CHAPTER 1

Global Public Goods in Light of the New Paradigm of Sustainable Development under the Challenges Facing Today's World

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1 Introduction

The COVID-19 pandemic has proven that the survival of humanity in the event of a crisis depends on its collective response and action. After decades of taking world peace for granted, the Russo – Ukrainian War undermines our feeling of safety from war. Even without the latest challenges facing the world, the rapid process of globalization, the deepening of economic integration, and the increase in cross-border flows worldwide have placed global public goods (hereafter GPGs) and the possibilities for intervention at the center of discussions initiated by international organizations in the past decades. Climate change, security, and health issues are just some of the challenges facing the global community. In addition, outstanding scientific and technological advances, particularly high-speed communication networks and advances in transportation, have increased the extent to which the world's population is affected by the above influences and perceives them in their daily lives.

Consequently, the awareness created by these challenges, cross-border externalities, and spillover effects increases the pressure on national governments and international organizations to address this issue. Addressing exigent global challenges via GPGs provision is crucial to improve global welfare. However, many obstacles prevent proper allocation of resources to providing GPGs. Apart from movement towards global governance in terms of regulating transport and communication, resulting in high payoffs and little loss of national autonomy (Buchholz & Sandler, 2021), there's no strong commitment to govern the provision of GPGs at the global level. One of the initiatives to address this challenge is the United Nations 2030 Agenda for Sustainable Development (United Nations, 2015). Some of the Sustainable Development Goals (hereafter SDGs) are directly related to the provision of global public goods and have the ambitious goal of being a major global development framework.

The purpose of this chapter is to discuss the evolution of the concept of GPGs and to address the main features and challenges related to GPGs, their provision

and financing. We aim to identify the causes of inefficiencies in the provision of GPGs and assess the impact of globalization processes, economic growth, and technological progress on the scope and diversity of GPGs. The chapter contributes to an understanding of the changing nature of GPGs and provides a framework for discussing the adjustments needed in the definition and provision of GPGs in the context of the new sustainable development paradigm.

The content of the chapter is structured along four sections and a conclusion. In Section 1, we first outline the characteristics and discuss the concept of public goods. In Section 2, we continue by introducing and discussing global public goods. Section 3 focuses on the provision and financing of GPGs, while Section 4 places GPGs in the context of sustainable development and the SDGs.

2 Characteristics of Public Goods

The concept of public goods, also known as collective consumption goods, comes from microeconomics and welfare economics. It was developed by Paul Samuelson (1954), although the concept as such goes back at least to the 18th century, where the "common good" was mentioned by David Hume (1739). Public goods can be distinguished from its private counterpart based on two principles, namely the rivalry in consumption and excludability from consumption. To understand what a public good is, it is useful first to examine the characteristics of a private good. In a market transaction a buyer gains access to a good (or service) in exchange for money or, sometimes, in exchange for another good. Buyers and sellers meet through the price mechanism, and if everything works in a textbook perfect way, the economy can reach a state of maximum efficiency in which resources are put to their most productive uses. A key condition for a market transaction, however, is that the ownership or use of a good can be transferred or denied conditional on the offsetting exchange – the payment of its price. Thus private goods tend to be excludable and rival in consumption. A piece of cake, once consumed, cannot be enjoyed by others (Kaul et al., 1999). With public goods, matters are different. Pure public goods are characterized by the properties of non-rivalry and non-excludability in consumption (Cornes & Sandler, 1994).

Non-rivalry (non-congestion) generally means that consumption of such a good by one consumer does not prevent consumption by other consumers. More specifically, an additional consumer of the public good does not reduce the utility of existing consumers and marginal costs are zero when an additional individual consumer engages in the consumption of the public good. Thus, non-rivalry allows a public good to be used by multiple consumers.

This means that the total utility from consuming a public good is the sum of the utilities of all individuals consuming that public good. Since markets are not able to detect the total utility, but only observe individual utility from the consumption of a public good via individual demand, the market is not able to ensure allocatively efficient quantities of public goods to be produced (Stiglitz, 1988). Regulation of the volume of production is therefore necessary to ensure sufficient production of public goods.

