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Satellite Communication And Rural Development In
"A Changing Asia" - Policy Issues

By

Serajul I Bhuiyan
Satellite Communication and Rural Development in "A Changing Asia"--
Policy Issues

Serajul I. Bhuiyan

Abstract

Information is the resource like other major development resources: human, natural, and financial. Recent experience applying information technology specially communication satellite in developing and industrial countries that appear to offer promising solutions to information problems. People-to-people communication, bypassing terrestrial boundaries both physical and political, is the emerging dimension of satellite communications.

The ongoing information explosion in the industrialized economies contrasts sharply with the information poverty of the developing countries. This poverty takes many forms: planning without facts, poor information support for macroeconomic and sectoral policy formulation and implementation, inadequate financial control and cumbersome reporting and monitoring systems, underdeveloped decision support systems at all levels of management, limited access to information for the rural populations, isolation of researchers and professionals from international research findings, lack of information on natural resources, poor access to timely information on national and international markets, and so on.

Communication satellite is the driving force for a new techno-economic paradigm with far reaching effects for all types of industries and services and for the competitive position of developing countries. Satellite communication along with other information technology can help improve planning, management, and productivity of all types of economic development activities: agricultural and rural development, poverty alleviation, environmental management, infrastructural development, and population and human resources development. It can improve policy analysis, macro economic management, debt management, enterprise management, financial intermediation, financial accountability, and popular participation. Satellite communication is a powerful tool to simultaneously integrate and decentralize.

Governments are recognizing their roles as information providers and users, facilitators of information technology diffusion, and providers of information and communication infrastructures, as well as their role in setting policies for communication satellite and informatics. In accepting a stronger role in each of these areas, they will have to pay special attention to: (1) regulatory policies governing the supply and use of satellite communication and information services; (2) priorities for information resources development and the infrastructural requirements to support them and to diffuse the best practices; (3) educational and employment policies to prepare human resources to exploit information technology; (4) proactive public policies to provide equitable and easy access to sector procurement and standardization of satellite information technology; (5) socio-economic, socio-cultural and socio-structural impact of satellite technology must be considered.
Introduction:

The global communications network enables us to access, collect, process, and deliver information from an office, home or a terminal to almost any place in the world. Indeed human societies are now part of the global connectivity, global mobility and global information society (Parapak, 1990). In the era of "communication revolution," or "information age," a nation or a region can no longer progress or have a competitive advantage without the support of high-quality communications networks.

The past quarter-century has been marked by dramatic technological developments in computers and telecommunications, and the growing importance of information in all aspects of human life. Access to information, and to the facilities to produce, store and transmit information, is now considered vital to development, so that the classifications "information-rich" and "information-poor" may be more than distinctions based on GNP or other traditional development indicators.

The new technologies of the post-1980s era are the combination of microcomputers and satellites. In fewer than twenty years, satellites have become an integral part of the communications industry, and have been used successfully for voice, video, and data transmissions in numerous situations. Remote-sensing for agricultural development, television, radio, teleconferencing, newspaper printing, medical care, peace missions, Olympic games, teaching, and emergency disaster and rescue services have all been carried out successfully via satellite communication. Many national and international companies keep inventory control and distribution via satellite communication.

More specifically, communication satellites epitomize the reality of two phenomena that are already cliches but are not yet fully understood: "global village" and "information age" (Hudson, 1990; Rogers, 1986; McLuhan 1965). While we tend to think of new communication and information technologies as the tools and toys of the industrialized world, they offer major benefits--and pose major policy dilemmas--for the developing world. Satellites are a classic example of a technology that holds dramatic promise for developing countries, but whose promise has remained largely unfulfilled due to financial, political, social structural, cultural and international factors.

Satellites have the potential to eliminate the barriers of distance that have hampered economic growth, social-service delivery, and public participation in rural and remote areas of both industrialized and developing countries. Yet access to the technology for domestic use has been generally limited to middle-income countries, and few of these are actually using this technology to help development goals (Williams, 1982). We need to
know how satellites can be used to increase rural people’s access to information, to raise agricultural productivity, and to promote other rural industries. Satellites are not a panacea to solve the problems of the development; rather, they are a catalyst or intensifier of change more than they are a sole cause of anything.

