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INTERNATIONAL SPACE YEAR
1992

Developing Country Perspectives



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EXECUTIVE SUMMARY

The 1992 International Space Year (ISY) will celebrate the pioneering nature of the world's space activities and highlight their practical benefits for all humankind. The U.S. Agency for International Development supports the view that ISY can serve as a mechanism to encourage satellite remote sensing for economic development and natural resource management in the developing world. This report summarizes the findings of teams sent by A.I.D./ Washington to elicit the first input from the developing world to planning for ISY. Key findings are the following: (1) Developing countries are enthusiastic about the ISY idea, but only if they can truly participate. (2) ISY is perceived as relevant to developing countries only if satellite remote sensing of the earth is a key theme. (3) It is widely believed that the United States has abdicated its international leadership role in remote sensing and that this role has been taken over by France, Japan, and others; however, there is broad agreement that strong U.S. leadership in promoting ISY will help reestablish the former preeminence of the U.S. (4) Planning for ISY activities in the developing world must begin immediately to be successful. Activities recommended by the countries visited include: in-country workshops in economic development and natural resource applications of remote sensing; multi-year remote sensing studies of direct relevance to each developing region; establishment of regional remote sensing societies; convening of regionwide remote sensing conferences; and publication of remote sensing newsletters and directories.

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INTRODUCTION

The International Space Year of 1992 is expected to be a major international event. ISY will commemorate the 500th anniversary of Columbus's revolutionary discovery of the New World. Simultaneously, it will mark the 35th anniversary of the historic International Geophysical Year of 1957 that focused scientific attention on the earth as a global system and ushered in the Space Age.

ISY aspires to celebrate the pioneering spirit of current activities on the new frontier of space and highlight their practical benefits for all humankind. A major objective will be to foster international scientific cooperation and maximize the effectiveness of current and prospective space-related activities throughout the world. ISY is intended to encompass a wide variety of research, applications, and educational activities in both the developed and developing worlds.

The United States Agency for International Development supports the view that ISY can play an important role in encouraging satellite remote sensing for economic development and natural resource management in the developing world. In September 1987, A.I.D./Washington (The Bureau for Science and Technology, Office of Forestry, Environment and Natural Resources) called upon one of its Indefinite Quantity Contractors, the Technology Application Center (TAC) of Albuquerque, New Mexico, to visit key remote sensing organizations in the major regions of the developing world. TAC's task was to initiate interest in ISY and to discuss with these organizations ways to make ISY meaningful and effective for their regions.

Between 16 November and 11 December 1987, TAC representatives and expert consultants visited remote sensing organizations in Bangkok, Thailand; Lima, Peru; Cairo, Egypt; Amman, Jordan; and Nairobi, Kenya.

Extensive meetings were held in each place. No organization had yet heard of ISY. The ISY concept was introduced and frank responses to this idea were solicited. The present report is a summary of these responses. It represents the first input from the developing world to planning for ISY.

BACKGROUND

The five countries visited by the AID-sponsored ISY teams--Thailand, Peru, Egypt, Jordan, and Kenya--are broadly representative of developing countries. All are experiencing major economic and social stresses from population pressure. Current growth rates will cause their populations to double in a period varying from only 18 to 33 years. However, these countries are already experiencing difficulties providing for their present populations. The prospect of having twice as many people to feed, clothe, house, educate, employ, and otherwise provide for soon after the year 2000 is an alarming prospect to national planners. In the year 2000, nearly 80 percent of the world's population will live in the developing world.

Like most developing countries, the five countries visited by the A.I.D./ ISY teams are relatively impoverished. Per capita GNP in this group of countries ranges from a low of \$290 in Kenya to a high of only \$1,560 in Jordan (1985 figures).

Continuing population growth and efforts to obtain a higher standard of living will place unprecedented demands on existing natural resources, requiring increased efforts for their wise management. However, the tropical or semi-tropical climates of these five countries make them inherently vulnerable to environmental degradation. Unfortunately, countries most in need of economic development tend to be those with environments most susceptible to disruption from development.

Population pressure is already precipitating a deterioration of resource bases, leading to environmental problems familiar throughout the developing world, such as deforestation, desertification, and water and air pollution. To prevent further environmental degradation, and to ensure that the positive effects of development efforts are sustained, it is essential that comprehensive resource management programs be implemented and coordinated with national development strategies.

