531 | 32149 | 36113 |
| 21 | AM | Canada | 6171 | 3670 | 26306 | 33118 | 32477 | 36778 |
| 26 | ASP | Hong-Kong (China) | 1489 | 609 | 28296 | 45731 | 29785 | 46339 |
| 45 | EUR | Germany | 6734 | 8183 | 23877 | 28001 | 30611 | 36185 |
| 56 | EUR | Ireland | 8358 | 18915 | 23788 | 29743 | 32146 | 48657 |
| 65 | ASP | Kuwait | 1008 | 1539 | 32595 | 44354 | 33603 | 45893 |
| 86 | EUR | Netherlands | 5036 | 4853 | 28540 | 32811 | 33576 | 37664 |
| 91 | EUR | Norway | 4364 | 3338 | 39278 | 44630 | 43642 | 47968 |
| 106 | ASP | Singapore | 10445 | 10628 | 26859 | 47760 | 37304 | 58388 |
| 112 | EUR | Sweden | 6087 | 5235 | 22899 | 30635 | 28986 | 35870 |
| 113 | EUR | Switzerland | 6260 | 6799 | 28518 | 31445 | 34778 | 38245 |
| 125 | AM | United States | 6257 | 5796 | 32851 | 39424 | 39108 | 45221 |

Source: M.C.Guisan(2017) from WB statistics. Canada in year 2015, updated . Table 1.3 includes 12 countries: 7 from Europe, 2 from America and 3 from Asia (Kuwait, Singapore and the Chinese Territory of Hong-Kong).

Table 1.4. Production per capita (25000 to 35000 Dollars at 2005 prices and PPPs

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 11 | EUR | Belgium | 5751 | 4199 | 24515 | 29138 | 30266 | 33337 |
| 34 | EUR | Denmark | 4758 | 4233 | 26963 | 28992 | 31721 | 33226 |
| 42 | EUR | Finland | 7140 | 4016 | 20323 | 27030 | 27463 | 31045 |
| 43 | EUR | France | 4384 | 3031 | 24841 | 27328 | 29225 | 30359 |
| 57 | ASP | Israel | 4154 | NA | 18837 | NA | 22991 | NA |
| 58 | EUR | Italy | 5544 | 4133 | 22176 | 21538 | 27720 | 25671 |
| 60 | ASP | Japan | 6009 | 5728 | 22604 | 26633 | 28613 | 32361 |
| 64 | ASP | Korea. Rep. | 5072 | 9139 | 12417 | 21290 | 17489 | 30428 |
| 108 | EUR | Slovenia | 5127 | 6149 | 14591 | 19306 | 19718 | 25455 |
| 110 | EUR | Spain | 4521 | 3721 | 20598 | 22972 | 25119 | 26693 |
| 124 | EUR | UK | 4668 | 3376 | 24504 | 31174 | 29172 | 34549 |

Source: Elaborated by M.C.Guisan(2017) from WB statistics. This group includes 11 countries: 8 from Europe and 3 from Asia (Israel, Japan and Korea Republic).

Almost all of the countries with high value of GDP per capita also have a high level of QMH, but in a few cases there are other main factors explaining their high levels of real Gross Domestic Product per capita: Energy in the cases of Kuwait and Norway, Mining in the Case of Australia, International Trade in the case of Hong Kong.

Table 1.5. Production per capita (18001 to 25000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|--------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 33 | EUR | Czech R | 4390 | 6972 | 12496 | 17345 | 16886 | 24317 |
| 40 | EUR | Estonia | 1879 | 3013 | 9174 | 16887 | 11053 | 19900 |
| 47 | EUR | Greece | 2183 | 2351 | 18391 | 18016 | 20574 | 20366 |
| 52 | EUR | Hungary | 3263 | 4942 | 10334 | 14005 | 13597 | 18947 |
| 71 | EUR | Lithuania | 1789 | 3892 | 7628 | 15994 | 9417 | 19885 |
| 87 | ASP | New Zealand | 3736 | NA | 18239 | NA | 21975 | NA |
| 98 | EUR | Poland | 2231 | 4079 | 9512 | 16095 | 11743 | 20174 |
| 99 | EUR | Portugal | 3468 | 3093 | 16934 | 18028 | 20402 | 21121 |
| 103 | ASP | Saudi Arabia | 1972 | 2620 | 17744 | 20093 | 19716 | 22713 |
| 107 | EUR | Slovak R | 3181 | 5131 | 9542 | 17517 | 12723 | 22648 |

Source: Elaborated by M.C.Guisan(2017) from WB statistics. This group includes 10 countries: 8 from Europe and 2 from Asia and Pacific (New Zealand and Saudi Arabia).

Table 1.6. Production per head (12000 to 18000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 4 | AM | Argentina | 1544 | 2277 | 8748 | 12414 | 10292 | 14691 |
| 10 | EUR | Belarus | 1859 | 3692 | 3951 | 9512 | 5810 | 13203 |
| 14 | AF | Botswana | 587 | 775 | 9196 | 13596 | 9783 | 14371 |
| 16 | EUR | Bulgaria | 1234 | 2502 | 5620 | 10358 | 6854 | 12860 |
| 24 | AM | Chile | 1781 | 1853 | 8694 | 13899 | 10475 | 15752 |
| 32 | EUR | Croatia | 2114 | 2750 | 8456 | 13808 | 10570 | 16558 |
| 62 | EUR | Kazakhstan | 973 | 1389 | 4433 | 11387 | 5406 | 12776 |
| 68 | EUR | Latvia | 1195 | 1797 | 7338 | 14585 | 8533 | 16381 |
| 75 | ASP | Malaysia | 3184 | 3651 | 7087 | 11990 | 10271 | 15641 |
| 78 | AM | Mexico | 2414 | 2609 | 9657 | 10749 | 12071 | 13358 |
| 93 | AM | Panama | 815 | 754 | 7334 | 15674 | 8149 | 16428 |
| 101 | EUR | Russian F | 1465 | 2063 | 7150 | 12741 | 8615 | 14804 |
| 120 | EUR | Turkey | 2041 | 3246 | 7235 | 13105 | 9276 | 16351 |
| 126 | AM | Uruguay | 1241 | 1999 | 7621 | 12700 | 8862 | 14699 |

Source: Elaborated by M.C.Guisan(2017) from WB statistics. This group includes 14 countries, 7 belonging to the group EUR (Europe and Eurasia), 4 from America (Chile, Mexico, Panama and Uruguay) and 1 from Africa (Botswana).

Table 1.7. Production per head (10001 to 12000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|--------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 15 | AM | Brazil | 1347 | 1036 | 6574 | 9158 | 7921 | 10194 |
| 27 | AM | Colombia | 965 | 1176 | 5468 | 8936 | 6433 | 10112 |
| 30 | AM | Costa Rica | 2029 | 1679 | 6088 | 10197 | 8117 | 11876 |
| 35 | AM | Dominican R | 1289 | 2158 | 3668 | 7869 | 4957 | 10027 |
| 69 | ASP | Lebanon | 1083 | 1016 | 7245 | 9138 | 8328 | 10154 |
| 72 | EUR | Macedonia | 1519 | 1417 | 5712 | 8921 | 7231 | 10338 |
| 96 | AM | Peru | 950 | 1294 | 4636 | 8853 | 5586 | 10147 |
| 100 | EUR | Romania | 1094 | NA | 5744 | NA | 6838 | NA |
| 128 | AM | Venezuela.RB | 1913 | NA | 7651 | NA | 9564 | NA |

Source: Elaborated by M.C.Guisan(2017) from WB statistics This group includes 9 countries: 6 from America, 2 from Europe and 1 from Asia and Pacific.

Table 1.8. Production per head (6001 to 10000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|---------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 1 | EUR | Albania | 335 | 748 | 4452 | 7752 | 4787 | 8499 |
| 2 | AF | Algeria | 426 | NA | 5661 | NA | 6087 | NA |
| 8 | EUR | Azerbaijan | 149 | 423 | 2341 | 8894 | 2490 | 9317 |
| 25 | ASP | China | 852 | NA | 1812 | NA | 2664 | NA |
| 36 | AM | Ecuador | 1043 | 1208 | 4448 | 7077 | 5491 | 8286 |
| 38 | AM | El Salvador | 1244 | 1307 | 3731 | 5120 | 4975 | 6427 |
| 44 | EUR | Georgia | 211 | 823 | 2131 | 5280 | 2342 | 6103 |
| 55 | ASP | Iran. Islamic | 997 | 1330 | 6670 | 8338 | 7667 | 9668 |
| 59 | AM | Jamaica | 633 | 682 | 5125 | 6295 | 5758 | 6977 |
| 84 | AF | Namibia | 509 | 594 | 3407 | 6223 | 3916 | 6817 |
| 109 | AF | South Africa | 1421 | 1094 | 6059 | 8714 | 7480 | 9808 |
| 117 | ASP | Thailand | 1948 | 2621 | 3781 | 6007 | 5729 | 8628 |
| 119 | AF | Tunisia | 980 | 1405 | 4464 | 7425 | 5444 | 8830 |
| 121 | EUR | Turkmenistan | 403 | NA | 3265 | NA | 3668 | NA |

Source: Elaborated by Guisan(2017) and updated from WB statistics. This group includes 14 countries: 4 from Europe and Eurasia, 4 from Africa, 3 from America (Ecuador, El Salvador, Jamaica) and 3 from Asia (China, Iran, Thailand).

