INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION DEVELOPMENT BUREAU

ITU-D STUDY GROUPS

Document 1/015-E
Document 2/020-E
19 August 1998
Original: English

FIRST MEETING OF STUDY GROUP 1: GENEVA, 10 - 12 SEPTEMBER 1998
FIRST MEETING OF STUDY GROUP 2: GENEVA, 7 - 9 SEPTEMBER 1998

Questions : All

STUDY GROUPS 1 AND 2

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU (BDT)

TITLE: RECOMMENDATIONS ADOPTED BY THE ITU-D STUDY GROUPS WITHIN THE LAST STUDY PERIOD AND APPROVED BY WTDC-98

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Please find hereafter Recommendations ITU-D 1 to ITU-D 12 which were approved within the last study period.

RECOMMENDATION ITU-D 1

TELECOMMUNICATION POLICIES

Question 2/1: *Telecommunication policies and their repercussions at the level of institutional, regulatory and operational aspects of services*

The World Telecommunication Development Conference (Valletta, 1998),

recognizing

the sovereign right of each Member State to regulate its telecommunications and the need to implement the instruments of the International Telecommunication Union (ITU),

noting

the report by ITU-D Study Group 1 on Question 2/1 "Telecommunication policies and their repercussions at the level of institutional, regulatory and operational aspects of services",

taking into account

a) relevant national laws and regulations, including those concerning licensing and frequency assignments;

b) the three regional policy papers, namely the African Green Paper, the Americas Blue Book and the Arab Book, and decisions taken at regional telecommunication development conferences,

convinced

a) that legislative, structural and regulatory reforms in the telecommunication sector should be considered with a view to fostering investments, increasing operating efficiency, broadening the supply of services to meet the objectives of universal access to basic telecommunications and improving service quality;

b) that competitive conditions should be promoted as far as practicable, at least in the terminal equipment, value-added services and cellular mobile markets;

c) that an appropriate regulatory body be established;

d) that telecommunication markets in many countries are taking on new dimensions, and regulatory solutions tailored to these countries' real needs and possibilities are of critical importance,

recommends

that governments and administrations take account of the following principles when establishing and implementing their telecommunication development policies:

1 in order to restructure the sector on the basis of a number of objectives such as efficiency, interoperability of telecommunication services, better access to services and improving quality of service, countries should:

- after clearly defining them, separate the incumbent operator's telecommunication regulatory (and supervisory) functions from the operational and ownership functions;
- allocate sufficient budgetary and management autonomy to the operator(s) to enable them to act as commercial entities;
- develop a stable legal and regulatory framework promoting:

  - transparency of decision-making;
  - cost-orientated tariffs;
  - investment;
  - provision of universal access/service;
  - fair competition;
  - innovation and development of the network;
  - efficient use of scarce resources;
- encourage the development and management of human resources;
- define the conditions for possible sale of shares in the incumbent operator;
- begin liberalizing market segments such as terminal equipment, value-added services, cellular mobile services and other services based on new technologies;

2 the typical process of restructuring the telecommunication sector, the timing and manner of which can vary, should include all or some of the following steps:

- high-level government commitment to commercialization/liberalization, as exemplified through the establishment of a policy declaration, a strategic plan and/or the initiation of procedures for the adoption of a new or amended law or legal framework;
- continuous development and management of human resources;
- separation of the postal and telecommunication operations, as well as of the operational, regulatory and ownership functions;
- sufficient financial and management autonomy for the operator;
- consider sale of shares in or privatization of the state-owned operator;
- establishment of an autonomous or independent regulatory body; and
- introduction of competition by allowing new entrants to compete with incumbents;

3 various models exist for a country's regulatory body (e.g. self regulation, partially independent body, fully independent body – see Annex 3). The typical functions of an autonomous regulatory body include rule-making and enforcement, licensing, and management of scarce resources. The regulatory body should perform these functions in a transparent manner encouraging public participation. The regulatory body should be autonomous when making its legal decisions and independent from the operator. In performing these functions, the following are some of the key regulatory issues:

