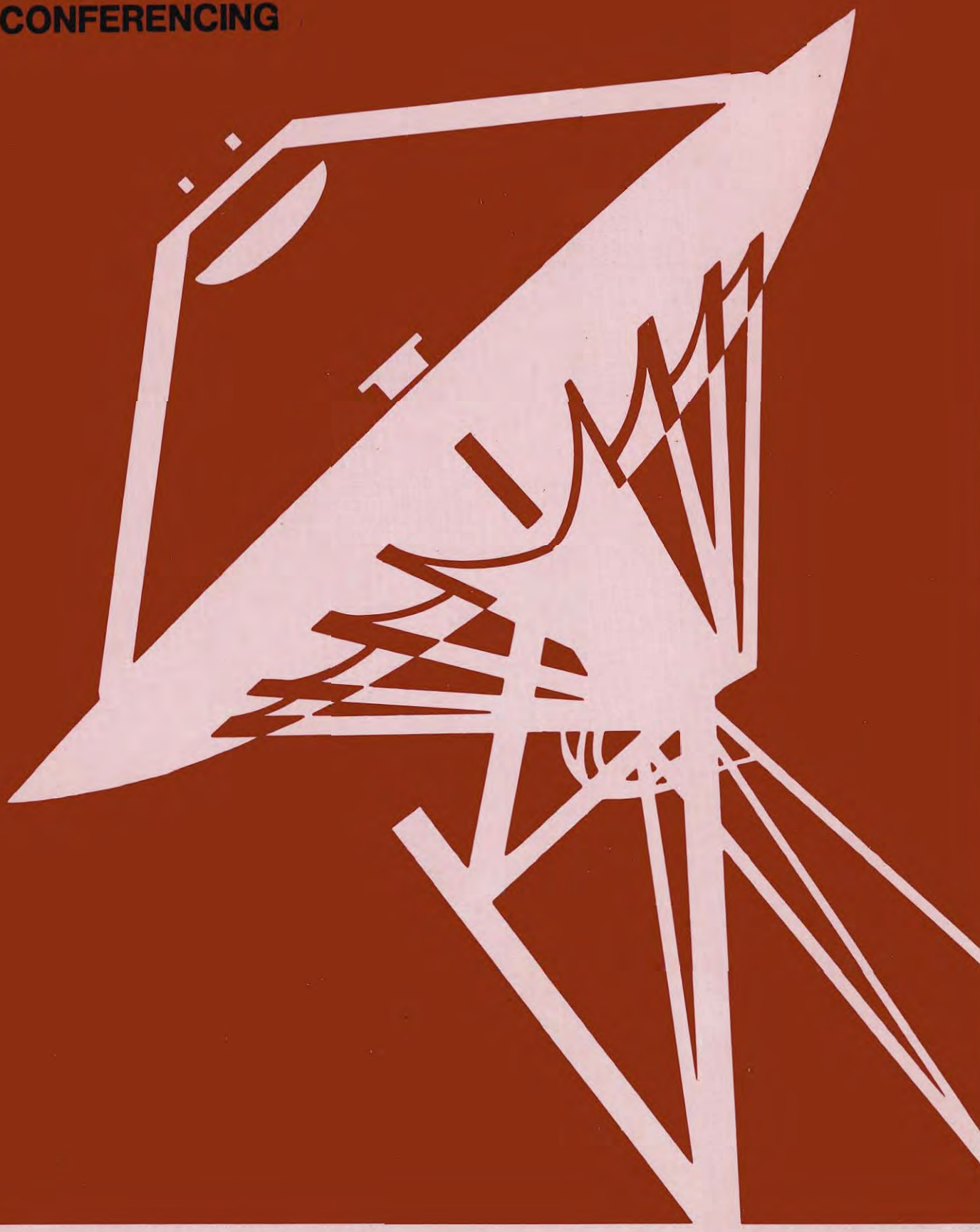
Telecommunications and Rural Development

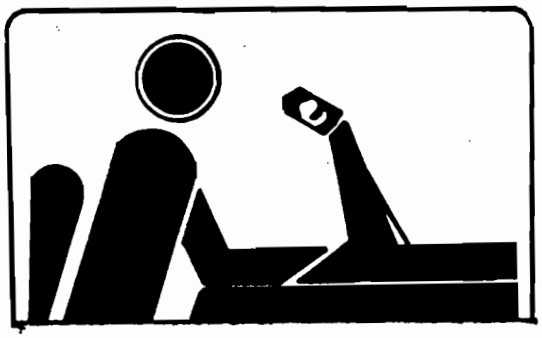
TWO-WAY TELECONFERENCING



The AID Rural Satellite Program

DISTANCE EDUCATION VIA SATELLITE
A TRI-NATIONAL PERSPECTIVE

Willard D. Shaw, Ed.D.
USAID Rural Satellite Program
Academy for Educational Development