The 45 countries of table 1.10 to 1.12, had low indicators of Schooling for the period 2000-2015 and very low levels of Investment per capita, low levels of Manufacturing production per capita and high percentages of poverty. Many of the 45 countries with lower levels of real production per capita c belong to Africa (29), 9 to Asia-Pacific, 4 to the area Europe and Eurasia, and 3 to America.

Table 1.9 . Production per head (4000 to 6000 Dollars at 2005 prices and PPPs)

| | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 3 | AF | Angola | 79 | NA | 2554 | NA | 2633 | NA |
| 5 | EUR | Armenia | 435 | 624 | 1855 | 5357 | 2290 | 5981 |
| 13 | AM | Bolivia | 534 | 645 | 3029 | 4611 | 3563 | 5256 |
| 29 | AF | Congo. R | 91 | 315 | 2930 | 3763 | 3021 | 4078 |
| 37 | AF | Egypt. AR | 800 | 835 | 3411 | 4846 | 4211 | 5681 |
| 48 | AM | Guatemala | 832 | 918 | 3131 | 3743 | 3963 | 4661 |
| 53 | ASP | India | 258 | 533 | 1460 | 3490 | 1718 | 4023 |
| 54 | ASP | Indonesia | 760 | 1089 | 1954 | 3675 | 2714 | 4764 |
| 61 | ASP | Jordan | 581 | 847 | 3051 | 3776 | 3632 | 4623 |
| 80 | ASP | Mongolia | 162 | 411 | 1867 | 4944 | 2029 | 5355 |
| 81 | AF | Morocco | 507 | 743 | 2473 | 4032 | 2980 | 4775 |
| 95 | AM | Paraguay | 618 | 867 | 3174 | 4633 | 3792 | 5500 |
| 97 | ASP | Philippines | 633 | 858 | 2004 | 3517 | 2637 | 4376 |
| 111 | ASP | Sri Lanka | 522 | 933 | 2546 | 4970 | 3068 | 5903 |
| 114 | ASP | Syrian R | 261 | NA | 3464 | NA | 3725 | NA |
| 123 | EUR | Ukraine | 702 | 808 | 2994 | 4944 | 3696 | 5752 |

Source: Elaborated by Guisan(2017) and updated from WB statistics. Notes: R=Republic, AR= Arab Republic. Tabla 1.9 includes 16 countries: 7 from Asia and Pacific, 4 from Africa, 3 from America and 2 from Europe and Eurasia.

Table 1.10. Production per head (2001 to 4000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 19 | ASP | Cambodia | 172 | 448 | 837 | 2119 | 1009 | 2568 |
| 20 | AF | Cameroon | 385 | 421 | 1447 | 1880 | 1832 | 2301 |
| 51 | AM | Honduras | 667 | 776 | 2231 | 3048 | 2898 | 3824 |
| 66 | EUR | Kyrgyz R | 285 | 276 | 1216 | 2074 | 1501 | 2351 |
| 67 | ASP | Lao PDR | 87 | 304 | 1365 | 2821 | 1452 | 3125 |
| 77 | AF | Mauritania | 208 | 76 | 1389 | 2339 | 1597 | 2414 |
| 79 | EUR | Moldova | 233 | 521 | 1222 | 2870 | 1455 | 3391 |
| 83 | ASP | Myanmar | 41 | 173 | 541 | 2195 | 582 | 2368 |
| 88 | AM | Nicaragua | 296 | 510 | 1819 | 2707 | 2115 | 3218 |
| 90 | AF | Nigeria | 58 | 242 | 1398 | 2134 | 1456 | 2376 |
| 92 | ASP | Pakistan | 290 | 364 | 1641 | 2278 | 1931 | 2642 |
| 94 | ASP | Papua NG | 157 | NA | 1806 | NA | 1963 | NA |
| 127 | EUR | Uzbekistan | 147 | NA | 1485 | NA | 1632 | NA |
| 129 | ASP | Vietnam | 271 | 635 | 1326 | 2999 | 1597 | 3635 |

Source: Elaborated by Guisan(2017) from World Bank statistics.

Table 1.11. Production per capita (1001 to 2000 Dollars at 2005 prices and PPPs)

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GDPH 2000 | GDPH 2015 |
|-----|------|---------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 9 | ASP | Bangladesh | 135 | 358 | 766 | 1551 | 901 | 1909 |
| 12 | AF | Benin | 94 | 109 | 1084 | 1465 | 1178 | 1574 |
| 17 | AF | Burkina Faso | 143 | 62 | 753 | 1168 | 896 | 1231 |
| 23 | AF | Chad | 79 | 77 | 799 | 1256 | 878 | 1333 |
| 31 | AF | Cote d'Ivoire | 317 | NA | 1444 | NA | 1761 | NA |
| 41 | AF | Ethiopia | 32 | 59 | 494 | 1273 | 526 | 1332 |
| 46 | AF | Ghana | 102 | 86 | 914 | 1813 | 1016 | 1898 |
| 49 | AF | Guinea | 40 | 70 | 972 | 1002 | 1012 | 1072 |
| 63 | AF | Kenya | 154 | 139 | 1133 | 1567 | 1287 | 1705 |
| 70 | AF | Lesotho | 167 | 176 | 1029 | 1505 | 1196 | 1681 |
| 82 | AF | Mozambique | 61 | 137 | 445 | 888 | 506 | 1025 |
| 85 | ASP | Nepal | 81 | 84 | 824 | 1162 | 905 | 1245 |
| 102 | AF | Rwanda | 45 | 63 | 595 | 1261 | 640 | 1324 |
| 104 | AF | Senegal | 210 | NA | 1193 | NA | 1403 | NA |
| 115 | EUR | Tajikistan | 341 | NA | 662 | NA | 1003 | NA |
| 116 | AF | Tanzania | 78 | 117 | 786 | 1406 | 864 | 1523 |
| 118 | AF | Togo | 69 | 51 | 700 | 950 | 769 | 1001 |
| 122 | AF | Uganda | 62 | 112 | 713 | 1143 | 775 | 1255 |
| 130 | ASP | Yemen R. | 124 | 91 | 1940 | 1307 | 2064 | 1398 |
| 131 | AF | Zambia | 113 | 138 | 916 | 1412 | 1029 | 1549 |

Source: Elaborated by Guisan(2017) from World Bank statistics.

Table 1.12. Production per capita below 1000 Dollars at 2005 prices and PPPs

| Nb | Area | Country | QMH 2000 | QMH 2015 | QNMH 2000 | QNMH 2015 | GPDH 2000 | GDPH 2015 |
|-----|------|-----------------|-------------|-------------|--------------|--------------|--------------|--------------|
| 18 | AF | Burundi | 41 | 31 | 297 | 328 | 338 | 359 |
| 22 | AF | Central Afri. R | 44 | 32 | 690 | 467 | 734 | 498 |
| 28 | AF | Congo. DR | 26 | 36 | 230 | 348 | 256 | 385 |
| 39 | AF | Eritrea | 68 | NA | 613 | NA | 681 | NA |
| 50 | AM | Haiti | 163 | NA | 1027 | NA | 1190 | NA |
| 73 | AF | Madagascar | 103 | NA | 755 | NA | 858 | NA |
| 74 | AF | Malawi | 92 | 97 | 613 | 736 | 705 | 833 |
| 76 | AF | Mali | 34 | NA | 823 | NA | 857 | NA |
| 89 | AF | Niger | 40 | NA | 528 | NA | 568 | NA |
| 105 | AF | Sierra Leone | 15 | 13 | 366 | 790 | 381 | 803 |
| 132 | AF | Zimbabwe | 441 | 71 | 2318 | 575 | 2759 | 645 |

Source: Elaborated by Guisan(2017) from World Bank statistics. Table 1.12 includes 11 countries with the lowest values of Gross Domestic Product per capita: 10 from Africa and 1 from America (Haiti).

1.2. Economic Studies, 2020: Food, Poverty and CO2 Emissions

Study by Guisan and Exposito (2020 a): Education and CO2 Emissions

Guisan and Exposito (2020 a), in AEID 20-1, analyze the causes of the increase of CO2 Total Emissions in the World, for the period 2000-2017, finding that around 85% of the increase is due to an important increase of Population in countries and areas with low levels of average Schooling. Education is the most positive policy for moderation of excessive rates of Population growth and to avoid high increases of CO2 Total Emissions.

Table 1.13. Population and Total Emissions in 3 groups of countries, 1970-2015

| Countries | Population (million) | | Total CO2 Emissions (million Tm) | | Emissions Increase (mill. Tm) |
|---------------------------------|-------------------------|-----------------|--|--------------|-------------------------------------|
| | 1970 | 2015 | 1970 | 2015 | 1970- 2015 |
| Europe 6 | 278.078 | 328.912 | 2666 | 2191 | -475 |
| USA | 205.052 | 321.040 | 4325 | 5159 | 835 |
| Group 1: OECD 7 | 483.130 | 649.952 | 6991 | 7350 | 360 |
| Russia | 130.079 | 144.097 | 1337 | 1715 | 378 |
| China | 818.315 | 1371 | 949 | 10598 | 9649 |
| India | 553.943 | 1310 | 227 | 2450 | 2223 |
| Group 2: 3 countries | 1502.337 | 2825.097 | 2513 | 14763 | 12250 |
| Group 3: ROW | 1698.533 | 3865.951 | 8339 | 14078 | 7998 |
| Total World | 3684 | 7341 | 15583 | 36191 | 20608 |

Source: Elaborated by Guisan and Exposito(2020 a) from EU(2014), EU(2019) and World Bank Indicators. Data without discount of the effects of wildfires. Note: ROW=Rest of the World.

