



Global Public Goods: International Cooperation in the 21st Century

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Regional Public Goods in International Assistance

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Abstract and Keywords

The concept of global public goods can help us understand and respond to the new global policy challenges likely to face nations in the twenty-first century. Tackling this growing agenda of common concerns will require fresh thinking, intense research efforts, new political instruments, and innovative policy responses. Up to now, global public goods consisted primarily of “traffic rules” between countries and such at-the-border issues as tariffs. But increasingly, the initiatives for international cooperation reach behind national borders. Global concerns are penetrating national agendas, and national concerns are becoming the subject of international debate and of policy coordination and harmonization. Today, concrete outcomes and targets – such as disease control, pollution reduction, crisis prevention, and harmonized norms and standards – matter. The reasons for these new exigencies: enhanced openness, growing systemic risks, and the policy demands of the growing number of transnational actors in both business and civil society. Nation states will witness continuing erosion of their capacities to implement national policy objectives unless they take further steps to cooperate in addressing international spillovers and systemic risks. But that cooperation must be of a new type. Not just cooperation that keeps global public bads at bay (until they reach crisis proportions) but cooperation that centers on creating global public goods and internalizing externalities. And not just cooperation that mistakenly assumes that the sphere of “public” ends at national borders, but cooperation that recognizes that an efficient system of global public

policy is a necessary ingredient of an efficient global economy. To make cooperation work along these lines, its current structure must be reengineered to create: (1) clear jurisdictional loop, reaching from the national to the international (regional and global) level and back to the national; (2) participation loop, bringing into the process all actors – governments, civil society and business; all population groups, including all generations; and all groups of countries; (3) an incentive loop to ensure that cooperation yields fair and clear results for all.

Keywords: cross-border externalities, development economics, global public goods, international cooperation, international relations, public economics, public goods

One of the basic lessons of modern economic development is that the public sector should focus its scarce energies, talents and resources on those activities that will not be provided adequately by private markets. Such activities include those involving a clear natural monopoly (law enforcement), problems of collective action because of the nonrival or nonexcludable nature of goods (basic research, national defence, macroeconomic policy, definition of property rights) or serious externalities not easily overcome by the assignment of property rights because of high transactions costs (infectious disease control, watershed management, fisheries management). It is also increasingly appreciated that international development assistance should have a similar focus, supporting desirable activities that will not be provided adequately either by private markets or by the local and national governments that are the recipients of such aid. While some aid is simply redistributive in purpose (such as humanitarian assistance in the wake of a natural disaster), a considerable amount of aid aims to correct market failures through the provision of public goods.

During the 1980s and 1990s aid programmes increasingly became a kind of surrogate national government, with outside agencies (usually led by the Bretton Woods institutions) attempting to foster the provision of public goods at the local and national levels. The basic motivation, sometimes explicit but more often implicit, was that national governments could not be trusted to provide public goods within their own territories as a result of some kind of “political failure”. In this vision the International Monetary Fund (IMF) and the World Bank would lead reform on behalf of the national polity because the government receiving the aid was too weak, too corrupt, too prone to backsliding or too incompetent to mobilize the needed actions on its own. Thus during the 1980s and especially in the first half of the 1990s aid was closely tied to policy conditions to ensure that the aid was linked to appropriate policies and the appropriate **(p.437)** provision of public goods by the national government. In principle, if the aid was not used in the way agreed with the outside agencies, it would be cut off.

We know from a large number of studies and frustrating case histories that this model is deeply flawed. First, money is fungible. Even if foreign agencies succeed in ensuring that particular funds are directed towards particular

purposes, they cannot be sure that the aid funds are truly incremental in support of those purposes. Thus an outside agency may desire to boost spending on education, only to find that the international aid dollars directed towards education are offset by a reduction in the government's own budgetary outlays on education. In this way foreign aid becomes a mere income transfer, not a promoter of public goods. Second, donor agencies have their own policy agendas that may have little overall coherence. Each donor is driven by its own local politics. The sum of the aid does not add up to coherent development assistance. Third, conditionality is extremely weak. Aid agencies often do not know enough about local conditions to make strong demands on the recipients about the use of the funds. And even when they do, the agencies generally lack the incentive to carry through on threats to cut off aid when the monies are misspent, because the recipient countries may be politically important to key donor countries. Fourth, it seems that many World Bank and IMF loans are simply defensive loans, in the sense that they are made so that countries will pay back previous loans from these institutions.

