

Global Public Goods

**Todd Sandler, Endowed Chair Emeritus
School of Economics, Political & Policy Sciences
Department of Economics
University of Texas at Dallas**

**UN DESA
Economic Analysis and Policy Division**

Introduction

- This overview investigates the increasing importance of global public goods (GPGs) in today's interdependent world.
- **A GPG has nonrival or partly rival and nonexcludable or partly excludable benefits that affect a large portion of the globe.**
- Main drivers of GPGs
 - Novel technologies, monitoring systems
 - Balkanization of countries
 - Enhanced globalization and its flows of goods, services & externalities (non-compensated interdependencies)
 - Population increases
 - Economic growth

Key GPGs

- **Curbing climate change**
- **Reducing world hunger and promoting other sustainability goals**
- **Addressing terrorism**
- **Eliminating interstate and intrastate wars to preserve world peace**
- **Eradicating infectious diseases and promoting global health**
- **Discovering scientific breakthroughs**
- **Instituting universal regulatory practices in transportation and elsewhere**
- **Practicing geoengineering**

Presentation addresses

- Account for noncooperative provision
- Coalition formation and implications
- Ways to bolster GPG provision

Recurrent Themes associated with GPG provision

- Huge welfare implications
- **Strategic considerations**
- Importance of alternative institutional arrangements
- GPGs' defining properties and their influence on provision
- **New actors' roles**
- Collective action concerns

GPGs' Properties

- Partially or fully nonrival
- Partially or fully nonexcludable benefits
- Global range of spillovers
- Technology of aggregation

Distinctions among public goods

- **Global geographic scale**
- **Heterogeneity among contributors**
- **Layers of actors – at global, interregional, regional, and national levels**
- **Coalition formation – presence of leakages**
- **Alternative institutions – countries' sovereignty concerns**
- **Multilateral institutions – World Bank, United Nations, Regional Banks**

GPG's Failures and Successes

Failures for GPGS

- **Climate change**
- **Financial crises**
- **Civil and international conflicts**
- **World hunger**

Successes for GPGs

- **Smallpox eradication in 1979**
- **Replenishment of the stratospheric ozone shield – Montreal Protocol**
- **Regulatory practices on the seas and air corridors**
- **UN peacekeeping operations after the Cold War**
- **Addressing some regional environmental issues with treaties**
- **Monitoring of disease outbreaks**

Background concepts

- **Nonrival GPGs**
 - **Implication**
 - **Financing concerns**
- **Nonexcludable GPG – free-rider concerns**
- **Pure, impure, and club GPGs**
- **Club GPG – an essential institutional fix for some GPGs**
 - **INTELSAT, Suez Canal, Air corridors, Air-traffic systems**
 - **Crowding**
 - **Toll or user fee**
 - **Finance optimal provision**
 - **Can address membership heterogeneity through user charges**

Aggregation technologies

- **Definition:** Countries' contribution to GPG determines the overall level of the good that is available for consumption or use.
- **Examples:**
 - **Summation**
 - **Weighted sum**
 - **Weakest link**
 - **Weaker link**
 - **Threshold**
 - **Best shot**
 - **Better shot**
 - **Joint products**

Aggregator tied to strategic concerns, income transfers, leadership, and coalition formation.

