TOWARD A NEW UNDERSTANDING OF DEVELOPMENT IN FACE OF GLOBAL WARMING

Jan Priewe
Hochschule für Technik und Wirtschaft Berlin, University of Applied Sciences (Germany)
Email: jan.priewe@posteo.de

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ABSTRACT

The terms 'development', 'developing countries', and 'developed countries' are often used, but not well defined. The most important definitions are arbitrary. The paper intends to review some variants of the terms, attached to underlying theories and concepts of development. After many decades of development, it is clear that most theories did not properly foresee the factual development that has taken place. Although the problem of scarcity of exhaustible natural resources is known since long, the challenge of the climate crisis has not been sufficiently integrated in the understanding of development. Given that today two thirds of global emissions originate from the 'Global South', battling global heating depends on taking responsibility of all countries in the North and in the South. De-development is a great risk for many developing and emerging economies and the entire planet. The paper sketches a proposal for a new understanding of development, based on the green growth concept.

Keywords: Development, developing countries, development economics, climate change.
JEL classification: O11, O14, O15, O16, Q54, Q56.

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HACIA UNA NUEVA COMPRENSIÓN DEL DESARROLLO
ANTE EL CALENTAMIENTO GLOBAL

RESUMEN

Los términos "desarrollo", "países en desarrollo" y "países desarrollados" se usan con frecuencia, pero no bien definidos. Las definiciones más importantes son arbitrarias. El artículo intenta revisar algunas variantes de estos términos, vinculados a teorías y conceptos de desarrollo subyacentes. Después de varias décadas de desarrollo, es claro que la mayoría de las teorías no previeron adecuadamente el desarrollo que de facto ha tenido verificativo. Aunque el problema de la escasez de los recursos naturales no renovables se conoce desde hace tiempo, el desafío de la crisis climática no se ha integrado de manera suficiente en la comprensión del desarrollo. Dado que hoy dos tercios de las emisiones globales se originan en el "Sur Global", el combate al calentamiento global depende de que todos los países del Norte y del Sur tomen su responsabilidad. El de-desarrollo es un gran riesgo para muchas economías en desarrollo y emergentes y para el planeta entero. El artículo bosqueja una propuesta para una nueva comprensión del desarrollo, basada en el concepto de crecimiento verde.

Palabras clave: desarrollo, países en desarrollo, economía del desarrollo, cambio climático.

Clasificación JEL: O11, O14, O15, O16, Q54, Q56.

1. WHAT IS DEVELOPMENT

Development economics deals with the economics of a particular specie of countries called "developing", in contrast to another "developed" specie. The terminology suggests that development is the historical process of becoming developed and that all countries of the first specie can and do move forward, sooner or later, mainly by capital accumulation and growth of Gross National Income (GNI) per capita (p.c.). The second specie has finished its development and remains in an eternally mature state. The immature specie is still fully or partially backward, the second is modern and somehow finished. This leads to convergence of some kind. This narrative is both theoretically and em-

pirically untenable. There is no linear pathway from the poor to the rich status. Development is everything but an escalator. This conception was modified, changed, improved, but remained in essence the backbone of most approaches to development.

Environmental issues remained by and large absent, especially climate change, until the late 1980s, and afterwards included but in a reduced form. To be clear, here the discussion is not about the broad field of environmental economics, mainly microeconomic or regional economics, but the economics of climate change with a broader and deeper impact on the entire world economy.

Regarding development in historical reality, convergence and catch-up did not take place, with few important exceptions; the race upward had a high price since greenhouse gas (GHG) emissions of the Global South mushroomed up to two thirds of global emissions in 2023, coming from already 45% in 1975. My hypothesis is that the two issues —economic and environmental failures— are related. The core of the problem is an inappropriate understanding of development, which triggers factually dystopian development, leading to a tandem of economic and environmental disaster.

Section 2 comments on the traditional understanding of development in development economics (and in economics in general, as far as developing countries are concerned). Section 3 analyses multi-dimensional concepts for development of United Nations institutions, the World Bank (WB), the Human Development Index (HDI) and the Sustainable Development Goals (SDG), the first and the last including environmental challenges. This leads to a proposal for a new understanding of development in section 4, which intends to merge traditional and environmental ideas for development. Section 5 reviews in brief the historical evolution of the GHG emissions and the roles of the Global South and the North. The outlook in section 6 presents a few ideas how the economic and the environmental challenges could be tackled jointly.

2. THE TRADITIONAL UNDERSTANDING OF DEVELOPMENT – AND FOUR DEVIATIONS

The traditional understanding of 'development' is vague, as Myrdal (1974) complained. It is centred on the demarcation line between devel-

oping and developed countries. The latter are understood as industrial countries, the former as not yet industrialised. Industrialisation is seen as the engine of growth of Gross Domestic Product (GDP) p.c. which promises welfare and prosperity for the majority of the population, based on technical progress linked to industrialisation. Convergence with developed economies is more or less the common conviction in most, if not all, theories under the roof of development economics or general macroeconomics applied to developing countries. This would include structural change which follows the structural change in advanced countries. If the latter includes greening of production, including policies against climate change, developing countries might be following via technology transfer, trade or foreign direct investment. Perhaps this expectation could help to explain the obvious lacuna in incorporating environmental issues into the body of development economics and the respective understanding of 'development'. Perhaps it was also the implicit stage-concept of development —industrial progress first, also grappling with mass poverty, environmental progress afterwards, as the environmental Kuznets curve suggests.

This ex-post excuse for the neglect of much debated issues (in economics, natural sciences, etc.) after the Club of Rome's "Limits to Growth" (1974) and the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro (1992), also called 'Earth Summit', and the Kyoto Conference 1997 is not very convincing. Perhaps the influential position of Nordhaus (1992), that adaption should have priority against climate mitigation, echoed by the World Bank's World Development Report 1992 on 'Development and the Environment', supported this position which was later heavily refuted by Stern (2005). Nordhaus's take was grist to the mill for those who believed that advanced countries have the main responsibility, that the urgency of the problem seems to be exaggerated, and developing countries are better advised to prepare for climate adaptation if their level of production and income is growing faster.