Non-excludability is another characteristic usually associated with public goods. In the case of non-excludability, no consumer can be excluded from consuming a good. This means that free riders, consumers who do not contribute to the payment of a public good, can participate in its consumption. When a public good is characterized by both non-rivalry and non-excludability, both regulation of the volume of production and collective financing of a public good (direct taxation or subsidization of private spending) are essential to ensure the allocative efficiency of the production and consumption of public goods (Silvestre, 2012).

Table 1.1 presents the taxonomy of goods according to their characteristics of rivalry and excludability, distinguishing between pure and impure public goods (Buchholz & Sandler, 2021). Pure public goods are consistent with the above definition as completely non-rivalrous and non-excludable. In the case of pure public goods, the marginal cost of providing the good to another consumer is zero, and no one can be excluded from the benefit of the good. In modern democracies, few cases of pure public goods come to mind. Samuelson's (1954) examples of the lighthouse, traffic lights, national defense, and world peace (Kaul et al., 1999) are a few cases of pure public goods. But several impure public goods that are excludable and/or congestible, thus carrying one of the private goods' characteristics, can be found. Such goods are, for example, tertiary education, motorways, public libraries, museums, and sporting facilities, as well as certain aspects of urban infrastructure (Economides & Philippopoulos, 2020). Impure public goods are not entirely non-rivalrous nor non-excludable. Club goods are a subtype of impure public goods. They are characterized by

TABLE 1.1 Taxonomy of good types by excludability and rivalrousness

	Rivalrous	**Non-rivalrous**
Excludable	Private goods	Club goods
Non-excludable	The tragedy of the commons	Pure public goods

SOURCE: GRAVES (2020)

excludability in consumption, being available only to club members (members of a particular organization or institution), although they are characterized by non-rivalry up to a certain congestion threshold. Accordingly, they are often classified as a subtype of public goods that begin to behave like private goods above a certain level of consumption or number of consumers. That is, above a certain level, additional members of the club, i.e., additional consumers, lead to a congestion effect that may be viewed as introducing rival consumption (Coase, 1974; Baumol & Blinder, 2015). Regardless of the type of public good, the provision of public goods is a central function of governments.

In sum, public goods represent an example of market failure, which prevents markets from achieving an allocatively efficient level of output. Unlike private goods, public goods justify either the governmental direct provision, regulation of the volume of production or merely financing of the public good (Thöne & Kreuter, 2020).

3 Global Public Goods

GPGs have captured the attention of economists and social scientists since they were discovered based on the standardization of measurement system, the defining of property rights, and the opening of trading systems, showing the need for international public goods provision in the absence of a supranational government (Buchholz & Sandler, 2021). Since the end of the 20th century, the key international institutions such as the World Bank and the United Nations have recognized the growing importance of goods with benefits that spill over national borders. Such goods have benefits that extend beyond the country of origin. Some authors (e.g., Sandler, 2002) differentiate between regional public goods, providing benefits within regions, international public goods, providing benefits to more than one country, and GPGs, where benefits evolve worldwide.

As explained, global public goods, unlike country-specific or regional public goods, are not bound by geographic boundaries. Moreover, global public goods are multidimensional and include sociological and temporal dimensions in addition to geographic ones to reflect the complexity of the real world (Kaul et al., 1999). Therefore, we can define global public goods as goods whose benefits span multiple countries, inhabitants, and generations, which are global and inherently public at the same time (Kaul & Mendoza, 2003). "Global public goods are institutions, mechanisms, and outcomes that provide quasi-universal benefits to more than one group of countries, extending to both current and future generations" (Birdsall & Diofasi, 2015). Consequently, GPGs provide benefits to people regardless of their country's level of development.

GPGs play a key role in securing social, economic, and political progress and are fundamental to addressing global risks such as security, climate change, infectious diseases, and financial crises.