A new approach to aid is needed. In our view donors should get back to basics, to ensure that aid really delivers public goods that otherwise will not be provided either by markets or recipient governments in the absence of the aid. Without a doubt, there is one hugely neglected area of public goods: goods that can only be provided effectively at the level of the region (defined here to mean a grouping of neighbouring governments)¹ or on a global scale. The first category may be called “regional public goods” and the second category “international public goods”. This chapter focuses on regional public goods, partly because international public goods are covered in other chapters and partly because very little work has been undertaken on the actual and desirable levels of public goods provision at the regional level.

The Case for Regional Public Goods

It is easy to offer pertinent examples of regional public goods—that is, public goods that must be delivered on the supranational level by a number of national governments acting in concert. A nonexhaustive list includes: **(p.438)**

- *Environment.* Many issues of environmental management inherently cut across national boundaries. Watershed management inevitably requires the cooperation of all countries along the watershed to define issues of property rights, monitoring, analysis and enforcement. Many kinds of pollution (acid rain, effluent runoffs) cross national borders and so involve one country imposing external costs on another. Management of natural reserves often cuts across national boundaries (Serengeti-Masai Mara, Peru-Ecuador Amazonia, Nicaraguan-Honduran Atlantic Coast rainforest). Scientific research on issues of ecozone management (biodiversity, desertification, impacts of climate change) are inherently regional or global public goods because the benefits of research accrue to

all who share the ecozone, which typically involves a number of neighbouring countries.

- *Public health.* Management of infectious disease inherently involves cross-border issues because migrant workers typically are pathways for the spread of disease. This is emphatically and disastrously true for the greatest epidemic now striking Africa—the human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS). It is also true for more traditional and devastating diseases such as malaria. Large migratory populations in many parts of the developing world (East Africa, West Africa, Southern Africa, South-East Asia, the Middle East) also mean that national health systems are overwhelmed by demands from non-nationals. Cross-country financial or administrative arrangements rarely meet the health needs of migratory populations. Basic research on diseases endemic to a particular region (for example, onchocerciasis in West Africa) raises issues of regional cooperation, again because of the lack of ability and incentive for any one country to bear the costs of effective research and development on its own. Intellectual property rights raise cross-border issues as well, because the incentive for private pharmaceutical companies to develop effective responses to endemic diseases depends on the intellectual property rights regime governing an entire affected region, not just an individual country.

- *Financial market regulation and stabilization.* Cross-border links between financial markets are inevitable because financial markets are characterized by various increasing returns to scale in their operations (as vehicles for managing risk as well as for reducing unit costs of financial services). These links raise important questions about the regulatory environment because the quality of oversight of financial markets in one country will sharply affect financial markets in neighbouring countries. Similarly, a financial panic that starts in one country can quickly spread to neighbouring countries, as occurred in the “tequila crisis” following Mexico's 1994 devaluation and in the East Asian crisis of 1997–98. For these reasons, regional groupings of governments are increasingly looking for ways to harmonize their financial regulations **(p.439)** and to ensure that all countries in a region are appropriately monitoring their financial policies, lest the mistakes in one redound to the detriment of the others.

- *Transport.* The coordination of cross-border transport networks is crucial to economic development, yet extremely difficult to manage in practice. The historical record suggests, for example, that inland countries are deeply disadvantaged relative to coastal countries, in part because of inadequate cooperation between them. Roads that lead from the inland to ports are in poor shape because the coastal country often lacks the incentive to build, maintain and police roads on behalf of the inland country. In general, the location and maintenance of roads is

largely driven by local politics rather than by the optimization of the transport network. Similarly, a single national port facility may serve a number of countries, raising claims for regional governance over basic utilization of the port (private concessioning, operations of customs agents, policing and so on).

- *Telecommunications and data transmission.* As with asphalt highways, information highways pose tremendously important cross-border issues. Satellite systems and fibre-optic cables service regions rather than nations. The regional scale of competition among providers of telecommunications services will determine, to a significant extent, the pricing and quality of service within any individual nation.

- *Power grids.* Power systems at the national level almost always require regional cooperation, management and financing. This is plainly true in the case of hydroelectric power, where rivers are not only the source of power but also often the border of neighbouring countries. Similarly, countries that tap hydroelectric power upstream may have huge negative effects on downstream countries that require cooperative solutions. Electricity is increasingly transmitted across national borders by regionally linked grids, enhancing competition in energy provision and lowering unit costs. Pipelines typically must cross national borders to take oil from inland sites (as in Central Asia) to world markets, provoking difficult regional issues of economics and security.