Whatever the reasons for negligence, the hazy definition of development, developing, and developed countries supported the common goal that development is first and foremost high GNI p.c. growth to be achieved by industrialisation. Yet, opinions about the strategy to this goal differed strongly. The core theories of development were centred on one dimension of development – GNI p.c. The main theory in this respect was

Rostow's theory of stages of development (1959), in essence a variant of neoclassical growth theory applied to development. Although quite different, most authors of classical development economics also had a one-dimensional vision of development (Rosenstein-Rodan, 1943; Lewis, 1955; Nurkse, 1961; Gerschenkron, 1962). Other goals of development were subordinated and expected to be spin-offs from growth, like employment or poverty reduction. Other theories were open for multi-dimensional goals, such as increasing inequality (Kuznets) or, to the contrary, limit and reduce inequality, especially via poverty reduction (many in the *dependencia* group of economists). Pursuing multi-dimensional goals makes theories more flexible to open themselves for environmental issues.

Four notable, but very different exceptions from the narrow focus on economic growth stem from Grossman and Krueger (1995), Myrdal (1974), Furtado (1974/2020) and Bresser-Pereira (2023). Grossman and Krueger attempted to link development and environment. They hypothesized an environmental Kuznets curve (EKC) as an appendix to Rostow's theory of stages ('modernisation theory'). It has the same shape as Kuznets's inverted U-curve (Kuznets, 1955) which links rising income inequality —with more profits, more saving and more investment— to the first stages of development until the turning point is reached when the stage is open for mature developed countries. In the rising part of the EKC people in developing countries are too poor to be clean, environmental damages are accepted for reaching less poverty and basic incomes, later preferences and priorities change. Economic growth is thus the saviour of the environment. The original Kuznets-curve was not based on evidence, only on a conjecture, while vast empirical research of the EKC found evidence for the left side of the curve, less for the right-hand part. It remained empirically controversial but nourished uncertainty and also hope for the believers. For the greenhouse gases it is utterly wrong and misleading – take China as a case in point (see below). If irreversibility and accumulation of negative external effects are heeded, a disaster-stage of no return might be reached. For connecting development and environment, the EKC was a *cul-de-sac*, but an influential one which led debates in the wrong direction.

Myrdal (1974) put forward a holistic understanding of development: "By development I mean the movement upward of the entire social

system, and I believe this is the only tenable logical definition." (p. 736) Progress in one field triggers progress in others. He emphasized three tenets of development. First, he criticizes the production-centred view on development by hinting to consumption and distribution. Production is not more than the means to improve the level of consumption, both private and public (collective), and thereby productivity. Second, distributional reforms need more weight, especially land reform rather than land tenancy reforms. Third, development needs institutional reforms which is close to a developmental state in classical development economics. His critical leaning to GDP growth, his sense for less income and wealth inequality and his holistic view would probably allow him a favourable attitude to environmental reforms. With a Keynesian background he had little sympathy for Rostow's theory of stages, akin to neoclassical growth theory.

Another exception is Furtado's book "Myth of Development" from 1974. Furtado, one of the key economists in Latin American and a sympathiser with the Dependency theory and structuralist camp, was shocked and even bewildered in his belief in "development" by the "Limits to Growth" of the Club of Rome (1972). He was impressed by the world system approach and admitted that the 'Club' had unshrouded trust and providence in the possibility of development of the periphery —a bitter experience of delusion: development as a myth and an ideology which had fooled so many people to believe in a mission impossible. Therefore, he concluded, development should look for a more "egalitarian" way of living in periphery countries rather than striving for the consumption standard in the core countries. His new vision remained unelaborated. Furtado was amazingly prescient of an ongoing disaster for humanity.

Bresser-Pereira (2025), the pioneer of 'New Developmentalism' (ND), devoted a short chapter in his recent book on the climate issue. The latter is seen as a big challenge but manageable in the framework of "sustainable development" as described in the Brundtland-Report (1987) and with massive green investment, implicitly "green growth" on the planet —no mention of Furtado and not clear what green growth means. He seems to believe that lack of finance is the main barrier to 'green growth' in the Global South, since he refers to a recent proposal from Rajan (2021) which will be addressed in more detail below. Bresser-Pereira surely

includes environmentalism in his notion of developmentalism. His ND incorporates besides economic growth, made possible by overcoming Dutch disease, also human development, security, freedom, social justice and environmental protection —as in developed countries, as he writes, surprisingly, as if the 'North' were a model for the 'South', although still far off the Paris goal.

3. RENEWED APPROACHES: WORLD BANK, HDI AND SDG

Since economic theories on development (*i*) maintained for decades their vague handling of the key term "development", failed (*ii*) to think multidimensional and (*iii*) to include environmental goals in their agenda, three supranational institutions changed course and proclaimed new concepts. The World Bank (WB) as a think-tank and a policy maker as well worked on all three shortcomings, resulting in its classification system of countries and with three *World Development Reports* (1992, 2010 and 2024) on linking development, environment and overcoming the 'middle-income trap', after observing lack of convergence with advanced countries. This approach is linked to environmental issues. The United Nations Development Programme (UNDP) proposed in 1992 the 'Human Development Index' for three dimensions, beyond merely growth of GNI. The 'Sustainable Development Goals' proclaimed by the UN General Assembly 2015 17 goals for the next 15 years, in parallel to the Paris Agreement in the same year, after little success with the 'Millenium Development Goals' decided in 2000.

3.1. The World Bank approach

We start with the WB's classification of countries. The institution divides the world economy in four classes. The main indicator is income p.c. at GNI in United States Dollar (US $), at times also in Purchasing Power Parity (PPP), especially for measuring poverty. Although GNI p.c. is offered only as a mundane statistical device, it might involve a hidden concept akin to Rostow's stages. Officially, the WB is committed to poverty reduction, shared prosperity (often interpreted as pro-poor growth) and since a few years preserving the world as a "liveable planet", alluding to environmental issues.

