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Author(s): Mark H. Killinger, James R. Griggs
Pacific Northwest National Laboratory, Richland, WA USA
Kenneth E. Apt, James E. Doyle
Los Alamos National Laboratory, Los Alamos, NM USA

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US-India Technical Collaboration to Promote Regional Stability

Mark H. Killinger, James R. Griggs
Pacific Northwest National Laboratory, Richland, WA USA
Kenneth E. Apt, James E. Doyle
Los Alamos National Laboratory, Los Alamos, NM USA

Abstract

Two US-India documents were signed in 2000 that provided new impetus for scientific and technical cooperation between the two countries. The first document is the US-India Science and Technology Agreement, which is aimed at "promoting scientific and technological cooperation between the people of their two countries." The second is the US-India Joint Statement on Energy and Environment, which states "the United States and India believe that energy and environment could be one of the most important areas of cooperation between the two countries."

In addition to the work already underway as part of these two agreements, the US Department of Energy (DOE) has established a US-India Science and Technology Initiative to utilize the expertise of DOE national laboratories to conduct activities that support US policy objectives in South Asia. PNNL and LANL are working with US government agencies to identify appropriate non-sensitive, non-nuclear areas for US-Indian technical collaboration. The objectives of such collaboration are to address visible national and international problems, build trust between the United States and India, and contribute to regional stability in South Asia. This paper describes the approach for this engagement, the Indian scientific organization and infrastructure, potential areas for collaboration, and current status of the initiative.

Introduction

During his March 2000 trip to South Asia, President Clinton declared that broadening and strengthening US/Indian ties in science and technology was critical to achieving US foreign and security policy in the region. Several actions were taken at that time: signing of the US-India Science and Technology Agreement[1] and the US-India Joint Statement on Energy and Environment[2], and establishment of the Indo-US Science and Technology Forum. The Forum will assist in the facilitating and promoting joint collaborative projects. The Forum will also commission studies, reports, and papers and will promote an "exchange of ideas and opportunities in Indo-US science and technology cooperation and other areas."

Since India's 1998 test of a nuclear weapon, the US Government has restricted certain activities with India. However, the *State Department Guidelines on USG Science Activities in India*, dated April 20, 2000, describe a policy shift "from a presumption of denial to a case-by-case review with a presumption of approval for new USG science and technology activities in India, as long as the activities do not involve listed entities, do not require a Glenn Amendment waiver, and do not violate US law." We have proposed

using technical collaboration as one component of a strategy to enhance regional security in South Asia.[3]

US-India Science and Technology Initiative

In 2000, DOE's International Policy and Analysis Division (NN-42) approved a US-India Science and Technology Initiative to utilize the expertise of DOE national laboratories to conduct activities that support US policy objectives in South Asia. Pacific Northwest National Laboratory (PNNL) and Los Alamos National Laboratory (LANL) began working with US government agencies to identify appropriate non-sensitive, non-nuclear areas for US-Indian technical collaboration. The overall objectives of such collaboration are to address visible national and international problems, build trust between the United States and India, and contribute to regional stability in South Asia.

The desired near-term result of the PNNL-LANL program is twofold: 1) Engage Indian government, academic and scientific communities in scientific achievements not related to nuclear weapons; and 2) Identify areas where Indo-US scientific and technological collaboration can help solve problems of mutual interest.

Approach

In January 2001, PNNL and LANL presented a plan to DOE and several DOE national laboratories. The plan is intended to facilitate and promote the interaction of U.S. and Indian scientific, government, commercial, and academic communities. At the center of the plan is a workshop or series of workshops. The objective of these workshops is to identify key problems in South Asia that could be effectively addressed by science and technology, and to define collaborative US/India projects to respond to the problems. This project will be coordinated with the State Department and be conducted consistent with the Indo-US Science and Technology Forum.

While the workshop is central to the project, several other steps are essential. The overall approach is as follows:

1. Research the organization of the Indian scientific community to help identify appropriate participants in the workshop(s).

2. Research problems in India that could be effectively addressed by science and technology. This will help to identify appropriate US participants in the workshop(s) and prepare them with relevant background information on India.

3. Research current US/Indian collaborative work in S&T in order to coordinate or avoid duplication of effort.

4. Solicit advice from India experts who can help guide the strategy of this project.

5. Conduct a planning meeting, involving DOE, the State Department, PNNL, LANL, and several other DOE laboratories. This was done at DOE in January 2001.

6. Work with the Indian scientific community to identify government, technical, and commercial experts who are eager to participate in the workshop(s).

7. Organize and conduct a workshop with Indian scientific, government, and commercial representatives to identify specific technical areas of collaboration and associated contacts.