USAID RURAL SATELLITE PROGRAM

U.S. Agency for International Development
Bureau for Science and Technology
Office of Education
Washington, D.C. 20523

Academy for Educational Development
1255 Twenty-Third St., N.W.
Washington, D.C. 20037

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WHAT IS THE AID RURAL SATELLITE PROGRAM?

- **A 6-year R&D program on the use of telecommunications as a development tool**

Specifically,

- Designing telecommunications projects to support development activities in agriculture, health, and education
- Assisting LDC institutions in educational use of the technology
- Assessing specific equipment and technologies for the developing world environment
- Working with policymakers to expand development applications of telecommunications
- Evaluating impact and effectiveness

WHAT DID THE RURAL SATELLITE PROGRAM DO?

Three Pilot Projects were designed and implemented in:

- **Indonesia:** linking 13 universities spread over 2,500 miles in a distance education network
- **Peru:** providing 7 towns in the Amazon basin with basic telephone service and a teleconferencing network for the training and administrative support of field workers
- **West Indies:** establishing a 7-nation teleconferencing network to support the University of the West Indies and other regional development activities

The Pilot Projects shared information and scarce human resources through a variety of distance education programs delivered over a single telephone circuit.

- University courses
- Teacher training
- In-service training for field workers
- Health campaigns
- Research support
- Administration and coordination activities

The Pilot Projects introduced and adapted new technologies such as:

- Unattended, solar-powered small earth station in Indonesia
- Small, 6.1-meter earth stations to connect into domestic satellite network
- Innovative, low-cost designs for rural communication networks

WHAT COMMUNICATIONS TECHNOLOGIES DID THE RURAL SATELLITE PROGRAM USE?

The Rural Satellite Program used telephone-based conferencing. It did not use television.

- Telephones provide the simplest form of two-way communication
- One expert can interact with learners at many sites through teleconferencing
- Telephone networks cost 1/100 of television networks
- Educators find teleconferencing easy to use

Telephone lines can now carry other forms of information in addition to voice.

- Pictures, through "slowscan" video
- Data, text, and graphics, through microcomputers
- Print materials, through facsimile
- Notes, charts, and diagrams, through telewriters

The Program developed the educational use of all these technologies. Their capabilities and costs are described in the chart on the next page.

TWO-WAY TELEPHONE-BASED TECHNOLOGIES

Equipment	Capability	Per Unit Price Range
Voice:		
Basic Audioconferencing Unit (speaker-amplifier and 6 microphones)	• voice connection between large groups of people at multiple sites • network bridge necessary if satellite is not used	$1000-1500 $1000-2000 per connection into bridge
Graphics:		
Facsimile	• immediate electronic transfer of existing paper documents, charts, etc. • unattended reception or transmission	$2000-4000
Microcomputer Network	• immediate transfer and storage of text/graphics created on the micro (modem and printer need to be added for transmission and printing capability) • "electronic mail" bulletin board features and data storage • multiple-site dialogue on a single screen • access to data bases hosted by a larger computer	$1000-4000 micro $150-1500 modem $200-2000 printer $1000 networking software $1500-3000 networking hardware
Slow-Scan Video	immediate transmission of still video pictures (e.g., picture of speaker, audience, x-rays, slides, text, objects, etc.)	$4000-10,000
Videophone	immediate transmission of video images that are live, off videotape, or on computer disk; smaller version of slow scan; needs additional external monitor for groups	$2000-8000
Telewriter	immediate two-way transmission of handwriting and graphics onto video screens	$6000-20,000

WHAT ARE THE COSTS OF A TELECONFERENCING NETWORK?

Three cost elements must be considered:

- the capital costs -- the teleconferencing equipment, associated hardware, and facilities;
- the transmission costs -- satellite "air time" and telephone lines; and
- the management and maintenance costs -- operating the systems and developing programs for delivery.