The metric of GNI per capita is worked out for low-, lower middle-, upper middle- and high-income countries (LIC, LMIC, UMIC, HIC). Implicitly HICs are no longer developing countries, they tend to be sufficiently equipped with the capacity to further move upward in the direction of the frontier. The metric relies on GNI in current US $, adjusted with the Atlas-method which smooths exchange rates over a period of three years. This method leads for the year 2024 to the upper limit for LICs at $1,135, for LMIC at $4,495, and for UMIC the upper threshold is $14.005 p.c. for 2025. Above this ceiling the realm beyond "development" begins with a sharp brim. All thresholds are set arbitrarily, including the upper one for UMIC. Hence, the definition of developing and developed countries is arbitrary. Setting the borderline at US $14,006 p.c. for developing countries is a statistical and semantic feat. Of course, development does not stop to exist beyond this margin.

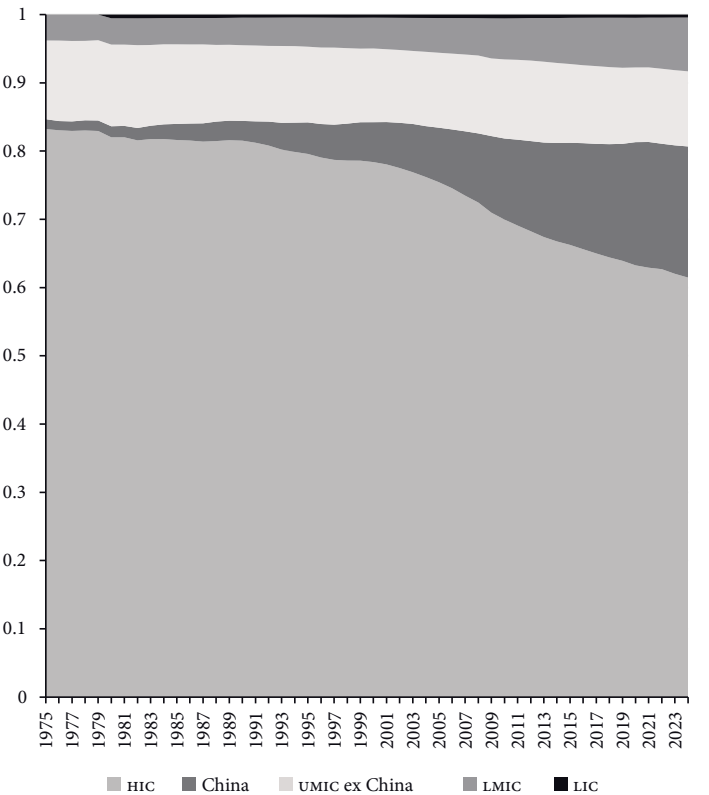
The quantitative thresholds were introduced in 1987 and adjusted annually with the weighted inflation rate of the five countries in the basket of special drawing rights (SDR-deflator), in earlier years five leading HICs (for the debates within the WB see Ravallion, 2012; Fantom and Serajuddin, 2016). In this way the thresholds in GNI p.c. are set uniformly for all countries. The methodology for setting the upper margin for the UMIC seems to raise it below the actual inflation rates and at a level that is since 1987 falling relative to the average of HIC-incomes p.c. so that it becomes easier to graduate from UMIC to HIC than formerly.

For assessing poverty, the WB uses income p.c. in PPP US $ rather than in GNI p.c. Atlas-method. PPP-based indicators are often used for international comparisons, since exchange rates are normally not aligned to PPP. This method leads to totally different results, since PPP-based incomes are two-to-fourfold higher than measured in the Atlas-method. This issue cannot be deepened here. Recently, the WB has redefined and updated its margins and the definition for poverty. $3.00 per day in PPP is considered equivalent to $1 per day in the Atlas method. This should apply only to LIC. The $4.20 margin should apply to LMIC, which means $1.14 in Atlas method, while $8.30 PPP is around $4.00 in the Atlas method and could apply to UMIC. In addition, a new 'societal poverty' line is recommended, which is country-specific, either $3.00 PPP, or $1.50 + 0.5 of the median income. The result is that the poverty headcount in all three classes of developing countries measured with

the stilted margins is around 2 billions (bn), one fourth of the world population. The absolute headcount did not change much since the year 2000, due to population growth (no earlier data available), but the share of the poor in the Global South diminished.

In the framework of the WB's classification, we see at a glance the historical dynamics since 1975 and where we stand now (graph 1). We compare the growth performance in the four country groups plus China, which is in the top of the UMIC group at the verge to graduate for the HIC but shown separately. One has to have in mind that the population of the Global South (global population minus HICs) increased in the period shown by 4.3 bn, in HICs only by 0.4 bn. HICs faced a marked reduction of

Graph 1. GDP in constant 2015 US $, % of World GDP, 1975-2024

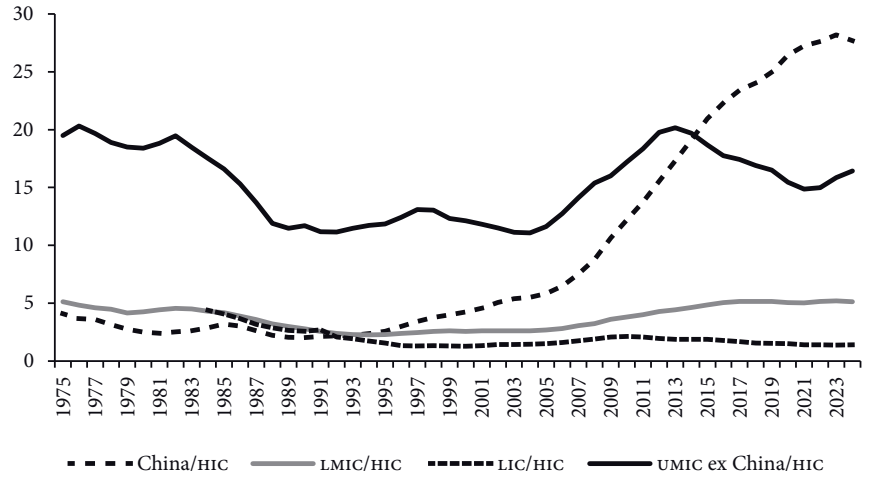


Source: WB, *World Development Indicators* (WDI), own calculation.

their share in the global GDP (from 82 to 61% 1975-2024), while UMIC ex (without) China lingered in the same period persistently at 11%. China expanded from 1.4% 1975 to 19% in 2024. China makes up half of the Global South, defined in terms of GDP in constant prices. We see immediately that the hope for economic convergence materialised only for China, and for LMICs to a small extent.

