

Global Public Goods

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1. Introduction

Recognition of the interdependencies characterizing the Earth (a global common) and the globalization phenomenon necessitate collective actions at the global level to solve multilateral issues in trade, finance, environment, spread of infectious diseases and security. There is also growing awareness that the existing institutional arrangements to solve multilateral issues exhibit signs of adaptive (dynamic) inefficiency, with institutional changes lagging behind rapidly evolving realities as manifested in growing tensions in reaching cooperative solutions.

An International Task Force on Global Public Goods was constituted in 2003 to identify relevant international public goods from a perspective of reducing poverty and to study the provision and financing issues. See International Task Force on Global Public Goods (2006). This Task Force has identified the following priority global public goods (GPGs): (a) preventing the emergence and spread of infectious disease, (b) tackling climate change, (c) enhancing international financial stability, (d) strengthening the international trading system, (e) achieving peace and security, and (f) generating knowledge.

We need a framework for defining, identifying, providing and financing GPGs. Section 2 reviews alternative approaches to defining GPGs. Section 3 classifies GPGs into two categories: pure global public goods and global public goods by global public choice. Section 4 considers delivery systems for GPGs. It assesses the existing institutional frameworks for the supply of pure GPGs through the lens of GPG framework developed by Kaul *et al* (2003). Then it considers the division of labour

among stakeholders at global, national and state levels using the Subsidiarity Principle. Finally, it suggests some changes in the delivery system for an efficient provision of GPGs. Section 5 explores the financing options. Section 6 contains concluding remarks.

2. Definition of GPG

We review briefly three attempts to define public goods:

a. Samuelson (1954)

Even though the concept of public good is old in economic literature, Samuelson developed the concept in a rigorous manner. According to him a pure public good must satisfy two features: non-rivalry in consumption and non-excludability. Non-rivalry means that consumption of the good by one person does not decrease its availability to others (e.g. knowledge, defense). Non-excludability means that the good is available to all; it is impossible to exclude any one from consuming the good. Samuelson's aim was to determine the optimum mix of public and private goods based on the economic efficiency criterion.¹ As the marginal cost of supplying a public good is zero, economic efficiency requires that the good is supplied at zero price. Therefore, we need a non-market mechanism, for example, public provision of a public good. As the good is available free of cost, an individual has no incentive to reveal his true preference for the good. Hence the free rider problem arises. A limitation of the theory is that it does not deal with the equity issue.

¹ According to Pareto an economic allocation is efficient if by any reallocation it is impossible to improve the welfare of at least one individual without decreasing the welfare of others

In this framework GPG is defined as a public good whose benefits are available globally.

b. World Bank, Development Committee (2000)

It defines GPGs as commodities, services and systems of rules or policy regimes with substantial cross-border externalities that are important for development and poverty reduction and can be supplied in sufficient supply only through cooperation and collective action by developed and developing countries. The above definition does not mention features like non-rivalry and non-exclusion, but it is useful for a practitioner interested in funding development projects which aim at poverty reduction.

c. UNDP, Office of Development Studies

Kaul, Conceicao, Goulven and Mendoza (2003) provide the following definitions of public goods:

- (i) Goods have a special potential for being public if they have non-excludable benefits, nonrival benefits, or both.
- (ii) Goods are de facto public if they are nonexclusive and available for all to consume.

GPGs are goods with benefits that extend to all countries, people and generations.

(i) Weakens Samuelson's definition, and (ii) does not require non-rivalry. Hence, a private good can be put in a public domain by

public choice (a socially determined process) because it is a merit good, a basic need or a right. [See Desai for a historical perspective (2003)].

The aim of the authors is to refurbish the concept of GPG. According to them the need arises because (i) public goods are provided by individuals, communities, nations and via international cooperation; (ii) public participation is essential in the determination of levels of the goods; (iii) accrual of benefits depend on capacities and costs of access of different groups; and (iv) special problems of developing countries.

They introduce the concept of "triangle of publicness", that is, publicness in consumption, publicness in decision making and publicness in distribution of net benefit. This concept is used to evaluate the structure of international institutions, decision making processes, framing and enforcement of rules, and distribution of net benefits among member nations.