- *Agricultural research and extension.* Agriculture research has deep public goods aspects, and these often inhere to the regional rather than national scale. The development of new seed varieties, for example, generally requires strong public sector support because hybrid seeds are nonrival and generally nonexcludable goods, and therefore the benefits of hybrid seed development cannot easily be appropriated by the original research team. Similar regional issues inhere to a wide range of agricultural problems: weather monitoring stations, weather modelling and forecasting, crop insurance, conservation research and management, and biotechnology research.

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- *Law enforcement.* Many types of criminal activities (drug trafficking, car theft, financial fraud, tax evasion, money laundering) operate at a regional scale, often with one country serving as a transit point or safe haven for criminal operations in another country. In many activities law enforcement is only as good as its weakest point. A road from an interior state to a coastal port will be nearly useless to the interior if the road is underpoliced in the coastal state.

In each of these areas public goods arise at all levels of governance: international, regional, national and even local. Public health measures may involve vaccine research appropriately financed and undertaken at the

international level, testing and inoculation programmes at the regional level (given specificity of disease types within regions, high levels of cross-border mobility and so on), public health system maintenance at the national level and operational control of health clinics at the local level. Similarly, in the area of agricultural productivity, basic biotechnology research on tropical foodstuffs may take place in an international research institute, specific seed development for a regional ecozone (such as the African Sahel) at the regional level, agricultural extension planning at the national level and implementation at the local level. As a third example, in the area of financial market regulation, public goods provision involves international norms (Article VIII standards on currency convertibility under the IMF charter, proposed standards on cross-border capital flows), regional undertakings (regional stock markets, supervisory agencies and accounting standards), national macroeconomic management and local government fiscal control within the national arrangements.

One extremely pertinent general category of regional public goods is scientific research on regionally focused problems of health, agriculture and environmental management. For well-known reasons, basic research is almost always a public good, at least in part. This is mainly because the gains from basic scientific research cannot easily be appropriated by the researchers (and even when they can be—say, through patent rights that give a temporary monopoly on the supply of a new discovery—there are often huge efficiency losses resulting from the underutilization and monopoly pricing of the new discovery).

Recent research on development problems carried out at the Harvard Institute for International Development stresses that most developing countries, and particularly those in the tropics, face profound problems in public health, agriculture and environment that will require new scientific and technological approaches that cannot simply be “borrowed” or taken from **(p.441)** advanced economies (Gallup and Sachs 1999; Bloom and Sachs 1999). Advanced country scientific research pays relatively scant attention to tropical problems such as malaria, schistosomiasis, helminths or tropical agriculture. Moreover, health and agricultural technologies developed in advanced economies are not directly applicable in the tropics. And scientific funding for problems of tropical health, agriculture and environment is a pittance of the funds mobilized for temperate zone problems in these areas. To name just one striking example, the 1989 expenditures of the US state of Georgia on agricultural research stations exceeded the budgets of each of the five largest global research centres on tropical agriculture, such as the International Rice Research Institute (IRRI).²

As poor as the delivery of public goods may be at the national and local levels, it is even more exiguous at the regional and international levels. In many cases regional needs are particularly neglected because while international programmes, research institutes and the like have been created, they lack the

needed counterpart institutions and funding at the regional level. This hypothesis is not easy to prove because there is little careful cataloguing of the needs and actual provision of public goods at the international, regional, national and local levels. Indeed, part of the hope of this chapter is to spur a much more careful empirical analysis of this claim. In any event, we have good reason to believe that regional public goods are generally under-provided—and often completely neglected. Transactions costs in managing public goods provision at the national level are already very high. At the regional level, they are often insurmountable. Why?