For assessing development, we look at GNI per capita, since population growth differs strongly among the country groups. This is shown over the period since 1975 in graph 2, using the Atlas method with current exchange rates to the US $. GNI p.c. is shown in the Global South as a share of the average in the HIC-group. GNI per capita in LIC and LMIC remained below 5% of the HIC-level, in UMIC ex China they swang between 11% and 20%. China rushed from 2.5%, the trough in 1989, to almost 28% in 2024. Hence, no grand catching-up, except for China. The bottom five bn people in LIC, LMIC and UMIC ex China reached between 1.4%, 5% and 16% p.c. income of the average of the HIC group in 2023, slightly less than in 1975. A global trend to convergence with the HIC-group, let alone with the frontier around the US is not visible. It looks like the great illusion of development, if convergence is the benchmark.

Graph 2. Low and middle income countries, GNI per capita as % of HIC, 1975-2023 (Atlas method)



Source: WDI, own calculations.

Regarding climate challenge, the WB had published three *World Development Reports*, which appear annually, the first in 1992 on 'Development and Environment', the next on 'Development and Climate Change' and the third in 2024 on the 'Middle Income Trap' (WB, 1992; 2010; 2024). The first report contained eight pages on the Greenhouse Effect. It was seen that the climate might rise by 1.5°C to 4.5°C in the 21st century, but there are too many uncertainties to take immediate action for mitigation. This would be too expensive in terms of a cost-benefit analysis —the costs were estimated at (only!) 3-7% of global GDP by the end of the 21st century (p. 160). Therefore, an insurance strategy was proposed to prepare for high adaptation costs in case necessary. However, subsidies for fossil energies should be abandoned, and research on renewable energies intensified. Promoting economic growth in developing countries and poverty reduction should support insurance for the future.

The 2010 Report appeared at a time when international coordination for the preparation of an international agreement was already underway, which then took place in Paris 2015. The report aimed at the 2°C goal for 2050, meaning a 50% reduction of the emissions in 1990, leading to around 30 Gt GHG in 2050 (presently ca 54 Gt), and zero emissions by the year 2100. Poverty reduction in the Global South would need high growth, but middle-income countries should participate with advanced countries in mitigation, with climate finance and technology transfer. Now mitigation ranked above adaptation, and development should be combined with climate action. However, the wording was not clear in what way and to what degree mitigation should be tasked on developing countries; the main burden should be on advanced countries. Read with hindsight, in many aspects the report is excellent, reflecting the best knowledge available at the time. Yet, the growth dynamics of the emerging market economies, especially in China, were massively underestimated.

The WB-Report 2024 falls back. Again, the WB-classification is interpreted and used by the WB itself as a theory of stages. This is made crystal clear in the analysis of the 'Middle Income Trap'. It is said that the ambition of the authors is to take the 108 middle income countries in two or three decades beyond the threshold for HIC. This would almost abandon the category of developing countries. It would require a growth rate of GNI p.c. (Atlas) of 8.7 to 13.0% annually (p.a.) in nominal terms if the threshold were not raised (estimate of the author), in that case

much more. The Chinese goal of reaching the median income level of the HIC-group by 2035 is mentioned (referring to the last 5-years-plan), and India (following the Prime Minister) should become a developed country (HIC) by 2035. The 'Asian Tigers' and China seem to be the role models. This enormous growth acceleration is to be achieved through a "Schumpeterian strategy" —comprising higher investment, infusion and innovation. It should include also rapid shrinking of the emission intensity (GHG emissions per unit of GDP). LIC should focus on more saving and investment, LMIC on investment and infusion, understood as diffusion of modern technology flowing in from advanced or other partner countries. Additionally, UMIC should engage in innovation and research, up to the global frontier level. Although it is not mentioned, this strategy likens China's. It should include modern energy technology for the transformation of the energy sector. How this can be achieved, remains hazy. CO2 taxes or emission trading is neither mentioned nor excluded, subsidies are mentioned as unavoidable to some extent. Obviously, the authors believe that renewable energy is in general cheaper than fossil energy, although it is mentioned that capital costs in developing countries (interest rates for loans, yields on equity) are much more expensive than in advanced countries. Long-term loans from the Global North are also mentioned in passing. In general, the authors count on all kinds of efficiency gains via competition, reducing overregulation, creative destruction and entrepreneurial activities of incumbent and new companies. The huge task of mitigation in order to achieve the Paris goals is not adequately addressed, to say the least.

Most amazing is that the economic and environmental evolution of China is tuned out. It would have shown that scaling up output with strong GDP-growth can outpace advances in the promotion of renewables which had led China eventually to mushrooming growth of emissions (3.7% p.a. 1990-2023). This is due to GDP growth rates exceeding the change rate of emission intensity. Emissions rise, but fall relative to GDP (relative decoupling). Apparently, the relationship between GDP growth and growth of emission intensity is not well analysed in the report. If this constellation continues, peak emissions will never be reached.