We prefer Samuelson's definition of public goods. However, Kaul *et al* definition of de facto public goods is relevant if the global community commits to provision of certain merit goods via collective action. Their concept of triangle of publicness is also useful in designing a fair institutional mechanism for the supply of GPGs.

3. Identification and Classification of GPGs

GPGs can be classified on the basis of different principles: broad features and supply conditions, aggregation technologies and geographical range.

We may consider two categories of GPGs keeping in view their features and supply conditions.

- a. Pure GPGs satisfy the features of non-rivalry in consumption and non-excludability. Examples of pure GPGs are knowledge, ozone restoration, reduction of green house gases, biodiversity, sound trading regime, financial market stability, and global governance. All persons benefit, may be in varying degrees depending on their capacities and preferences. The cost of provision does not increase with the number benefited. International cooperation and collective action are necessary to solve the free rider problem.
- b. Goods are put in the public domain because of global consensus. Examples: poverty eradication, access to safe drinking water, access to sanitation, compulsory primary education. The goods may be private goods in the sense they possess the features of rivalry and excludability but they are put in the public domain by global community. The rationale for this choice, in individualist tradition, is based on positive externality or being a merit good or simply altruism. From the viewpoint of communitarian (German) tradition, these wants transcend individual likes and dislikes and everyone is entitled to supply of the goods. Unlike the case of pure public good, the cost of provision increases with the number covered. The target group has to be identified and full coverage of members of the target group is necessary to realize the goal.

The Millennium Development Goals (MDGs) are based on the UN Millennium Declaration, 2000. The UN General Assembly has approved

the goals and targets. It may be seen from Table 1 that most of the goods and services needed to achieve the MDGs come under the category GPG by global public choice.

If we classify GPGs on the basis of aggregation technology then the following categories of technology emerge:

- *Weighted sum technology*: In this case the provision of the public good received by country i is the weighted sum of the provisions of the public good by various countries, the weights being the proportions of the good produced by the respective countries which are consumed by country i . Put very simply, the total amount of the good consumed by country i is the sum of the quantities provided to it by the various countries. Sulfur emissions received by a country follow this technology.
- *Best-shot technology*: In the case of this technology the amount of the public good received by each region/ country depends upon the maximum resource contribution which is made by a production agent. For example, assume that ten different production agents in ten different countries are spending money on research to discover an AIDS vaccine. Given the large monetary and time costs involved in this research, it is only the expenditure of the largest agent that might matter. This has some implications for international cooperation. It is very clear that countries must collaborate to form research consortia to tackle the pressing medical and scientific problems in this world. This will help them to gain the maximum social returns from their joint expenditure.

- *Weakest Link Technology*: In this case the amount of the global public good/ bad consumed by each country depends on the technology of the weakest link. If a country has very poor arrangements to contain contagious diseases then irrespective of the arrangements made by other countries the latter might suffer in the presence of porous borders delineating countries. Thus, it is essential through a system of financial disincentives and rewards to ensure the compliance of each country with certain minimum health standards.
- *Summation technology*: This technology implies that the total supply of a public good is the sum of supplies by all countries. Consumption of the good might be rival or non-rival, excludable or non-excludable. But if both these characteristics are present then the action of any one country affects the well –being of other countries and there are bound to be certain problems of international coordination.

PGs can also be classified according to their geographical range or spillover area. This is the range or area over which their benefits or disbenefits are felt. On the basis of their range we might classify these goods into local (benefits affecting a small locality), national (pertaining to a nation), regional (relating to groups of nations) and global (pertaining to the entire world). Thus, garbage dumped by a person is a local public bad as the stench affects only a small locality. The donation made by a rich person to a public park falls under the same category. Defense expenditure leads to a feeling of security, which is a public good for the entire nation. A trade block is a regional good as it benefits a group of nations. Green house gas emission is a global public bad as it affects people all over the globe.