Capital and Recurring Costs

Cost Element	SISDIKSAT (Indonesia)	UWIDITE (West Indies)	RCSP (Peru)
• Audio Equipment	$ 9,941/site	$ 4,985/site	$ 4,549/site
• Annual Transmission	118,750/yr.	104,000/yr.	no charge
• Annual Management	82,313/yr.	139,702/yr.	33,300/yr.
• Hourly Cost (transmission & management)	94/hr.	140/hr.	68/hr.

Cost Effectiveness: Comparison with Face-To-Face Delivery Methods

Activity	Face-to-Face	SISDIKSAT	UWIDITE	RCSP	Savings
• Course	$ 1,281/site	$ 542/site			58%
• Seminar (1 day, 84 people)	11,250		1,000		90%
• Workshop (6 days, 20 people)	9,325	3,384			64%
• Training (31 sessions)	4,000			2,600	35%
• Teaching Certificate	8,172/ student		3,836/ student		54%
• Visiting Professor	64/course/ student	11/course/ student			83%

WHAT DID THE RURAL SATELLITE PROGRAM PROVE?

Telephone-based technology can be made reliable:

- 98% technical reliability in Indonesia
- 96% technical reliability in Peru

Telephone-based systems can answer development needs:

Indonesia—

- Extends expert teaching of 17 courses to over 3,500 students each semester
- Voluntary seminar programs attract over 1,800 participants

Peru--

- Telephone capacity expanded twice with Peruvian funds
- Telephone service used by over two-thirds of the region's families, yielding $100,000 annual revenue
- Provides over 300 training conferences per year for health, agriculture, and education field workers

West Indies—

- Doubled the annual number of Certificates of Education awarded by UWI
- Reaches over 500 health care professionals in the region

Teleconferencing is effective:

Peru—

- 92% of participants rate the teleconferencing program as beneficial and immediately relevant to their work
- Over 80% of field workers in the region participated in teleconferences

Indonesia—

- 99.2% of seminar participants requested that additional seminars be offered
- 74% of students indicated they learned especially well from the interactive question and answer sessions
- 67% of students felt they learned as much or more from the distance courses as from their regular classes
- 95% of local tutors felt the students learned as much or more from distance courses
- 100% of local tutors believed the distance course improved their teaching of similar courses on campus

Teleconferencing is affordable:

- Course delivery cost $10/course/student over the system versus $64/course/student using existing "flying dosen" (visiting professor) program in Indonesia
- A one-week training course for 30 people in the West Indies costs $6,000 using the system versus $19,000 for face-to-face meetings at one central location

Teleconferencing is manageable by developing-nation institutions.

- Part-time university staff manage the 15-site Indonesian system
- UWI fully operates its Caribbean-wide network
- Peru's telecommunications company manages social applications

WHAT DOES THE FUTURE HOLD FOR THE PILOT PROJECTS?

All host countries have continued and expanded these networks after the completion of A.I.D. funding in the 1985-86 period.

In Indonesia:

- Ministry of Education continues to fund the system
- 3 sites have been added with host-country funds
- Most classrooms have been expanded to accommodate more participants (in some cases, over 100 seats)
- Open University (enrollment 150,000 students) depends on the teleconferencing system for administration and tutor training in eastern Indonesia
- Ministry of Education is conducting its primary and secondary teacher upgrading program via the system
- Other Ministries and organizations have recently requested use of the system or development of their own networks
- Ministry of Education is seeking funds from the World Bank for the creation of a satellite network in western Indonesia.

In Peru:

- 2 sites have been added due to local demand
- Peru's telecommunications authority (ENTEL) continues to offer the social service conferencing program
- 19 local earth stations are being addd by ENTEL in 1987-88 based on the RSP experience
- CORDES (rural development authority) has pledged $45 million for telecommunications infrastructure in 700 rural communities based on Pilot Project success
- ENTEL has proposed project extension to 53 communities in the Andean Trapezoid
- ENTEL plans to offer commercial teleconferencing service to industry and business

In the West Indies:

- 2 nations have been added to the original system; others being planned
- Challenge Exam program will be presented exclusively over the system for all UWI students
- JHPIEGO reproductive health program relies solely on the system for doctor and nurse training programs
- Other international and regional organizations--ILO, Project Hope, PAHO, Caribbean Food and Nutrition Institute--regularly use and pay for the system to deliver programs
- The Project won the 1984 Gleaner Honor Award for its **". . . most dramatic impact on the quality and improvement of life not only in Jamaica but the entire Caribbean, enhancing the education of the people of the region."**
- UWI has incorporated network cost into its regular budget

WHERE ARE TWO-WAY TELECOMMUNICATIONS APPLICABLE?