There are four particular characteristics of GPGs that we need to observe in order to distinguish between different types of GPGs (Buchholz & Sandler, 2021), i.e., non-rivalry, non-excludability, the existence of spillover effects and the technology of aggregation. The first and the second characteristic relate to GPGs as public goods and involve the degree of non-rivalry and non-excludability from consumption. These two characteristics of the GPGs imply that Pareto optimum level of the provision of GPGs cannot be achieved by provision decisions of individual countries. When non-rivalry is complete, an additional country using the GPG does not reduce the benefits from other countries and marginal cost of including additional country in the consumption is zero. An example of such a GPG is a thickened stratospheric ozone layer, where the benefits of one country are not smaller when other countries benefit from less ultraviolet exposure as well (Buchholz & Sandler, 2021). Non-excludability means that once provided, GPGs benefits are unconditionally available to all countries, i.e., regardless of their payment. For example, the stratospheric ozone shield, preserving biodiversity, controlling infectious diseases, are GPGs which are non-excludable (Buchholz & Sandler, 2021). The third characteristics of GPGs involves the range of benefit spillovers. GPGs are related to global benefit spillovers while smaller ranges of benefit spillovers result in transregional, regional, transnational, and national public goods (Sandler & Arce, 2002). The fourth characteristic of GPGs is related to technology of aggregation (also called aggregator technology). Buchholz and Sandler (2021, p. 496) differentiate between seven types of aggregator technologies:

- Summation, where the overall level of GPG equals the sum of the countries' contributions (e.g., limiting greenhouse emissions or preserving biodiversity, curbing organized crime in a globalized world, developing smart city platforms and strategies)
- Weighted sum, where the overall level of GPG equals a weighted sum of the countries' contribution (e.g., controlling the spread of an infectious disease, reducing acid rain, system of canals and waterways)
- Weakest link, where the smallest contribution of the world's countries determines the GPG's aggregate level (e.g., maintaining the functionality of a global network, surveillance of a disease outbreak)
- Weaker link, where the smallest contribution of the world's countries has the greatest influence on the GPG's aggregate level, followed by the second smallest contribution, and so on (e.g., inhibiting the spread of financial instability, inhibiting crop disease diffusion)

– Threshold, where benefits from the GPG only arise once its cumulative contributed quantity surpasses a threshold amount (e.g., establishing an early-warning system for disasters, suppressing large-scale forest fires, or curbing flooding)
– Best shot, where largest contribution by a country determines the GPG's aggregate level (e.g., diverting a comet, developing financial or agricultural best practices, providing satellite launch facility)
– Better shot, where largest contribution by a country has the greatest influence on the GPG's aggregate level, followed by the second largest contribution, and so on (uncovering best treatment regimes for diseases, limiting the diffusion of transnational terrorist campaigns, biohazard facility)

Table 1.2 maps the above-described aggregator technology categories to three general types of GPGs, i.e., pure GPGs, impure GPGs, and club goods.

The overview of the literature covering the GPGs topics (Buchholz & Sandler, 2021) by the area of interest show that global public health, environment preservation, climate change mitigation, global public health, and security are considered as fundamental GPG-related areas:

– *Natural environment*, where GPGs are related to protecting essential ecosystems and preserving biodiversity, reversing ozone layer depletion and curbing climate change, adopting universal regulatory practices related to these topics (for more on green energy, see Chapter 12)
– *Health*-related GPGs, such as identifying virulent pathogens, eradicating infectious diseases, developing disease treatment regimes (for more, see Chapter 13)
– *Security and food safety issues* related to fostering cybersecurity, reducing transnational terrorism, and maintaining world peace (for more, see Part 2)
– *Economic, social, and other conditions*, such as discovering scientific breakthroughs, preserving cultural heritage, adopting universal regulatory practices and international trade rules, ameliorating global financial and/or economic crises, addressing refuge flows, and promoting smart city platforms (for more on these issues, see Parts 3 and 4 and Chapters 14–16)

Bostrom (2013) argues that mitigating existential risk is another issue that should be treated as a GPG, if not the most important one. Another example of a GPG is knowledge (Stiglitz, 1999). It fulfills both theoretical criteria, since an additional consumer of knowledge does not diminish the amount of knowledge available (non-rivalry) and, moreover, additional consumers can hardly be prevented from accessing existing knowledge (non-excludability), all the more so in the era of digitalization.