- Neighbouring states are often in direct military conflict, and thus are busy uprooting regional infrastructure (cross-border bridges, roads, power systems) rather than creating it.
- Neighbouring states are often in diplomatic competition (“cold war”) when they are not in outright military competition. Thus Chile and Bolivia have lacked diplomatic relations since the War of the Pacific (1879) despite the fact that Chile provides Bolivia's natural outlet to the Pacific Ocean. The main road from Bolivia to the Pacific Port of Arica was unpaved for a century, until 1995. Similarly, the notorious feuding in East Africa has left interior states cut off from natural outlets to world markets.
- Regional bodies are often politically weak and dramatically underfunded by participating national governments. As a US Congressional leader once famously observed, “all politics is local”. In the nationalistic political environment that has gripped and still grips many countries, cross-border cooperation is looked on with extreme suspicion—consider US **(p.442)** public opinion towards the North American Free Trade Agreement (NAFTA)—and is typically extremely underfunded. Even the European Union, after 40 years of successful European integration, commands resources on the scale of around 1% of GDP of member governments, or about one-fiftieth of the resources mobilized at the national level.
- International assistance programmes are mostly directed to national governments rather than supranational entities. As documented below, this pattern is partly the result of the charters of aid-granting institutions, both at the international level (for example, the IMF and World Bank) and at the national level (for example, donor agencies in high-income countries). It is also the result of the fact that the political weakness of regional bodies becomes self-fulfilling. Donor agencies do not give to “weak” regional bodies, and as a result those bodies do not gain strength, capacity and financial viability.

The result is that around the world, regional bodies that aim to provide regional public goods are underfunded and often nothing short of incapacitated. In Africa, for example, regional groupings such as the Southern African

Development Community (SADC), East African Community and similar bodies in West and Central Africa are extremely promising in concept. But in practice they generally fall far short of their aims because of limited authority (which is jealously guarded by national politicians) and, even more damaging, weak national capacity as a result of meagre budgets and uncertain future planning periods. One finds little difference in most other parts of the world, as with institutions for Central American integration, the Andean Pact and the Association for South-East Asian Nations (ASEAN). In most cases the stated regional goals are admirable, and the funding of regional activities, minuscule.

Modest Evidence on the Provision of Regional Public Goods

Despite the magnitude of international assistance, surprisingly little can be gleaned about its composition from publicly available data. We do not really know, for example, how much foreign aid is directed at public goods provision rather than at activities that could be directly financed by the private sector. Most observers recognize, for example, that many World Bank activities in infrastructure financing essentially substitute for project financing that could be raised in private markets. Indeed, in many cases a project is the object of direct competition between the World Bank and private firms. These private firms often complain bitterly that the Bank has edged them out of activities for which they are well-suited. Even when money is spent on health or **(p.443)** education, it is not really clear whether the funds are substitutes for private activity. And as noted, even when international assistance is directed at public goods provision, it is analytically difficult to discern whether the project financing is truly incremental. Recent evidence regarding African aid, for example, suggests that a considerable amount of aid funds are fungible, and thus more in the character of generalized income transfers than incremental provision of public goods.

The insufficiency of the empirical record is largely the result of two shortcomings:

- *Lack of systematic classification of aid programmes.* While the Organisation for Economic Co-operation and Development (OECD) has made major strides in the classification of international assistance, such classifications remain incomplete, especially for the purposes of systematic analysis. The OECD does not allocate multilateral aid programmes on the same basis as bilateral aid programmes, and OECD data certainly do not distinguish between the provision of public goods and private goods.
- *Lack of distinction between local, national and regional projects.* There is no attempt to classify aid projects according to whether such aid is directed at national or local projects versus regional projects. For example, some assistance programmes involve coordinated transfers to neighbouring countries so that the two countries can coordinate the provision of public goods. Thus international aid might finance a

hydroelectric plant on the river boundary of two countries, designed to provide electricity to both. Such aid would typically be classified as two national projects rather than one integrated regional project.

Despite these severe limitations, it is possible to look at the provision of international assistance for regional public goods. We have sought evidence, albeit indirect and incomplete, on the amount of funding that international assistance programmes direct towards regional as opposed to national efforts. There seems, in short, to be precious little such funding, though there are certainly some notable cases, and success stories, of regional assistance.

Bilateral Assistance

The most comprehensive source on bilateral assistance is the OECD Development Assistance Committee (DAC) reporting system (OECD 1998). We use this source to classify aid programmes on a national or regional basis. We define a national programme as aid from a donor government or multilateral institution to a single recipient country. We classify a programme as a regional assistance programme if it is allocated to a region but unallocated by **(p.444)** country. This accounting is imperfect, but it is the best that we can do with the published data. It will misclassify aid programmes in three ways. First, bilateral aid to individual countries can be closely coordinated, so that in effect the aid is providing a regional public good. Second, a regional aid programme (unallocated by country) could be providing national public goods to countries in the region, without a true regional component. Third, some aid that is unallocated by country and region (and is designated simply as “LDCs [least developed countries] unspecified” in DAC reports) may include regional assistance.

Net official development assistance (from countries and multilateral institutions) in 1996 is shown in table 1. We see immediately that regional aid programmes unallocated by country represent a very small portion of total assistance: just 7.4% in Africa, for example.

