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Research Article

The Unfulfilled Hopes of the UN Data Revolution – Zooming in on SDG 6 in India[1]

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Abstract
This paper shows how the Sustainable Development Goal 6 (water) has neither been sufficiently realized at the international level nor in India, in spite of hopes and promises. The desired connection of "better data, better lives" propelled by the belief in the so-called UN data revolution has not sufficiently materialized in practice. We argue that this is not surprising as that belief in itself does not sufficiently come to grips with complex realities of the policy cycle and corresponding governing mechanisms at the domestic level. Understanding them better requires zooming in on compliance and implementation efforts within countries. By looking at India as the largest democracy in the world, one of the most prominent supporters of the SDGs and a country suffering from severe water stress, we intend to show how lack of effective domestic reference to SDG 6 may illustrate shortcomings of the SDGs process on a global level.

Keywords: data revolution, sustainable development goals, indicators, water, implementation, India

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Introduction

In 2015 the United Nations (UN) decided to address the most fundamental world problems through the agenda of Sustainable Development Goals (SDGs). The core element of this endeavour is to achieve 17 ambitious goals such as fighting poverty, eradicating hunger, reducing inequality, providing better education and enhancing sustainable economic prosperity by measuring and even generating progress towards their realization on the basis of multiple data. Placing the project under the motto "better data, better lives", the UN claims: "Data helps the international community measure the progress of development. How many children attend school, who has access to healthcare and how many people are employed? We collect all these data, about the world and the people who live in it, to find out what it takes to realize a better world for all" (UN DESA 2015).

It was indeed an important success to bring everyone to the table and agree on common goals to tackle problems that the whole world is facing. Even more so at a time where global consensus is faltering and increasingly hard to achieve. Yet, unfortunately, with only five years to go until 2030, ambition and progress worldwide regarding attainment of the set goals, targets and indicators diverge rather strongly. It seems that collecting more data alone does not lead to major changes in policy – possibly the main obstacle is not lack of knowledge but lack of political will or capacity. Already the 2022 SDG Development Report stated: "This year's report paints a particularly sobering picture. Using the latest available data and estimates, it reveals that the 2030 Agenda for Sustainable Development is in grave jeopardy due to multiple, cascading and intersecting crises" (United Nations 2022: 3). The 2023 report then refers to how "the coronavirus disease (COVID-19) pandemic, the war in Ukraine and climate-related disasters" had negatively impacted the achievement of the SDGs. It warns that while "lack of progress […] is universal, it is […] the world's poorest and most vulnerable" who are experiencing the worst effects of these unprecedented global challenges (United Nations 2023). Or, even more recently, the 2024 SDG report states that with just six years remaining, current progress falls far short of what is required to meet the SDGs. "It finds that only 17 per cent of the SDG targets are on track, nearly half are showing minimal or moderate progress, and progress on over one third has stalled or even regressed" (United Nations 2024b).

At the same time, the UN has renewed its hope that an improvement in statistics can point a way out of the multiple crises. In his foreword to the report, UN Secretary General António Guterres calls for "greater investment in data infrastructure […] to efficiently target investments now, anticipate future demands, avoid crises from descending into full-blown conflict and plan the urgent steps needed to achieve the 2030 Agenda" (United Nations 2022: 2). In 2023 the SDG Report states that "progress on more than 50 per cent of targets of the SDGs is weak and insufficient; on 30 per cent, it has stalled or gone into reverse" (United Nations 2023: 2) albeit the "number of data records in the database has increased from 330,000 in 2016 to

2.7 million as of May 2023. In just seven years, the global SDG database has expanded significantly" (United Nations 2023: 8). The Report of 2024 reassures: "Data help identify challenges, formulate solutions, monitor implementation and make needed course corrections. Without high-quality data providing an evidence base, it will be impossible to truly understand where we are succeeding and falling short on the SDGs" (United Nations 2024b: 4).

Given the difference between aspiration and reality, the question arises as to whether the approach of a data-driven development agenda of the SDGs is actually promising. To what extent does the UN's approach of relying on big data and measuring by indicators suit the purpose to enhance global living conditions, and to what extent is the expansion and proliferation of international soft goals standards more than mere window dressing? Since data alone do not bring about change, the UN's underlying assumption must be that beyond data collection the necessary change will actually be achieved within domestic policy cycles. The UN gives little guidance in this respect, so that the operationalization is largely left to the States and their specific institutions and procedures through which the necessary changes can be managed. But how exactly the implementation of the SDGs works domestically, how real changes are generated, is largely unknown.

Whilst more recently comprehensive efforts showing the lack of SDG success across the board have been advanced (Biermann et al. 2024), qualitative in-depth studies on the interaction of SDGs with local legal and political institutions are still largely missing. We claim that this black box needs to be opened, and the way we do this is by investigating the processing of SDG 6 (water) in the domestic Indian context. This paper provides the necessary groundwork for such an investigation by showing that there is a mismatch of the SDGs' promise and its realization in India, as exemplified by SDG 6. Zooming in on deficits in SDG 6 implementation in India, our paper aims to show how the heralded data revolution intended to drive achievement of the Sustainable Development Goals suffers from a largely unwarranted belief that better data make better policies, without fully respecting the complexities of domestic policy-making and governance.