Two-way telecommunications networks can contribute to development projects wherever rapid communication is needed between two or more distant locations. Networks can be based on two-site, multi-site, or one-way data communication needs.

- They can be established wherever there is reasonably adequate telephone or two-way radio service. Leased lines can be used to greatly increase reliability.
- Wherever domestic satellite systems are (becoming) available, these telecommunications services are even more practicable and cost-effective.
- Four-fifths of the developing nations have access to satellites. Many LDCs have launched their own satellites:
  - -- Palapa (1983): Indonesia and 5 ASEAN countries (Thailand, Philippines, Malaysia, Singapore, Brunei)
  - -- INSAT (1983): India
  - -- ARABSAT (1985): 22 Arab nations
  - -- BRAZILSAT (1985): Brazil and Bolivia
  - -- Morelos (1985): Mexico
  - -- STW 1 (1984): China
  - -- Under study: Africa (RASCOM), Andean countries (Condor), Pakistan, Argentina
  - -- 27 other nations use INTELSAT for internal communications

For further information on the potential applications of these technologies to development problems, contact:

at A.I.D.

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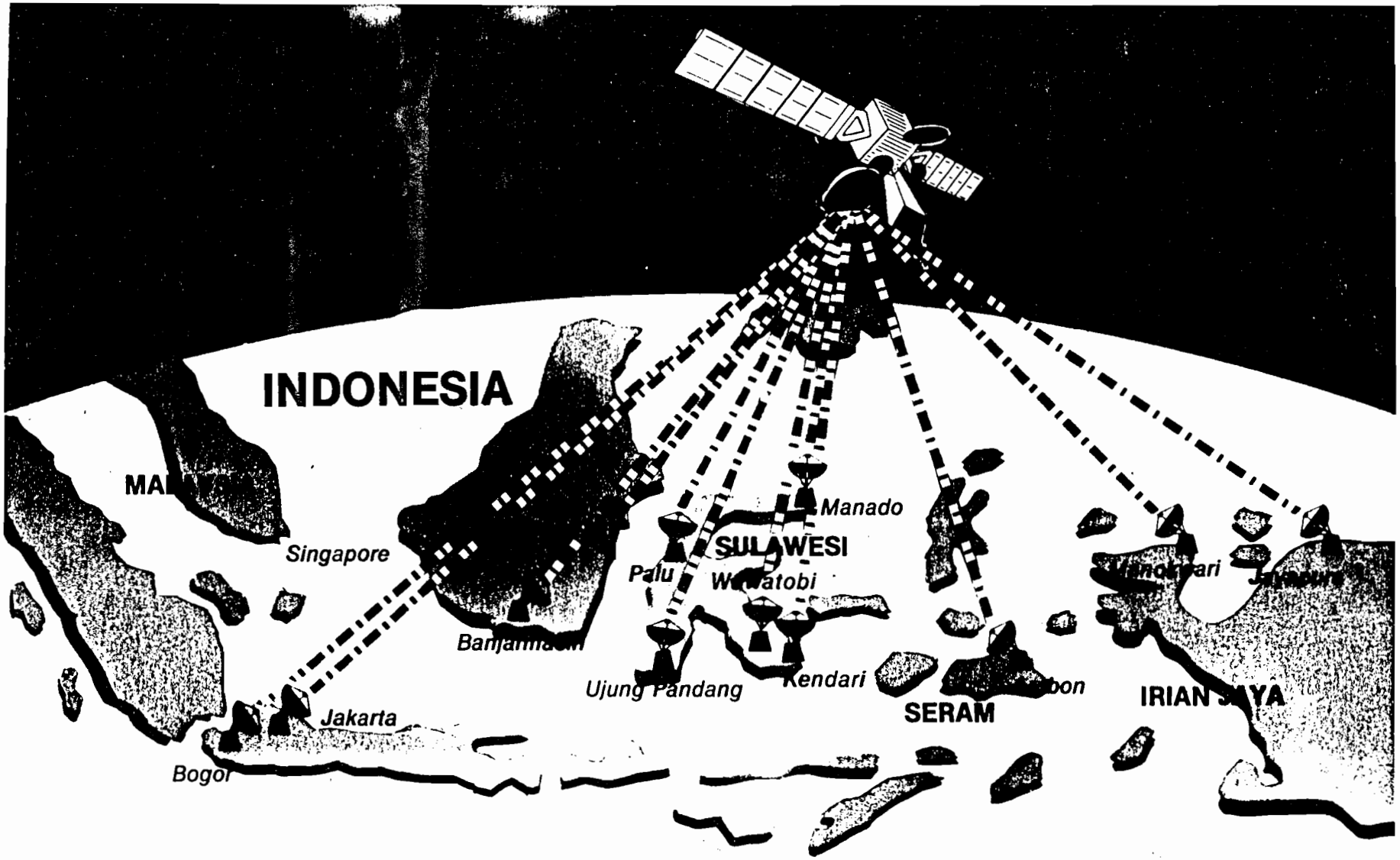