The most significant contribution of satellites will be to bring basic communications to people in developing countries. Smaller and cheaper earth stations, many of them solar-powered, coupled with new and improved radio technologies, should make it possible to reach virtually every human settlement (Hudson, 1990). Yet developing countries will still face decisions about how to invest their limited resources to improve basic infrastructure, including communication, transportation, electricity, and water supplies.

Today, satellites are helping communication and commerce, education and entertainment. Media and telecommunications, agriculture, health, and nutrition, banking and business, have all benefitted from satellite communication. But as with all new advances in technology, there is an element of debate and controversy as narrow interests seek to exploit the potential for power and profit in presence to the general good (Media Asia, 1990).

By the late 1980s approximately 3,300 satellites have been launched into orbit. The direct and related revenues generated from communication satellites currently amount to more than $10 billion per year (Pelton and Howkins, 1988). Different specific examples of satellite contribution to the national development are available now in Asia, Latin America and Africa.

Planners in developing countries will therefore need guidance on what priority to assign to communications and how to gain the greatest benefits from telecommunication/satellite investments. Thus, research on how the extension of telephone, broadcast, telecast and remote sensing services through satellites can contribute to social and economic development will continue to be needed to assist planners and policymakers in the next decade.

The overall purpose of this paper is to discuss and analyze the impact of satellite technology and concerned policy issues in the development of "Changing Asia." Author in this article shares a critical if not "radical" perspective searching for the political, economic, and cultural significance of satellite communication technologies, asking who gains, who pays and who bears the burdens of their usage and how Asian countries can better domesticate the stakeholder arrangements. The attempt to deal with the complexity of the issues concerning satellite communication/information and development in the contemporary situation in Asia has undoubtedly produced some shortcomings in the following discussion. While some policy issues and problems are recognized as vital to understanding
the current situation, it is not dwelled upon to a great extent in this article because of space constraints.

**Satellite Communication and Development**

Communication satellites have two major technical and cost advantages over land-based communication technologies. One is the ability to broadcast signals—whether television, radio (video, voice) or data—over the entire coverage area of the satellite, which can be as large as one-third of the world. The other is to provide reliable communication connecting any pair of points in the coverage area with costs independent of distance or intervening oceans or terrain (Hudson, 1990).

A reliable telecommunications infrastructure can facilitate economic growth and promote national development aims. Telephone services to rural and remote areas can stimulate economic development and bring the rural resident closer to the main stream of national life. Satellite television and radio network positively contribute to the economic, social and cultural development of a nation providing required information to the audience.

Satellites transmit data for business users. Wire services and stock market reports are received by satellite at newspapers and brokers’ offices around the world. Satellite technology offers wide coverage, high-quality transmissions, multi service offerings and high speed of implementation.

Communication satellites photograph, survey, and "sense" the earth and transmit the data around the world to the reception stations that instantaneously process the information with powerful computers. In its entirety, this activity is termed remote sensing. The uses to which remote-sensing data already have been applied are numerous and impressive, including crop monitoring, mineral and fuel exploration, forest management, national resource inventorying, flood control, pinpointing fish concentrations for the fishing industry.

In the oil industry, data have been used for locating prime uranium targets, laying out pipeline routes through mountains, extrapolating geologic models to upgrade offshore drilling locations, pinpointing hot spots of concern in oil refineries, mapping ancient burnout zones in coal fields, predicting area of intensity fractured rocks for safety control in coal mining..... and, of course, preliminary oil and gas exploration. It is already clear that the potential of remote sensing for providing physical information about all areas of the globe, for human benefit, is phenomenal (Schiller, 1984).

With satellites, the costs of providing a range of telecommunications services to small and scattered communities has
been dramatically reduced. Satellites now make it possible to extend basic two-way communications and broadcasting services throughout a country or region, including the most remote islands and villages. Satellites can be used to provide basic telephony as well as specialized networks for transmission of banking and financial data, weather information, commodity prices, wire services and so on. In addition, satellites can transmit national radio and television networks with multiple sound tracks for local languages or inserts of local programming.

They are used to transmit educational programming, such as rural development information, and school curricula from primary to universal level to outlying areas. Teachers, doctors, nurses, extension and rural development workers and other development personnel can further their education via satellite. Such services can be done by teleconferencing via satellite and can range from a simple audio network that serves as an improved version of multiparty high-frequency radio services found in many developing countries, to enhanced systems that include features such as computer conferencing, audiographics, freeze-frame video, or motion video using new bandwidth-compression technique.