In doing so, we are looking at the world's biggest democracy and concentrate on the goal which addresses one of the most fundamental problems the world faces, namely water scarcity and lack of supply. SDG 6 covers various aspects of improved water supply and sustainable water management and places the goal of providing access to clean water for all by 2030 at the top of the list.[2] We chose India because it is obvious that if the water problems are to be solved through the SDG process, they will have to be solved in India in particular. India has 4 per cent of the world's water resources and almost 18 per cent of the world's population. The country already has large water supply deficits, is extremely vulnerable to climate change, and is expected to increase its water consumption in the coming years (NITI Aayog 2019,

2 Target 6.1. "By 2030, achieve universal and equitable access to safe and affordable drinking water for all." For further information on SDG 6, cf. table below.

2022). Successful implementation of SDG 6 is therefore of paramount importance for India. At the same time, any major progress in the most populous country of the world would automatically affect world-wide water statistics in a positive way, as the Indian government has claimed itself (NITI Aayog 2024).

We will proceed as follows: First, we will look at the unfulfilled hopes, i.e. the limits of SDG 6 effectiveness globally and in India in particular since 2015. Second, we will investigate to what extent that failure can be explained with a flawed belief in a data driven policy that does not respect the complexities of the policy cycle and corresponding governing mechanisms. This will allow us to draw some conclusions on how SDG 6 implementation in India illustrates limitations of the UN data revolution and their reasons.

The Unfulfilled Hopes: Lack of Compliance with SDG 6 Worldwide and in India in Particular

SDG 6 emphasizes, among other things, individual access to safe drinking water, which is already encapsulated in the human right to water, but in large parts of the world, especially in many rural areas, not sufficiently implemented. This is true for India, as well, where the realization of the right to drinking water, according to current forecasts, will become even more remote in the future.

SDG 6: Goal, Targets, Indicators, and the Problems of Reliability

The overriding goal of SDG 6 is to "ensure availability and sustainable management of water and sanitation for all", and it comprises 8 targets and 11 indicators as follows:

SDG 6: Ensure availability and sustainable management of water and sanitation for

Nr.	Target	Nr.	Indicator
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all	**6.1.1.**	Proportion of population using safely managed drinking water services
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	**6.2.1**	Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	**6.3.1**	Proportion of domestic and industrial wastewater flows safely treated
		6.3.2	Proportion of bodies of water with good ambient water quality

6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	**6.4.1**	Change in water-use efficiency over time
		6.4.2	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	**6.5.1**	Degree of integrated water resources management
		6.5.2	Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	**6.6.1**	Change in the extent of water-related ecosystems over time
6.a	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	**6.a.1**	Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan
6.b	Support and strengthen the participation of local communities in improving water and sanitation management	**6.b.1**	Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

Source: https://unstats.un.org/sdgs/metadata/?Text=&Goal=6

The goal reaches further than water-related aspects of the previous Millennium Development Goals (MDGs) in aiming for universal access (not only halving the proportion of the population without access), equitable access, i.e. reducing inequalities in service levels between population subgroups, and it specifies that drinking water should be safe, affordable and accessible to all. Reaching SDG 6 is not only in itself crucial, but it is interlinked with other goals and therefore also critical for their achievement like "reducing poverty and achieving universal access to basic services; ending all forms of malnutrition (2.2); ending preventable child deaths, combating neglected tropical diseases and waterborne diseases, and achieving universal health coverage (3.2, 3.3, 3.8 and 3.9); providing safe and inclusive learning environments (4a); ending violence against women and girls and reducing gender inequality (5.2 and 5.4); ensuring adequate, safe and affordable housing for all (11.1) and reducing deaths caused by disasters (11.5)" (WHO 2017: 10 f.).

In the following assessment of progress on SDG 6 attainment, we will largely focus on target 6.1, since this is the key target which promises more reliable data than, for

example, handwashing opportunities or actual cooperation, due to easier measurability compared to other targets.

Before looking at the data, though, we need to take a short look at their origin: Water is a cross-cutting issue and has therefore been or is being addressed by over 30 United Nations organisations. The sources therefore vary in terms of the organisations, the indicators used, and the years covered. We draw on data from various central institutions that describe their own role as follows:

- UN Water has coordinated the work of UN organisations dealing with water since 2003. One of the body's three main tasks besides informing policy processes and building knowledge is supporting monitoring and reporting on water and sanitation (UN Water 2023).
- The WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) has reported country, regional and global estimates of progress on drinking water, sanitation and hygiene (WASH) since 1990 (WHO/UNICEF N/A).
- The United Nations Department of Economic and Social Affairs (UN DESA) hosts a Division for Sustainable Development Goals (DSDG) which acts as a Secretariat for the SDGs "providing substantive support and capacity-building for the goals […]. DSDG plays a key role in the evaluation of UN systemwide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs" (United Nations/Department of Economic and Social Affairs N/A).
- The United Nations Environment Programme (UNEP) is the global custodian for SDG indicators 6.3.2, 6.5.1 and 6.6.1 and "operates globally and regionally at the interface of the environment, water and development" (United Nations/UN Water N/A).
- The World Health Organization (WHO) "monitors global progress on water, sanitation and hygiene (WASH) through estimates of global burden of WASH- related disease, monitoring of progress under the SDGs on WASH in households, schools and health facilities, wastewater treatment and the enabling environment for WASH service delivery" (United Nations/UN Water N/A).
- The United Nations Development Programme (UNDP) "work on water and ocean governance focuses primarily on the challenges related to SDG 6 – sustainable management of water and sanitation for all – and SDG 14 – to conserve and sustainably use the oceans, seas and marine resources" (United Nations/UN Water N/A).
- The Food and Agricultural Organization (FAO) "is the custodian agency for the SDG indicators 6.4.1 on water use efficiency, and 6.4.2 on level of water stress. As such, FAO collects and reports indicators' data produced and/or verified by each country, and provide technical support and capacity

development as required" (United Nations/UN Water N/A). FAO has developed the monitoring capacity AQUASTAT which includes a global water database, country reports and associated tools for global analysis of water issues (FAO 2021).