The scope and the variety of GPGs have been steadily increasing due to technological advances, processes of globalization, economic growth, and

TABLE 1.2 Examples of GPGs according to aggregator technology categories and three general types of GPGs

	Pure public goods	Impure public goods	Club goods
Summation	Greenhouse gas emissions limitation Biodiversity conservation	Organized crime curbing Peacekeeping assets deployment	INTELSAT communication network
Weighted sum	Infectious outbreak spread control	Acid rain and pollution reduction	System of canals and waterways
Weakest link	Global network maintenance	Financial crises surveillance Disease outbreak surveillance	Air traffic control system
Weaker link	Financial instability contagion prevention Maintaining sterilization	Inhibiting pests Crop disease diffusion	Global internet network
Threshold	Early-warning system for natural disasters	Suppressing forest fires Curbing flooding	Crisis management counterterrorism force
Best shot	Eliminating a rogue country Diverting a comet	Developing financial or agricultural best practices	Satellite launch facility
Better shot	Treatment regimes for diseases	Limiting terrorist campaigns Drug trafficking prevention	Biohazard facility

SOURCE: BUCHHOLZ AND SANDLER (2021)

population expansion. As discussed in Buchholz and Sandler (2021), advances in technologies lead to the rise of novel GPGs, such as nuclear waste sequestration, the internet, satellite-based communication networks, supersonic air travel, and ozone-depleting chlorofluorocarbons. Economic growth and population expansion in some parts of the world relates to climate change and its mitigation as one of the most crucial GPGs nowadays. By using the

newest monitoring technologies, the global public bads (hereafter GPBs) can be marked, such as the accumulation of atmospheric greenhouse gases, the melting of the icecaps, deforestation of the rainforest, the spread of the deserts.

Further, some national public goods are becoming global as their consequences extend to neighboring countries and beyond, such as transnational terrorism and civil wars. The integration of markets requires the development of a common response to market crisis while the high-speed communication enables sharing of ideas, threats, knowledge, misinformation, panics, and best practices within the global community.

4 Provision and Financing of GPGs

In case of non-excludability, compulsory collective financing (e.g., financing by general taxes) of public good provision is the best option to overcome the free-rider issue. But other possibilities of financing exist in the case of goods characterized with excludability in consumption. One possibility is mandatory collective financing of a public good, which leads to uniform and free access to public goods for all members of society. The oppositeto mandatory collective financing is the case where individuals are free to choose the amount they want by paying a price (usually called a use price), with that price determined by a market-based mechanism. Of course, anything in between is possible, e.g., combining policy-based and market-based mechanisms, as well as outcomes for other pricing systems, such as average cost or marginal cost pricing (Economides & Philippopoulos, 2020).

Even though GPGs are related to the same issues as the public goods provision and collective action, additional features are of particular importance in the case of GPGs. The provision and financing are more complex in the case of GPGs, contrary to country-specific public goods that are provided by national governments and financed via national tax systems. The required geographical scale of the collective action is greater in the case of GPGs compared to national counterparts. Consequently, the provision capabilities of the GPGs are more heterogeneous (Chen & Zeckhauser, 2018). GPGs involve countries or institutions to act as the agents, while public goods involve individuals as agents. With countries as agents, their sovereignty needs to be considered with respect to provision and agreement. Various institutions, such as coalition formation (e.g., voluntary cooperation by a subgroup of countries), public private partnerships, non-governmental organizations (hereafter NGOs) and multilateral organizations are important actors in the provision of GPGs (Buchholz & Sandler, 2021).

Barret and Dannenberg (2022) use an experiment to investigate the decision to link trade cooperation to the provision of a GPG. They study a unilateral approach, in which players decide independently and without commitment, and a multilateral approach, in which players decide by, and are committed through, an agreement. Results confirm the superiority of the multilateral approach, where the agreement by a majority coupled with commitment by this majority are required for successful provision of the public good. This supports the crucial role of international organizations (hereafter IOs) for the optimal provision and adequate financing arrangements of the GPGs.

