Global Knowledge and Development Project

Report of the International Advisory Meeting Lima and Urubamba, Peru September 30 – October 4, 2002



Centre for Global Studies University of Victoria



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Purpose - New Directions for S&T Cooperation

Foro Nacional/Internacional (FORO) and the Centre for Global Studies (CFGS), University of Victoria, convened a meeting of international science and technology (S&T) policy experts in Lima and Cusco, Peru, September 30- October 4, 2002. The purpose of the meeting was to gather input and advice on the Global Knowledge and Development (GKD) Project, a joint one-year initiative of FORO and the CFGS aimed at identifying new directions for strengthening S&T capacity in developing countries. In particular, participants were asked to review and provide comment on the project's three major elements: the draft GKD Concept Paper; the Inventory of International Science and Technology Cooperation Programs; and the proposal to establish a new Global Knowledge and Development Facility. Over the course of the five-day session, these topics were treated to in-depth discussion, the results of which will be applied toward preparation of the final project report in January 2003.

Program and Participants

Participants at the GKD meeting comprised a core group of seven senior-level international development specialists, with broad experience over the past thirty years in the design and application of international S&T policy instruments. The Director of the Rockefeller Foundation's Global Inclusion Program – the project's funder – was also in attendance, adding a valuable donor's perspective to the discussion. In addition, through a combination of good timing and some thoughtful advance coordination, the meeting was able to incorporate exchanges with participants at two related events taking place in Lima during the same week. The first of these was the gathering of developing country scientists and science policy experts sponsored by the RoKS (Research on Knowledge Systems) Project, a new cross-cutting initiative of the Canadabased International Development Research Council (IDRC). The theme of the RoKS meeting was "The Changing Public-Private Divide In Research For Development". In the second case, the GKD and RoKS meetings coincided with events at the National Council for Science and Technology (CONCYTEC) to commemorate Peru's signing of a US\$60 million S&T loan from the Inter-American Development Bank. The convergence of these events allowed for a multifaceted program of presentations and discussion among the GKD and RoKS groups, CONCYTEC staff, and IDB and Peruvian government officials. In the second half of the week, the GKD and RoKS groups traveled together to Urubamba, where further sessions were conducted, including a joint trip to Machu Picchu on the final day of the proceedings.

Global Knowledge and Development Project – Background

The GKD Project evolved from the previous collaboration of the two project directors during 2001 in *Transcending Post-Seattle Angst*, a multi-phased initiative of the CFGS aimed at exploring the potential for global governance reform through the establishment of new, state-of-the-art international institutions. A research consortium of seven international think tanks - the

"T-7" - was formed, each one charged with the task of 1) identifying niches or gaps in the existing global architecture, and 2) conceptualizing the institutional mandate and structure that could best respond to these needs. Funding to conduct further investigation of three of these proposals - the Microfinance Promotion Agency, the Digital Initiative for Development Agency, and the 2020 Global Architecture Visioning Exercise - was obtained by the Canadian International Development Agency. A fourth proposal by Foro Nacional/Internacional to establish a Global Knowledge and Development Facility became the subject of the current project.

Discussion Context

A central theme underlying the week's discussions was the sense of urgency surrounding the need for dramatic review and renewal of the international S&T cooperation system. This is evidenced by the perception shared by most in the group that the post-war "development aid" approach to S&T has failed. The knowledge gap between north and south has expanded to a degree that was unimaginable twenty years ago, and the donor community appears largely adrift on the issue of how to proceed with a more effective program of cooperation and assistance. To the extent that it was ever a priority (which is questionable), there is a sense that S&T capacity building has fallen completely off the development agenda, in favour of a more short-term focus on the millennium development targets of poverty alleviation, basic education, etc. For example, the PRSP's (Poverty Reduction Strategy Papers) completed so far have no S&T focus whatsoever. Likewise, within the increasingly mainstreamed discourse of anti-globalization, it is common to see science and the institutions that support it vilified as part of the problem, or else ignored altogether.

It is in this context that the GKD Project in its current iteration has been conceived. At the request of the funder, the project has been focused quite narrowly on the task of mapping out the existing landscape of international cooperation. To date, there has been little effort to create a systematic record of the scope and dimensions of S&T cooperation, and it is believed that data gathered by the project will satisfy a variety of different needs and purposes among researchers and policy makers in relation to who is doing what in the field, and how these activities can best be interpreted. However, the project has always been intended to set the stage for something more ambitious – namely, to chart the way out of the current impasse toward a new generation of institutions or initiatives that will significantly boost the reach and the impact of international S&T cooperation. In this sense, the broader theme of the meeting was to allow for reflection on the practical steps needed over the next few years to realize this vision.