4. Delivery Systems for GPGs

We consider three issues: (a) the extent to which the existing institutional framework fulfils the expectations for the delivery of GPGs, (b) the Subsidiarity Principle, and (c) possible changes in the delivery system to achieve economic efficiency/cost minimization.

a. Problems in Existing Institutional Framework

It is worth examining the functioning of the institutional framework in the provision of a few GPGs through the lens of the GPG framework developed by Kaul *et al.*

The World Trading Organization (WTO) is hailed as a transparent, democratic and fair trading regime. WTO has now 151 members and this member nations account for 98 percent of world trade. WTO agreements recognize the Rio principles of ‘special situation and needs of developing countries’ (Principle 6) and ‘states have common but differentiated responsibilities’ (Principle 7), but principle 12 ‘trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade’ is violated because many developed countries use non-tariff barriers such as tighter environmental standards, labour standards and conformity required with process and production methods. These regulations are proliferating, more frequent, stringent and complex (UNCTAD, 2004). Their commitments toward liberalization of agricultural trade have not been met. There is also asymmetry in trade liberalization. While there is considerable liberalization in flow of goods and capital, there are many barriers to mobility of labour and technology. Many developing countries lack skills and bargaining powers in rule making

and modifying trade agreements. As a result, the anticipated gains from trade have not accrued to many developing countries. Mendoza (2003) concludes that WTO is a GPG only in form but not in substance.

The objective of Framework Convention and Climate Change (FCCC) is to achieve stabilization of greenhouse gases (GHG) concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. GHG reduction is a global public good. FCCC takes into account Rio Principle 7, which states, 'states have common but differentiated responsibilities'. It also notes that the developed countries have to bear the responsibility 'in view of the pressures their societies place on the global environment and of the technologies and financial resources they command'. But at the implementation stage problems do arise. The Kyoto Protocol has become operational now but the US has not yet ratified it. Under the Clean Development Mechanism, Global Environment Facility funds are reimbursed to developing countries only on the basis of the incremental cost principle. There is no net benefit to developing countries, Ghosh (2003). A cooperative solution based on individual rationality, coalition rationality and Pareto optimality would require sharing of net benefits between developed and developing country parties (see Sankar, 1995). There is also no compensation mechanism for the past damage. Creation of global tradable permits and its allocation on per capita basis or in relation to past damage will be beneficial to developing countries, Ghosh (2003).²

² According to World Development Report 1992, if the rights were allocated on the basis of population and if the rights were sold at \$25 per ton of carbon the industrialized world would have to pay to developing countries about \$70 billion to afford one year's emissions at 1988 level.

The Official Development Aid commitment of 0.7 percent of GDP of developing countries is yet to be realized; in 2002 it was 0.23 percent of GDP. Special and differential treatment provisions in the WTO Agreement and promise of technical and financial assistance to developing countries in multilateral environmental agreements are only best endeavour measures and are not mandatory.

The main international treaty dealing with the development and exploitation of extra-orbital space is the 1967 Outer Space Treaty which makes provision for usufruct rights. The 1979 Moon Treaty is based on the principle of common heritage of mankind which means that no single nation or private entity has the right to appropriate commonly-owned resources. Marshall (1995) notes that a few technologically elite space-capable nations would appropriate the commonly-owned resources of the Solar System for themselves, without any commitment of sharing of the benefits to non-space capable nations. Already the global demand for spectrum and orbital slots exceeds the availability and the latecomers will find it difficult to launch satellites in the geostationary orbit.

Loss of biodiversity is viewed as a common concern of mankind. The Convention on Biodiversity has three objectives: (a) conservation of biodiversity, (b) sustainable use of biological resources, and (c) creation of an access and benefit sharing regime for biological resources and associated traditional knowledge. Inclusion of country /source of origin, prior informed consent, and access and benefit sharing agreements in applications for patents based on biological resources and associated

traditional knowledge, will prevent biopiracy and benefit owners/guardians of the resources in mega-biodiversity countries in the South, but the TRIPS Council has not accepted the suggestion.

The above examples reveal that development concerns get low priority in the implementation of treaties/agreements. The WTO Doha Round of negotiations, commenced in 2001, was aimed at addressing development concerns of developing countries, but the negotiations are in stalemate now. We need mechanisms for effective participation by developing countries, both at the rule making stage and at the implementation stage, to enable them reap the benefits of multilateral agreements.

b. Assignment of Functions at Global, Regional and Local Levels

In the provision of GPGs, assignment of responsibilities to different stakeholders at global, national and local levels is necessary. Here the Subsidiarity Principle is relevant. This Principle assigns decisions and enforcement to the lowest of government capable of handling it without significant residual externalities. In case of pure GPGs international cooperation is needed to set priorities, to identify responsibilities of developed and developing countries, to reach binding agreements, to decide financing options and to reach consensus on enforcement mechanisms. But even in case of pure GPGs, implementation of many decisions has to be at national and regional levels. For example reduction of GHGs can be achieved by pursuing a variety of policy options e.g., afforestation, switch from coal to natural gas in power generation, substitution of non-conventional energy sources like wind energy and

solar energy for thermal energy and so on. The investment decisions are location-specific. Similarly in bio-diversity conservation, the conservation measures have to be region/location-specific.