The benefits of telecommunications/satellites seem intuitively obvious: the ability to maintain personal contacts, to get help in emergencies, to manage projects, to find sources or markets for products and services, and to obtain and exchange information. Yet in the telecommunications sector in developing countries, planners tend to justify the provision of services on a cost-recovery basis, ignoring the indirect benefits to users and to the economy as a whole.

In general, communications is more costly for poorer countries, as the relatively small message traffic costs more per circuit than heavy traffic of developed countries, which can be trunked with numerous circuits to save on material costs. This situation can be resolved by reducing the material costs of thin-route telephone systems to provide service to a number of nations. Satellite systems may play a useful role in this process.

Further, they also assume that in rural and densely populated areas the costs of providing and maintaining service will substantially exceed the revenues. Both macro and micro level studies on the investment on Satellite and telecommunication projects around the globe show the high contribution to the national development (Hudson, 1990; Chu, 1991; Wigand, 1984; Schiller, 1984). Joseph N Pelton mentioned that for virtually all the countries in the world, there is high correlation (more than 80 percent) between telephones per capita and GNP per capita. For each dollar placed into telecommunications development, there can be up to an additional $4 invested in the economy as a result of the original telecommunications-related commitment. International Telecommunication Union show that the cost/benefit ratio for
telecommunications investments in developing countries can run as high as 100 to one.

The Asia-Pacific region is undeniably the fastest growing region in the world. The region has become a new growth center as well as economic interdependence among the member countries in the region has also increased significantly reflecting greater potential and dynamism (Parapak, 1990). The Asia-Pacific market is now the world's biggest market with a value of almost US$ 3 trillion and a weekly growth rate of US$ 3 billion and this trend will be increasing in the international restructuring of production and gradual improvements in the transportation and telecommunication infrastructure.

Development of telematics (the joining together of telecommunications, broadcast media, and computer technologies into a single infrastructure for developing, sending, receiving, sorting, and utilizing information) for in the Association of Southeast Asian Nations (ASEAN) moved so rapidly during the 1980s that the region took on "model" status for modern communications in the Third World. The momentum actually started in the 1970s, when parts of region set their sights on upgrading communications (Lent, 1991). By 1976, Indonesia, with the great help from foreign nations, especially U.S.A., became the world's sixth nation to have a domestic satellite, Palapa, and by the following year ASEAN had built up Asian Telecommunication Highway.

As these realizations grow, an increasing number of developing nations are investing in satellite-based telecommunications systems. Within the last decade, Indonesia, India, Brazil, Mexico, and a coalition of twenty-two Arab nations have launch their own satellites. Through INTELSAT, twenty-seven other developing countries have established domestic satellite-based communications systems. What was once regarded as the wave of the future is now a present-day reality. How can developing countries benefit from this "telecommunications revolution?" What (Melkote, 1991). What will be the social, cultural impact? What tele/satellite technology can do regarding inequality of wealth due to "modernization paradigm?"

Current status of satellite use in Developing Countries

In the transformation of global information environment, television played a key role. Significant penetration of Television has occurred in the largest Third World nations such as China, India, Indonesia and Mexico beyond urban areas. The key elements in the diffusion of the medium are enhanced transmission capability and rural electrification. In the enhancement of transmission capability many countries made a decision to utilize communication satellites.
For domestic communications of voice, data, and broadcasting service by satellite, the Third World countries at present have three alternatives: (1) leased capacity from Intelsat; (2) use of a regional satellite system; and (3) procurement of a domestic satellite system.

Nineteen developing countries currently lease capacity from INTELSAT for domestic use, primarily to provide communications to provincial or state capitals and major regional centers (anonymous, 1988). Regional satellite services are now available in the Middle East and Southeast Asia. The Arabsat system, launched in February 1985, was designed to provide domestic and regional services for its twenty-two members in the Middle East and North Africa. Palapa B, the second generation of Indonesia's domestic and regional services throughout Southeast Asia (Hudson, 1990). The four members of the Association of Southeast Asian Nations (ASEAN) namely, Malaysia, the Philippines, Thailand, and Singapore have entered into agreements with the Indonesian telecommunications agency, Perumtel, to lease capacity on Palapa B.