In its joint sessions with the RoKS Workshop, the group would tackle a similar set of issues, as discussions focused on identifying future themes, policies, and directions that will best serve the RoKS program's objective of harnessing research activities to improve social and economic equity in partnership with the South.

Project Review – the GKD Concept Paper and Inventory of International S&T Cooperation

Summary of the Draft Concept Paper – "Knowledge, Technology and Production: An Essay on Science and Technology for Development"

This paper, prepared by Francisco Sagasti and his staff at FORO, is an effort to establish a conceptual framework for understanding the complex relationship of S&T capacity to social and economic development. It includes an historical overview of the diffusion of Western science over the past 500 years; a series of empirical indicators linking countries' overall development to

their level of S&T capacity; and a discussion of the types of policies that are most appropriate for consolidating S&T capacity in the context of the current shift toward a "post-Baconian" technoeconomic paradigm. This shift is characterized by the transition from oil to the microchip as the primary driver of techno-economic activities, and in the emergence of new scientific fields like bionics, materials science, genotyping, etc., all of which demonstrate a high degree of technological convergence. The paper argues compellingly for the necessity of an "endogenous S&T capability" – in which there is strong integration among knowledge, technology, and production systems within a society – as a pre-requisite for sustainable development. It touches on the different ways indigenous and traditional forms of knowledge can be deployed toward achieving this objective.

The paper emphasizes two principles for the design of S&T development strategies: the importance of a long-term approach (endogenous R& D capacities take more than fifteen years to create, but can be wiped out in less than two years by misguided policies); and the central role of the state as facilitator of scientific knowledge generation and innovation capabilities. The latter point reflects a change away from the orthodoxy of liberalization and de-regulation in development, since there seems to be growing recognition that knowledge can not be simply imported or taken "off the shelf" from developed countries. There must be local S&T capability to be able to identify, select, adapt and effectively utilize imported technologies and knowledge. The countries that succeed in development are those that have a national effort in science and technology. Finally, the paper discusses the role of international cooperation in the future of S&T development, and introduces the idea of a GKD facility, proposing a number of suggestions for potential roles and functions.

Summary of the Inventory of International S&T Cooperation Programs

In this component of the project, the research team at CFGS has compiled an inventory of approximately 275 programs engaged in the delivery of various forms of S&T cooperation activities with developing countries. Funding sources for the programs are derived from a total of 119 multilateral, bilateral, national, regional, non-governmental and private industry sources. The entries are contained in a searchable database, which is available on the Web at http:/139.142.245.96. Entries in the database are searchable by name, country, region, sector, budget, eligibility criteria, source of funding, and type of funding mechanism (technical assistance, loans, grants, fellowships, donations in kind, etc.). The database provides information on Agencies and Programs, but does not extend to descriptions of individual projects.

In the course of conducting this research, many issues have arisen which are still outstanding. Decisions on whether to include or exclude a program in the inventory were judged on the basis of four major criteria: primary focus on developing countries; direct as opposed to indirect focus on S&T; current, continuing or future programs; North-South or South-South lines of cooperation. In practise, however, the criteria proved difficult to apply in an even way, resulting in some inconsistencies. With regard to methodology, Internet searches provided the major source of information, along with literature reviews and document searches (program publications, annual reports, etc.). In cases where the Website contained incomplete information, efforts were made to contact agency staff directly. This highlights issues of transparency, since certain agencies were found to be much more accessible and forthcoming with information than others. In general, the UN Agencies were most problematic in this regard.

One area that has yet to be fully addressed in the database is the matter of evaluation. The entries are not evaluative, though ideally the preference is to move the research in this direction. In the interim, the entries have been assigned a rating of one to three stars, in which rankings are assigned according to the following three criteria:

- degree to which S&T capacity-building and transfer of knowledge are a direct, rather than indirect, focus of the program;
- degree to which the program reflects southern priorities and a participatory partnership structure between donor and recipient organizations;
- degree to which the program explicitly promotes development of indigenous knowledge.

Comments on the Paper

Discussion of the two project components occurred during multiple GKD and joint sessions with the RoKS group over the five-day period. A summary of the major themes of feedback is provided below:

Concepts and definitions

A number of points were raised in this regard. There is an impression that the paper shifts too quickly between abstract and empirical styles. Some effort is needed to tidy up terminology. Having said that, the paper is very strong on both accounts. On the conceptual side – these are big ideas that could be extremely useful for policy makers. They show clearly how S&T capacity impacts level of development. The indexes are also very useful and should be strengthened.