Apart from the assignment function, an incentive structure is needed to reach the goals at the least possible cost. This problem is important in cases where an activity generates private benefits, local public benefits and global public benefits. In some cases there may be complementarity between private benefits and public benefits. We need a mechanism to internalize conservation decisions of private individuals and forest department. Reimbursement of costs only on the basis of incremental global benefits is not adequate to encourage resource conservation/regeneration (Perrings and Gadgil, 2003). Effective public participation is needed to ascertain people's preferences regarding the type and level of GPG, peoples' willingness to pay user charges for merit goods and their involvement in monitoring/enforcement of the delivery systems. Choice of an appropriate institutional framework – public, private, community or public private partnership – should be based on the criteria of least cost service provision, given the goals.

c. Changes in Delivery System

Public responsibility in the provision of merit goods does not necessarily imply public production and supply. To avoid leakage in distribution and to ensure adequate supply to the target groups, alternative delivery mechanisms should be explored. Food coupon system is an alternative to Public Distribution System for the supply of essential food items to the poor. Similarly, Education Voucher Scheme can be a substitute for public schools. One attractive feature of Food Coupon Scheme or

Education Voucher Scheme is that it provides a choice to the recipient to choose the shop or the school he/she prefers and thereby creates competition in the supply systems.

One major problem in achieving universal coverage is the 'last mile problem'. The unit costs of providing utility and other essential services are higher in rural and remote areas than in urban areas. Revenue realization per unit of service is also lower in rural areas. We need innovative, technical, institutional and management solutions, and subsidies and cross subsidies to achieve universal coverage. For a discussion of the problems in dissemination of space technology, see Sankar (2007).

For monitoring and assessing performance, it is desirable to move from input based measures such as amount spent on rural water supply or number of wells/hand pumps erected to outcome based measures in terms of degree of access, availability of water in different months, and quality of water.

In case of common property resources, creation of self-governing institutions with built-in incentive and penalty structures may be needed to ensure sustainability of the commons (see Ostrom, 1990).

5. Financing Options

The conventional wisdom in public finance is that public funding is required for financing pure public goods. In case of pure GPGs also there is a case for financial support from international institutions and national governments but application of the principle of common but

differentiated responsibilities means that the developed countries should bear greater part of the burden. When activities generate both private benefits and public benefits (local and national) there is scope for raising funds from all the stakeholders. The financing options along with the desired uses of funds are given in Table 2.

6. Concluding Remarks

The International Task Force Report on GPGs says that international cooperation is a tool for altruistic purposes and it serves geopolitical interests. It is also a tool for nations to align their long-term enlightened national interests to achieve common goals. Rio Declaration 1992 contains principles for international governance and Agenda 21 gives an action plan. However, despite the establishment of the WTO in 1995, ratification of more than 200 multilateral agreements, and the UN Millennium Declaration, the pace of international cooperation has been slow. The factors hindering international cooperation are (a) governments' unwillingness to accept binding international commitments because they restrict their policy spaces, (b) political myopia, (c) differences in preferences and priorities of governments, (d) lack of catalytic leadership, (e) inadequate funding, and (f) difficulties in creating effective institutions for implementation of the shared visions. The challenge for countries is to find ways and means of overcoming the barriers to address the common concerns of mankind in such a way that every nation finds that it is better-off via international cooperation than otherwise.