- The World Bank is the world's largest multilateral source of financing for water in developing countries and is "working closely with partners to achieve 'A Water-Secure World for All,' by sustaining water resources, delivering services and building resilience" (World Bank 2023).
- OECD Water "contributes analyses to improve knowledge, identify good practices, and offer policy guidance. […] OECD work focuses on water economics and governance" (OECD 2024: 2).
- UN Statistics "is committed to the advancement of the global statistical system" and posits the idea that better data will lead to better lives (United Nations 2025).

Apart from the fact that different organisations are involved in water governance, water policy, policy advice, data collection and data analysis, an overview of the actual status of SDG 6 is also complicated by the facts that there are

- no international standards for drinking-water quality,
- several definitions of access (WHO 2022: 85),
- and that definitions are not applied consistently.

For example, the JMP significantly changed the basic definition of "safe" water in 2017 to include bottled water and tanker truck water: "The JMP recognizes that bottled water and tanker truck water can potentially deliver safe water, but has previously treated them as unimproved due to lack of data on accessibility, availability and quality. From now on, the JMP will treat them as improved and classify them as 'limited', 'basic' or 'safely managed', based on the criteria outlined above" (WHO 2017: 13). Modifications of definitions can thus cause significant shifts in statistics without any change having occurred in reality. Overall, different data sources can refer to different definitions of drinking water safety, different access conditions and different sourcing options.[3]

SDG 6.1 calls for universal and equitable access to safe and affordable drinking-water for all. The target is monitored using the indicator "proportion of population using safely managed drinking water services", and "safely managed drinking water is defined as use of an improved drinking water source that is located on premises, available when needed and free from faecal and priority chemical contamination" (WHO/UNICEF 2017: 24). This definition is further specified in the second step:

> In order to meet the standard for safely managed drinking water, a household must use an improved source type that meets three criteria. First, the facility should be

3 See furthermore https://www.indiawaterportal.org/drinking-water/packaged-drinking-water-in-india-issues-and-challenges.

> accessible on premises (located within the dwelling, yard or plot). Second, water should be available when needed (sufficient water in the last week or available for at least 12 hours per day). Third, water supplied should be free from contamination (compliant with standards for faecal and priority chemical contamination). (WHO/UNICEF 2017: 24)

In more recent publications, this definition has been refined further and now includes five criteria (accessibility, quality, quantity, continuity, affordability) (WHO 2024), but even with regard to only three criteria the WHO and UNICEF state that "many countries currently lack one or more criteria for at least part of the population. The JMP will only make an estimate for safely managed drinking water where data are available on water quality and for either accessibility or availability for at least half of the relevant population. Where estimates for safely managed services are not yet available, the JMP only reports the population using at least a basic level of service" (WHO/UNICEF 2017: 24 f.).

This leads to the more general question whether the data are actually correct and up to date. In all years of reporting on the SDGs, serious deficits in data collection are pointed out by the UN: "The lack of accurate and timely data on many marginalized groups and individuals makes them 'invisible' and exacerbates their vulnerability. While considerable effort has been made to address these data gaps over the past four years, progress has been limited" (United Nations 2022: 3).

At the same time, there is a demand for more money and more knowledge to improve data quality:

> In 2016, countries received support valued at $623 million from multilateral and bilateral donors for all areas of statistics, up from $591 million in 2015. Such support increased by almost $400 million from 2006 to 2016, yet was still insufficient to satisfy data and statistical demands created by the SDGs. To meet statistical capacity building objectives by 2030, current commitments to statistics—0.33 per cent of total ODA—need to double. (United Nations 2022: 57)

However, it is unclear where we are financially at the moment: no data are available for the relevant indicator 17.18.1[4] (Our World in Data team 2023).

Likewise, the Pact for the Future outlines, in objective 4, the need to "advance responsible, equitable and interoperable data governance approaches" (UN 2024). It "recognize[s] that quality data is critical for tracking, targeting and accelerating progress across the Sustainable Development Goals as well as responding effectively to crises"; and it entails a commitment to "increase financing for data and statistics

4 Indicator 17.18.1: "By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts." Note that this goal should have been achieved by 2020 already.

from all sources and enhance efforts to build capacity in data and related skills, as well as responsible data use, particularly in developing countries".

As laudable as these approaches are, they cannot help but sound a bit like a mantra by now, when looking at the shortcomings that continue to exist.