The definition of "development" is of interest. The paper touches briefly on it through a discussion of two new models that are emerging in place of the older notion of "progress". One is Amartya Sen's notion of development as emancipation; the other is a new concept of development involving an open-ended process of value redefinition that emerges through the ongoing dialogue of civilizations. Because of their fundamental importance, these ideas need more attention in the paper. They are part of a broader paradigm shift, the elements of which include a new concept of how to measure and characterize development in ways that go well beyond GDP, and that encompass human security, and other non-monetary measures (Japan is the model for what is happening here. All the standard economic tools are failing in Japan, which doesn't behave according to model of rational economic behaviour). Other elements include:

- an emphasis on environmentalism, sustainability
- a new focus on public-private partnerships (but there one must go cautiously)
- a move away from project-based funding to strategic planning

Methodology

The methodology adopted in the paper needs to be made more explicit – what is the method that leads from the first page to the final argument? It may not be linear or causal – more of a systems model perhaps, which does not offer proof, but can do more to show how things are related. The typology of countries according to their S&T capabilities (the Type I II III IV grid) is a huge conceptual leap forward – however, may require some further explication to distinguish it from the old style differentiation of countries.

Past efforts

There needs to be more assessment of the historical record, mainly in terms of the quality and the quantity official ODA efforts over time. This could include some evaluations to look at what worked and what didn't work.

Context

The paper needs more discussion of the globalization context. Most of what we did previously was within a different regime of governance. The ethical dimension is also an important part of the landscape today. Also, the geo-political context, migration, east-west shifts, etc.

Audience

There is a need to question who the readership will be. There may eventually need to be two or more versions of the paper. One that offers a historical overview; one that focuses on the policy issues (preferred?); one aimed at a more critical audience that takes bold and provocative positions. Whether it currently has the right balance between all of these is not clear.

Institutional base.

The paper could be more explicit in describing the settings in which transformation is more likely to take place. There is a whole set of national constraints – funding, teaching, infrastructure. Need to show how the different activities are integrated. This can include a discussion of the delivery mechanisms and administrative capacity that are required for executing policies.

Indigenous knowledge

In general, this theme is not developed enough. More particularly, the claims about the emerging importance of indigenous knowledge could be better supported. What are the empirical references? Indigenous knowledge can mean something much broader than the traditional native culture. It can mean different actors, stakeholders, industries. Overall, this angle is important but problematic. In the example of Korea, it did not play a role. On the other hand, there is a small but important literature focusing on the value of traditional technologies for enabling non-market, more environmentally sound forms of social relationships. The paper tried to strike a middle ground, advocating for a strategy of "technological pluralism" for a period of time, involving some measure of protection, of subsidies. But very little research exists on how to do this.

There are many good examples in Latin America of scientists using practical knowledge to improve traditional technologies. Example –alpaca growers in Peru who were using broken bottles for shearing the Alpaca. Some local universities are working on technologies to improve management of Alpaca farming. This is a local, specialized niche, and a good example of the use of knowledge.

Poverty and exclusion

This issue also posed a dilemma for the author. This concept of poverty has been used extensively in the work with Agenda Peru, but it has never been fully incorporated into the work on knowledge. It seemed like a research agenda that is beyond anything that could be included here. Yet, it is obviously a priority for the funder. How does science help the poor? This is *the* defining question for the [Rockefeller's] Global Inclusion Program. Other questions are:

- Are we focusing on the country level or communities of people?
- How are the poor excluded from S&T?
- What have been the results of past efforts?
- Are we capturing other kinds of knowledge?
- What is the significance of the rural/urban divide?
- What is the public role in science? How does it evolve?
- Definitions: What are the distinctions between science, knowledge, information, and technology? The tendency is see an emphasis on creation of new knowledge, which is more broad, and includes things that may be of greater value to developing countries.

It is not expected that all of these questions will be answered, but could be included in the paper as an agenda for future research.

Comments on the Inventory

Gaps and coverage

There is a sense that the Inventory has made a good start. It has identified over three times the number of programs listed in the best example that exists so far. But it has not captured all dimensions of the S&T landscape. There remain many gaps. Some specific suggestions for enhancing the coverage include:

- Check the inventory of Scientific Institutions prepared by Nature magazine.
- There will inevitably be gaps but they will look different depending on the classification used. How they can be addressed will also depend on the size of your resources.
- There is not enough on the private sector. This has never been done, and would be very useful. Could start by approaching the World Business Council for Sustainable Development.
- Needs more emphasis on north to north, south to south or triangular relationships. For example, SAREC conceived a triangular program that included Chile, Argentina, and Uruguay. These are cost-effective and reduce brain-drain.
- Perhaps too much attention has been given to research activities. The Inventory should include teaching activities, science education and innovation systems, in order to get a picture of the different activities needed to build capacity.
- Might be useful to have a contact person from each country or organization who can feed you the information in the right way.