In recent years, especially after the global financial and economic crisis (2008/2009), we have witnessed a weakening of the multilateral foundations of the world economic order created after World War II under the umbrella of the Bretton Woods institutions and the system of UN agencies. Growing skepticism and disrespect for global/international agreements and even threats to withdraw from IOs on behalf of narrow national interests further undermine the already weak foundations of the multilateral format. The question arises: Are international institutions (e.g., the World Bank, IMF, WTO, WHO) capable of playing a decisive role in the governance of GPGs? Given the growing scope and number of GPGs, on the one hand, and the erosion of the institutional strength of IOs, on the other, IOs do not seem well equipped to handle the complex task of managing GPGs. According to economist Ravi Kanbur (2001), IOs need to change their approach and governance systems and, in particular, rethink their country-by-country approach to allocating funding.

The multilateral design needs to address the provision as well as the financing of GPGs, following the fairness principle. Namely, on the one hand, some countries have an incentive to contribute less, creating the so-called free-rider problem at the international level, which results in the provision of GPGs being less than globally desired (Kornek & Edenhofer, 2020). Thus, in the case of GPGs, economic efficiency is maximized when economic activities – and the policies to regulate them – extend across national borders. Indeed, similar to all public goods, the provision of GPGs will be structurally undersupplied if left to markets or individual countries that have suboptimal incentives to spend (Kopiński & Wróblewski 2021). Since the provision of GPGs cannot be done single-handedly by national governments, collaboration between multiple countries is required. Chen and Zeckhauser (2018) show that GPGs are particularly challenging due to the substantial asymmetries among nations. Namely, in the case of GPGs, there is an absence of a central authority possessing tax and expenditure responsibilities to provide an efficient level of public good. Consequently, voluntary arrangements must replace coercive ones, and

significant underprovision must be expected as small-interest nations have strong incentives to ride cheaply.

For example, Bättig and Bernauer (2009) identified free-riding as one of the problems in reducing greenhouse gas emissions to address the problem of climate change. While their results suggest that democracy, as measured by the presence of institutions, increases policy outputs related to climate change, their impact on policy outcomes is not clear. The free-rider problem among signatories to international environmental agreements can be addressed through various means, one of which is (trade) sanctions. However, whoever imposes such sanctions harms both signatories and non-signatories, so the result may not be the desired welfare increase, even if it increases the supply of GPGs (Barrett, 1997).

Another issue on the supply side is the protection of intellectual property rights, which can limit the provision of public goods on a global scale. This aspect of the role of intellectual property agreements and the privatization of public goods is a developing area of research (Brandi et al., 2010; Pogge, 2005; Maskus & Reichmann, 2004). Although the outcomes of Trade-Related Aspects of Intellectual Property Rights (TRIPS) are difficult to measure, some findings suggest that developing countries are more affected, particularly by patents on pharmaceutical and health-related products.

On the other hand, however, international solidarity in terms of financing the provision of GPGs is inherent in several international institutions. These institutions are also the main proponents of the crucial role of GPGs. In contrast to the free-rider approach, countries sometimes assume a disproportionate responsibility for financing GPGs to ensure their existence and/or sufficient volume. Funding is an important issue, especially for developing countries, so that they can also participate in the supply of GPGs. Funding is usually obtained through development assistance (Porter et al., 2008). For both reasons, i.e., to overcome the free-rider problem or to promote international solidarity in the provision of GPGs, strong international cooperation is needed, based on a formal agreement along with institutions to support it (Estevadeordal & Goodman, 2017).

5 GPGs and Sustainability

GPGs remain an important aspect of addressing many persistent issues and are as such inviolably linked to sustainable development. "Meeting our own needs without compromising the ability of future generations to meet theirs" (Keeble, 1988) is the one goal that, though perhaps sometimes overlooked, is in

the background of discussions about GPGs and the need for global responses. Underprovision of GPGs, such as climate change mitigation, financial stability, global health, or cyber security, today threatens global development and, thereby, also global economic, social, and environmental sustainability (Kaul, 2019). For example, the success of the green revolution, a period of substantial agricultural development whose impact helped reduce poverty, can be attributed to heavy investment in crop research, policy support, and knowledge transfer (Pingali, 2012). Issues regarding the financing of health at the global level are prominent and have persisted for a longer period of time (McCoy et al., 2009).