International Progress

Establishing progress on the world-wide supply of safe water is a rather intricate task. On the one hand, when looking at absolute numbers, some improvements can be seen. On the other hand, when comparing this to the overall population the situation looks rather disillusioning. Between 2015 and 2020 the percentage of world population with access to safely managed drinking water service increased from 70 percent to 74 percent and achieving universal access to safely managed services was estimated to "require a 4x increase in current rates of progress" (WHO/UNICEF 2021: 8). In 2022, the proportion declined to 73 percent of the world population. But in the end it is completely unclear whether there is actually progress or regression, since only 52 percent of the world's population is statistically recorded (UN Water 2024).

What makes the assessment even more complicated is that some of the goalposts have apparently been shifted along the way, i.e. definitions and markers of success have been altered. As pointed out above, recent studies have shown that the SDG process is failing in many ways (Biermann et al. 2024). In parallel, the UN has launched the 2025 Comprehensive Review Process in accordance with General Assembly (GA) resolution 71/313. The process is due to be completed by March 2025. Again, the GA resolution has emphasized "the need for quality, accessible, timely and reliable disaggregated data to help with the measurement of progress and to ensure that no one is left behind". In this review process, ideas are articulated to alter the framework with regard to the indicators (IAEG-SDGs 2023). Hence, the principles guiding the process spell out that this is a "a good opportunity to improve the indicator framework" (IAEG-SDGs 2023). Whilst major changes are discouraged due to the additional burden on reporting and monitoring, they are actively considered. This might amount to another attempt of moving the goalposts, without recognizing sufficiently that the problem is not the indicators but the structural reasons for lack of domestic implementation.[5]

5 There is a very interesting parallel to the Aichi Targets on Biodiversity (Secretariat of the Convention on Biological Diversity 2020). As Maney et al show: "[…] fewer and fewer actions taken at each stage of the implementation process of the last strategic plan for biodiversity. Some of this, as we hoped to investigate, is linked to commitments that weren't successfully implemented, were cancelled, or otherwise implemented without their desired impact. However, the bulk of 'lost' commitments were simply not reported on. This may be due to unwillingness to report on failed objectives or simply the fact that the evidence for those commitments was not available. However, this shortfall in reporting has clear implications for new plans for monitoring commitments. Compiling National Reports with this current coverage of commitments into a global progress report, as planned for the

Water Issues in India/SDG 6 Record in India

According to a survey by NITI Aayog in 2018, 600 million Indians, half of the population, were affected by high to extreme water shortages, three quarters of all Indian households were not connected to the drinking water supply (NITI Aayog 2018: 15). Moreover, 70 per cent of India's water resources are contaminated, which puts India in third last place out of a total of 122 countries that collect data for the Water Quality Index. Contrary to the SDG 6 goal of universal access to safe drinking water and sustainable water resource management by 2030, the situation in India is likely to worsen in many regards. Data indicate that the supply of clean drinking water has increased by only two percent since 2015 (UN Water 2024). Estimates of future developments predict, that, if there are no changes, by 2030 around 40 % of the Indian population may have no access to drinking water (NITI Aayog 2018: 28).

Meanwhile, the Indian government portrays itself as moving forward on all SDGs (NITI Aayog 2025). The rather grim prognosis was lightened up by a far more positive narrative (NITI Aayog 2023, 2024). However, this is countered by media reports, showing how "[t]he world's most populous nation has suffered from water shortages for decades, but crises are coming around with increasing frequency" (Das and Patel 2024). The contradictory findings nourish doubts as to the success of SDG implementation and underline the importance of zooming in on domestic places that may serve as a kind of litmus test to show to what extent the goals and indicators of the SDGs can really guide action. A careful examination reveals that progress only pertains to some aspects of SDG 6 (whilst less favourable developments are not sufficiently mentioned). Furthermore, the positive outlook seems to be facilitated by using a separate domestic yardstick through indicators and reporting schemes only partially related to what the UN has provided (Koerber 2024). In addition, the progress described in the governmental report appears rather vague, the categories are not sufficiently precise.

This is not tantamount to saying that no progress has occurred at all. Some advancements have been made, for instance with regard to sanitation (Arora 2023; NITI Aayog 2024). Nevertheless, India seems to be at least partially unable to effectively manage the goals, targets and indicators contained in the SDGs in order to achieve a better future for all (cf. e.g. Rathee and Mishra 2021; Biswas, Sachdeva, and Tortajada 2021: 114, 123; UN Water 2024). Across the board the picture is still rather grim, in particular when relating it to the rapidly growing population. Looking at these findings, one can surmise the following: This country of now 1.4 billion

Kunming-Montreal Global Biodiversity Framework's monitoring framework, would provide an inadequate and flawed perception of the implementation and success of commitments" (Maney et al. 2024). After the dramatic failing of each of the targets, CBD members, in the Kunming Montreal CBD Conference in 2022, adopted the Global Biodiversity Framework (GBF), spelling out 23 new 2030 targets (Secretariat of the Convention on Biological Diversity 2022). So, instead of trying to find the root causes of failure, the idea was that we need new and better targets. Judging from the findings of Maney et al, the prospects of being more successful this time are unfortunately not very high.

inhabitants, where water scarcity and conflicts materialize in a dramatic way, uses the SDGs to paint a very positive picture. This does not mean that there are no serious efforts to achieve the goal, but their actual effectiveness appears to be rather limited.

How Can the Lack of Progress Be Explained?