Definitions and taxonomy

There is a problem with definitions. How do you determine what gets classified in and what gets classified out? What is cooperation? What is research and development? These must be made explicit.

The definition problem is not as serious as it looks. When compiling the data, each example is so unique it becomes impossible to organize them within a strict framework. But you begin to know it when you see it. If you look closely, the definitions emerge from the contents. And you begin to be able to extrapolate an answer to the question of what kind of capacity helps countries build S&T.

Potential uses

The inventory is worthwhile as a baseline, and could have several potential uses. The first priority is to deliver something that the funder will find useful. Other users would be policy makers in the developing world. Who are the agencies out there that support the things I want to do? There is a joint value in what CFGS and Sci-Dev have been doing, and possibly room for further collaboration. The methods were very different. Sci Dev sent out emails to 25,000 scientists. The Inventory could be very useful for pointing out the massive inefficiencies of asking for money from 200 different locations. It speaks to the need for a more efficient funding mechanisms, and peer to peer relationships. The inventory will also be useful in strategic planning of a GKD Facility.

Evaluation

There is a problem of verification and evaluation with the data. The Inventory is an empirical mapping of the landscape. It tells us what people *think* they are doing, but how much of it will stand up to scrutiny? Are programs funded or underfunded and against what goal, and by what measures? What are your metrics? One suggestion is to conduct a second iteration, which

incorporates follow-up interviews with selected organizations to verify that they are doing what they say they are doing. For Rockefeller, the challenge is to know whether there are mechanisms or policies that can better serve poorer countries. Not that we would necessarily make grant-making decisions about this, but it is useful to learn more about what approaches are needed or not needed.

It won't be possible to answer this in the first draft. The important thing is to have a good overview of what's out there as a baseline of what people think they're doing.

Budget question

There have been three or four major attempts to measure the amount of funding that goes into scientific research. It has proved very hard to do. CFGS efforts are also inconclusive, mainly because it has been impossible to standardize the different types of budget information available.

Harmonization with Concept Paper

There needs to be greater harmonization of the inventory with the conceptual framework. It may need a different schema for the inventory that matches the paper. In order to do this, you will need to decide whether this is a project about governance or about S&T, since this determines how the data will be organized. Once the revisions to the paper are completed, we need to look back and see how this can help improve the classification in the Inventory.

Policy Instruments for the Development of an Effective Science and Technology System: The Case of Korea

The Republic of Korea represents s one of the most impressive examples available of the application of a national S&T strategy for development. In the early 1960's, the country was characterized by the World Bank as one of the world's poorest, "a backward agricultural society with no natural resources and no technological base." Inspired by the technological proficiency of the American military during the Korean War, however, the government embarked on a plan to make S&T the centerpiece of a national platform for recovery. Korea adopted a number of policy instruments to establish strong public sector support for innovation, economic development, and export-oriented industrialization. An early emphasis on tertiary education enabled Korea to produce its own supply of highly skilled workers (the Korean Institute for Science and Technology has graduated 25,000 M.A.'s and PhD's in science since1966). Programs were created to promote technology transfer to the private sector, and to establish government-supported research units linked to each of the major industrial sectors. By 1989 R&D centers were established in every university in the country.

Korea's aggressive program of S&T investments has brought enormous social and economic benefits to the country, which is now ranked as a world leader in electronics and nuclear technologies. Notwithstanding the many new challenges faced by national governments in comparison with the era of the 1960's and 1970's, Korea remains an important model for developing countries to look to.

Envisioning a GKD Facility

The context for this discussion is that the Global Knowledge and Development Facility is an idea that has been circulating for some time within the international S&T community. There are many

different opinions about it, but at the end of the day what is essential is that the exercise should lead to a massive quantitative increase over a short period of time in the amount of resources available for pursuing an effective global S&T agenda. This will require innovative financial mechanisms and new institutional structures to raise, administer, and effectively channel a significant magnitude of funds (at a minimum in the billions of dollars range). Beyond that, the facility must provide ideas; it must promote diversity, differentiation, and spread of best practise; and it must model effective governance. There is a severe governance deficit within the existing global institutions, and an urgent need for old structures to give way to new principles and practices that reflect the best elements of the new knowledge paradigm.