The effect of the increase of Population from 3584 to 7341 million people explains more than 85% of the increase of 20608 million Tm in the Total CO2 Emissions in year 2015 in comparison with year 1970.

Education is the variable with the most important effects on the moderation of excessive Population increase, on the moderation of Total Emissions of CO2 and on fostering economic development and quality of life. In section 1.3 we analyze empirical evidence in this regard.

The study includes a table with 9 hypotheses for Total Emissions in year 2009. depending on 3 options of World Population and 3 options of average Emissions per capita.

Table 1.14. Total CO2 Emissions in year 2030 (in million Tonnes, Tm) under 3 hypotheses for Population and 3 for Emissions per capita,

| World Population | Emissions per capita | | |
|------------------|----------------------|----------|----------|
| | (1) 3 Tm | (2) 4 Tm | (3) 5 Tm |
| (1) 8249 | 24747 | 32996 | 41245 |
| (2) 8374 | 25122 | 33496 | 41870 |
| (3) 8733 | 26199 | 34932 | 43665 |

Source: Elaborated by Guisan and Exposito(2020).

Guisan and Exposito (2020 a) say: “*The lowest value in table 1 is of 24747 million Tonnes, which is lower than the value of year 2015 (36191) and would imply a diminution of 31.62%, although it would be higher than the value of year 1970 (15583). In order to moderate Total CO2 Emissions and to avoid high increases of CO2 ppm in the atmosphere, for the period 2020-2030 and at the same time, foster sustainable economic development, we should have into account these questions:....*”

They highlight:

- 1) the great importance of fostering international cooperation for Education, in order to increase average years of Schooling in the countries with low educational level, with its effects on family planning and moderation of the increase of Population.
- 2) The diminution of CO2 Emissions per capita, from 4.93 of year 2015 to an amount between 3 and 4 in year 2030 in order to get that total Emissions would be lower than in year 2015.
- 3) Policy of Mitigation of CO2 emissions, accordingly to suggestions by scientists.

They conclude: “*Thus, Mitigation of CO2, diminution of Emissions per capita, and the increase of Education with its effects on the moderation of World Population growth, are three great challenges in order to foster environmental sustainable economic development and poverty eradication in all the countries of the World*”.

The most pessimist option in table 1.14 would be 43665 million Tm of Total CO2 Emissions in year 2030, what imply an increase of 21% in the value of year 2015. The most important policy is to foster cooperation for Education.

Study by Guisan and Exposito(2020 b): Food and Poverty in the World

Guisan and Exposito (2020 b), in RSES 20-1, analyze the evolution of Food, Agricultural production, Population and Poverty in the World for the period 2000-2017.

Table 1.15 shows the evolution of Food Production in the World.

In the last column shows important percentages of increase, for the period 1979-2017, of some productions like Maize (363%), Lentils (398%) and Soybeans (298%). Population increased by 72% and almost all the groups of food of the table 1.14 experienced a higher increase, what implies more food resources per capita in the World.

Table 1.15. World Production (thousand Tms, million Kg) and Population (million people), for 1979-2017

| Production And Population | 1979 | 2007 | 2017 | Factor 2017/1979 | % of increase 1970-2017 |
|---------------------------|---------|----------|---------|------------------|-------------------------|
| Maize | 397371 | 792733 | 1841528 | 4.63 | 363 |
| Wheat | 424144 | 606681 | 771719 | 1.82 | 82 |
| Rice | 375239 | 656556 | 769658 | 2.05 | 105 |
| 3 Cereals | 1196754 | 2055970 | 3382905 | 2.83 | 183 |
| Chickpeas | 7587 | 9662.261 | 14722 | 1.94 | 94 |
| Beans (dried) | 4481 | 3892.723 | 5370 | 1.20 | 20 |
| Lentils | 1284 | 3225.085 | 6393 | 4.98 | 398 |
| 3 Legumes | 13352 | 16780 | 26485 | 1.98 | 98 |
| Soybeans | 88698 | 219793 | 353027 | 3.98 | 298 |
| Potatoes | 283332 | 314208 | 388191 | 1.37 | 37 |
| Milk | 420403 | 648220 | 827880 | 1.97 | 97 |
| Meat | 138143 | - | 333600 | 2.41 | 141 |
| Fish | 72380 | - | 173000 | 2.39 | 139 |
| Population | 4358 | 6675 | 7511 | 1.72 | 72 |

Source: Elaborated by Guisan and Exposito (2020 b) from FAO statistics. World Population from WB(2020). Retrieved on 6th March 2020.

Table 1.16 shows the evolution of food per capita in Kg per inhabitant. For the period 1979-2017 There was a great increase of production per inhabitant of maize (169%) and a more moderate amount of wheat (6%) and rice (19%). The increase of production per capita of milk was also moderate (14%) and the production of potatoes per capita diminished by 20%.

Table 1.16. Food Production per Capita in the World
(kg per inhabitant and year)

| Product | 1979 | 2007 | 2017 | Factor 2017/1979 | % of increase |
|------------------|------|------|------|---------------------|------------------|
| Maize | 91 | 119 | 245 | 2.69 | 169 |
| Wheat | 97 | 91 | 103 | 1.06 | 6 |
| Rice | 86 | 98 | 102 | 1.19 | 19 |
| <i>3 Cereals</i> | 275 | 308 | 450 | 1.64 | 64 |
| Chickpeas | 1.74 | 1.45 | 1.96 | 1.13 | 13 |
| Beans (dried) | 1.03 | 0.58 | 0.71 | 0.69 | -31 |
| Lentils | 0.29 | 0.48 | 0.85 | 2.93 | 193 |
| <i>3 Legumes</i> | 3.06 | 2.51 | 3.53 | 1.15 | 15 |
| Soja bean | 20 | 33 | 47 | 2.35 | |
| Potatoes | 65 | 47 | 52 | 0.80 | -20 |
| Milk | 96 | 97 | 110 | 1.14 | 14 |
| Meat | 32 | na | 44 | 1.37 | 37 |
| Fish | 17 | na | 23 | 1.35 | 35 |

Source: Elaborated by Guisan and Exposito(2010), from FAO statistics. World Population from WB(2020). Retrieved on 6th March 2020.

Guisan and Exposito(2020 b) indicate: “*Total Production of Hen Eggs evolved from 463 Bn in year 1979 to 1120 in 2007 and 1340 Bn in year 2017, multiplying by a factor of 2.89, and a percentage of increase of 189%. Production of Eggs per capita evolved from 106 units in 1979 to 168 in 2007 and to 178 in year 2017. This variable multiplied by a factor of 1.68 what implies an increase of 68% per cent*”.

They also present a table, elaborated from FAO(2020) Pocket Book, with the net trade of food by continent in year 2016:

Africa has negative balance in Cereals, Meat, Milk products and positive in “Fruits and Vegetable” and Fish. America has positive balance in all the groups of food with exception of milk. Asia present positive balance in Fish and negative balance in other groups of food. Europe presents positive balance in Cereals Meat and Milk and negative in “Fruits and Vegetable” and Fish. Oceania present positive balance in all the groups of food.

The study by Guisan and Exposito(2020 b) also analyzes the percentages of people on poverty and the low levels of production by sector in many countries, calling for international cooperation for Education and Investment, in order to diminish poverty and improve living conditions.

In the Annex they found that in a list of 200 countries and territories, at the World Bank data, there are 113 without available data (NA) for safe water and 123 without data for sanitation.

Among countries with available data, many have less than 25% of population with safe water and sanitation systems. Only 38 countries got percentages of population higher than 85% with good sanitation. They found that 71 countries got percentages of safe water higher than 85%,

Good sanitation, safe water and increase of investment and production per capita are very important to increase health and health services, increasing Life Expectancy and quality of life.

1.3. Econometric models, 2021-2023: Quality of Life in 164 countries

We present a summary of three econometric studies: 1) Guisan(2021), in AEID 21-2, on Education and Quality of Life, Guisan(2022). 2) Guisan(2022), in AEID 22-1, on Political Stability and Development. 3) Guisan(2023), in AEID 23-2, on Economic Freedom and Development. These three studies include data of many indicators in 164 countries.

1)Guisan(2021): Education, Development and Quality of Life in 164 countries

Data of 164 countries included in the study by Guisan(2021): Production per head (PH95, PH19), Education (Tyr10), Fertility (Fer19), X1=Life Satisfaction around year 2019, X2=Quality of Government (Voice of Citizens) around year 2019, X4 = Positive indicator of Peace around year 2019; X8=Hom (Homicides rate per 100 thousand inhabitants).

Guisan(2021), in AEID 21-2, analyzes World development for 1995-2019, and estimates econometric equations that relate Human Capital, Development, Quality of Government and Life Satisfaction in 164 countries. In the Entry 47 of our Blog of the Euro-American Association of Economic Development Studies, we present a summary of the contents of the article

Table 1.17 presents some relevant indicators of average values of production per capita and of indicators of quality in 9 groups of countries. The indicators of average years of Schooling of adult population is one of the most important to explain the differences in development.

Real production per capita increased in 6249 Dollars (at 2017 prices and purchasing power parities) in a period of 24 years (from 1995 to 2019), what implies an average of 260 Euros per year, but in the poorest countries the increase was very low with only 20 Euros per year in group 1).