Developing countries with their own satellites include, India which has been operating the INSAT system since 1983; Brazil, which initiated the Brasilsat system in 1985. China has launched its own experimental satellites and is planning a domestic satellite for telecommunications and broadcasting. Other developing countries considering domestic systems include Argentina, Colombia, Nigeria, Pakistan, and Thailand.

Satellites appear to be an ideal means to deliver telecommunications and broadcasting services to the villages and oases scattered across the deserts of the Arab peninsula and North Africa. Algeria was the first nation to lease an Intelsat transponder for domestic use. Since, then, Saudi Arabia, Morocco, Sudan, Libya, and Oman have all leased Intelsat capacity. However, the Arab nations now also have their own satellite for regional and domestic communications—Arabsat.

Case Studies and Experiences in Asia

More than two decades, countries in the Asia-Pacific have been adopting new communication technologies in the fields of broadcasting and informatics both for government information and development efforts, as well as for industry. The most important and pervasive of such technologies is the communication satellite.

Satellite technology has stirred a revolution as it has swept across the world altering the lives of millions of people. By overcoming the barriers of climate and geography, satellites have propelled the countries of Asia-Pacific into the space age, helping them to leap-frog technological gaps in reaching the message of development to the cross-section of the society and remotest
citizens. Palapa B in Indonesia and INSAT in India are the success stories of satellite technology in rural development in Asia.

Indonesia:

Godwin Chu, Alfian and Wilbur Schramm (1991) in their studies "Social Impact of Satellite Television in Rural Indonesia" found that in Indonesia, television has proved to be an effective, attractive and information instructor. During six-year period, rural Indonesians learned from Palapa television approximately three times as much about eight principal development programs as did non-viewers. Television helped narrow the knowledge gap between the lower and upper social and economic strata.

It contributed to national integration through learning of the national language, Bahasa Indonesia, especially among those with little or no schooling. During the six-year period, the number of persons able to understand the national spoken language increased nearly 17 percent more among the viewers than the non-viewers of television, and those able to read the national written language was 32 percent higher among TV viewers than non-viewers. Among the television viewers in less educated group more than twice as many as--73 percent as compared to 34 per cent of the non-viewers -- reported they could read Bahasa Indonesia at the end of the sixth year of the study. The per capita income has increased from US $ 75 in 1970 to US $ 275 in 1976, and US $ 547 in 1981 (ADB, 1983).

Palapa satellite television enhanced higher education by linking thirteen new universities in the Indonesia archipelago. These eastern islands universities suffered form a severe shortage of specialized faculty, particularly basic sciences and agriculture. The satellite audio conference system enabled a professor at one institution to teach students at several locations. The network was also used for faculty training and for administration, enabling administrators to meet electronically between infrequent face-to-face meetings. Sites were also equipped with facsimile machines and electronic blackboards for transmission of material written or drawn on graphic tablets. At most locations, the sites accessed existing Perumtel earth stations through telephone lines. Despite, problems of telephone infrastructure, institutional responsibility, adequate resources, Open University Programme achieved some development goals.

This findings assumes enormous significance in a country where many different dialects are spoken. Television promoted the adoption of family planning and modern health care, encouraged greater participation in village social organizations, and facilitated more active use of rural markets and public financial institutions (Chu and et. al. 1991). In the lower social and economic strata, television helped to raise the adoption of modern agricultural practices close to the level in the upper strata. Among viewers, television became the predominant source of
information, surpassing in importance all other sources combined. Consumption of advertised products increased markedly among viewers.

Rural Indonesia has apparently become more closely integrated into the national scheme. It has become better informed, more participatory, and more efficient in managing its own resources and community affairs. Indonesia has become more oriented to consumerism and somewhat leaning toward secularism. Authors, on the basis of their findings, termed this social transformation of rural Indonesia was rather fundamental and had come about at a pace and over and area made possible largely by the massive influx of information from Palapa television.

Indonesia is planning to advance the launching of the new telecommunications satellite PalapaB-4 to around 1992 or 1993, earlier than the initially planned 1995, to cope with the growing domestic and regional needs. Indonesia currently leases its satellites to Malaysia, Thailand and the Philippines. Plans are underway to build Indonesia’s next generation satellite, the Palapa C, which would be widely marketed to countries in the region, including Vietnam, Mayanmer, Papua New Guinea (AMCB, 1991). But there is no mention in the study regarding negative impact of "modernization paradigm" in Indonesian Society, as it has impacts in other societies.