The promulgation of such attempts to overcome the middle-income trap would virtually destroy the planet – imagine if several "smaller Chinas" would emerge (see graph 3 in section 5 below). The case shows that

replication of the Asian-Tiger-catching-up is in face of global warming most likely not feasible anymore. It would require a breathtaking speed in reducing the emission intensity – a mission impossible. Obviously, there is a conflict of goals – GDP growth versus decarbonisation. Compromises and balancing seem necessary. This implies that maximising growth rates is not the road to sustainable development.

Using the WB data, development in the sense of catching-up or convergence with the HIC-group has hardly taken place, the gap between UMIC and HIC average is rising, with the exception of China (graph 2). Neither Rostow's vision materialised nor the one of the classical development economists, apart from the East Asian Miracles[1].

3.2. The Human Development Index – the first multidimensional approach

The HDI index was created by the UNDP in 1990, a response to the traditional fixation at GNI or GDP. Three basic dimensions of human development were synthesized, to better assess the "human capability" or potential for countries, if freedom for the individuals is given and institutions support such capabilities. Three dimensions were included: GNI per capita (in PPP terms), life expectancy and education; the latter was captured by the mean years of schooling and the expected years of schooling. The three variables were normalized by setting a minimum and maximum. They are weighted equally, and the HDI is the geometric mean of its parts. It is obvious that the mean GNI per capita disregards income inequality which is important for measuring human capacity of each individual. The median GNI p.c. would be more conducive to measure the income of the majority of people. To assess inequality in all dimensions, in 2016 the 'Inequality-Adjusted HDI' was introduced which deducts a certain amount from the HDI the higher inequality. In a perfectly equal society, the IHDI would equal HDI. The method uses inequality in all three sub-indicators. The ranking of countries informs about relative human development, but not about the stage or level of development. The higher the global degree of development, the smaller

[1] Since here each country group is aggregated, we cannot exclude that some countries performed better at the expense of others in the group.

the average difference to 1.0. Gauging the process of human development over time on a global scale shows historical progress.

Although it is a multidimensional index, differing from GDP or GNI per capita, it is strongly influenced by the level of GNI p.c. If all countries have higher growth or better education or life expectance, the index will rise everywhere, ranking likely unchanged. The same applies to the IHDI. That income per capita is indicative of the standard of living, even in the IHDI, is an extreme simplification and also a distortion. Health, security, discrimination, gender equality, working time, democracy, etcetera, are omitted. The quality of the environment is completely left out. GNI p.c. is not representative for these indicators, neither the other two. So, it remains unclear for what the HDI stands. Leaving out environmental indicators, the GNI p.c. sub-indicator might even indicate a high level of negative externalities. Country-specific values would hide the global burden. Hence, simply adding data of the average footprint p.c. would not help to make the HDI more meaningful since it is the global aggregate that matters (Sagara and Najam, 1998; Biggeri and Mauro, 2018).

3.3. Sustainable Development Goals – multidimensional, including climate change

When the Millennium Development Goals were proclaimed by the UN General Assembly in the year 2000, the main idea was to eradicate (extreme) poverty —and related goals— until 2015. Three years earlier, the Kyoto Protocol was ratified geared to reduce Greenhouse Gas emissions (without global quantitative goals) by 36 UN signatory states with binding targets and many developing countries as Annex B countries without binding targets. Probably this was the reason why climate change policy was mainly considered affordable for the rich countries, whereas the poorer ones should focus on poverty. For the MDG, mainly low and lower middle-income countries were addressed, officially all countries. The idea was focused on a goal, not a strategy. It can be assumed that the main road via which to achieve the goal was increased foreign aid. As the goal was not accomplished, the much broader SDG p.c. comprising 17 goals and many indicators followed for the next 15 years until 2030, again with no universal strategy. The SDG was a response to the neglect of the environmental dimension of development in predominant theories

and concepts. The spectrum of goals includes besides GNI p.c. growth also poverty reduction, thereby partially inequality, sustainable development in various aspects including climate change policies.

The SDG happened to come in tandem with the Paris goal of limiting the global temperature increase to 1.5° C compared to the pre-industrial level. SDG 12 on environmental goals has 11 sub-targets, among others support for developing countries in three fields: Technology, monitoring, reduction of fossil fuel subsidies. Phasing-out fossil fuels is not mentioned. SDG 12 mentions both "limit" temperature, meaning mitigation, and climate adaptation. SDG 7 on clean energy and SDG 13 on climate action are supportive to SDG 12. The lead for climate mitigation, *i.e.*, reducing emissions, is attributed to advanced countries. So, at least this part is not an integral obligation of the meaning of "development", similar to the Kyoto Protocol.

The SDGs are a wish-list, but they go beyond with many sub-targets and dozens of indicators for monitoring. Many goals apply also to upper middle-income countries and also Organisation for Economic Co-operation and Development (OECD) members. The climate crisis and the Paris goals are not properly integrated, for instance by the distance of a country to the goal. Furthermore, the Paris goal as a global goal is not commensurate with country-specific achievements.

4. A NEW CONCEPT FOR DEVELOPMENT

A new concept for development, sketched in a nutshell, stands on six pillars, each comprising goal and strategy.

1. A decent minimum living standard for all, excluding extreme poverty, including food/nutrition, clean water supply, safe accommodation, basic health provisioning. 'All' should comprise also future generations. The living standard should rise in line with productivity, without compromising the other goals. The strive for ever-lasting exponential growth of GDP and GNI p.c. growth is given up, also the notion of economic convergence with the rich and wealthiest countries on the globe in terms of GNI p.c.

2. Reducing GHG-emissions is considered a task of all nations, poor, emerging and rich. Mitigation of emissions toward the Paris goals should have priority, also against income growth. Adaptation follows in the pri-

ority, and is linked to mitigation. This implies that peak GHG emissions should be reached as soon as possible, followed by further reductions of emissions. The underlying economic concept is 'Green Growth'. It is understood as a growth rate of GDP and GNI below the absolute value of the reduction rate of GHG-intensity so that —by definition— GHG emissions fall. The dynamics of emission-intensity, *i.e.*, the GHG-emissions per unit of GDP (*I*, and *i* for the annual reduction rate), is the key variable for achieving sustainable economic development. If GDP growth g exceeds the (absolute value) of *i*, either g should be curbed or *i* accelerated. Growth of output is a means, not a goal. The goal is better private and public consumption (or more leisure time), hence better living conditions. Growth of GDP above *i*, hence with rising GHG emissions is called 'brown growth' (see Priewe, 2022a, based on Victor, 2010).