Table 1 Net Official Development Assistance by Region, 1996

Recipient region	Country	Unallocated	Total	Unallocated as % of total
Europe		2,371	122	2,493 4.9
Africa				
North		3,308	54	3,362 1.6
Sub-Saharan		15,831	915	16,746 5.5
Total		19,140	1,538 ^a	20,678 7.4
Americas				
North and Central		3,198	71	3,269 2.2
South		3,110	114	3,224 3.5
Total		6,308	1,877	8,185 2.3
Asia				
Middle East		4,696	94	4,790 2.0
South and Central		6,643	20	6,663 0.3
Far East		6,848	88	6,936 1.3
Total		18,186	710	18,896 3.8
Oceania		1,667	116	1,783 6.5

(a.) The total unallocated for Africa is not the sum of unallocated for North Africa and Sub-Saharan Africa because there is also \$569 million of unspecified aid for Africa as a whole, not separated into North and Sub-Saharan Africa. Similar discrepancies occur in the other regions.

Source: OECD 1998.

(p.445) World Bank

Under its charter the World Bank is to lend to member countries. Some Bank projects take on a regional public goods character, however, through the coordination of country-level programmes. Indeed, several projects in recent years have been “conceived as border-insensitive, jointly and severally implemented, with identical financing arrangements, and bundled and approved by the Board as a single venture” (Bhattasali 1998). Examples of such projects include agricultural research and dissemination within the purview of the Consultative Group on International Agricultural Research (CGIAR); water projects such as the Aral Sea Basin Program for Water and Environmental Management, which coordinates activities among Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan; disease control efforts such as the Onchocerciasis Control Programme, which coordinated efforts among Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger and Togo; and infrastructure projects such as the rehabilitation of the Abidjan-Ouagadougou-Kaya railway. Given the published data, however, it is not possible to estimate overall World Bank lending for regional programmes. Based on discussions with Bank officials, and in view of the difficulties under the Bank's charter of lending to regional bodies, we believe that region-based lending is very small, though with notable successes (such as the Onchocerciasis Control Programme).

United Nations

The United Nations was established in large part to solve problems of international coordination and to enhance regional and international cooperation. The 81 UN organizations, including the World Health Organization, United Nations High Commissioner for Refugees (UNHCR), United Nations Educational, Scientific and Cultural Organization (UNESCO), and UNDP, are core providers of regional and international public goods. This is clearly the case in programmes of disease control (World Health Organization), refugee resettlement (UNHCR), dispute resolution and peacekeeping, and so forth. Yet even with the United Nations it is not possible on the basis of published data to ascertain the actual flow of funds directed towards national-level programmes and those that are truly regional or international in character.

Regional Development Banks

Regional development banks, such as the Inter-American Development Bank (IDB) and African Development Bank (AfDB), would seem to be ideally suited to help finance the provision of regional public goods. Regrettably, this **(p.446)** generally seems not to be the case, as these banks have increasingly modelled their lending activities to match the country-level projects of the World Bank. As one AfDB staff member reportedly said, “we trade on our African identity, as an institution close to Africa's problems, but all we do is repeat what the World Bank has done with fewer resources and less efficiency” (*The Economist* 1998). The AfDB reported the allocation of African Development Fund loans and grants during 1974–97 using a breakdown among three categories of countries (lowest-

income, higher-income, and highest-income borrowing members) as well as “multinational” projects. On this basis it appears that 98.1% of the allocations went to country programmes, and just 1.9% went to multinational projects (AfDB 1998, p. 7). This is especially ironic for a region rife with regional problems involving transport (given that Africa has the highest proportion of landlocked countries of any region), infectious disease, cross-border conflict and so on.

The IDB seems to have a growing portfolio of regional projects, though it is still modest relative to overall lending. As of 1997 the IDB had made 58 regional loans totalling \$2.77 billion, with cumulative disbursements of \$1.71 billion. Total IDB disbursements were \$61.4 billion, so regional projects amounted to 4.5% of the total. In 1997 the IDB made 18 regional loans totalling \$833 million in commitments, compared with \$6.02 billion in overall loans. Thus regional loans accounted for 13.8% of the total, suggesting an increase in region-based lending (IADB 1998). Regional projects in 1997 included:

- Regional infrastructure (Bolivia-Brazil gas pipeline, Central American electric interconnection system).
- Regional financial markets (credit programme for the Central American Bank for Economic Integration).
- Research and development (technology programme for agriculture and natural resource management, digital mapping and geographic information systems).
- Regional policy reform (support for the Free Trade Area of the Americas Initiative).
- Regional training initiatives (fellowships and other support for advanced training of public officials).