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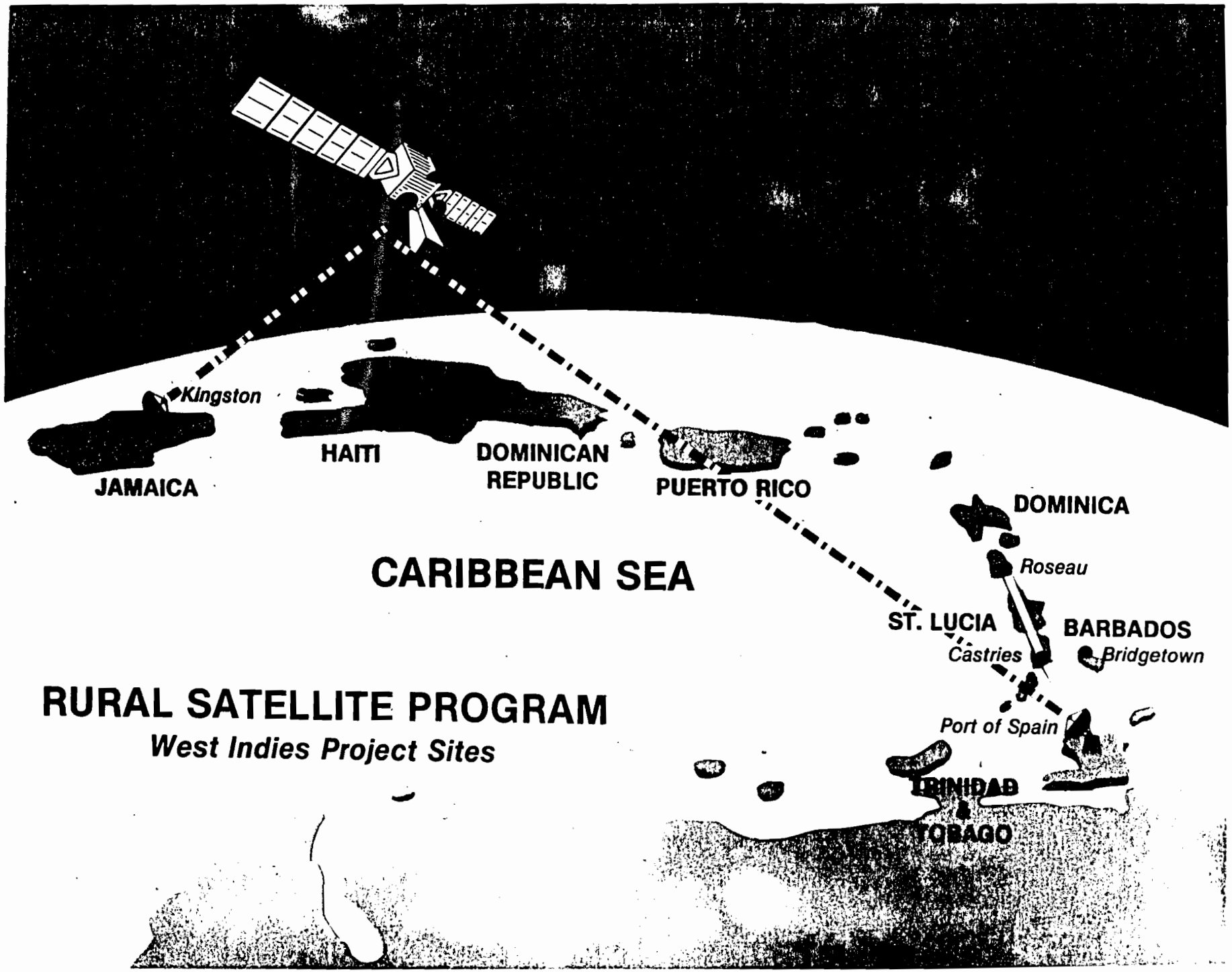
Indonesia Project Sites