- provision of service;
- interconnection;
- universal access/service;
- tariffing policies;
- frequency allocation and assignment;
- broadcasting;
- quality of service;
- standardization/type approval;
- numbering;
- competitive safeguards;

4 the following lessons from the experience of countries which have introduced changes should be considered:

- **Be realistic** – Regulatory expertise is developed gradually. Although development of telecommunications is essential to the overall development of the national economy, the political system, legal framework and availability of human resources largely affect what can be done in practice.
- **Keep it simple** – Although instant regulatory expertise is not expected, the real challenge is to identify critical regulatory functions. A clear statement of government policy and transparent, non-discriminatory procedures are essential in all phases of liberalization or commercialization. Investors have shown remarkable tolerance for imperfect regulatory arrangements if they have confidence that the regulatory functions will be carried out in a fair and open process.
- **Use existing institutions and knowledge during the transition** – Existing oversight mechanisms for business dealings, such as anti-trust and consumer protection laws, can play an important role in establishing fair rules for telecommunication service providers. Avoid excessive institution-building: a regulatory body with a limited scope of authority is sufficient if it has adequate power to enforce its decisions and rules. The responsibilities and functions of the regulatory body should mirror the evolution of the telecommunication sector.
- **Rely on contracts** – Licences and contracts of sale can be effective tools to establish fair rules for competition. Regulatory efforts during the transition from state to private enterprise can therefore be focused on defining transparent, non-discriminatory licensing and interconnection regimes,

recommends further

that governments and administrations take into account the guidelines set out in the attached Annexes 1, 2, 3 and 4 on general considerations, telecommunication sector reform, the regulatory body and regulating spectrum management, when establishing, implementing and reviewing their national telecommunication policies and regulations.

ANNEX 1

General considerations

Major factors cited by developing countries as influencing the gradual implementation of telecommunication reform, independently of world trends, are:

- Telecommunication services are commercial, which therefore implies significant private-sector participation.
- Shortage of sufficient government funds for infrastructure development.
- Termination of the monopoly, which may be ineffective in certain circumstances.
- Creation of an enabling environment for investment in the telecommunication sector and for manufacturing of telecommunication equipment, where appropriate.

Countries should keep in mind that the telecommunication infrastructure serves a broad public interest because its existence promotes development of the overall economy and communications should be a basic right of all people.

Countries should consider taking advantage of the rapid technological evolution in telecommunications that has brought great opportunities for expanding penetration, lowering costs, and upgrading services, thus giving developing countries an opportunity to leapfrog into advanced stages of network development.

To encourage economic activity, a country's overall economic, social and political environment and its regulatory framework must be sufficiently stable.

Referring to recommendations adopted by international bodies on liberalization makes it easier to build a national consensus towards reforming the telecommunication sector.

All major reforms involve appropriate regulation, private-sector participation and competition. These key elements are closely intertwined in telecommunications, and are essential for success of the reforms in terms of the long-term ability to overcome past constraints on telecommunication development.

The following *principles* should be taken into account when reforming the telecommunication sector:

Transparency

Equitable regulation of the telecommunication sector requires that operators know what to expect. The principles of transparency, objectivity and non-discrimination are applied so that all operators are subject to the same conditions to achieve fair competition. For example, all licensing criteria, as well as the period of time normally required to reach decisions, and the terms and conditions of the individual licences should also be made publicly available.

Clearly defining objectives increases credibility as well as transparency and provides for faster reform and implementation. Reaching those targets within a sector subject to such complicated dynamics, as is the case of telecommunications, demands a clear understanding of how the sector should evolve.

Investment

It has become evident that the demand for telecommunication services surpasses the ability of individual governments to pay for the development of a network to provide such services. If a

country is to benefit from the growing number of services that are available, it will need to find financial resources outside of its national treasury including private investment.