The five countries visited by the A.I.D./ISY teams include several of the developing countries most advanced in the use of satellite remote sensing. Egypt, Thailand, and Kenya have active remote sensing centers and programs that date back to the period immediately following the United States' launch of Landsat 1--the world's first civilian remote sensing satellite. Each of these three is a remote sensing leader in its region. Jordan is now in the process of establishing a major national remote sensing center with funds allocated by the Canadian and French governments. It will likely soon become a remote sensing leader in the Near East region. The last country visited, Peru, is more typical of the developing world in general. Peru still only aspires to develop strong capabilities in remote sensing. Like most developing countries, it hopes eventually to tap the power of satellite technology to serve critical economic development and resource management activities.

RESPONSES

TAC and its consultants provided a briefing on plans for the 1992 International Space Year for key remote sensing organizations in each of the countries visited. Frank responses to the ISY idea were encouraged. The following themes clearly emerged.

1. Organizations contacted in each developing country were enthusiastic about the ISY idea and eager to participate. They perceive satellite remote sensing as the primary way that space technology can benefit their countries and as representing the only satellite application meaningful for active participation in ISY. ISY is viewed as a valuable mechanism for fostering increased use of remote sensing for natural resource development and for tackling critical food production and resource management problems. The idea of increased regional and international scientific cooperation also holds strong appeal.
2. It was emphatically asserted that developing countries would probably participate in ISY only if practical uses of space were stressed, and only if they could truly participate. There was decidedly no interest in participating in ISY as mere spectators of developed world space missions. There was also little interest in celebrating the 500th anniversary of Columbus's discovery of the New World or in participating in IGY "revisited."
3. There is a widespread perception that the United States has abdicated its leadership role in satellite remote sensing, and a sense of disappointment over this fact. This abdication is considered to be evidenced in the virtual disappearance of U.S. government commitment to the Landsat program, in the reduction or termination of A.I.D. funding for remote sensing centers and projects in the developing world, and in the drying up of funding for developing country scientists and technicians to obtain remote sensing training in the United States. In the countries visited, leadership in satellite remote sensing has been assumed by Canada, France, Great Britain, Japan and others. However, there is agreement that strong U.S. leadership in promoting ISY-related remote

sensing activities could do much to reestablish the former preeminence of the U.S. in this domain. This role would involve both economic assistance and organizational input. Yet, in an era in which the U.S. is struggling to establish a commercial space industry, such an investment should prove to have a solid return.

4. The organizations contacted emphasized that, if ISY is to be a success in the developing world, planning must begin immediately. The developing world, in general, lacks a strong tradition of scientific cooperation and technological interaction such as is commonly found in the United States and Europe. In addition, the often cumbersome nature of government bureaucracies means that planning activities can be quite protracted by developed country standards. For these and other reasons, ISY can only have the desired major beneficial impact if: (1) the ISY idea is immediately introduced to key organizations throughout the developing world; (2) planning sessions for each developing region are organized, to which representatives from all interested countries in the region are invited; and (3) an agenda for ISY activities in each developing region is set.
5. Discussions about potential remote sensing activities for ISY in the developing world produced a broad spectrum of feasible ideas. Nearly all would be relatively inexpensive to actualize. They include the following:
 - Publish a directory of remote sensing organizations and units in each developing region, to include addresses, telephone numbers, profiles of facilities, and project histories. Such a directory would help to set the stage for increased scientific collaboration between the countries in each region, and also help to strengthen the remote sensing linkages between these countries and the developed world.

- Establish a newsletter to keep remote sensing organizations and units in each developing region up-to-date on preparations for ISY, as well as on remote sensing activities within their region and relevant remote sensing activities elsewhere.
- Print and disseminate impressive satellite images of each developing region with interpretations addressing problems of regional interest. These images would help demonstrate to non-professionals the utility of remote sensing for economic development and natural resource management.
- Establish a regional remote sensing society in each developing region where one does not exist. Bring in representatives from successful remote sensing organizations or societies in other developing world regions to discuss how to proceed in this undertaking. Latin America has a successful remote sensing society, SELPER, which could serve as a model for other developing regions.
- Promote increased long-term remote sensing training in developed countries to establish a solid cadre of remote sensing managers and technicians in each developing region. Providing funding for such training in the United States would help the U.S. to regain its leadership role in international satellite remote sensing. As a side benefit, it would help to expand overseas markets for the U.S. commercial image processing hardware and software industries.
- Bring in expert consultants to hold workshops in remote sensing for various natural resource and economic development applications of direct relevance. These workshops would address the following critical areas:

Resource Mapping. Most developing countries have inadequate or non-existent basic resource maps. They also lack the organizational capability to regularly acquire data pertaining to natural resources. In short, there is an acute lack of information for resource planning and development. Satellite imagery can not only provide these countries with a near-orthographic mapping base, but can also be used to generate maps pertaining to soils, forests, rangeland, hydrology, geology, land use, environmental problems, and other themes--all at a level of detail sufficient for integrated resource management.