Approaching climate neutrality is the goal, as demanded in the Paris Agreement. It is the key determinant of future living conditions in the second half of this century and therefore in line with the Brundtland short-form of environmental sustainability. In this way, goal 2 is aligned and subordinated to goal 1. Goal 2 requires phasing-out all fossil sub-soil fuels, *i.e.*, coal, oil, gas. The reserves in the ground should be considered a global common good, an insurance for preserving the atmosphere, the quality of the oceans and other environmental sinks. Their function is to guarantee the liveability of the planet.

3. Curbing global population growth. The UN forecasted a world population of 9.6 bn in 2050, 1.5 bn more than in 2024, *i.e.*, 18.5%. Most of the population increase will take place in Africa, thus increasing the scarcity of arable land, water and other natural resources. Non-coercive family planning and more women's rights for self-determination are key, besides better education and living conditions.

4. Lessening economic inequality in the income and wealth distribution in developing countries is the key task if growth of GNI p.c. is dethroned as the top goal of development. The predominant trend of the time is pro-rich and pro-wealthy growth. In many developing countries the Gini-coefficient ranks above the USA, other indicators show even better the trend to pro-super-rich growth, regarding income and wealth distribution. This trend spurs luxurious and conspicuous consumption of the upper strata and contrasts pro-poor growth or "shared prosperity". It also undermines pro-middle-income growth. The alleged correla-

tion of income growth and poverty reduction is weak and disregards changes in income distribution. In most concepts of development, reducing inequality is tabooed, with the notable exception of Myrdal, while the Kuznets-curve still seems to dominate debates. Yet, the correlation between high incomes or high wealth and fixed investment is less strong in many countries, also because human capital plays a bigger role, apart from the functioning of the domestic financial system (Thirlwall and Pacheco-López, 2017, chapter 3, for an overview).

5. Reforms of the financial and monetary system. In many developing countries the domestic financial system is malfunctioning with regard to provide a monetary system that guarantees in full the functions of local money, namely providing medium- and long-term loans at reasonable levels of real interest rates. The global monetary system based on the hegemony of the US-Dollar tends to partially crowd-out local money and makes the hierarchy of currencies very steep, triggering high interest and volatile exchange rates. Global monetary reform is urgent but extremely difficult (Priewe, 2022b).

6. The need for financial support for development and climate change policy is the consequence. Due to the shortcomings of the local financial systems in many countries, support for the Global South in terms of affordable climate finance and other developmental tasks is indispensable. This hard-currency finance can help to accelerate technology transfer for decarbonisation (see section 6).

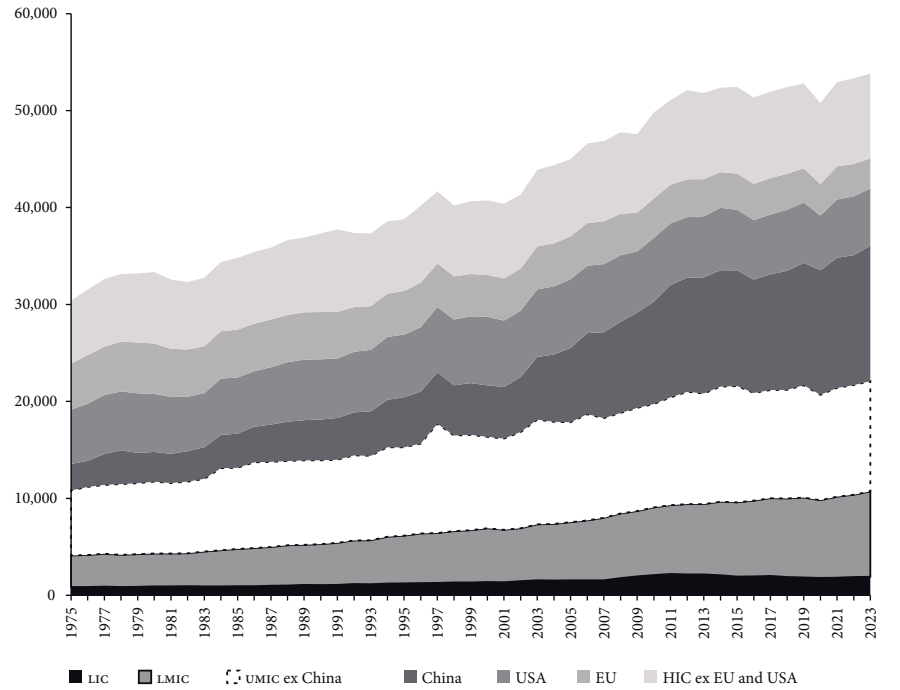
If the GNI p.c. would be no longer the focal point for development, then multidimensional indicators are needed, including the degree of GHG-emissions; for this reason, a new metric for classifying countries should be considered. If China climbs up the ladder to the HIC in the next few years, the Global South shrinks conspicuously in size and the ladder within the HICs becomes longer and the group more heterogenous. It should be considered to classify all countries according to a multi-dimensional set of indicators, but without a composite overall indicator and without a sharp demarcation line in a two-worlds concept that we have now. It would turn out that almost all countries are to some extent and in some dimension developing. For instance, the HIC-group is in terms of GHG p.c. ranking worse than the Global South, especially the US, when looking at cumulative GHG emissions p.c. even more (see section 5).