Table 1.17. Average of PH, Tyr, Fer, X1, X2, X3, X4 and XM (mean of X1, X2, X4) in 9 Groups of countries (values of PH in \$ at 2017 prices and PPPs)

| Group | Ph 95 | Ph 19 | Incr. | Tyr 10 | Fer 19 | X1 Happi | X2 Gov | X4 Peace | XM Mean |
|-------|-------|-------|-------|--------|--------|----------|--------|----------|---------|
| 1 | 1172 | 1668 | 496 | 3.38 | 4.82 | 4.25 | 3.12 | 4.00 | 3.79 |
| 2 | 2268 | 3591 | 1323 | 4.90 | 3.75 | 4.59 | 3.26 | 4.57 | 4.14 |
| 3 | 3171 | 5674 | 2503 | 6.57 | 3.42 | 4.94 | 4.10 | 4.52 | 4.52 |
| 4 | 5133 | 8667 | 3534 | 6.52 | 2.54 | 5.46 | 4.51 | 4.87 | 4.95 |
| 5 | 7165 | 12930 | 5765 | 8.71 | 2.56 | 5.25 | 4.30 | 4.52 | 4.69 |
| 6 | 9691 | 19444 | 9753 | 8.63 | 2.02 | 5.63 | 4.98 | 4.95 | 5.19 |
| 7 | 15924 | 31060 | 15136 | 10.73 | 1.79 | 6.07 | 5.94 | 5.47 | 5.83 |
| 8 | 33389 | 44521 | 11132 | 11.01 | 1.65 | 6.71 | 7.14 | 5.70 | 6.52 |
| 9 | 50482 | 69249 | 18767 | 11.66 | 1.53 | 7.07 | 8.24 | 6.30 | 7.20 |
| All | 9886 | 16135 | 6249 | 8.09 | 2.40 | 5.35 | 5.0 | 4.80 | 5.38 |

Source: Elaborated by Guisan(2021), in AEID 21-1, with data of 164 countries, from WB(2021) WDI and WGI, UNDP(2021), WHR(2021), EIP(2021), and own elaboration from table A1, in the Annex, as explained in 3.1. Notes: Non-weighted averages of each group. Incr. is the increase of PH for the period 1995-2019.

Indicators of Development and Quality of Life included in table 1.17:

PH = real Gross Domestic Product per capita at 2017 prices and purchasing parities in years 1995 (PH95) and 2019 (PH19).

Tyr10= average of Total Years of Schooling of Population 25+ in year 2010.

Fer is the average of Fertility rates of the countries of each group.

XM= average of 3 indicators of quality of life X1, X2 and X4, all of them with positive impact and measured in the decimal scale.

X1 (Happiness), in decimal scale

X2 (Voice of Citizens), in decima scale

X4 (Peace, from 0 lack of Peace to 10 Maximum of Peace).

Countries with high levels of Schooling usually have good indicators of Production per inhabitant (PH) and high levels of the indicators of quality of life. Tyr 10 was 3.38 in group 1 and 11.66 in group 9.

The indicator of Happiness (X1) varies between an average value of 4.25 in group 1 to a value of 7.07 in group 9. The indicator of Quality of Government (X2=Voice of Citizens) varies between an average of 3.12 in group 1 and an average of 8.24 in group 9. The indicator of Peace (X4)

varies between a low average value of 4 in group 1 and a value of 6.30 in group 9. Figure 1.6 includes some of the main conclusion of Guisan 2021)

Figure 1.6. Main conclusions of the study by Guisan(2021), for 1995-2019

| |
|--|
| <p>1) Education and Development: Usually Education is the variable with the highest impact on economic development and quaaality of life. The indicator Tyr10 is "Total years of schooling of adult population (+25 years old) in year 2010. The value varied between a low average of 3.38 years of Schooling in group 1 (lowest level of economic development) to 11,66 in group 9 (highest level of economic development). World average was 8.09.</p> |
| <p>2) Average Fertility rate: As seen in the econometric model of Guisan, Aguayo and Exposito (2021) (journal AEID Vol. 1-1), there is an important impact of Education in the moderation of average fertility rates. Countries with the lowest levels of Schooling have high average Fertility rates (4.82 children while countries with high educational levels have moderate average Fertility rates (1.53 children per women).</p> |
| <p>3) Indicators of Quality of Life from 0 (minimum) to 10 (maximum). Indicator X1=Happiness varies from an average of 4.27 in group 1 to 7.07 in group 9, usually increasing with real income, health care access, working conditions, and other variables. Indicator X2=Government Quality (in the scale 0 to 10) regarding Voice of citizens) varies between 3.12 in group 1 to 7.07 in group 9- Indicator X4= Peace. The average value of X4 varies between 4.00 in group 1 to 6.30 in group 9, usually increasing Peace with socio-economic development.</p> |
| <p>4) Indicator XM is the mean of the indicators X1, X2 and X4. The average value varies between 3.79 in group 1 to 7.20 in group 9.</p> |
| <p>5) Other contents of the Development Report 2021: Cooperation in the increase of Schooling contributes to diminution of total CO2 Emissions.</p> |

Source: Summary of the study by Guisan(2021) in AEID 21-2, included by the author at [Entry 47 of the Blog on World Development \(Euro-American Association\)](#)

World average experienced an increase of 6249 Dollars per inhabitant for a period of 24 years (1995-2019), what amounts to an annual increase of 260 Dollars. This implies a high increase of total real Gross Domestic Product.

There was a diminution of -4.34% in year 2020 as consequence of the Pandemic of Covid19, as seen in the annex of Guisan(2021).

Figure 1.7 indicates the names of the countries of each group. Data for each country are included in the Annex in Guisan(2021).

Figure 1.7. Countries of each group in alphabetical order, year 2019

| Groups | Countries |
|--|--|
| 1) 19 countries Ph19 <5000 | Afghanistan, Burkina Faso, Burundi, Central African R, Chad, Congo DR, Ethiopia, Gambia, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali. Mozambique, Niger, Rwanda, Sierra Leone, Togo, Uganda. |
| 2) 21 countries Ph19 (2500-5000): | Bangladesh, Benin, Cambodia, Cameroon, Comoros, Congo R, Guinea, Haiti, Kenya, Lesotho, Nepal, Pakistan. Papua-New Guinea, Sao Tome and Principe, Senegal, Sudan, Tajikistan, Tanzania, Timor-Leste, Zambia, Zimbabwe. |
| 3) 16 countries PH19 (5000-7500) | Angola, Cabo Verde. Cote d'Ivoire, Djibouti, Ghana, Honduras, India, Kyrgyz R, Mauritania, Myanmar, Nicaragua, Nigeria, Samoa, Tonga, Uzbekistan, West Bank and Gaza, |
| 4) 10 countries PH19 (7500-10000) | Bolivia, El Salvador, Eswatini (former Swaziland), Guatemala, Jamaica, Lao PDR, Morocco, Namibia, Philippines, Vietnam, |
| 5) 25 countries PH19 (10000-15000) | Albania, Algeria, Armenia, Azerbaijan, Bosnia-Herzegovina, Brazil, Colombia, Ecuador, Egypt, Gabon, Georgia, Guyana, Indonesia, Iran, Iraq, Jordan, Lebanon, Moldova, Mongolia, Paraguay, Peru, South Africa, Sri Lanka, Tunisia, Ukraine. |
| 6) 19 countries PH 15000-25000): | Argentina, Belarus, Botswana, Bulgaria, Chile. China, Costa Rica, Dominican R, Equatorial Guinea, Libya, Maldives, Mauritius, Mexico, Montenegro, North Macedonia, Serbia, Thailand, Turkmenistan, Uruguay. |
| 7) 20 countries PH19 (25000-40000): | Croatia, Estonia, Greece, Hungary, Kazakhstan, Latvia, Lithuania, Malaysia, Oman, Seychelles, Panama, Poland, Portugal, Puerto Rico, Romania, Russian Fed., Slovak R, Slovenia, Trinidad and Tobago, Turkey. |
| 8) 17 countries PH19 (40000-50000): | Australia, Bahrain, Canada, Cyprus, Czech R, Finland, France, Israel, Italy, Japan, Korea R, Kuwait, Malta, New Zealand, Saudi Arabia, Spain, UK. |
| 9) 17 countries, o territories, PH19 >50000 | Austria, Belgium, Bermuda, Denmark, Germany, Hong-Kong (China), Iceland, Ireland, Luxembourg, Netherlands, Norway, Qatar, Singapore, Sweden, Switzerland, United Arab Emirates, USA. |

Source: Elaboration by Guisan(2021) from World Bank WDI statistics.

Table 1.18 present a summary of the econometric models estimated by Guisan(2021) with a sample of 164 countries.

Table 1.18. Econometric models relating Education, Development and Quality of Life, in 164 countries, year 2019

| Model | Dep. variable | C, Dummies | Explanatory variables (estimated coefficient) | R ² |
|-------|---------------|------------|---|----------------|
| 1 | FER19 | +, + | XTYR (-0.3074) | 0.7148 |
| 2 | PH19 | no, no | PH10(1.0015), XTYR (496), XFER (-528) | 0.9638 |
| 3 | X1 | +, + | PH19/1000 (0.0227), X2 (0.2218), DUM3(-1.85) | 0.7346 |
| 4 | X2 | +, + | PH19/1000(0.0458). TYR19 (0.1427), X4(0.4880) | 0.8406 |
| 5 | X4 | +, + | X2(0.4005), DUM5 (-2.0990) | 0.7029 |

Source: Elaborated by Guisan(2023) in EE12 from Guisan(2021) AEID 21-2. Notes: C + means intercept or constant term included. Dum + means included Dummies.

FER19= Fertility rate in year 2019 (expected children per woman in her life).

XFER=(FER19+FER10)/2. Indicator of Fertility for 2010-2019

XTYR = (TYR10+TYR19)/2. Indicator of Educational level for 2010-2019.