One of the prerequisite conditions to obtain investment is stability and assurances. To secure new sources of capital, developing countries must address these issues as soon as possible.

Investment will be deterred if there are unacceptable market barriers that limit the commercial opportunities that can be pursued or that otherwise place the new investor or operator at a disadvantage. Domestic and foreign firms are deterred from investing because of political risk, the possibility of expropriation of assets or profits, foreign exchange controls, and discretional taxation, as well as restrictions on capital repatriation for foreign firms.

The commitment to liberalization in international multilateral negotiations like the World Trade Organization (WTO) signals to investors and lenders that their investments will be secure.

Provision of universal access/service

The provision of universal access/service should be one of the most important objectives of telecommunication policy and legislation in developing countries. The concept of universal access/service, its content and the implementing policy may vary depending on a country's specific needs. The concept and policy must be sufficiently flexible to adapt to the changing needs of the country concerned.

It is important for national governments to play an active role to ensure that the provision of universal access/service is successful. However, it is also necessary for such governments to examine how responsibilities can be appropriately allocated to telecommunication operators and local authorities, particularly in a competitive multi-operator environment.

There are different approaches to financing universal service obligations, some of which are:

- the telecommunication operator must provide service to rural and remote areas as a condition of the licence;
- new competitors may be required to pay certain charges to interconnect with the dominant telecommunication operator, with some or all of the charges being used to provide service to rural areas;
- a telecommunication operator may have the choice of paying certain charges into a universal service fund or providing the service directly itself;
- when the incumbent telecommunication operator cannot or does not want to provide service to rural or underserved areas, the opportunity will be given to other service providers to attain universal access/service goals;
- a transparent government subsidy financed from its tax revenues that helps pay for service to underserved and high-cost areas, including rural and remote areas.

Policies that encourage operators to provide telecommunications in unprofitable areas can be implemented through government incentives.

Some of these incentive schemes may require tax relief in order to enable investment to take place. This is where governments play a major role by offering incentives such as:

– Removing the duty on telecommunication equipment that may be targeted to specific or general areas of telecommunication development.
– Tax concessions, which may take the form of a tax holiday for specific periods or could be geared to a certain level of investment.

– Lifting foreign exchange restrictions and permitting free monetary policies.

In all cases, these incentives should be implemented in a manner that stimulates investment.

If subsidies are used, it is important that the amount of subsidies and their specific application be measurable, identifiable and transparent.

Any WTO Member State has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive *per se*, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member State.

Establishment of fair competition

Increasingly competitive markets moving to a global scale bring new competitors in all industry sectors, driving all players to increase efficiency, reduce costs and prices, increase economies of scale and focus on their customers.

Assuming that some degree of liberalization and competition are contemplated, the following activities must be undertaken:

– prevent or correct possible abuses of market power by the dominant telecommunication service provider;

– enable new service providers to become operational;

– act as a surrogate for competition and maintain pressure on the dominant operator to perform well until competitive pressures are sufficient to take over this role;

– support distributional goals such as service to disadvantaged geographical areas or segments of the society.

If competition is to remain transparent, fair and sustainable in the long term, it is worth considering the possibility of shifting from a policy of indiscriminately applied cross-subsidies to a policy of declared subsidies applicable to specific cases. Examples include the granting of a certain level of service free-of-charge to low-income users or the construction of networks in areas that are not yet covered.

Innovation and development of the network

Innovation and development of telecommunication networks and services should be left primarily to market forces. Regulation, in this context, should promote innovation and development, *inter alia*, through:

- fast and clear standardization processes;
- unambiguous interconnection interface definitions;
- freedom to select the appropriate technology;
- transparent, competitive procurement practice.

Regulatory body

An independent regulatory body that is separate from, and not accountable to, any supplier of telecommunication services ensures that telecommunication services will be provided in a way that serves the public interest. The regulatory body should establish, within the framework of national legislation and having regard to international rules, processes for regulating the market and monitoring application of the regulations in force. The decisions taken should be impartial with

respect to all market participants. Personnel at the regulatory body are best able to be impartial if they do not have a personal or financial interest in the entities which they regulate or oversee.