India:

Indian Satellite Instructional Television Experiment project in 2400 villages contributed in the development of mass communication, teacher training, distance education, improving primary school education, agricultural extension, health and hygiene, nutrition, family planning, meteorological warning or remote sensing and national integration since its inception during 1975-76.

All India Radio uses satellite links for regional networking and program distribution (Hudson, 1990; Hornic, 1988; Haque, 1991). This experimental project provided Indian technicians a valuable opportunity to develop expertise in dealing with operational and management aspects of very sophisticated high-tech project. Prior to the launching of communication satellite, television access in India was limited to 28 percent of the population living in the major cities. By 1990, about 90 percent of the population had access to the television (Haque, 1991). India’s plan is to provide TV access to 378 million people on 63 million sets by the year 2000. India has also become one of the largest manufacturers of television receivers in the world producing four million sets compared to 1.5 million by Brazil, nine million by China during 1988.

Opponents of INSAT, however, argue that money expended on
satellite television would be much better spent for teachers, and infrastructure development. Inadequate maintenance of receiving sets has also been a problem. Opponents remind planners that educational television programming must be followed with material resources such as loans, medical supplies, and agricultural innovations. Communication is not a singular approach to development; development requires interaction among different factors in the society, and communication is a facilitator to that interaction. It is, however, deemed requisite for self-sustaining change.

Recent studies carried out in India highlight the plight of a farmer who could have eliminated a futile six-day, round trip by curt to a fertilizer supply station had he been able to walk 10 kilometers to a call box and learn whether the fertilizer was indeed available (Pelton, 1990). In agricultural communities, knowing when to bring a product to market and how to negotiate a good price for its transportation, which could be accomplished by telephone, could affect the annual net profit for the farmers by more than 50 percent.

Yash Paul, the secretary of India’s Department of Science and Technology and the head of the SITE project, observes that communication specifically telecommunication in India "is not a luxury; it must be used for all development programs" (NOVA, 1985). Critiques say, satellite technologies in India helped to increase "regional," "national," and "global" elite groups and contributed to broaden "information gap" between rich and poor in Indian Society (Agrawal, 1982).

Recently India is planning to build up a rural satellite system called GRAMSAT (Grameen Satellites-meaning village satellites) within 1995-96 which will be dedicated to meet the basic demands in rural areas for information on health, hygiene, environment, family planning and better agricultural practices. It will also provide continuing education to workers on the shopfloor to update their technical skills. GRAMSAT will help in providing adult education programmes, supplement educational programmes for primary and secondary educations.

Pakistan:

A microwave telecommunications system links major cities in Pakistan and enables simultaneously viewing of television programming with the help of INTELSAT and earth stations. Pakistan is using remote sensing technology (1) to conduct research in crop yields estimation, land use, and the environment; (2) to coordinate research with national institutions and organizations; and (3) to promote use of satellite data through awareness seminars and training. LANDSAT imagery is the basis for research in agriculture, hydrology, morphology, geology, and land use (Mowlana and Wilson,
Pakistan is planning intensive use of satellite technology in its development activities in future.

**Thailand:**

Thailand uses LANDSAT data in agriculture for crop differentiation, acreage estimation, yield forecasting, and damage assessment. Economic studies show LANDSAT to be extremely cost-effective and to help determine appropriate crop calendaring and agricultural practices (Mowlana and Wilson, 1990). In forestry, LANDSAT data were applied to identify forest land, shifting cultivation and watershed areas, and areas of cut forest and to map land use for resource planning. Remote sensing data also provide information on potential fishing areas and the location (by habitat) of fish stocks. A number of satellite communication programs have been recommended and approved by the Thai government and are currently operated by several governmental and broadcasting organizations, and "a series of attempts have been made to draw up a national policy to bring these scattering satellite communications programmes under same system" (Supadhiloko, 1983).

**China:**

China emphasizes satellite technology as a fundamental basis for its four "modernization": agriculture, industry, national defense and science and technology. China's three systems of satellite—INTELSAT, DBS and LANDSAT in conjunction with new communications satellite will have important spillover effects on development. Recently, China successfully launched a telecommunication satellite ASIA SAT I, serves telecommunication authorities in Mayanmar, China, Russia, Pakistan, and Thailand, in addition to Hutchison's Hutch Vision Unit, which beams a five channel television network over Asia and the Middle East (Flournony, 1991; AMIC, 1992).