PH19= GDP per capita in year 2019 (Dollars at 2017 prices and purchasing parities)

PH10 = GDP per capita in year 2010 (Dollars at 2017 prices and purchasing parities)

X1 = Happiness (decimal scale)

X2 = Quality of Government (Indicator Voice of Citizens) (decimal scale)

X4 = Peace = Decimal scale (0 minimum Peace, 10 maximum Peace).

Dummies: DUM3 is a dummy variable for countries with actual value of X1 lower than expected in equation 3. DUM5 is a dummy variable, equal to 1 in the countries with values of X4 lower than expected in equation 5.

Figure 1.8. Missing explanatory variables and high goodness of fit

The high goodness of fit of Model 2, for PH19, does not mean that the explanatory variables are the only factors of development. It means that the relevant missing variables are linearly related with the included regressors and are represented through them. In the case of Model 2, some missing variables are Investment per capita, Industrial Production per capita, and other ones whose effect may be well represented by XTYR.

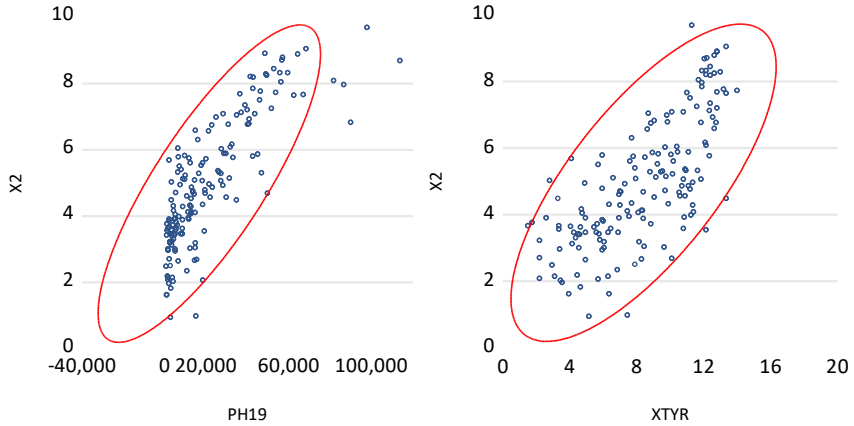
Source: Elaborated by M.C.Guisan, having into account the books by Guisan(1997), (2022) and the Annex in the article Guisan(2022).

DUM3 is equal to 1 in the following cases: Afghanistan, Botswana, Hong-Kong (China), India, Rwanda, Singapore and Zimbabwe.

DUM5 is equal to 1 in the following cases: Afghanistan, Colombia, Congo DR, India, Iraq, Israel, Pakistan, Russia, Turkey and the United States

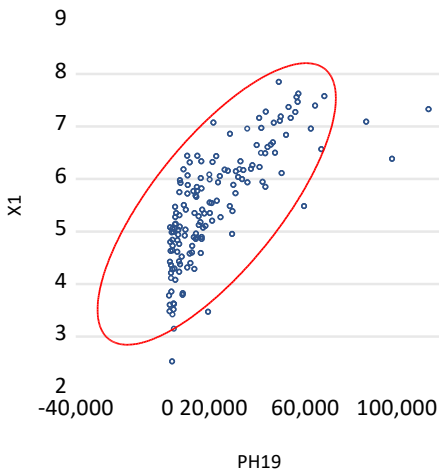
The following graphs show the relationships between these variables.

Graph 1.3. Quality of Government and PH. Graph 1.4 Quality of Government and Education

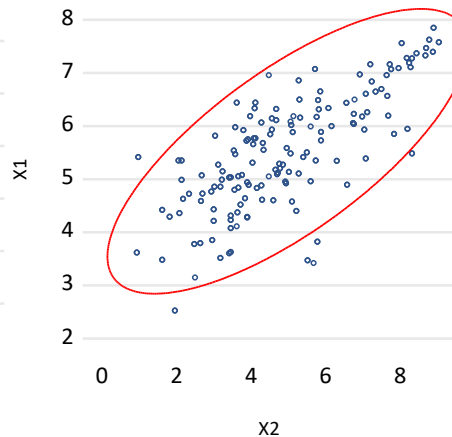


Source: Guisan(2021), AEID 21-2. Data of 164 countries in year 2019

Graph 1.5. Happiness and PH

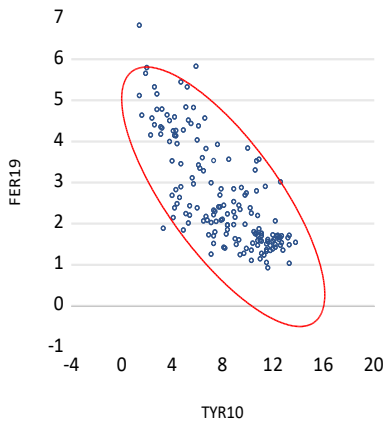


Graph 1.6. Happiness & Quality of Government

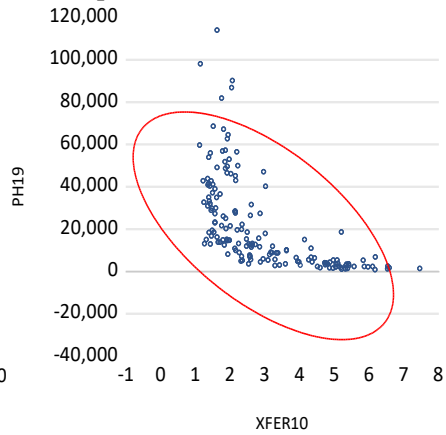


Source: Guisan(2021), AEID 21-2. Data of 164 countries in year 2019

Graph 1.7. FER and Education.

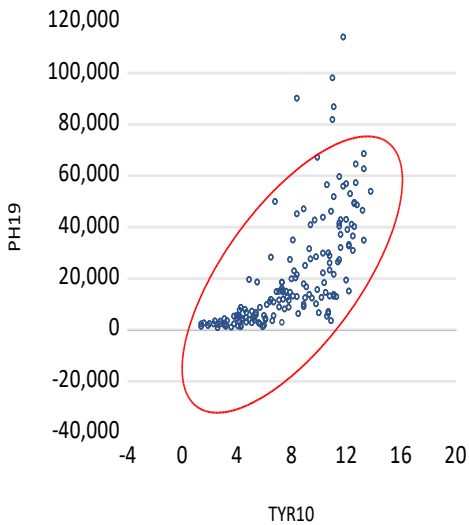


Graph 1.8. PH and FER

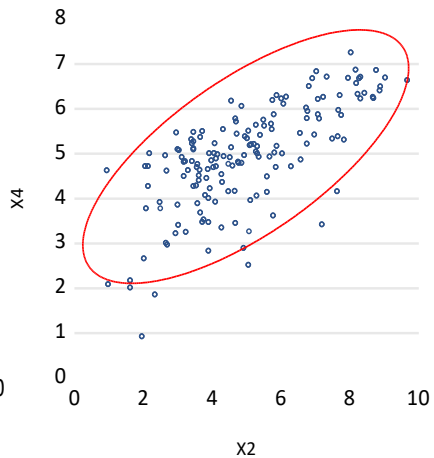


Source: Guisan(2021), AEID 21-2. Data of 164 countries in year 2019. FER is average Fertility rate and Tyr is Average Years of Schooling (Population 25+).

Graph 1.9. PH and Education.



Graph 1.10. Peace (X4) and Voice of Citizens(X2)



Source: Guisan(2021), AEID 21-2. Data of 164 countries in year 2019

Figure 1.9. Several positive effects of Education on Quality of Life

- 1) Education usually contributes to moderate average values of FER.
- 2) Education usually contributes to increase PH (directly in equation 2 and indirectly through its effect on diminution of FER in equation 1).
- 3) Education usually contributes to increase X2 (Voice of Citizens) in equation 4, directly and indirectly through its positive effect on PH.
- 4) Education usually contributes to increase X4 (Peace) in equation 5, through the positive impact of X2.
- 5) Education usually contributes to increase X1=Happiness in equation 3, indirectly through the effects of PH and X2.

Source: Elaborated by M.C. Guisan(2023) in this book EE12

The World Happiness Report, WHR (2023) highlights six factors that help explain countries degrees of Happiness:

- 1) Production per capita (PH), 2) Healthy Life Expectancy 3) Social Support
- 4) Freedom to make life choices. 5) Perception of Fair Management (not corruption). 6) Generosity or social support.

An important question is how to improve those factors in less developed countries, and we highlight the important role of Education and international cooperation.

2) Study by Guisan(2022): Political Stability, Peace and Development

Guisan(2022), in AEID 22-1, analyze the effects of Political Stability on Peace and Economic Development in 164 countries for the period 2010-2020.

Data of 164 countries included in the study by Guisan(2022): The study includes table A1 with the following indicators for years 2010 and 2019 (expressed in Dollars at 2017 international prices): X5 IPS= Index of Political Stability (IPS10, IPS19, IPS20); PH=Production per capita (PH10, PH19,) and MEH Military Expenditure per capita (MEH10, MEH19)

The Index of Political Stability IPS was calculated in decimal scale, from the World Bank WGI where the Index was in the scale -2.5 to 2.5. Our study includes a table with 9 groups of countries classified by IPS value in year 2020 with the following conclusions: 1) There are 95 countries with low levels of stability, with IPS20 below 5: 26 countries with a value below 3, 30 countries with a value between 3 and 4 and 39 countries with value between 4 and 5. 2)

There are 56 countries with intermediate levels of stability, with IPS20 between 5 and 7, and only 15 countries with high level of stability.