ANNEX 2

Guidelines on telecommunication sector reform

Strong commitments from top levels of government are essential for any reform process to begin and for the reform to succeed. The political and economic environment of the country thus essentially sets the stage for the design of telecommunication reforms.

The pace of reform and the extent to which its potential benefits can be harnessed will ultimately be contingent on the capability of governments to create an environment that promotes efficiency and enables, *inter alia*, private investment and initiative.

Government disengagement from direct intervention in the telecommunication economy through close control of the sector, towards a system largely driven by market forces and competitive regulation, is one of the main conditions for successful restructuring. The necessary changes can be achieved more effectively through private-sector participation.

Regulatory reform for telecommunications and the resulting institutions will reflect the broader environment of the state or country, and its historical legal, social, political, and economic foundations. The unique national circumstances will modify or influence the method of reforming telecommunications in each country.

The task of beginning to construct basic regulatory processes should encompass the following actions:

1) develop a government policy for the telecommunication sector (or broader information sector);
2) translate the policy into new or modified legislation or decrees;
3) create a regulatory body with a clearly defined mandate;
4) design the method of funding for the regulatory body in such a way that the body established is independent in its decision-making;
5) establish conditions and procedures to be followed by the regulatory body in dealing with matters within its jurisdiction.

Strategic plan

The first and most critical step of developing a government policy for the telecommunication sector (or broader information sector) requires the government clearly to establish a set of basic objectives, both short and long term, for the sector. This strategic planning exercise, which should be the result of a public debate, should address issues such as:

1) developing a set of policy objectives and plans related to greater commercialization of national and international telecommunication services, to form an integral part of a policy for liberalization of the sector, with specific objectives;
2) developing a set of policies, objectives, and related plans to divide regulatory responsibility between the prime minister/minister/ministry/government and the regulatory body for functions such as rule-making and enforcement, licensing and management of scarce resources, and for areas of jurisdiction such as application and oversight of rules governing interconnection and tariff approval;

3) publicizing the government telecommunication policy paper which incorporates some of the above plans and objectives, and includes a description of the relationship between the government and the regulator.

The strategic plan should take account of the following factors:

1) the social benefits, including improvements in health-care, education or overall quality of life;
2) optimal funding arrangements for the sector;
3) technologies which can be integrated easily into the existing network and lend themselves to fairly rapid implementation, while nevertheless offering a wide range of applications, and which are future-oriented;
4) cost-orientated tariff structures and levels, as part of the planning process;
5) continuous monitoring of changing needs and demands.

Human resource development

Successful regulatory reform requires strong regulatory leadership committed to serving the public interest; good management of the regulatory process, including knowledge of the sector; and qualified professional staff in the various related disciplines.

Core personnel may be recruited from the sector ministry. The ITU, regional telecommunication organizations and other interested parties should establish a joint training programme to increase knowledge of telecommunication policy, strategies and regulations. Funds for training activities may be generated through the sector restructuring programmes of international financing organizations.

Legislative reforms

To implement sector reform, it is almost always necessary for a country to pass some kind of new or amended telecommunication legislation. In some countries, constitutional changes are necessary, hence a broad consensus in the society is needed to implement the reform.

Depending on its needs, each country must decide on the best form for the legislation. Some countries may choose to introduce reforms more gradually by passing specific legislation that allows competition in certain segments or sectors of the market. Other countries may introduce changes in an entirely new law that sets forth a different framework for the telecommunication sector in the country.

Telecommunication legislation is most effective when it is broad and establishes the framework for rules and regulations, which set forth the details of implementation (e.g. by ordinances or similar legal instruments). The broader the legislation, the better the chance that it will be long-lasting.

Structural reforms

Despite the fact that service providers can choose from a broad range of approaches to ensure that they are adequately financed as they move into the 21st century, there are certain basic structural attributes of a telecommunication regime that are essential to attracting both domestic and foreign investment.