Recommendations for Enhancing the Provision of Regional Public Goods

The shortfall of international assistance in the area of regional public goods is stark, even though it cannot be precisely determined with published data. **(p. 447)** Nonetheless, it is clear that international donors, both bilateral and multilateral, focus the vast bulk of their attention and financial resources on country-level programmes. Country-level programmes are sometimes coordinated across borders, but this is the exception rather than the rule. And there is very little direct financing of regional institutions, such as the secretariats of regional bodies like SADC, or projects initiated and overseen by such regional institutions.

This chapter is a very preliminary look at the issue, meant to spur further analysis and action. We therefore recommend the following five operational steps in the near term:

- Coordination between UNDP, the World Bank, the OECD and regional development banks to develop a more accurate accounting of the allocation of activities between national projects and regional projects.

- Development of analytical methods within UNDP, the World Bank and the OECD to examine the allocation of aid flows between public goods, private goods and income transfers.
- Review of the governing principles of the World Bank, IMF, UN agencies, regional development banks and principal bilateral donor agencies to examine biases or legal limitations on the provision of aid to regional projects and regional bodies.
- Canvassing by UNDP of regional bodies (SADC, Economic Community of West African States, Mercosur, ASEAN, Andean Pact and so on), to determine operating budgets, regional projects under their supervision and support received from national and international agencies.
- A series of UNDP workshops around the world to explore policy options for increased regional public goods provision in key areas such as infrastructure, public health and research and development.

Sceptics of regional public goods provision repeatedly point to the current weakness of regional bodies such as SADC in fulfilling the mandate of public goods provision. This is a mistaken, static view of the issue. Regional bodies will inherently be weak until they are given both the mandate and—especially—the financing to do more. Who would have thought, at the conclusion of the Second World War, the France and Germany, after three bitter wars in 75 years, would form the nucleus of an unprecedentedly effective regional grouping in Western Europe? And yet the European Union found its origins in decisions by the United States to channel postwar reconstruction aid through a regional body (the Organization for European Economic Cooperation, or OEEC, later OECD) in the context of the Marshall Plan. The Marshall Plan, together with a group of European visionaries, effectively created European **(p.448)** regional cooperation and public goods provision by pressing the war-torn continent to work together as a condition of receiving US assistance.

In this context, the possibility of creating a new set of OEECs (or OECDs) for the major developing regions has been raised. The idea is a powerful one that draws strength from the success of the Marshall Plan. On a practical level, assuming that the decision were rightly made to vastly enhance the provision of regional public goods, it would often be desirable to build on existing (admittedly weak and underfinanced) regional bodies rather than reinvent them from the start.

Our common longer-term goal should surely be to work towards a reassessment and redesign of the international aid strategy in general, to make sure that international assistance serves the most important needs of the developing world—mainly by focusing on activities that cannot otherwise be addressed by national and local governments or private actors. Public action, urgently and amply supported, will be crucial in generating the ideas and technologies

needed to overcome the crises in health, demography, environment and food productivity facing so much of the developing world in coming years.

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Notes:

(1.) Even the term "regional" is fraught with ambiguity. In some usages "regional" refers to a grouping of neighbouring countries like the Central American Common Market (CACM) or Southern African Development Community (SADC). In other cases "regional" is reserved for continent-wide activities (such as within Africa) while "subregional" is applied to groups like the CACM and SADC. We use the first sense of the term.

(2.) Eicher (1994 p. 89). IRRI's budget for core and special projects was 36.2 million, compared with Georgia's budget of 40 million. The combined US state spending on agricultural research stations by the 10 largest programmes—

California, Florida, New York, Texas, Georgia, North Carolina, Minnesota, Nebraska, Louisiana, Ohio—exceeded by a wide margin the combined spending by the 10 largest international research centres on tropical agriculture—IRRI, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Maize and Wheat Improvement Center (CIMMYT), International Center for Tropical Agriculture (CIAT), International Institute of Tropical Agriculture (IITA), International Center for Agricultural Research in the Dry Areas (ICARDA), International Potato Center (CIP), International Livestock Center for Africa (ILCA), International Livestock Research in Animal Diseases (ILRAD) and International Food Policy Research Institute (IFPRI).