**Korea:**

Korea is the fifth country in the Asia-Pacific region to have an international communication satellite earth station after the United States, Japan, the than Soviet Union and Singapore. Korea recently launched an International Marine Satellite (INMASAT) earth station in Kumsan at a cost of about 6.4 billion won, has enabled crew members of Korean ships sailing in the Pacific to make international subscribers' dialling (ISD) calls home without the tedious relay of a foreign earth station and the aid of foreign operators. It will send into orbit two telecommunications and broadcasting satellites with a cost of US$4320 million in 1995.

**Singapore:**

Singapore's recently launched mobile satellite communications system is targeted at some 300,000 users, mainly shipowners, by the end of the decade. Called Inmarsat-C, it is the world's smallest
portable satellite system. With this new service, travelling businessmen, the transport and shipping industry and journalists can now send telex messages by connecting their laptops and personal computers to the portable terminals which cost between US$8000 and US$10,000 each.

Hong Kong:

Hong Kong-based Business News Network (BNN) is to launch the Asia-Pacific regions' first business news satellite and cable TV network. BNN expects to have an initial audience of more than eight million businessmen annually, mostly drawn from the region's high-tariff hotels in 45 cities. Other customers will include the growing number of cable TV and satellite master antenna TV operators in the region, broadcasters and individual satellite dish owners.

Japan:

Japan launched a satellite in 1970 and its first domestic communication satellite, SAKURA in 1977 (Space Technology Agency, 1984). Stated objective of Japanese satellite and telecommunication policy is to strengthen communications especially broadcasting, weather forecasting, remote sensing, and relay of communication between many parts of the country. In broadcast satellites, Japan is not so determined to push indigenous development as it is to provide services. The first of two BS-2 satellites was tested in May 1984, making Japan the first country in the world with a nationwide Direct Broadcasting Satellite (DBS) system (Japan's Economic Institute, 1984).

Japan's metrological satellite plays a vital role in that country's metrological and navigational observation, especially in the Pacific, where observations points are few. Japan launched its own remote sensing satellite MDA-1 in 1986 (NSDAJ, 1984).

Cambodia and Vietnam:

Cambodia opened its first modern telecommunication links with the rest of the world when a satellite earth station in Phnom Penh came into service in October 1990. Cambodia made an agreement with Australian company to develop the country's communication system over the next 10 years. Vietnam is to install a satellite television receiver on the Spratly Islands and two further satellite stations in mountain regions to "improve the cultural and spiritual life" of troops posted in remote areas.

Issues and Problems

(1) The benefits of satellite communications depend heavily upon local contexts, socio-political structure, and policy goals, and
must also be related more directly to alternative technologies and applications. Traditional economies produce investment strategies biased against consideration of the social benefits of a public good such as information, and toward technologies suitable for urban telecommunication system. The fact is that while the spread of communication satellites has far-reaching implications, there have been little systematic efforts to evaluate their impact within a broad socio-economic context (Rice and Parker, 1984).

(2) Another problem is the difficult market aggregation issue. The high power satellites necessary to have low per-circuit or per location cost for thin-route applications are expensive in total cost (Rice and Parker, 1984; Gilling, 1975; Hardy, 1980; Hudson and Goldshmidt, Parker and Hardy 1978; Shapiro, 1967). Few countries could afford all the capacity—many already sustain foreign debts which are too large—and none could utilize it all the outset because of the time and cost associated with putting the ground stations in place. Some project evaluation reports suggest that the combination of low unit-cost and high total cost make it desirable to work out some kind of multinational sharing procedure, just as INTELSAT permits capacity sharing for international traffic.

(3) A third problem concerns issues related to Third World access to and assistance in creating satellite services. Regional/ cooperative satellite systems are one resolution to growing orbital congestion and allocation disputes.

(4) A fourth problem is that of capital formation. Developing countries may well be able to finance the ground station costs and lease charges for satellite system. But that need funds. It may be appropriate for developing countries to request that international funding institutions provide the capital for a revolving fund that could provide initial capacity. This type of fund is unfortunately controversial. Dependency theory works there. It is argued that these institutions simply help maintain the system of transnational capitalism and thus, in the long run, obstruct true development goals (Sunkel and Fuenzalida in Villamil eds. 1979).