5. THE EVOLUTION OF CLIMATE CHANGE AND THE RISK OF DE-DEVELOPMENT

The case for a new understanding of development in the face of climate change lends itself to the fact that nowadays two thirds of Greenhouse Gas emissions occur in the 'Global South'. This includes China as the biggest emitter, as shown in graph 3 which alone makes up for 26% of global emissions while the other upper middle-income grouping accounts for 21%. China's increase (in the period 2000-2020) occurred despite a remarkable reduction of the emission intensity (–3.8% p.a. for GHG including LULUCF), which was more than offset by high GDP growth (8.4% p.a.); hence, GHG emissions grew immensely by 4.3% p.a. in this period. This was and is not green but brown growth.

The low- and lower middle-income countries contributed 20% to global emissions. The numbers include land-use-change and de- or reforestation

Graph 3. GHG emissions by country groups 1975-2023 (production method)

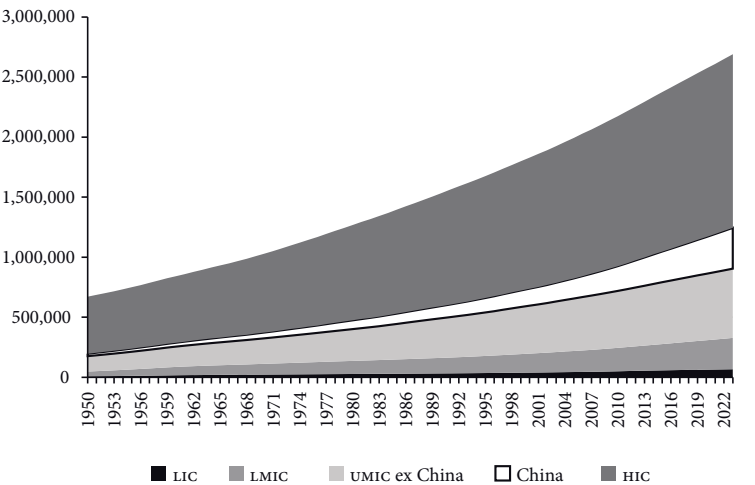


Source: OWID (2025).

(LULUFC) which is globally almost 18% of total GHG emissions in 2023. In this year, the share of the HIC group (Global North) is 33% (without Russia which accessed the Global North in 2025), coming down from 55% in 1975. All data refer to production-based emissions, which – due to emissions incorporated in trade – differ from consumption-based data. The latter increase emissions of the global North and reduce those of the South, in the EU by around +25%, in the US by nearly +6%, in China emissions drop by around –15% (OWID, 2023).

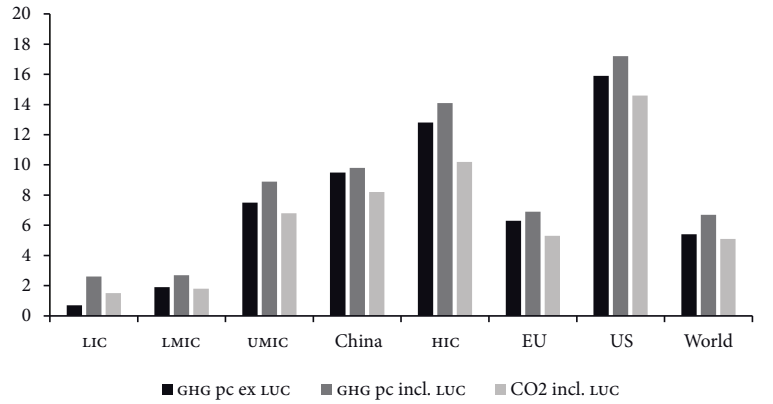
The Greenhouse effect is caused by the stock of cumulated gases which stay for long periods in the atmosphere. Cumulated CO2 emissions since 1950 are shown in graph 5. Early emissions from the 19th century and the first half of the 20th century are miniscule compared to what we have now. HICs account for 53.7% of the stock of emissions, the UMIC for 34.1%, only 12.6% from China. The per capita emissions differ strongly across the groupings (graph 6), with very high values for the HIC-group, especially the USA. The per capita emission in the UMIC-groups is much above the world average, and also higher than in Europe. China has reached a very high level, still on the rise while the peak CO2 had already been reached years ago in the HIC as a group, but even in the US.

Graph 4. Cumulated CO2 emissions



Source: OWID (2025).

Graph 5. GHG and CO2 per capita 2023 (tons)



Note: LUC is here a short-form of LULUFC. Emissions are counted according to the production method.
Source: WDI (2025).

Why did the share of the South grown so rapidly, despite the relatively lower per capita emissions? GHG emissions grew in the South from 1975 until 2023 by 166% (incl. land use change), but the population grew by 120%. This explains 72% of the growth of emissions in the South. By contrast, in the HIC-group, population growth was only 32% in this period while emissions grew by 5.6%. Furthermore, the GHG intensity of GDP (GHG/GDP) improved in the period 1975-2023 by the factor 3.5 in the South and by 3.0 in the North, but in 2023 the level of emission intensity was still 3.3 fold lower in the North. This implies that having in the South the same emission intensity than in the North, global emissions would be around 30 gigatons in 2023 instead of 54. So, part of the problem is the too slow technology transfer, and a big part of the technology transfer is finance.

The sobering conclusion from the big data picture makes sure: If the global North would stop all emissions immediately and forever, and the global South would freeze its emissions at the present level, the Paris goals could not be reached. Furthermore, focusing only on emission growth misses the point. Constant emissions per year would cumulate and exceed the goals way beyond the absorption capacity of the sinks. Postponing emission reductions would increase the stock of GHG in

the atmosphere and surpass the residual GHG budget. In other words, the 1.5 to 2°C goal requires that the countries of the South, first and foremost from the UMIC-grouping, participate actively in decarbonisation. A large part of the new technologies is available, another part of the emissions can be reduced profitably, one part requires higher unit costs, and one part can even be avoided by appropriate behaviour without costs. Many fruits are low-hanging, some hang high. One can conclude, limiting the global temperature to a level not much above +2°C hinges on all countries, on the South and the North. The North is a late-comer, the South is a late late-comer —or a no-comer if there were no or too late change.