Responses generated from the discussions are grouped according to the following themes:

Funding / Role of Private Sector

A first order of concern is the issue of financing. How will such an ambitious agenda be funded over both the short and long term? One answer points to a more vigorous role for private investors, but there is a mix of views as to how this can be achieved (and whether it is desirable). Favouring this strategy is the fact that there has been massive expansion of capital markets over the past ten years resulting in considerable excess capacity. The challenge is to 1) make venture capital aware of the opportunities for innovation in developing country markets – that is, match supply with demand; 2) increase investor comfort and reduce risk through the use of guarantors, interest subsidies, tax incentives, cost-shared loans, etc. Considerable potential lies in the emergence of ethical/social investment funds. Also, in a marketing strategy that can advance a new concept of profit that recognizes not only the private but the social rate of return on investments that will accrue from poverty alleviation. This could tap in to the vested interest corporations have in improving the economic conditions of developing countries. These strategies should not attempt to replace the continuing importance of strong public sector engagement, however. And it is worth looking to the universities to contribute, since some of them have acquired enormous amounts of money from corporate investments. Is there something that would attract corporations to invest in southern universities? Ultimately, coordinating financing for global S&T development will be the primary niche for a new facility.

Selling S&T to the Global Community

Everyone present at these meetings shares a belief in the role of science, innovation, diffusion of knowledge, etc., as fundamental drivers of development. The poverty implications over the coming years for countries that fail to acquire these capabilities will be devastating. And yet, these are claims that are deeply contested within the development community. The literature on the correlation of S&T to development is weak, and there are many contradictions - that is, examples where science failed to solve problems, or resulted in increases in poverty. In addition are the multitude of other development needs – for water, health, literacy, gender equity, HIV AIDS, environment, etc.- which are also enormous, and which are all in competition with one another for limited development dollars. For this reason, it is essential that the S&T movement become much more skilled at building and promoting its case. It has not been successful at doing this so far. The GKD Facility should make advocacy and public awareness a priority. It should adopt an activist model to achieve this. It should become the "Greenpeace" of international S&T cooperation.

Problem Solving vs. Capacity Building

The dilemma in this regard relates to the question of how S&T can be most effectively deployed in countries that have such a range and complexity of different problems. Ideally the objective is to promote endogenous S&T capacity within every developing country. Some argue that there can be no problem-solving in the short term in the absence of this capacity. In the case of the AIDS vaccines donated through the Global Health Initiative, for example, there is growing concern that due to major breakdowns in infrastructure affecting the delivery and follow-up of treatments, the effort is likely not only to create risk, but to result in new drug-resistant strains of the HIV virus. Is it worthwhile providing S&T inputs if these basic infrastructures are not in place? On the other side of the coin is the argument that S&T investments *must* be targeted toward solving the immediate problems of the poor. Many poor countries are years away from the most basic conditions necessary to support an endogenous capability. A more ethical approach – and one that will generate broader public supports - is to tie S&T investments to missions that bring tangible results for poor people in the short term.



Function/Mandate

Combined together, the above themes point to some tentative conclusions regarding the specific niche(s) that the GKD Facility can potentially fulfill:

1. Raise awareness

- learn and educate
- permeate highest levels of political leadership

2. Identification of viable programs, products, opportunties that will support development and capacity building.

- systematic, knowledge-based approach; best practice
- focus on innovation introducing new knowledge into the local productive base
- specialized capability technical assistance
- different strategies for different countries
- 3. Identify funding sources and mechanisms
 - link venture capital to new markets/ideas
 - innovative financing strategies subsidies, private/social rates of return
 - franchise model develop and disseminate new technologies

Conclusions – The GKD Project and the Future of International S&T Cooperation

The main conclusions of the project can be summarized as follows:

• There is a strong need to clarify the interactions between knowledge, technology and innovation on the one hand, and the process of development in the other. The concept paper goes a long way towards achieving this, but much more work is required to make the arguments more persuasive and comprehensive, and to address directly the concerns of the policy makers.

- The inventory has shown that there is a large number of relatively small and largely disconnected initiatives to build S&T capacities in developing countries, although the research is still incomplete. There is need for a significant expansion of cooperation in this field and for much better coordination and exchange of information among the institutions and programs in this sector of international cooperation.
- There is a compelling case to invest time and effort in the design of something along the lines of the proposed "Global Knowledge and Development Financial Facility". As soon as the concept paper and the inventory are revised, the two institutions participating in the project should explore the possibility of organizing a project towards this end.

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