The World non-weighted average of 164 countries in year 2019 was 6.04, but there are differences among countries. The correlation coefficients of IPS with other indicators, in 164 countries in year 2019, are shown in table 1.19

Table 1.19. Correlation coefficients of IPS19 with X1, X2, X4, PH19 and TYR19

| | | | | | |
|----------|--------|--------|--------|--------|--------|
| | X1 | X2 | X4 | PH19 | TYR19 |
| X5=IPS19 | 0.6221 | 0.7610 | 0.9139 | 0.6559 | 0.6025 |

Source: Guisan(2023) with data from WB por IPS and the sources indicated below table 1.17 for other variables. Notes: TYR= Schooling, X1=Satisfaction win Life, X2=Voice of Citizens), X4=Peace. PH real GDP per capita.

In the study by Guisan(2022) we have found positive significant impacts of Political Stability on several indicators of development and quality of life.

In some cases there may be a bilateral relationship. For example between Political Stability and Peace, because usually Political Stability favors Peace and Peace may contribute to Political Stability.

The following equation shows the positive impact on IPS19 of its lagged value IPS10, the increase of Education (TYR19-TYR10) and the indicator X2=Voice of Citizens (X2). The equation also includes 2 dummy variables (DN1 and DN2) to have into account special circumstances of some countries.

Equation 1.8 IPS19 related with IPS10, X2, Tyr19 and dummy variables

| | | | | |
|--|-------------|-----------------------|-------------|--------|
| Dependent Variable: IPS19. Method: Least Squares | | | | |
| Sample: 1 164. Included observations 163 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| IPS10 | 0.694430 | 0.040722 | 17.05294 | 0.0000 |
| TYR19-TYR10 | 0.290491 | 0.100612 | 2.887247 | 0.0044 |
| X2 | 0.251516 | 0.039156 | 6.423504 | 0.0000 |
| DN1 | -3.702449 | 0.535129 | -6.918803 | 0.0000 |
| DN2 | -2.487135 | 0.524914 | -4.738178 | 0.0000 |
| R-squared | 0.836120 | Mean dependent var | 4.654356 | |
| Adjusted R-squared | 0.831971 | S.D. dependent var | 1.789982 | |
| S.E. of regression | 0.733738 | Akaike info criterion | 2.248866 | |
| Sum squared resid | 85.06273 | Schwarz criterion | 2.343766 | |
| Log likelihood | -178.2825 | Hannan-Quinn criter. | 2.287394 | |
| Durbin-Watson stat | 1.875651 | | | |

Source: Elaborated by M.C. Guisan from the international indicators analyzed in Guisan(2021) and (2022).

The indicator X2=Voice of Citizens usually is a good indicator of the quality of Democracy and shows a positive impact on IPS=Political stability. The increase of average Education (Tyr19-Tyr10) also shows a positive impact on IPS19.

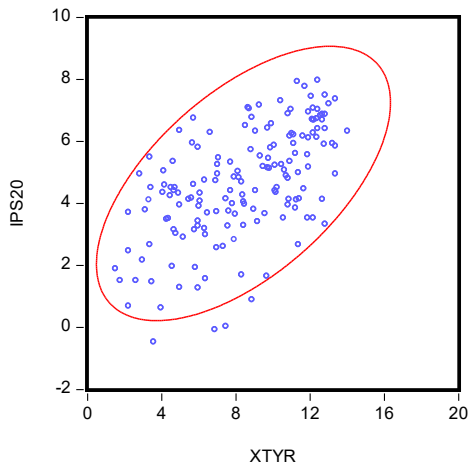
DN1 and DN2 are dummy variables that take account of some negative factors, due to special circumstances, that diminish the value of IPS. DN1= 1 in 87) Libya and 94) Mali. DN2=1 in 31) Hong-Kong (China) and 157) Ukraine. Both variables are equal to zero in other countries.

These correlations, and the econometric models estimated by Guisan(2022), suggest that Political Stability usually contributes to Quality of Life and to Economic Development.

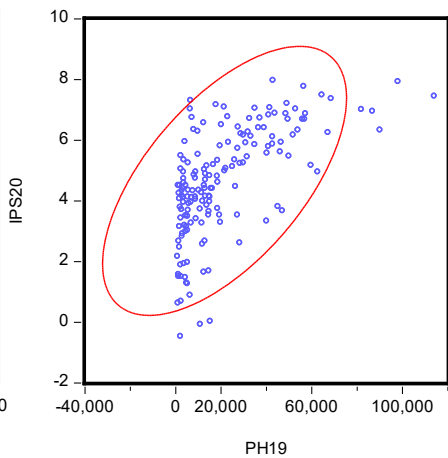
The econometric models and the following graphs show some positive relationships in 164 countries of the World in year 2019. There may be exceptions to the general relationships in case of special features of the countries (effect of missing variables not linearly related with the included regressors in the models).

Graphs 1.11 and 1.12 show the positive impact of Education and PH on Political Stability. Graphs 1.13 and 1.14 show a positive effect of Political Stability on Happiness and Voice of Citizens. There may be also, in some cases, a positive effect of Voice of Citizens on Political Stability.

1.11. Political Stability and Education



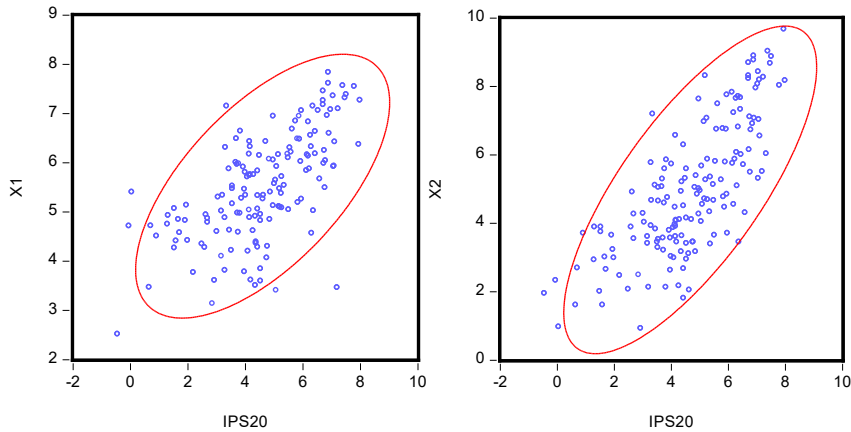
1.12. Political Stability and PH19



Source: Elaborated by M.C. Guisan from international data, based in several sources published in Guisan(2021) and (2022).

1.13. Happiness and Political Stability

1.14. Voice of Citizens and Political Stability



Source: Elaborated by M.C. Guisan from international data, based in several sources published in Guisan(2021) and (2022).

Equation 1.9, IPS19 related with IPS10, X2 and Tyr19, with dummy variables

| Dependent Variable: IPS19. Method: Least Squares. Observations: 163 | | | | |
|---|-------------|-----------------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| IPS10 | 0.694430 | 0.040722 | 17.05294 | 0.0000 |
| TYR19-TYR10 | 0.580983 | 0.201224 | 2.887247 | 0.0044 |
| X2 | 0.251516 | 0.039156 | 6.423504 | 0.0000 |
| DN1 | -3.702449 | 0.535129 | -6.918803 | 0.0000 |
| DN2 | -2.487135 | 0.524914 | -4.738178 | 0.0000 |
| R-squared | 0.836120 | Mean dependent var | | 4.6543 |
| Adj. R-squared | 0.831971 | S.D. dependent var | | 1.7899 |
| S.E. of regression | 0.733738 | Akaike info criterion | | 2.2488 |
| Sum squared resid | 85.06273 | Schwarz criterion | | 2.3437 |
| Log likelihood | -178.2825 | Hannan-Quinn criter. | | 2.2873 |
| Durbin-Watson stat | 1.875651 | | | |

Source: Elaborated by Guisan(2023), in EE12, with data of Guisan(2022).

DN1 and DN2 are dummy variables that take account of some negative factors, due to special circumstances, that diminish the value of IPS. DN1= 1 in country 87 (Libya) and 94 (Mali). DN2=1 in territory 31 (Hong-Kong, China) and 157 (Ukraine). Both dummy variables are equal to zero in other countries.

Political stability usually contributes to development and quality of life. One of the exception, regarding the positive effects of PH and IPS on X1=Quality of life, is the case of Botswana, country included by WHR in 2023, and in previous years, among the most unhappy countries of the World. In the Annex of Guisan and Exposito(2021) in RSES 21-2, there are some links related with the low indicator of happiness in Botswana.

The study by Guisan(2022) confirm the positive effect of Education on Peace, through the impact of Education on Political Stability (IPS) and the positive effect of IPS on the increase of the Index of Peace (X4). Diminution of Conflicts is very important, as well as fostering Political Stability, Freedom and other indicators that increase quality of life.

The study showed that MEH, depends on economic development but usually it is not a direct factor of development, although it may have positive effect on development and quality of life when it contributes to Peace, Political Stability, Economic Freedom or other indicators that have a positive direct on development.

3) Study by Guisan(2023): Freedom, Development and Quality of Life

The study by Guisan(2023) includes the estimation of an econometric model, with data of 164 countries in year 2019, that relates the variable X6=Freedom with economic development and quality of life.

Data of 164 countries included in the study by Guisan(2023): The study includes a table with data, for 164 countries, of the following indicators: Indicators already included in Guisan(2021) (PH95, PH19, TYR19, X1, X2) and the indicators X6=Free (Indicator of Freedom in decimal scale) and X7=Pollution (PM2.5 indicator of Particles 2.5 per cubic meter of air).