Those who are afraid that climate change policy is unaffordable for the South and would compromise development (in the traditional meaning), especially poverty, should learn from the past performance: Differences in terms of emissions are visible in each country group – take *e.g.*, the HIC: Countries with half the emissions of the US enjoy the same or a better living standard for the majority of their people. GDP per capita is not the proper metric for decent life for all (Stiglitz, Sen, and Fitoussi, 2010). Besides this, decarbonisation policy raises in relative terms the living standard of many future generations, compared to the damages and adaptation costs due to expected climate change if overheating occurs.

A backlash is expected, if both the SDGs and the Paris goal are missed. First estimations of adaptation costs range high (UNCTAD, 2024; Fahr, Senner, and Vismara, 2024; SP Global, 2022; Dietz *et al.*, 2018). The most vulnerable regions are South-East Asia and in general low and lower middle-superior countries, but the costs are higher in the UMIC-group despite their superior resilience. In many of the poorest countries annual costs can rise up to 40% of GDP p.a. Backward development is likely in many countries, though many uncertainties on the physical and biological impacts remain. The menace of widespread *de-development* will prevail, the stronger the average temperature rises.

Since the climate crisis affects all countries, including the HICs, and also the relationship of HICs to the low and middle-income countries, developed countries could also fall back, despite a superior resilience. Hence, they become a special kind of developing countries with multiple pervasive changes, in consumption, in technology, in income, inequality,

the way of life, and in statehood. It is development in the sense of Polanyi's Great Transformation (Polanyi, 1944) which changed Western societies in the process of industrialisation and formation of nation states. Now we enter a second Great Transformation. It is also time to part from the vision of exponential growth of output, income and affluence.

6. OUTLOOK

For accelerating decarbonisation and improving the affordability of mitigation, finance and technology transfer should be facilitated in the North-South direction, being aware that the South has to solve a giant task while having less options to generate finance. Facing the residual climate budget, *i.e.*, the additional emissions tolerable in order not to compromise the Paris goal, there is not much time left. Every year of postponed action, hence further annual increase of the stock of cumulated GHG, is irreversible, if technology to discharge or neutralise the gases does not exist. If finance can help the climate, it should be mobilised – whatever it takes.

As mentioned above, both global initiatives in 2015, the SDG and the Paris Agreement, lacked a strategy to achieve the goals. There was no consensus on collective measures, rules, incentives and penalties, and money. This dampened participation, incentivised free-riding and denialism, and it supported the vested interests of fossil industries. In 2024, Lall, Rajan and Schoder proposed an initiative called 'Global Carbon Reduction Incentive Scheme' (GCRI). The idea is to raise annually at least US $100 billion public finance for implementation of the goals, as demanded at the Copenhagen COP 2009 (Conference of the Parties). The proposal is based on the commitment of countries with per capita emission above the world average to pay US $10 per capita and per ton above the global average in a World Bank Fund. The money should be given to those countries which emit less than the world average. Any additional ton of CO2 produced in any country is taxed with US $10 p.c., which either flows in the global budget or curtails the revenue a country is entitled to. The proposal is calculated for all countries in several variants. The main contributors would be the USA and China, the main beneficiary India, to name the biggest players. The costs for each country are limited and transparent, avoiding the future costs of inaction is

the incentive to participate. All depend on each other. The scheme can be modified if contributions are based on consumption-based CO2, or if the fund were based on cumulated emissions (or in addition to the current emissions), or if methane emissions (current or cumulated) were added. Also, de- and afforestation could be added, hidden in the LULUCF data mentioned above.

The proposal is considered by the authors as fair, transparent, simple, including incentives and disincentives. The usage of payouts received is up to the country (subsidies, transfers, etc.), also the way how contributions are raised (*e.g.*, by trading CO2 emissions, taxation or debt). At the 29th COP meeting in Baku pledges of US $300 billion p.a. were made, including private contributors. This amounts to 0.3% of the GDP of the HIC bloc. If progressive taxation of countries according to their GDP p.c. were made, China's contribution could be lowered and the whole scheme of the GCRI could be aligned accordingly.

Another proposal for funding climate mitigation rests on a new allocation round of Special Drawing Rights (SDR) by the International Monetary Fund (IMF). SDR are interest bearing assets denominated in the basket currency of the five leading currencies. They are supposed to supplement currency reserves of fund members. In 2021 the IMF allocated additional SDR to help member states to better cope with costs of the COVID-19 pandemic. Presently SDR at the size of US $936 billion are allocated. A series of strong new allocation rounds could help members to finance mitigation if these funds were allocated to member countries with emissions below the global average (in terms of per capita emissions). SDR could either be earmarked for additional currency reserves so that the present reserves would become free to be used for climate mitigation. Distribution and usage would have to be managed by the IMF and the WB or a new agency. New SDR could also be used directly to supplement mitigation expenditures.

Additional SDR are global money creation, not new debt. Since there is no stable relationship between global normal money creation, SDR increases and global inflation, the risk of inflation is low or absent if proper monetary management is provided by local central banks. They should boost imports of goods and services in hard currency needed for decarbonisation. This means a focus on technology transfer is built-in.

The proposal is in line with older and recent proposals for an institutional IMF-reform including the role of SDR (see Ocampo, 2017; Williamson, 2015; Stiglitz, 2010; Zattler, 2010). Of course, the SDR-proposal and the proposal from Lall, Rajan and Schoder (2024) can be combined. Another policy proposal is a facility for long-term loans with low interest rates earmarked for capital intensive renewable energy equipment (solar panels, wind turbines, electricity grids), provided by various development banks, similar for leveraged finance offered for the MDG in 2015 (WB, 2015).

Whatever kind of finance for global decarbonisation will be found, new cooperation between the global South and the global North is indispensable. As mentioned above, the change in the relationship of developing and developed countries is key for overall development – a belated appraisal of *Dependency* theories. Yet, there is a difference: Today, the North depends on the South not less than the latter on the former. ◄

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