The term "sustainable development" was first defined in the World Commission for Environment and Development's report *Our Common Future* (1987) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Still, Barbier, Markandya, and Pearce (1990) are considered as founders of the concept of sustainable development, seeing it as "the achievement of a specific set of socially desirable objectives such as fair access to natural resources, an increase in real income per capita, an improvement in health and nutrition, an improvement in education levels and sustainability and self-sustaining growth." Today, in business and policy contexts, limits to sustainability are determined by physical and natural resources, environmental degradation, and social resources. Accordingly, sustainable policies place some emphasis on the future effect of any given policy or business practice on humans, the economy, and ecology.

5.1 *SDGs and GPGs*

In 2015, United Nations member states signed the 2030 Agenda for Sustainable Development (UN General Assembly, 2015), which was expected to be a milestone in the concept of sustainable development. The 2030 Agenda adopted 17 Sustainable Development Goals (hereafter SDGs). These 17 goals are focused on economic growth, social development, and environmental protection and are universal as they concern both developing and developed countries and because they are focused on sustainability rather than mere competitiveness. SDGs are often seen as a concept that is strongly related to the context of GPGs. Namely, the introduction and implementation the 2030 Agenda and its 17 SDGs brings an opportunity to discuss the world's response to global challenges and to rethink positions on GPGs (Jenks, 2015). Similarly, Dill (2018) believes that the SDGs are about providing public goods, while Naert (2019), for example, states that several of the SDGs fall either under state-level correction of market failure, such as the health area, or are related to the need for transnational agreement, such as in the case of combating climate change

or conservation of the oceans. Accordingly, with regard to SDGs the picture that emerges, in terms of provision, is a patchwork of national, subnational, and global engagement where subsidiarity should act as a guiding principle. In addition, private actors and civil society also have a role to play in the provision of these GPGs.

In Table 1.3, we focus on the global engagement part and link the four core areas of the GPGs, i.e., natural environment, health, security and food safety, and economic, social, and other conditions, to the 17 SDGs. We show examples

TABLE 1.3 Relationship between areas of SDGs and GPGs

Area of SDGs/GPGs		Natural environment	Health	Security and food safety	Economic, social, and other
1	End poverty in all its forms everywhere	early-warning system for natural disasters	developing disease treatment regimes	developing agriculture best practices	discovering scientific breakthroughs, amelioration of global crises
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	early-warning system for natural disasters		crop disease control, inhibiting pests	amelioration global financial and/or economic crisis
3	Ensure healthy lives and promote well-being for all at all ages		identifying virulent pathogens, eradicating infectious diseases, developing disease treatment regimes		
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all				addressing refuge flows, discovering scientific breakthroughs

TABLE 1.3 Relationship between areas of SDGs and GPGs (*cont.*)

Area of SDGs/GPGs		Natural environment	Health	Security and food safety	Economic, social, and other
5	Achieve gender equality and empower for all women and girls				addressing refugee flows
6	Ensure availability and sustainable management of water and sanitation for all	early-warning system for natural disasters	eradicating infectious diseases		
7	Ensure access to affordable, reliable, sustainable, and modern energy for all	curbing climate change			global network maintenance
8	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all				amelioration global financial and/or economic crises
9	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation				discovering scientific breakthroughs
10	Reduce inequality within and among countries				amelioration global financial and/or economic crises
11	Make cities and human settlements inclusive, safe, resilient, and sustainable			fostering cybersecurity, reducing transnational terrorism, maintaining world peace	developing smart city platforms and strategies

TABLE 1.3 Relationship between areas of SDGs and GPGs (*cont.*)

Area of SDGs/GPGs		Natural environment	Health	Security and food safety	Economic, social, and other
12	Ensure sustainable consumption and production patterns	protecting essential ecosystems, preserving biodiversity			preserving cultural heritage
13	Take urgent action to combat climate change and its impacts	reversing ozone layer depletion, curbing climate change			
14	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	protecting essential ecosystems			
15	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation, halt biodiversity loss	protecting essential ecosystems, preserving biodiversity, curbing climate change			adopting universal regulatory practices
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels			fostering cybersecurity, reducing transnational terrorism, maintaining world peace	preserving cultural heritage, addressing refugee flows