Our next step will be to find explanations for the lack of sufficient progress which we just documented. Our main focus will be on deficiencies in international governance, which we will illustrate by looking through the lens of the policy cycle. We proceed by showing first how the SDGs are meant to function before analysing why this mechanism is intrinsically flawed.

Inside the Engine Room: The SDG Process and Its (Theoretical) Mechanism toward Progress

Since the beginning of 2016, the political goals of the United Nations regarding sustainable ecological, economic and social development have been set out under the title "Transforming our world: the 2030 Agenda for Sustainable Development". In total, the SDGs define 17 overall goals and 169 sub-goals (targets), which relate to all areas of life (United Nations 2014). Compared to the previous period from 2000 to 2015 and the MDGs targeted at the time, the ambition has grown once more: Firstly, the SDGs do not only relate to the so-called Global South, but to the entire world. Secondly, they combine social, ecological, economic, political and institutional objectives. Thirdly, the United Nations is relying even more strongly than with the MDGs on indicator-based target setting: The transformation is to be driven forward with a total of currently 231 or 248 indicators (thirteen indicators repeat under two or three different targets), which in turn require global data collection (United Nations 2024a). At the beginning of the SDG process, the United Nations Statistics Division (UNSD) therefore called for a "data revolution to improve the availability, quality, timeliness and disaggregation of data to support the implementation of the new development agenda at all levels" (UNSD/NBS 2015).

Combined with comprehensive data and the corresponding indicators is the hope that this could also drive actual development, because better data should enable better policies. As the OECD puts it: "National, regional and local governments need precise and timely data to implement better policies for well being and sustainable development. Data and indicators are key for strategic planning and decision making, and are tools for promoting informed dialogues across levels of government and sectors of society, integrating both a national and an international perspective" (OECD N/A).

A comprehensive approach is certainly appropriate, and global agreement constitutes an advancement when looking at the common problems that the SDGs are addressing. Yet, the question is whether the way this approach has been devised is or can be successful. Before examining the assumed mechanisms of action that

translate better data into better policies in the SDG process, we briefly reflect on the basic state of research on policy goals and how they can be achieved in general, in order to understand the specificity of data-driven goal attainment.

Governing, or How Political Goals Can Be Achieved

In the early nineteen-seventies, political science discovered the field of "policy analysis", and thus a field that it had largely neglected in its studies of institutional and process conditions of politics before. By "policy" the authors meant "a course of action intended to accomplish some end […] and what occurs as a result of the intention" (Heclo 1972: 84 f.). Partly, this new interest stemmed from a former concentration on systems theory (Bertalanffy 1950), which David Easton in particular had tried to make fruitful for political science (Easton 1957, 1965a, 1965b), and which led to research on how policy outputs depend on social, economic, political or technological conditions. Partly, it was fuelled by the experiences with social and human resource programmes of the 1960s and concentrated more on gaining knowledge about the influence of governmental actions on social, economic and political conditions (Williams 1978: 635). In either case, political scientists shifted their focus to the question of how political goals can be formulated, how they are fed into the political process, successfully implemented and, if necessary, reformed; what conflicts can be expected and how they can be resolved; what resources are needed and which actors play a role.

The field of policy analysis developed extremely dynamically and quite yieldingly in the following years; interest was focused on various aspects of the policy process, and we will pick up only a few central results from the discussion in order to illustrate the complexity of a successful implementation of set goals.

1.) The so-called policy cycle was established as a kind of life cycle of a policy, in which different phases like problem definition, agenda-setting, policy formulation, implementation, evaluation and termination or reformulation follow each other (May and Wildavsky 1978). Political science thus pursued the system-theoretical perspective of interdependence, that "the operation of no one part can be fully understood without reference to the way in which the whole itself operate" (Easton 1957: 383). The policy cycle enabled a research heuristic that could understand policy making as a process, determine the interdependence of different phases of the cycle and, above all, gain more insight into the rules of the game in individual phases – such as implementation or agenda setting.

2.) The focus also turned to "identify and derive logically the types of coercion available to governments" (Lowi 1972: 299). Beyond regulatory politics Lowi branded three other types: distributive, redistributive and constituent policies which, he assumed, produce different kinds of coercion and are applied to different problems and groups. The main purpose of this "policy taxonomy" was to learn to distinguish between different types of governance and to understand that different conflicts are generated depending on the type.

3.) This taxonomy thus also laid the ground for a differentiation of policy arenas. The concept of policy arena "is closely related to general political conflict and consensus processes. […] Central determinants of a policy arena are the costs and benefits expected by those affected, as well as the control strategy (incentive, bid/offer, etc.) by means of which costs and benefits are conveyed" (Windhoff-Héritier 1985: 9). It was assumed, for example, that distributive policies know virtually no losers, because "something" is distributed to "everyone", and are therefore structured more consensually, while redistributive policies produce winners and losers, and are accordingly structured conflictive.

4.) The focus also was broadened to different instruments of governance, which essentially defined power as a hard instrument of governance, and information, offers and financial incentives as soft instruments of governance.[6]

5.) The turn towards actor-centred institutionalism underlined the different organisational and action capacities of individual, corporate and collective actors: Different types of actors pursue different goals in different ways and use individual or collective resources, which in sum leads to different forms of decision-making (Scharpf 2000).