Agriculture. Developing countries typically lack accurate up-to-date information about their agricultural resources. Ever-increasing consumer demand due to population growth has steadily increased the need for accurate inventories of agricultural resources for both short and long range planning. In addition, food importing countries (now a majority of the developing world) have an ever-increasing need for early crop monitoring systems. Without reliable and timely crop information, such countries cannot make intelligent agricultural commodity purchasing decisions. Satellite remote sensing offers an efficient and inexpensive means of estimating crop production, identifying potentially arable land, assessing rangeland conditions, monitoring irrigated lands, and accomplishing other critical tasks.

Forestry. Developing countries generally lack basic statistics on total forest acreage and acreages of major commercially exploitable species. This lack of information obviously hampers rational forest management. In addition, they usually have no clear idea of how significantly their forest cover has changed over time, and thus cannot assess the magnitude of their deforestation problems. This knowledge is critical, because deforestation can lead to agricultural acreage loss through erosion, to rapid siltation of reservoirs, to loss of water resources, and even to desertification--all with major economic consequences. Satellite remote sensing offers a quick, low-cost, and effective way to acquire basic forestry statistics.

Water and Mineral Resource Development. Satellite imagery can be used to produce basic maps pertaining to water and geologic features. In addition, image processing techniques applied to these data can often help pinpoint potentially valuable mineral deposits and sources of groundwater.

- Establish a multiyear regionwide remote sensing study focused on a theme of common concern. For the Near East (including North Africa), a regionwide desertification study was proposed. Organizations contacted in Southeast Asia suggested the establishment of a permanent tropical deforestation monitoring program for their region. Remote sensing leaders in Africa proposed an atlas project: African countries would

send cartographers to the regional remote sensing center in Nairobi, Kenya, to learn to produce national maps from satellite data. An atlas project was also proposed for Latin America. However, this atlas would help commemorate the 500th anniversary of Columbus's discovery of the New World by comparing early Spanish and Portuguese colonial maps of Latin American countries with modern maps based on satellite imagery.

- Hold regionwide remote sensing ISY conferences in 1992. These conferences would highlight remote sensing activities in the various countries in each developing region. They would both serve a technology transfer role and help spread awareness of the practical benefits of space technology. Dignitaries would be invited to deliver the keynote addresses to increase the publicity value of each conference. For example, remote sensing leaders contacted in Thailand felt confident that their country's Princess Mahachakri Siridhorn would consent to giving the keynote address for the 1992 Southeast Asian ISY conference.
- Assign one or two A.I.D.-sponsored remote sensing experts to each major region of the developing world to help organize and coordinate activities leading up to and commemorating ISY. This cadre could regularly give PC-based satellite image processing demonstrations to relevant government agencies within each region to help expand use of this space technology for economic development and natural resource management.

CONCLUSION

The 1992 International Space Year can only become a truly historic international event if it encompasses the developing world. The developing world can and will actively participate in ISY only if satellite remote sensing

becomes a key theme. Manned space missions and basic space research envisioned as central themes by most ISY planners will not involve the developing world and will do little, in the foreseeable future, to improve the well-being of the majority of the world's citizens, who are struggling with day-to-day survival. Satellite remote sensing has the real potential to help improve the world's food production systems and solve pressing natural resource problems. The ISY vision of demonstrating the "practical benefits of space for all humankind" is a noble vision. It can be actualized through encouraging applications of remote sensing in the developing world.

Benefits from adopting remote sensing as a key ISY theme will accrue not only to the developing world. Major international initiatives such as the Man in the Biosphere Program (MAB) and the International Geosphere-Biosphere Program (IGBP) recognize that environmental degradation in the developing world--particularly tropical deforestation and desertification--will ultimately have severe consequences for global habitability. These programs will depend for their success on earth monitoring by satellite and the full cooperation of the developing world. By promoting satellite remote sensing, ISY can contribute to the solution of global problems. What better way to highlight the practical benefits of space? What better legacy for ISY?