TABLE 1.3 Relationship between areas of SDGs and GPGs (*cont.*)

Area of SDGs/GPGs		Natural environment	Health	Security and food safety	Economic, social, and other
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	curbing climate change	developing disease treatment regimes	promoting institutional strengths of IOs	universal regulatory practices, global network maintenance

SOURCE: OWN WORK

of activities that support the achievement of a particular SDGs and at the same time considered GPG from a particular core GPG area. Virtually all of the SDGs require, at least to some degree, a global level of governance to address the public good nature of the goals. Several SDGs are of the interdisciplinary type, as shown by the overlapping SDG/GPG areas in Figure 1.1.

5.2 *Financing SDGs, Provision of GPGs, and Official Development Assistance*

As we explained the link between the SDGs and GPG concept, we can also relate the issues of financing the public goods and the SDGs' financing. Namely, both, the SDGs and GPGs require significant finance and often face the same non-excludability related to the free-rider issue – especially those SDGs, that can only be achieved via transnational cooperation.

The SDGs require significant increases in investment in broad-based economic transformation. The proposed approach to deal with the financing of sustainable development is called "blended finance." Blended finance is aimed at mobilizing private capital to be used as an addition to philanthropic and public development funding for strategic financing of SDGs. For development finance and philanthropic funders, Blended finance represents an opportunity to drive significant new capital flows into high-impact sectors, while effectively leveraging private sector expertise in identifying and executing development investment strategies. Blended finance has three key characteristics (World Economic Forum, 2015). First, the development finance and philanthropic funds are used to attract private capital into deals. Second, blended finance is used to finance investments driving social, environmental and economic progress. Third, financial returns for private investors are to be in line with market

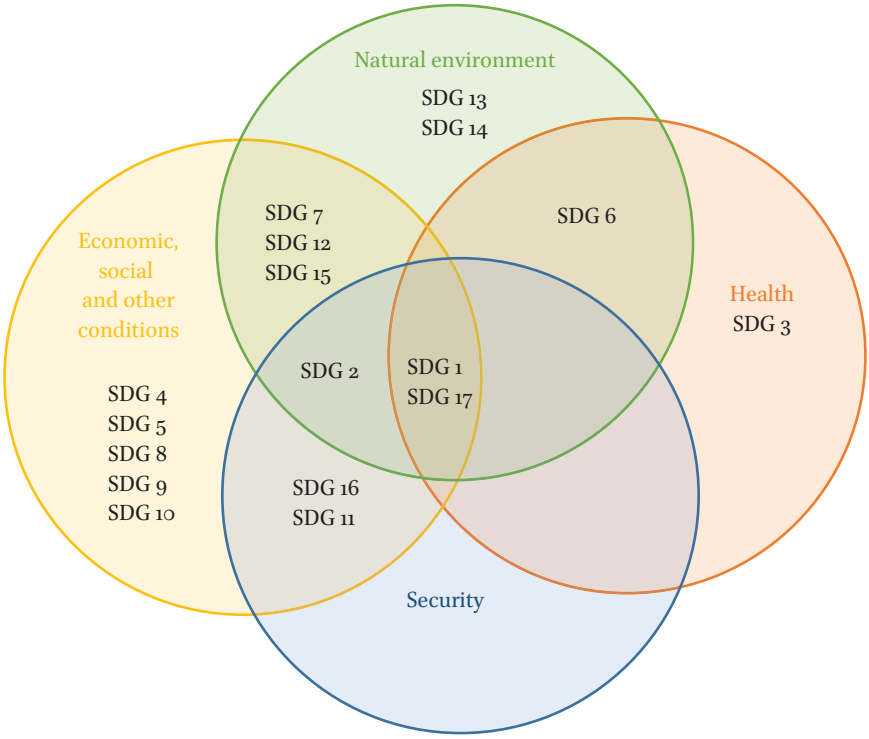

FIGURE 1.1 SDGs and GPG areas overlapping
SOURCE: OWN WORK

expectations, based on real and perceived risks. In such a financial framework, the "new ecosystem of investment for sustainable development" is key. In such a system, private actors are no longer seen as passive bystanders in the development process, nor merely as clients or contractors, but are seen as important co-investors and co-producers in development projects and programs.