6.) Another focal point of the debate was policy learning: Policy learning as a practice has a long tradition (Dobner 2002: 175 ff.), but now scientists identified different types of policy learning by asking: Who learns what from whom and why?

The list is neither exhaustive, nor do we do full justice to each of the aspects we touched here. But the main purpose here is not a full appreciation of the efforts of policy analysis, but to point out that political governance and the achievement of political goals is a highly differentiated subject of political science research and in practice must be:

- a well-planned combination of tailor-made instruments and procedures in all phases of the policy cycle,
- must suit the set goal,
- must take different actors and their potentially contradicting interests into account,
- needs to encompass several political levels and heterogenous political actors with multiple interests,
- and cannot simply be applied universally in order to be successful.

Policy analysis was rightly criticized in later years as being too mechanistic, too euphoric about its practicality, too rigid for the real world and oblivious to power. Nevertheless, it has great merits in terms of a better understanding of political processes and especially in terms of an understanding of the high complexity and the numerous possibilities of failure of political governance. Against this briefly

6 Nudging as another governance tool was added by Thaler and Sunstein (2008, 2009, 2021) and refers to a decision architecture that can change people's behaviour without bids and bans.

sketched background of the research on how to make political plans work and how to reach set political goals, the universal turn to and belief in data-based goal achievement at the global level as the central, if not the only mechanism to reach the set goals, seems surprisingly simple. The question of why the central results of policy analysis were not considered in the global policy of the SDGs can be answered in two ways: The belief in the power of digitization and the collective forgetting of scientific findings as a result of alternating scientific fashions.

Data already played an important role in the formulation of the MDGs in 2001: They were to capture the 8 goals with initial and final dates (1990–2015), for which 18 sub-goals and 48 indicators were agreed (United Nations 2003). At the same time, the indicators and data collection in the MDG process were massively criticized as insufficient (Behrend 2016; Pogge 2016; Pogge and Sengupta 2015) which, however, did not lead to a critical reflection on data-based development strategies, but to the demand for more and better data in the SDG process. This was not only in line with the zeitgeist, but also with new technical possibilities: "The SDGs were negotiated during a period of global socio-technical change, including expanded access to the internet, mobile phones, satellite imagery, and crowd-sourcing platforms. Their adoption coincided with the rapid increase in the velocity, variety, veracity, and volume of data supply and use, differentiating the pathways to impact from previous eras of sustainable development initiatives." (Fischer et al. 2025: e49-2) Data were considered the central key to real-time monitoring of progress (Espey 2019), greater accountability, better policy making and service delivery as well as increased business opportunities (World Bank 2021: 4).

This trend correlates with a change in the orientation of political science, which from the 1990s onwards increasingly abandoned its originally normative self-image in favor of quantified methods (Maier 1996: 16). In terms of scientific theory, one can speak of a new "fashion" that inevitably leads to a departure from earlier approaches: "As in clothing fashion, the yesterday's theory is done, anyone who continues to adhere to it is hopelessly old-fashioned, and it deserves attention at best from the perspective of the Historian" (Laitko 1996). As long as science remains in search of scientific revolutions, paradigm shifts are inevitably inherent (Kuhn 1973). However, turning away from earlier findings, in this case the knowledge of the complexity of political control, is not always synonymous with real scientific progress (Allert 2014).

Data-Driven Policies in the SDG Process

On that basis, we will now look at how policies are effectuated or intended in the SDG process and what deficiencies there are. As we have already pointed out at the beginning of this article, the production and usage of data is the central tool of the SDG process. The UN Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development (IEAG), convened in 2014, assumes in its recommendation for the use of data in the SDG process that "[d]ata are the

lifeblood of decision-making" (IEAG 2014: 4). Based on the fact that the amount of available data, data producers, dissemination of data and objects for which data is collected already represents a data revolution, the group calls for this to be made usable for the SDG process. By this it means firstly an integration of new, so-called big data with traditional data in order "to produce high-quality information that is more detailed, timely and relevant for many purposes and users, especially to foster and monitor sustainable development". Secondly, it calls for increased usability of data through more openness and transparency, "avoiding invasion of privacy and abuse of human rights from misuse of data on individuals and groups, and minimising inequality in production, access to and use of data". In sum, this should lead to "more empowered people, better policies, better decisions and greater participation and accountability, leading to better outcomes for people and the planet" (IEAG 2014: 6).

Given the key function of data in the SDG process, it is unsurprising that the hope for data-driven development is expressed in basically all SDG process documents (Sustainable Development Solutions Network 2015; United Nations 2016: 2, 2017: 16 ff., 2018: 16 f., 2019: 58, 2022: 3, 2024b: 4). What is really surprising, however, is that there is practically no reference to the scientific literature, which has long criticized a goal- and data-based policy of generating negative effects (Fukuda-Parr, Greenstein, and Stewart 2013; Fukuda-Parr 2014, 2019; Cobham 2014; Crawford, Miltner, and Gray 2014; Behrend 2016; Desai and Schomerus 2018; MacFeely 2019; Engle Merry, Davis, and Kingsbury 2015). No less surprising is that there are hardly any explanations on how exactly data could actually bring about real change. The translation of data into real policy remains largely a blind spot, with only some information found in application examples and in rather recently established research on impact of data. Instead, the idea seems to be that somehow knowing more will lead to more political action.