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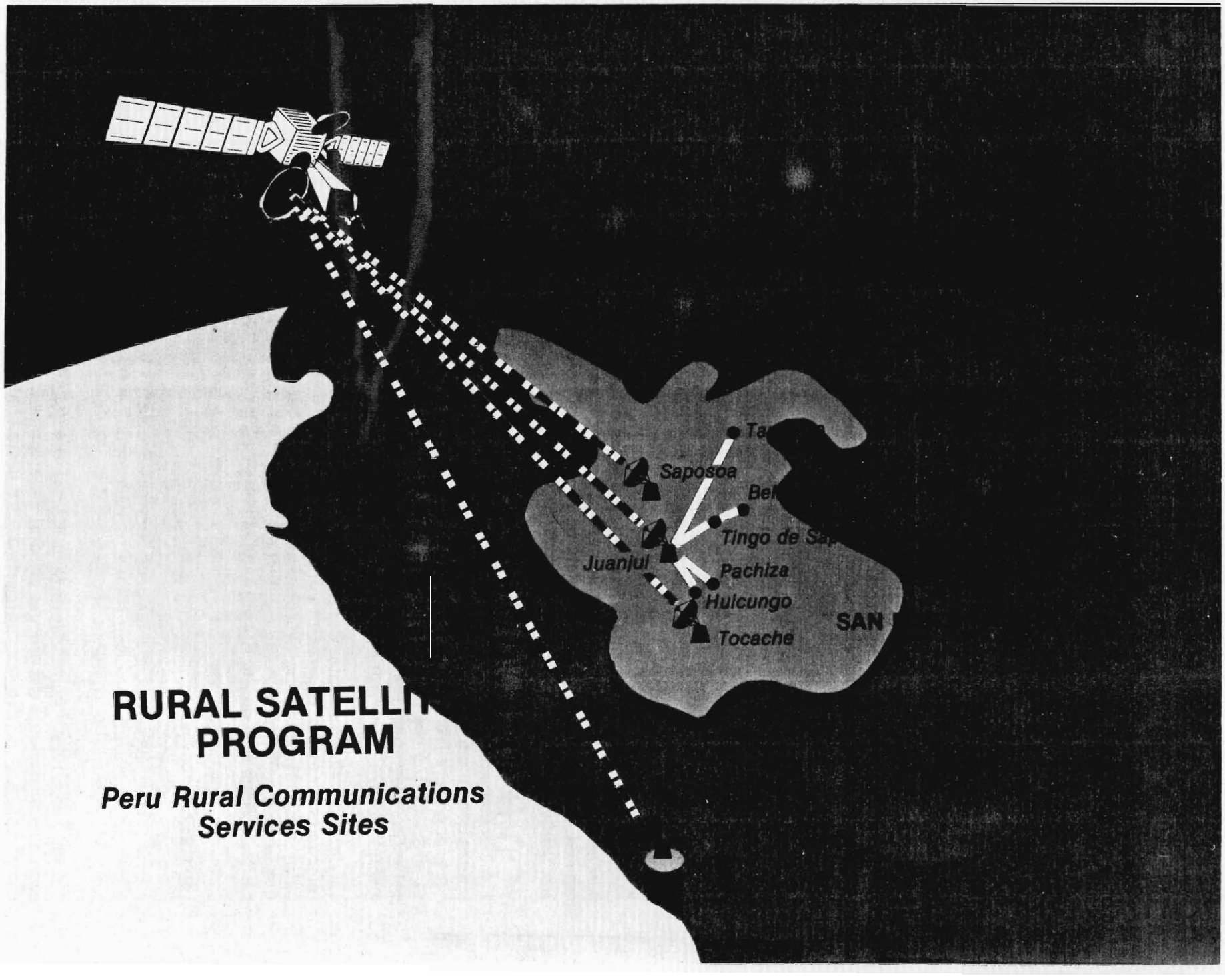
West Indies Project Sites



RURAL SATELLI
PROGRAM

Peru Rural Communications Services Sites

A Program of:

The United States Agency
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The Office of Education
Washington, D.C. 20523
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In Cooperation with:

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