Freedom for labor, investment and business usually contributes to foster economic development, and freedom for choosing the own choices in the life has usually a positive impact on X1=Satisfaction with life.

Equation 1.10 relates PH19 with its lagged value in year 1995 (PH95) and two explanatory variables very much related with factors of development (X2=Voice and X6=Free). It shows a positive impact of X2=Voice of Citizens and X6=Free on Production per capita (PH19)

Equation 1.11 relates X1=Life Satsifaction with shows a positive effect of X6=Free on X1=Satisfaction with Life with PH and with the sum of X2=Indicator of Voice and X6=Indicator of Freedom.

Equation 1.10. PH19/1000 related with lagged value, X2 and X8

| Dependent Variable: PH19/1000. Method: Least Squares | | | | |
|--|-------------|-----------------------|-------------|--------|
| Sample: 1 164. Included observations: 157 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| PH95/1000 | 0.938906 | 0.038974 | 24.09085 | 0.0000 |
| X2=Voice of Citizens | 2.494999 | 0.480337 | 5.194270 | 0.0000 |
| X6=Freedom/10 | 1.329558 | 0.677197 | 1.963326 | 0.0515 |
| C | -12.20457 | 2.701671 | -4.517415 | 0.0000 |
| D71 | 37.81689 | 5.316384 | 7.113272 | 0.0000 |
| D135 | 29.15025 | 5.371833 | 5.426499 | 0.0000 |
| D154 | -44.48723 | 6.003932 | -7.409682 | 0.0000 |
| R-squared | 0.942403 | Mean dependent var | 21.16546 | |
| Adjusted R-squared | 0.940099 | S.D. dependent var | 21.38315 | |
| S.E. of regression | 5.233451 | Akaike info criterion | 6.191580 | |
| Sum squared resid | 4108.352 | Schwarz criterion | 6.327846 | |
| Log likelihood | -479.0391 | Hannan-Quinn criter. | 6.246923 | |
| F-statistic | 409.0506 | Durbin-Watson stat | 1.869016 | |
| Prob(F-statistic) | 0.000000 | | | |

Source: Elaborated by Guisan(2023), in AEID 23-2, with data from World Bank for and from Heritage. Dummy variables: D71 (Ireland), D135 (Singapore), D154 (UAE).

Equation 1.11. Relationship of X1=Satisfaction with Life with development and social quality (measured by the sum of X2+X8), in 147 countries

| Dependent Variable: X1. Method: Least Squares | | | | |
|---|-------------|-----------------------|-------------|--------|
| Sample: 1 164. Included observations: 147 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 2.860750 | 0.243827 | 11.73271 | 0.0000 |
| PH19/1000 | 0.014043 | 0.003819 | 3.677606 | 0.0003 |
| X2+X6 | 0.220498 | 0.027388 | 8.050840 | 0.0000 |
| D18 | -2.289379 | 0.551366 | -4.152197 | 0.0001 |
| DN | -1.601426 | 0.252156 | -6.350943 | 0.0000 |
| R-squared | 0.754402 | Mean dependent var | 5.536224 | |
| Adjusted R-squared | 0.747483 | S.D. dependent var | 1.090707 | |
| S.E. of regression | 0.548092 | Akaike info criterion | 1.668673 | |
| Sum squared resid | 42.65743 | Schwarz criterion | 1.770389 | |
| Log likelihood | -117.6475 | Hannan-Quinn criter. | 1.710001 | |
| F-statistic | 109.0449 | Durbin-Watson stat | 1.740413 | |
| Prob(F-statistic) | 0.000000 | | | |

Source: Elaborated by Guisan(2023), in AEID 23-2, with data from WB, WHR and Heritage. Dummy variables: D18=Botswana, DN=Dummy for negative effects in several countries that showed a a value of X1 below expected (Georgia, India, Rwanda, Singapore, Tanzania).

Dummy variables, that take the value 1 in special countries, and zero in the other countries, were included to have into account special features of a few countries where the value of the dependent variable was higher or lower than expected by the equation.

Figure 1.10. Freedom Indicator (%) (countries in descending order)

| Index | Countries |
|---------|--|
| >80 | Singapore, Switzerland, Ireland, New Zealand, Luxembourg, Taiwan |
| 70 - 80 | Estonia, Netherlands, Finland, Denmark, Australia, Iceland, Norway, Canada, Germany, Lithuania Latvia, Korea South, Chile, Czech R, Austria, Cyprus, UK, USA, Georgia, Malta Barbados, Bulgaria, Mauritius, Portugal, Slovenia, United Araba Emirates (UAE) |
| 60-70 | Uruguay, Japan, Slovak R, Belgium, Bahamas (The), Poland, Samoa, Spain, Malaysia, Israel, Qatar, Croatia, Jamaica, Romania, Hungary, Cabo Verde, Albania, Peru, France, Macedonia North, Saint Vincent&Grenadines, Costa Rica, Panama, Italy, Armenia, Serbia, Colombia, Botswana, Brunei Darussalam, Indoneia, Kazakhstan, Sain Lucia, Mongolia, Mexico, Bosnia&Herzegovina, Guatemala, Thailand, Dominican R, Vanuatu, Paraguay, Bahrain, Azerbaijan, C*ote d'Ivoire, Greece, Moldova, Seychelles, Philippines, Benin, Micronesia, Tonga, Vietnam, Sao Tome&Principe, Kosovo, Jordan |
| 50-60 | Senegal, Ghana, El Salvador, Guyana, Honduras, Tanzania, Bhutan, Namibia, Kiribati, Morocco, Madagascar, Trinidad&Tobago, Burkina Faso, Kuwait, Gambia (The), Montenegro, Togo, Rwanda, Cambodia, Turkey, Oman, Belize, Solomon I., Fiji, South Africa, Russia, Mali, Gabon, Kyrgyz R, Uzbekistan, Saudi Arabia, Mauritania, Djibouti, Niger, Nicaragua, Papua New Guinea, Nigeria, Dominica, Ecuador, Uganda, Tunisia, Guinea, Ukraine, India, Sri Lanka, Brazil, Malawi, Belarus, Cameroon, Bangladesh, Kenya, Angola, Sierra Leone, Eswatini, Mozambique, Comoros, Argentina |
| 40-50 | Haiti, Chad, Tajikistan, Nepal, Burma, Ethiopia, Laos, Egypt, Pakistan, Zambia, Congo R, Suriname, Lesotho, China, Liberia, Congo DR, Maldives, Lebanon, Equatorial Guinea, Timor-Leste, Turkmenistan, Guinea-Bissau, Algeria, Central African R, Bolivia, Iran |
| 30-40 | Eritrea, Burundi, Zimbabser, Sudan |
| <30 | Cuba, Venezuela, Korea North |

Source: Heritage(2023). Index of Economic Freedom 2023. Note: There are links to more information of each country at <https://www.heritage.org/index/ranking>

Freedom has positive correlation with other indicators of development and quality of life, in some cases because they are cause and /or consequence of Freedom or are related with a common variable.

Table 1.19. Correlation of Freedom with several indicators, around year 2019

| PH19 | TYR19 | X1 | X2 | X4 | IPS19 |
|--------|--------|--------|--------|--------|--------|
| 0.7153 | 0.6614 | 0.7526 | 0.8388 | 0.7394 | 0.7631 |

Source, Elaborated by author: Data of 164 countris in year 2019. Note Gdp per capita (PH19), Average Years of Schooling of Adult Population (Tyr19). X1=Satisfaction with Life, X2=Voice of Citizens. X4=Peace. X5=Indicator of Political Stability.

1.4. Other international comparisons of quality of life, in year 2019

Comparison of the 11 most populated countries with OECD average

Table 1.7 presents a comparison of Indicators of Development and Quality of Life in 11 big countries of the World: 7 non OECD and 4 OECD countries (Brazil, USA, Japan and Mexico)

Table 1.7. Indicators of Quality of Life in OECD and 11 most populated countries, around years 2017-2019 and change of Life Satisfaction for 2003-2020

| Countries | X1= Life Satis faction 2019 (1) | PH19= Produc tion per capita 2019 (2) | Life Expect ancy 2020 (3) | X8= Homi cides rate 2017 (4) | X2= Voice of citizens 2019 (5) | X4= Peace 2019 (6) | X7= Pollu tion 2017 (7) | Chan ge of (1) (8) |
|--------------|--|--|---------------------------------------|---|---|-----------------------------|-------------------------------------|---------------------------------|
| OECD | 6.7 | 49947 | 80 | 2.6 | 7.4 | 5.9 | 14 | 0.15 |
| Brazil | 6.3 | 14759 | 76 | 29.5 | 4.1 | 3.9 | 12.7 | -0.34 |
| China | 5.3 | 16092 | 77 | 0.6 | 6.3 | 4.7 | 52.7 | 1.02 |
| India | 3.8 | 6717 | 70 | 3.2 | 5.8 | 3.6 | 90.9 | -1.57 |
| Indonesia | 5.3 | 11812 | 72 | 0.5 | 5.7 | 5.5 | 16.5 | 0.29 |
| Pakistan | 4.9 | 4690 | 67 | 4.4 | 3.9 | 2.8 | 58.3 | -0.71 |
| USA | 6.9 | 62555 | 79 | 5.3 | 7.6 | 4.2 | 7.4 | -0.20 |
| Bangladesh | 5.0 | 4754 | 73 | 2.5 | 3.4 | 4.8 | 60.8 | 0.84 |
| Japan | 5.9 | 41477 | 84 | 0.3 | 8.2 | 6.6 | 11.7 | -0.48 |
| Mexico | 6.3 | 19701 | 75 | 19.3 | 4.7 | 3.4 | 20.9 | -0.45 |
| Phillipines | 5.9 | 8915 | 71 | 11.0 | 5.1 | 4.0 | 18.1 | 1.23 |
| Russia | 5.5 | 27211 | 73 | 10.8 | 5.1 | 2.5 | 16.2 | 0.49 |
| World | 5.5 | 16135 | 73 | 6.2 | 5 | 5 | 46 | 0.15 |

Sources: Elaborated by Guisan(2022 b) in RSES 22-1: (1) based on WHR(2021), (2) WB(2022) (production per capita in year 2019, expressed in Dollars at 2017 prices and Exchange Rates). (3) OECD. Health at a Glance. (5) and (6), in decimal scale, elaborated by Guisan(2022) from World Bank WGI and IEP(2021). (7) from Indexmundi(2022) based in Brauer et al(2017), Mean annual exposure to PM2.5 micrograms per cubic meter of air. (8) Change in the indicator of Life Satisfaction, for the period 2003-2020, from Ortiz-Espina and Roser (2021). OECD non weighted average.