Unfortunately, the reality is somewhat different. Even prior to the COVID-19 crisis, countries were already facing difficulties to finance and fulfill the ambitions of the 2030 Agenda. The US$2.5 trillion annual SDG financing gap in developing countries prior to the COVID-19 epidemic is predicted to increase due to global economic uncertainty, rising public debt, and debt servicing costs, particularly in the poorest countries. All of this puts increasing pressure on SDG funding. The gap to achieve the SDGs in developing countries increased by 56% after the outbreak of COVID-19, totaling US$3.9 trillion in 2020. However, it would take less than 1% of global finance to fill this gap (OECD, 2022).

Furthermore, another question arises about the use of official development assistance (hereafter ODA) to finance GPGs. Should the financing of GPGs be

counted as ODA? Official development assistance is defined as government aid that promotes and specifically targets the economic development and welfare of developing countries. Therefore, the key point for GPGs financing to be part of ODA is who should benefit from the provision of GPGs. These are defined by the fact that they are non-rivalrous and non-excludable, rather than by a distinction based on which groups are most likely to benefit from them. Thus, there is no simple answer on the adequacy of allocation of ODA to the provision of GPGs. When the overwhelming beneficiaries of a GPG are developing countries, the answer tends to be yes, while in cases where this is much less clear, the answer tends to be no (Kenny, 2020). Another aspect is aid effectiveness; in this regard, strengthening commitments on untying ODA would increase aid effectiveness by reducing transaction costs and improving allocational efficiency, including in the case of GPG-related ODA.

There are no general statistics on the extent of ODA spent on the provision of GPGs; estimates for the share of ODA spent on GPGs available based on the OECD Creditor Reporting System range from 3.7% (Anand, 2004) and 8% (Knox, 2016) to 25% (Raffer, 1999), with this extreme range of estimates being largely due to differences in definitions. Knox (2016) reports that the most financed three broad GPG fields were environment (US$8.0 billion), global public health (US$2.1 billion) and other (i.e., non-health/non-environment) research. Reisen, Soto, and Weithöner (2008) estimated that donors spent around 30% of ODA on international public goods in 1997–2001 – half on GPGs and half on regional public goods. They also confirmed allocational trade-offs between GPG-related ODA and traditional aid but concluded that an increase in GPG spending is not likely to adversely affect the flow of aid transfers to the poorest countries.

A conceptual and practical separation of ODA and GPGs financing has been proposed (e.g., Kaul, 2019; Kaul et al., 2003;; Kenny, 2020), unless an investment brings both local (developing country) and global benefits and aid is an element of the financing mix because of local benefits. In principle, funding for GPGs such as biodiversity conservation, climate change mitigation, and related activities should be new and additional and should not come from ODA. Indeed, the concern is that by excluding general GPGs, the ODA category may exclude some expenditures that have higher return to developing countries than some expenditures included in ODA (including an inefficient technical assistance project, while excluding support for the development of a COVID-19 vaccine). This follows from the fact that ODA is explicitly not intended as a measure of all spending that brings benefits to developing countries, but rather as a measure of expenditures that are specifically motivated in terms of developing country welfare (Kenny, 2020).

6 Conclusions

The above discussion has shown that GPGs cannot be adequately and sufficiently provided by national governments acting unilaterally, and therefore cooperation among multiple countries is necessary. This requires reinforcement of existing formal arrangements as well as an updated role for the institutions to support it. Several interlinked challenges of today's world, related to environmental, technological, health, (cyber)security, economic, and geopolitical changes, have created the need for a new approach to GPGs that considers their interlinkages with the SDGs. They also call for improved effectiveness in the provision of GPGs through accountability measures aimed at increasing compliance with sustainable development and deliver better results by influencing member states' policies not only for more effective implementation but also adequate provision (private and public) for GPGs.

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