The Global Partnership for Sustainable Development Data for example provides a list in order to show the successful use of data, including statements like: "The government of Sierra Leone can better protect its vital mangrove forests. In Senegal, farmers can get prices for their crops more quickly at harvest time. The government of Paraguay can more effectively track flood risk and manage water systems. In Nigeria, the government is better able to track COVID-19 cases and health center availability" (Global Partnership for Sustainable Development Data 2020: 4). It is striking that, firstly, the vast majority of these examples exhaust themselves in stating that better data is now available without explaining how this will be effective in practice and that, secondly, in the examples that do point to an application, it remains unclear exactly what difference this application makes.

The Food and Agricultural Organization (FAO), on the other hand, published a report in 2020 that explicitly addresses the question of the impact of data with regard to forests. Three positive examples of Vietnam, Brazil and Cameroon are used to examine the conditions under which data can successfully contribute to a

reforestation or stop deforestation. Even though this positive selection is problematic in that it cannot structurally capture the reasons for failure, the study provides some results which we briefly summarize here. The report concludes that data can be helpful with regard to four phases in the policy-cycle, i.e. problem recognition, proposal and choice of solution, putting solutions into effect, and monitoring the results (FAO 2020: x).

At the same time, the examples point to a variety of conditions and additional measures that are necessary to actually achieve positive effects both in terms of data quality and policy conditions:

- Data may not help since "knowledge is power. The authorities in many countries may not want the truth to be known. They may have vested interests or things to hide or they may want to make claims that are not supported by the statistics" (FAO 2020: 14).
- Data need to be accessible, affordable, reliable, transparent, relevant and consistent across time and space (FAO 2020: xi, 39).
- "Data can be 'wrong' in several ways. First, where uncertainty is great, data do not yield clear conclusions. Second, data can be biased, usually to an unknown degree. Potentially most problematic is the case where uncertainties are unknown" (FAO 2020: 30).
- "Policy change requires a window of opportunity combined with the political will that data and analysis can catalyse but not create" (FAO 2020: ix).

What can be concluded from this? Data is useful when it is accurate, consistently collected, wanted, when the problem it presents is actually on the government's agenda, and when a window of opportunity opens to implement a solution, when regulatory and fiscal measures are taken and enforced, when corruption is discouraged and civil society demands a solution, and when the economic benefits of a solution are higher than a continuation of current practice. In other words, correct data can be helpful when there is the political will to identify a problem and find a solution – but it is not in itself the solution.

These findings are also consistent with research on the general impact of data. "Impact" can be defined as "an effect on, change or benefit to the economy society, culture, public policy or services, health, the environment or quality of life, beyond academia" (Jensen et al. 2022: 1 f.). Two main conclusions can be drawn from this research: Firstly, there is an extreme mismatch between the assumption that data drives change and the amount of research into whether this assumption is actually true, as Jensen et al. in 2022 claim: "This study is the first attempt to analyse the development of impact from data, focusing for the first time on examples of research where data played a major role in the generation of both research findings and impact." (Jensen et al. 2022: 9) Secondly, the analysis "found that research data on their own rarely develop impact, but instead they require analysis, curation, product

development or other strong interventions to leverage broader non-academic value from the research data" (Jensen and Reed 2019).[7]

With the SDGs, the UN and the signatory states have articulated the political will to make the world a better place. This is obviously a very laudable endeavour, but with the one-sided focus on "better data, better lives", they may have failed to reflect on the necessary steps that could make this political will really guide sufficient action on the ground. Whilst crises such as the pandemic have certainly made things worse, such findings cannot explain the shortcomings and sometimes even appear as excuses.

Recent findings by Biermann et al. seem to indicate that when they claim that "the 2022 SDG Impact Assessment, conducted by a global consortium of researchers, have pointed to some structural dysfunctionalities of the SDGs and have shown that the first phase of SDG implementation did not lead to a transformative reorientation of political systems and societies" (Biermann et al. 2023). As a result of a workshop in 2024 with over 100 scientists, Biermann and others have suggested to reinvigorate the SDGs. They refer to "extensive research and numerous policy reports suggest[ing] that these goals struggle to gain momentum, leading the UN Secretary-General to call for their urgent 'rescue'" (Biermann et al. 2024).

In addition to factors such as "weakened multilateral cooperation, global crises such as the Covid-19 pandemic, and rising geopolitical tensions", they emphasize that "the design of the SDGs and their institutional framework have been criticized for contributing to the slow pace of progress". They claim that the 2024 Pact for the Future falls short of what is needed. Other attempts to rescue the SDGs are made e.g. by Ruppel and Murray (2024) who suggest "[e]levating the SDGs to constitutional principles" in order to grant them "binding legal force, making governments accountable for their implementation" (Ruppel and Murray 2024).