TABLE 1
GLOBAL PUBLIC GOODS: AGGREGATE TECHNOLOGIES AND THREE PUBLIC GOOD TYPES

Aggregation Technology	Pure Public Good	Impure Public Good	Club
Summation: Overall level of GPG equals the sum of the countries' contributions.	Limiting greenhouse gas emissions or preserving biodiversity	Curbing organized crime in a globalized world or deploying peacekeeping assets	INTELSAT communication network
Weighted sum: Overall level of public good equals a weighted sum of the countries' contributions.	Controlling the spread of an infectious outbreak (e.g., Ebola)	Reducing acid rain or ambient pollutants	System of canals and waterways
Weakest link: Smallest contribution of the world's countries determines the GPG's aggregate level.	Maintaining the functionality or integrity of a global network	Surveillance of financial crises or a disease outbreak	Air-traffic control system
Threshold: Benefits from the GPG only arise once its cumulative contributed quantity surpasses a threshold amount.	Establishing an early-warning system for disasters, including tsunamis	Suppressing large-scale forest fires or curbing flooding	Crisis-management teams or counterterrorism force
Best shot: Largest contribution by a country determines the good's aggregate level.	Eliminating a rogue country or diverting a comet	Developing financial or agricultural best practices	Providing satellite launch facility

TABLE 2
AGGREGATOR TECHNOLOGIES: PROGNOSIS AND RECOMMENDATIONS FOR GPGS

Aggregator	Prognosis	Recommendations
<i>Summation</i>	<ul style="list-style-type: none"> • Free-riding tendency stems from the perfect substitutability of contributions. • General tendency is for underprovision. 	<ul style="list-style-type: none"> • Grants and loans are needed to support provision. • Multilateral institutions need support supply. • Repeated interaction may ameliorate underprovision.
<i>Weighted sum</i>	<ul style="list-style-type: none"> • Less of a tendency for underprovision since one country's provision is not a perfect substitute for that of another country. • Countries with larger impacts are incentivized to act. 	<ul style="list-style-type: none"> • Institute monitoring to gather information on countries' supply influence. • Spatial considerations may be essential.
<i>Weakest link</i>	<ul style="list-style-type: none"> • Efficient if countries possess same tastes and GDP. • More equal income distribution promotes provision. • Matching contributions are desired. • There is a need to shore up weakest links, which poses free-riding concerns. 	<ul style="list-style-type: none"> • Capacity building is essential when countries differ. • Global institutions, dominant country, partnerships, and others can assist weakest-links countries.
<i>Best shot</i>	<ul style="list-style-type: none"> • Global income inequality promotes provision. • Multiple best shooters results in a coordination problem. • Poor regions may not possess a best shooter. 	<ul style="list-style-type: none"> • Rich or dominant country fosters provision. • Multilateral organizations and others can pool actions. • Regions must coordinate their provision activity.

Some findings, stressing the interdependence of countries

- The equilibrium level of GPG is **suboptimal**, more so as the number of contributing countries increases.
- If income increases in some contributing country, more of GPG will be supplied and all countries' welfare improve
- **If some country's preference for GPG increases, GPG supply increases along with all countries' welfare except the one whose preferences has increased (it loses from less contributions from others)**
- A redistribution of income **among contributors** leaves GPG supply unchanged – this is the so-called neutrality result

More findings – generalization of baseline model

- **If income is transferred from noncontributing to a contributing country, GPG supply of all countries increase and utility of all countries, but donor, will increase – role for new agents.**

Technology of aggregation

- **A redistribution of income from a country with low GPG productivity to a country with high productivity increases GPG supply and the utility of all countries.**
 - **Implication for neutrality**
 - **Weighted sum**

Unilateral action findings

- Additional GPG contributions by a country are partially crowded out through reduced contributions by others – unilateral action usually doesn't pay for purely public GPGs.

Coalition formation

- Due to the reactions of noncoalition countries, cooperation of a limited coalition does not necessarily improve the utility of the coalition members owing to crowding out by noncoalition members' free riding.

Institutional engineering

- **Bolstering country-specific jointly produced**, complementary benefit entices select countries to support a GPG – give NATO and UN peacekeeping examples.
- **Exploit high income responsiveness** of some GPGs – defense, health, or environment – to induce contributions.
- **Designing assessment schemes to induce positive reactions** or matching behavior – e.g., UN peacekeeping assessments
- **Bring in new donor entities** to escape neutrality concern
- **When the GPG warrants use a club arrangement**
- **Utilize new institutional forms such as networks** (for tying together regions) or **public-private partnerships**.