(1) Life satisfaction: Among countries with more than 100 million inhabitants the indicator varies between 3.8 in India and 6.9 in the United States. The average of OECD countries was 6.7 and the World average 5.5.

(2) Production per capita. The OECD had an average of 49947 Dollars per capita (at 2017 prices and parities) and the World average was 16135.

(3) Life Expectancy: The OECD average (80 years) was higher than the World average (73 years).

(4) Homicide rates. The OECD average (2.6) was lower than the World average (6.2 intentional homicides per 100 thousand people).

(5) Voice of Citizens: as indicator of quality of Government, reached an average of 7.4 points in the OECD much higher than the World average (5).

(6) The indicator of Peace, in a positive decimal scale (maximum peace 10) (reached a value of 5.9 in the OECD, higher than the World average (5).

(7) The indicator of Pollution (PM2.5 per cubic meter) had an average of 14 in the OECD much lower than the World average (46).

Violences and Intentional Homicides in the World

Table 1.8: Homicides rates in OECD and in the World by Continent (number of homicides per 100 thousand people among men, women and all)

| | Men | Women | All |
|---------|------|-------|------|
| OECD | 4.4 | 0.9 | 2.6 |
| Africa | 21.5 | 4.5 | 13.0 |
| America | 31.2 | 3.6 | 17.4 |
| Asia | 3.1 | 1.5 | 2.3 |
| Europe | 4.3 | 1.7 | 3.0 |
| Oceania | 3.9 | 1.8 | 2.8 |
| World | 9.9 | 2.3 | 6.2 |

Sources. Elaborated by Guisan(2022 b) from UN(2017) and OECD(2022).

Global Study on Homicides (UNODC(2019): “464,000 people estimated to have been victims of intentional homicide in 2017. An average global homicide rate of 6.1 victims per 100,000 population was estimated in 2017. About 90 per cent of all homicides ...were committed by male perpetrators. Men make up almost 80 per cent of all homicide victims recorded worldwide”

There are many types of violence that generate social suffering and insecurity. Usually, the rates of violence are higher in countries with low values of several positive indicators (Schooling, Voice of Citizens, Political

Stability, Peace and other ones). World Bank(2019) includes information about violence against women and girls, and UNODOC(2023) includes information about several types of delinquency. WPR(2023) presents an indicator of Women Danger Index in 50 countries.

Education, Women Empowerment, Development and Quality of Life

Table 2.9 presents 8 groups of countries by the value of the Gender Inequality

Table 1.9 Gender Inequality Index (GII), from UNDP(2023)

| GII | Country |
|------------|--|
| (0, 0.1] | Australia, Austria, Belgium, Canada, Croatia, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea R, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, UK |
| (0.1, 0.2] | Albania, Bahrain, Belarus, Bosnia and Herzegovina, Chile, China, Cyprus, Czechia, Greece, Kazakhstan, Latvia, Lithuania, Malta, Montenegro, North Macedonia, Poland, Serbia, Slovakia, Turkmenistan, Ukraine, USA |
| (0.2, 0.3] | Argentina. Armenia. Azerbaijan. Barbados. Brunei Darussalam. Bulgaria. Costa Rica. Georgia. Hungary. Libya. Malaysia. Moldova R. Oman. Qatar. Romania. Russian Fed.. Saudi Arabia. Tajikistan. Tunisia. Turkey, Uruguay, Uzbekistan, Viet Nam |
| (0.3, 0.4] | Bahamas, Belize, Brazil, Cabo Verde, Cuba, Ecuador, El Salvador, Fiji, Jamaica, Kuwait, Kyrgyzstan, Maldives, Mauritius, Mexico, Mongolia, Panama, Peru, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Sri Lanka, Thailand, Timor-Leste, Trinidad and Tobago |
| (0.4, 0.5] | Algeria, Bhutan, Bolivia, Botswana, Cambodia, Colombia, Dominican R, Egypt, Guatemala, Guyana, Honduras, India, Indonesia, Iran IR, Jordan, Lao PDR, Lebanon, Morocco, Myanmar, Namibia, Nepal, Nicaragua, Paraguay, Philippines, Samoa, Sao Tome and Principe, South Africa, Suriname, Syrian AR, Venezuela |
| (0.5, 0.6] | Angola, Bangladesh, Burundi, Cameroon, Congo, Eswatini, Ethiopia, Gabon, Ghana, Iraq, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Pakistan, Senegal, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe |
| (0.6, 0.7] | Afghanistan, Benin, Burkina Faso, Central African R, Chad, Congo DR, Côte d'Ivoire, Gambia, Guinea, Guinea-Bissau, Haiti, Liberia, Mali, Mauritania, Niger, Nigeria, Sierra Leone, Tonga |
| > 0.7 | Papua New Guinea, Yemen |

Source: Elaborated by author from UNDP(2023). Low values of GII indicate equality and highest values indicate strong inequalities with lower levels of rights for women in comparison with men.

Countries with high levels of Quality of Life usually have good indicators related with working conditions, living conditions, and social conditions, both for men and women, and thus they have low levels of Gender inequalities (GII). Low levels of GII is usually a necessary condition, but not a sufficient one, for high Quality of Life. High values of Freedom, Voice of Citizens and other indicators are also necessary for Quality of Life of women and men.

Countries with high levels of inequalities measured by GII, may present sometimes other negative indicators of lack of quality of life for women (indicators of homicides and other violent acts, lack of equality of opportunities to access education and work, and other ones).

Even in the cases of countries with low levels of inequality we may found low levels of social support for people that have to conceal working activities with care of dependent family members (new born, other children, older members or other persons). Usually, the majority of the caring people are women, More social support in this regard is important.

In Guisan and Aguayo(2011), in AEID 11-1, we have analyze the relationship between Education, Development and Women Empowerment, with a sample of 41 countries belonging to Europe (28), America (11), Eurasia and Central Asia (2). We found a high positive correlation between the indicator GEM of Gender Empowerment from United Nations and three indicators of Life Satisfaction.

The Women's danger index published by the World Population Review (WPR(2023), has into account indicators of: Street Safety, Intentional Homicides, Partner and Non-Partner Sexual Violence, Legal discrimination, Global Gender Gap, Gender Gap, and Attitudes against violence.

Among the 50 countries in the list of WPR(2023) the 5 most secure countries for women were: Spain, Singapore, Ireland, Austria and Switzerland, followed by a group of 10 countries: Norway, Portugal, Croatia, Canada, Poland, UK, Netherland, France, Denmark, Italy and Czech Republic.

Cooperation for Education, Development and Poverty eradication

For the periods 1950-2000 and 2000-2023, the World experienced some important positive advances in real income per capita, poverty diminution and in several indicators of quality of life (increase of Life Expectancy, Women Empowerment, Freedom, Political Stability and other ones), being the effect of Education when of the main factors of those improvements. In a few countries there has been little advance, in spite of an increase of average schooling, due to lack of Peace, lack of Freedom or to other problems.

Guisan, Aguayo and Exposito(2015) highlight 7 channels of foreign aid per capita, estimating an average effect on many developing countries with income below World average, with a total Population of 3440 people in year 2010. Table 2.10 shows the estimations.

Table 2.10. Average Aid received per capita in developing countries, 2010

| Channel | Aid per capita |
|--|----------------|
| 1. Foreign Direct Investment (FDI) | 543 |
| 2. Trade: income from Exports | 628 |
| 3. Income from foreign Tourism | 63 |
| 4. Private aid: donations | 39 |
| 5. Remittances (by workers from abroad) | 38 |
| 6. Official Development Aid (ODA) | 23 |
| 7. Financial support (Investment less Savings) | 97 |

Source: Guisan, Aguayo and Exposito(2015). Summary in the Entry 24 of our Blog on World Development: <https://euroamericanassociation.blogspot.com>

The most important channels, on average are: Exports, FDI, Financial support and Tourism, followed by Private donations and Remittances and in the last position the Official Development Aid (ODA) from the OECD countries. All the aids are important but investment on infrastructures and production capital are the most outstanding, as well as Education aids.

The 45 countries of table 1.10 to 1.12, had low indicators of Schooling for the period 2000-2015 and very low levels of Investment per capita, Manufacturing production per capita and high percentages of poverty. Many of the 45 countries with lower levels of real production per capita c belong to Africa (29), 9 to Asia-Pacific, 4 to the area Europe and Eurasia, and 3 to America.

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