8. As a result of the workshop, develop joint proposals for potential collaboration in a variety of appropriate technical areas. PNNL and LANL will work with Indian participants to develop proposals that could be submitted to the U.S. Government and to foundations for funding in each area of proposed collaboration. The Indian side will seek funding from appropriate sources.

As of July 2001, parts of steps 1, 2, 3, 4, and 5 were done. Some of those results are given later in this paper.

The approach was also coordinated with DOE/International Affairs, the White House Office of Science and Technology Policy, Agency for International Development, the State Department, and the Science Counselor in New Delhi.

A second phase of the project could involve organizing a conference in India to showcase first results of the collaborative activities. PNNL and LANL will also encourage joint papers and presentations on these collaborative activities at professional society meetings.

Indian Scientific Organization and Infrastructure

The situation in India and South Asia must be considered carefully when determining the most effective areas of Indo-US technical collaboration. Recent positive developments in India include increased literacy (52% in 1991 to 64% in 2000), a food surplus of wheat and rice which is exported, and 95% of villages with a safe source of drinking water. Negative developments include worsening government corruption, water and electricity shortages, pollution, and the Kashmir conflict.

India's scientific programs are extensive. Approximately 300,000 people are employed in research & development (R&D). About $2.2 billion was spent on R&D in 1994, nearly all by the government, representing ~1% of India's Gross National Product (GNP). For comparison, the United States spends ~2% of its GNP on R&D. India's historical scientific focus has been on atomic energy, space, electronics, and defense.

The science and technology infrastructure in India consists of ~400 national laboratories and several government departments: Scientific and Industrial Research, Atomic Energy, Space, Biotechnology, and Ocean Development. Perhaps the most important for the

purposes of this initiative is the Council of Scientific and Industrial Research (CSIR), which has about 40 labs. The science and technology infrastructure also includes ~1300 R&D units and 200 universities.

Identification of Areas for Collaboration

DOE, PNNL, and LANL have established several criteria for choosing areas of collaboration with India:

- Consistent with US nonproliferation policy and legal restrictions.
- Within a technical area that is of general interest to the US Executive Branch and Congress.
- Generates interest in the Indian scientific and government communities.
- Engages Indian entities where valuable US/Indian relationships can be established and/or cultivated.
- Involves Indian scientific establishments that have the technical capability to be successful partners in the collaborative activity.
- Promotes regional cooperation and therefore stability, particularly through:
    - Addressing common regional problems
    - Involving other countries in the region
- Addresses a visible issue or problem of social, economic, or human importance.
- Practical to implement.
- Compatible with resident expertise of the cognizant DOE national laboratories.
- Reasonable likelihood of success within limitations of available funding.
- Reasonable likelihood of attracting funding from Indian and US government and/or private sources.

At this point, we are considering collaboration within the broad areas of environmental sciences, energy, and health sciences.

We have obtained and reviewed descriptions of current US-India scientific collaboration, specifically involving 1) the US-India S&T Fund (USIF) which includes many US government agencies, 2) DOE, and 3) Sandia National Laboratory's Cooperative Monitoring Center (CMC). Most of the USIF projects have been completed, but the potential new projects under our initiative will be reviewed to ensure there is no duplication. We saw no current DOE collaborative activities that we need to avoid duplicating. CMC has one environmental project with which we might dovetail.

Next Steps

PNNL and LANL have presented DOE two options for conducting the workshop (items 6 and 7 in the Approach section above):

Option 1: PNNL will host a 4-day workshop. DOE, State, PNNL, and LANL will attend. We expect Indian participants to include some CSIR representatives as well as some laboratory representatives in the areas of energy, environment, weather prediction,

and health. Corresponding US lab representatives will attend. The outcome of the workshop will be a prioritized list of collaborative projects, names of US and Indian scientists for developing proposals for each project, and potential funding organizations for each project. Outlines of proposals may be completed for the top proposed projects.

Option 2: The US side will meet in New Delhi with CSIR and possibly their selected lab representatives. The outcome of the meeting will be specific plans for a workshop as described above. The US side would consist of DOE, State, PNNL, and LANL.

Our hope is that the US-India Science and Technology Initiative becomes an important component of a strategy that moves South Asia toward regional stability.

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[1] *US-India Science and Technology Agreement*, March 21, 2000, www.usinfo.state.gov/regional/nea/mena/india3.htm.

[2] *US-India Joint Statement on Energy and Environment*, March 22, 2000, www.usinfo.state.gov/regional/nea/mena/india5.htm.

[3] Killinger, M.H. and J.R. Griggs. "Moving Toward a Regional Safeguards System in South Asia." *Proceedings of the INMM/ESARDA Third Workshop on Science and Modern Technology for Safeguards*, Tokyo, Japan, November 2000.