The principles for global telecommunications systems also influence the policy issue of developing countries. The principles that might underline a global communication policy serving all the people of the world equitably, while permitting nation-states to preserve their local and national options, are availability, reliability, integrity, security, efficiency, transparency, interconnectivity, interactivity, diversity, and universality (Branscomb, 1984).

(5) In the new political economic environment of Asia, the conception of the public interest within a nation is changing. Traditional consensus about the prices and qualities of public utility of services and the universality of coverage of public services declines (Sussman and Lent, 1991). The nature and
direction of government policy intentions are always heavily constrained to some degree by market conditions and the power of corporations and other large economic units to prevent their effective implementation.

(6) Most small nations have been attempting to implement independent economic and cultural policies for generations, but they have neither the economic power nor the political power to implement them effectively in the face of domination by the Transnational Corporations (TNCs) and larger nations. As national governments tie themselves more closely to the promotion of corporate power of their TNCs, they are at the same time reducing their own degrees of freedom to adopt domestic or international policies contrary to TNCs interest.

(7) With limited jurisdictional control over satellite communications, the broadcast media, and other communication facilities, some administrators in Asia might be expected to moderate the flow of information and amusement media from abroad. Studies revealed that information/communication sector cannot be viewed in isolation from other requirements of local, state, and commercial power interests, which are not so autonomous in the context of the debt trap, export dependency, joint-venture relations with TNCs, technology and expertise deficiencies, military and security linkages, and often desperate food, housing, education and health facility shortages.

(8) Finally, the problem is that substantial amount of national budget is now allocated for the military activities in the Asian countries. But why? What benefits do military activities bring for the nation? Sometimes they pollute the democracy (also political parties do). I do not suggest to eliminate whole military systems but a huge amount of budget can be saved and invested in the development programs. Of course it also depends on the social structure and democratic condition of the country. Collapse of U.S.S.R. and Eastern Europe justifies ends of cold war and competition of military super powers in the world. Heavy military investment is no more required for the developing countries. Economic power succeeds the military and nuclear powers in the globe.

Policy issues and Potentialities to be Realized

Satellite technology combined with advances in low-cost earth station design, solar power supplies for remote communications installations, bandwidth compression techniques to facilitate transmission of motion video, and new techniques for low-cost data communications—all promise a wealth of new services, extension to services to new users and most important, social and economic benefits for society as a whole. But will this promise be fulfilled? The answers depends not on the technology, but on a
variety of other factors related to matters discussed above.

Hudson (1990) rightly raises the issues of cost, ownership, competition, equity, role of government and participatory approach. Pricing policy: Will new services be offered at prices which attract widespread use? Will tariffs reflect the advantage of the new technologies— for example, cost-independence of distance, point-to-multipoint distribution, economical uses of satellite power? Will new tariffs be installed to maximize revenues from large users or subsidize the costs of others services?

Ownership of facilities: Will users such as broadcasters be able to own their own satellite-receive terminals and transmit stations?

Terrestrial facilities: Will resources be allocated to solve the "last mile" problem, that is, to install local loops or radio links, rebroadcast transmitters, power supplies, and so on?

Competition facilities: Will the established communication networks take advantage of the technology to lower their costs and reach new customers?

Equity: Who will be most benefitted with this technology? Will the technology reduce the information gap between "rich" and "poor"? If not how will this gap be reduced?

Role of government: Will government policies be flexible enough to facilitate maximum use of the technology— though licensing of new or expanded broadcasting networks support for pilot projects, and the adoption of policies to minimize user’s costs and to encourage new entrants to supply both equipment and services?

Participatory planning: Will potential users such as broadcasters, educators, health care providers, and extension workers, and the intended beneficiaries be involved in determining needs and planning and implementation of satellite services in the developing countries of Asia? There are so many questions which are relevant to the adoption and diffusion of satellite technologies in Asian countries. Policy planners and makers and respective governments will have to consider these issues in designing and implementing satellite technologies. Political commitment embedded with "social reality" is important in policy planning and implementation of satellite communication technology.