This Pact for the Future makes a number of promises on how to accelerate progress. Water scarcity is addressed by Action 6: "We will invest in people to end poverty and strengthen trust and social cohesion." (UN 2024) This action builds on the following finding:

> We express our deep concern at persistent inequalities within and between countries and at the slow pace of progress towards improving the lives and livelihoods of people everywhere, including people in vulnerable situations. We must meet the Sustainable Development Goals for all segments of society and leave no one behind, including through the localization of sustainable development. We emphasize that guaranteeing access to energy and ensuring energy security is critical for achieving the Sustainable Development Goals, promoting economic development, social stability, national security and the welfare of all nations worldwide. (UN 2024)

7 Cf. also (Jensen and Reed 2022).

It is hard to disagree with this statement in Action 6, but it is equally hard to see how it by itself will accomplish the change of paradigm that is actually needed. Articulating the will by itself does not mean that the domestic political situation or capacity has changed. If the problem of injustice is to be taken seriously it would have to be addressed by the international financial architecture more seriously. Similarly, at the domestic level, it requires solutions regarding distribution of resources, effective poverty reduction, strengthening sustainability, addressing power conflicts, etc. that are inconvenient but necessary. To what extent these endeavours have or may become more effective in light of the SDG paradigm remains a largely unanswered question.

Similar action is suggested by Action 10, again very lofty and sounding almost imploring: "We will accelerate our efforts to restore, protect, conserve and sustainably use the environment. [....] We will address the adverse impacts of climate change, sea level rise, biodiversity loss, pollution, water scarcity, floods, desertification, land degradation, drought, deforestation and sand and dust storms." Action 29, which again mentions water, promises to "scale up the means of implementation to developing countries to strengthen their science, technology and innovation capacities". Again, this is certainly a good idea, but it requires the actual transfer of resources even where there is no market for it. This is all what can be found in the Pact – water is not mentioned anywhere else in the whole 64 pages document, which is quite astonishing, looking at the gravity of water scarcity and other water related issues.

However, even the suggestions from academia (as important as they are) so far do not seem sufficient to remedy the weaknesses. Biermann et al. suggest, for instance, "to [e]stablish an independent expert-based assessment mechanism to monitor progress and strengthen the science-policy interface" (Biermann et al. 2024) (1.2), furthermore integrating them into existing or new legal frameworks (1.3), reforming the global financial architecture (1.4), strengthen participation from civil society (1.5), develop national and subnational plans (2.2). The demand is: "Governments must effectively operationalize and integrate the SDGs into national and subnational development strategies, customizing them to align with local contexts and priorities as well as actually deliver on their implementation."

Implementing the SDGs is obviously a very important point but merely demanding it does not answer the question why governments are not delivering on this promise so far. In turn, the suggestion to recalibrate the targets and indicators is one that we do not share because it simply means to shift the goal posts, which is exactly what the UN is doing already to some extent. Finally, the suggested "paradigm shift in economic policy" remains rather opaque, suggesting that there was a major dissent in the background.

Similarly, the suggestions by Ruppel et al. (2024) do not sufficiently address the root causes either. The study names some important factors, such as "addressing systematic inequalities and power imbalances". But it is limited to what would be

helpful in terms of legal reform. Suggesting to implement the SDGs in the constitution is a technical legal solution that would certainly strengthen their legal force, but the lack of consensus on the international level and haphazard implementation domestically does not make it seem very likely that this will actually happen. Admittedly, a decentralized approach, such as the one chosen in the Paris Agreement, might help to advance the agenda at least in some countries. However, this will depend on the political consensus, and whether this consensus will grow upon juridification is unclear.

Conclusions

To conclude, SDG 6 has neither been realized internationally nor in India, in spite of what the UN process promised. The desired connection of "better data, better lives" has not materialized. On the contrary, neither the data situation has improved sustainably in the ten years since the beginning of the SDG period, nor has the material supply of clean water. Whilst it is always easier to focus on what has not worked, it is much more difficult to say how things can be improved. But in order to do the latter, a thorough analysis of where we are and why things have not worked out the way they were supposed is imperative. We claim that this has not occurred sufficiently.

Our study cannot check reliably on effectiveness of SDG 6 as this would require a far more complex methodology on counterfactual analysis. Putting it simply, we do not know whether the situation on what SDG 6 demands might not be much worse without the SDG itself. In fact, there are some reasons to believe that this is actually the case, looking at the dramatically increasing impact of climate change which turns any attempt to implement the SDGs into an uphill battle. This is an important limitation of this study, and one that justifies even greater respect for a government that is aiming to address the issues. However, what we can say is that the intended goal with its targets and indicators has not yet been achieved, and we can offer at least one important reason why it probably could not have been achieved.

As our analysis shows, the lack of success is not surprising as the key assumption that better data makes better policy is quite under-complex and actually in many ways untrue. As we have argued using the policy cycle, the way that the United Nations has devised the SDGs is, at least to some extent, flawed and almost destined to fail. Of course, one should not underestimate the indirect effects of the SDGs. And in some ways the weaknesses that remain are simply a consequence of trying to achieve global consensus which is of course difficult enough – and has even become far more difficult in the last couple of years, looking at the various crises in the world and the crisis of the UN as such. In light of this, having managed to generate such a consensus is a big achievement in itself, and none of our criticism aims to deny that. Yet, nevertheless, whilst hopes and enthusiasm are helpful to generate a momentum and new norms may inject additional energy into the process we still need to be

aware of shortcomings and name them, in order to try and improve the system as it stands, as disappointed hopes without remedies merely lead to frustration.

More research is needed that zooms in even further and deconstructs the black box of SDG related law and policy in India. Looking at places where SDG implementation can be expected to happen should help to analyse whether there are in fact implementation efforts or not. If such implementation efforts in likely places exist, they are obviously not effective enough. If they do not exist, that could further underpin our findings of lack of effectiveness.

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