Table 1: Millennium Development Goals as Global Public Goods

Goal	Type of GPG
Eradicate extreme poverty and hunger	<i>Merit goods, GPG by global public choice.</i>
Achieve universal primary education	<i>Merit good, GPG by global public choice.</i>
<i>Combat HIV/AIDS, malaria and other diseases</i>	GPG
<i>Promote gender equity and empower women</i>	GPG
<p><i>Ensure environmental sustainability</i> Integrate the principles of SD in the country policies and reverse the loss of environmental resources Halve by 2015 the proportion of people without sustainable access to safe drinking water By 2020 to have achieved a significant improvement in the lives of atleast 100 million slum dwellers</p>	<p>} GPG</p> <p>Merit good, GPG by global public choice.</p>
<p><i>Develop a Global Partnership for Development</i> Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Includes a commitment to good governance, development, and poverty reduction – both nationally and internationally Address the special needs of the least developed/land locked countries and small developing states</p>	<p>GPG</p> <p>GPG, Equity</p> <p>Equity, GPG by global public choice</p>

Table 2: Financing Options: Sources and Uses

Source	Use
1. Financial Assistance from Developed Countries ODA GEF Through UN agencies	Poverty alleviation Environmental protection Environmental Projects in developing countries Achieving MDGs
2. Public private partnership at global level Global Health Fund	To fight AIDS, Tuberculosis and Malaria
3. Global Commons a. Rent for geostationary orbital space Rent for other global commons b. Carbon emissions tax c. User charges Emission oriented charge for international airways Ecologically differentiated user charges for international seaways	GHG reduction GHG reduction/biodiversity conservation Reduction in the use of fossil fuels GHG reduction Ocean environmental management
4. Technology transfer at concessional rates a. Environmentally sustainable technologies b. Access to drugs/medicines covered under IPR	Technological upgradation modernization in SMEs Supply to poor to meet MDGs
5. Debt-for-nature swap	Biodiversity conservation
6. Internet tax	Bridge the digital divide among countries.
7. Market creation a. Institution of property rights for green house gases, market creation and allocation of rights on per capita basis; allow for trades in rights. b. Access fees for biological resources, traditional knowledge ex-situ conservation (identify country of origin)	Greenhouse gas reduction Biodiversity conservation benefit sharing among stakeholders

Note: See Ghosh (2003) for (3) and 4(a) and Schubert (2003) for 4(b).

References

- Desai, M. (2003), "Public Goods: A Historical Perspective", in Kaul *et al* (2003).
- Ghosh, P. (2003), Issue Note, <http://www.dse.de/ef/gpg/ghosh.htm>
- International Task Force on Global Public Goods (2006), *Meeting Global Challenges: International Cooperation in the National Interest*, Final Report, Stockholm.
- Kaul, I., P. Conceicao, K.L. Goulven and R.U. Mendoza (2003), *Providing Global Public Goods: Managing Globalisation*, Oxford University Press.
- Marshall, A. (1995), "Development and Imperialism in Space", *Space Policy*, II (1), 41-52.
- Mendoza, R.U. (2003), "The Multilateral Trade Regime: A Global Public Good for All?", in Kaul *et al*.
- Ostrom, M. (1990), *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press.
- Perrings, C., and M. Gadgil (2003), "Reconciling Local and Global Public Benefits", in Kaul *et al*.
- Samuelson (1954), "The Pure Theory of Public Expenditure", *Review of Economics and Statistics*.
- Sankar, U (1995), "On the Allocation of Joint and Common Costs", in N.S.S. Narayana and A. Sen (eds.), *Poverty, Environment and Economic Development*, Festschrift for Kirit S. Parikh, Interline Publishing.
- Sankar, U (2007), *The Economics of India's Space Programme, An Exploratory Analysis*, Oxford University Press, New Delhi.
- Schubert, R. (2003), "The Concept of User Charges for Global Environmental Goods", <http://www.dse.de/ef/gpg/schubert.htm>
- United Nations Assembly (2000), *Millennium Declaration*, <http://www.un.org/millennium/declaration/552e.htm>.
- United Nations Assembly (2000), *Millennium Goals*, <http://www.un.org/millenniumgoals>.
- United Nations Conference on Trade and Development (UNCTAD) (2004), "Environmental Requirements and Market Access for Developing Countries", note by the UNCTAD Secretariat for the pre-UNCTAD XI Workshop at Brazil.
- World Bank (1992), *World Development Report: Development and the Environment*, Oxford University Press.
- World Bank, Development Committee (2000), *Poverty Reduction and Global Public Goods: Issues for the World Bank in Support of Global Public Goods*, Washington D.C.

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