Jan Servaes (1990) mentioned, "a communication technology must be planned in such a way that it supports national development rather than being oriented to the implantation of alien technologies. The appropriateness of any technology chosen for application in the process of development should, therefore, depend upon its contribution toward the general development goals." Servaes else where clearly indicated the negative social, cultural
and economical impact of "modernization paradigm" and the "dependency theory" in Third World nations regarding western technology transfer and adoption.

Modernization theory did not bring the development in real sense. Western Technology was not neutral. Now, new slogan is "indigenous development" or "alternative development" or Multiplicity Paradigm where social values, culture, social institutions, social structure and environment, social and human ecology are important in development and adoption of new communication technologies. In the policy formulation of satellite technology in Asia these factors are critical. Communication technology and information dissemination are not only solutions of development problems but issues of how to use technology and information? who will use? who will be benefitted with information via satellite? how to solve the problem of increasing "information gap" within different strata of different countries in Asia?

Moreover, a series of carefully evaluated rural satellite and telecommunication projects is necessary to obtain better evidence of the benefits and of the particular constraints of prior social and political structure in other Third World countries. Such projects must not, however, be transfer of sophisticated technology, and should include, training and human resource development, funding, internal resource mobilization, test, and production of new services for and by the Asian countries.

To address these issues some specific suggestion for policy are as follows:

- Appropriateness of satellite communication technology can be gauged on the basis of institutional analysis of local system to which the technology is to be applied;

- Institutional structure of Asian countries and particular communication system and its relationship with both domestic and international factors must be considered;

- An institutional structure to monitor and adapt to a dynamic technology environment is essential;

- Policy and planning should be action-oriented aiming at greater independence and self-reliance by paying attention to communication policy formulation and resource allocation;

- Policy should be formulated to respond to socio-economic reality and policy choices must give primacy to the user: who will use? who will be benefitted? and who will lose?

- Who will control the satellite technology- private or public
national or transnational corporations as a tool of exploitation or cultural imperialism? These issues must be sorted out.

- Satellite communication policy must be a part of the overall development strategy;
- Policy should emphasis on the research to demonstrate benefits, cost-risks, proper utilization of satellite communication for egalitarian distribution of information, to identify new potential areas of satellite communication;
- Close regional cooperation among Asian countries with economic, cultural and political ties can facilitate satellite communication technology development, adoption, adaptation through pooling of economic resources and experts;

Conclusion:

On the aggregate level, the economic benefits of communication have been considered in numerous studies indicating the high correlation between communication variables such as mass media, telephones and satellite and wealth variables such as GNP, (Rice and Parker, 1984; Butler, 1979; Kelley, 1982). However, such measures of economic development are also limited, as they do not capture dimensions such as distribution, access, social development, appropriateness, and dependency (Cherry, 1977; CCITT, 1973). It is important to keep in mind that all potential benefits are conditioned and often prevented by local contexts, existing structures and the lack of a "community of interest". Access is only the first stage of the communication process and indicates nothing about exposure, content, information outcomes and, finally, social outcomes.

Therefore, it cannot be concluded as satellite and telecommunication technology a panacea for rural development. Denis Goulet calls technology the uncertain promise: it is needed for development, yet can introduce destructive values or maintain prior constraints. The goal is to manage the technology for the people, and by the people affected by it.

Developing countries in Asia now have the opportunity to harness satellite and telecommunications and information technology to overcome the barriers of distance and the diseconomies of reaching scattered users. Whether these societies will reap the full benefits of satellites and other new technologies will depend less on the technologies themselves than on the commitment of policymakers to allow them to flourish. Moreover, the task of
examining policy choices pertaining to satellite technology for Asia and groups within them must begin with an inquiry into the trends determining the growth and direction of satellite technology.

In an environment of development planning, initial intense and productive research has been necessary to demonstrate the benefits, acceptable cost risks, and solutions to potential problems. Local needs, goals, and social values, culture, political commitment, stability and strong technological policy, must be linked with development strategies and should have high priority. In this context, the introduction of satellite communication technology should be considered as only one element in indigenous development. Satellite technology can be benevolent or menevolent only according to its use.

Indeed technological innovations should be cautiously used as a powerful tool to attack the system responsible for rural inequality and backwardness in the changing Asia. Policy regarding adoption of satellite technology will have to be embedded by those factors. More specifically, Asian countries should formulate their satellite communication policy on the basis of their socio-political, economic and socio-cultural reality to shape their socio-economic growth and information needs of the people.

References


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