These structural changes are the ones that global, regional and local investors want to see as they consider investing and the ones that the operator itself needs to adapt to in the new telecommunication environment.

Commercializing operations

To operate more efficiently, telecommunication operating entities perform best when they are run as a commercial business – irrespective of who owns them.

To encourage new service providers, with new sources of capital, to enter the telecommunication market, there are a number of different actions that may be taken to restructure the sector, such as:

a) dividing an existing nationwide monopoly into separate entities designated by geographic service regions or offering different services;

b) providing by law that new services (or new technologies) will be outside the scope of the existing monopoly, enabling new operators to provide these services on a competitive basis;

c) authorizing the existing network operator to subcontract certain areas or services to third-party service providers; and

d) entering into build-operate-transfer (BOT) arrangements (or an equivalent) with an experienced third-party operator, ensuring that that expert support is available to train personnel and to supervise the start-up operations.

Increasing private-sector participation

a) Private-sector investment

Private investment is one possible source of telecommunication financing that may be appropriate to an individual country's requirements.

The decision to introduce private investment gives the government the chance to match its telecommunication needs with the development plans of investors (e.g. through the sale to private investors by the government of a minority or controlling share of a sole incumbent operator or the granting of a licence to provide public telecommunication services).

Governments frequently impose certain obligations on an exclusive licensee, such as building out the network within a specified time-frame, to justify its exclusivity. Issues that should be addressed include:

a) level of investment required to meet public/social needs, including universal service obligations;

b) projected timetable for recovery of investment by the operator;

c) ability for the operator to face up to competition in other segments of the telecommunication market during the investment recovery period; and

d) termination date of any period of exclusivity and actions needed to ensure smooth transition to competition.

The government's objective in its discussions with prospective investors should be to limit the scope of exclusivity, both in time and nature of services involved; to define clearly the investment and service obligations assumed by the licensee; and to protect its ability to revoke the exclusive licence if the obligations are not fulfilled.

If clear conditions are established in this process, a firm foundation may be built for the introduction of more or even full competition at a date certain in the future.

It is also important to establish clearly the mechanisms by which state power is to be retained with respect to participation in intergovernmental organizations.

b) Privatization

Privatization is a complex process of introducing private capital and know-how in telecommunication operations, and there is more than one way to time and sequence this process effectively.

Successful privatization of a state telecommunication enterprise depends on a number of factors falling into place:

- Privatization must be supported by the political process.
- The timing and modality of privatization in a given country is largely conditioned by relatively narrow and somewhat unpredictable windows of political opportunity and by broader developments in economic strategy.
- At an early stage, the government must clarify its position regarding trade-offs among conflicting interests arising from privatization, such as among existing operators, employees, prospective buyers, potential competitors, investment bankers, the treasury, equipment suppliers, large users, and the public at large.

Internal reorganization of the enterprise may be undertaken before privatization to enhance the company's value or this reorganization may be left to the new owners. Management contracts could be used to run the enterprise along private business lines, followed later by privatization of assets.

If privatization is chosen, the following facets of the privatization process can be distinguished:

- separating telecommunication operations from non-telecommunication activities (for example, posts, manufacturing);
- corporatization, i.e. restructuring telecommunication operations as an independent state enterprise that is administratively and financially autonomous from the central government;
- clear definition of the government organization and the very person representing the state as owner during the whole process;
- internally reorganizing the enterprise in ways that are suited for running it as a business;
- reorganizing the telecommunication enterprise under private company law;
- devising a strategy for privatization or sale of shares including decisions on controlling interest, employee stock ownership, phasing of stock sales, and residual state ownership, as well as changing the company's capital structure to enable implementation of this strategy;
- executing the sale.

It is also necessary to decide on how, and on the procedures according to which, the government or regulatory body will check that the privatized company is fulfilling the commitments made during the privatization process.

Competition

The introduction of competition is not necessarily associated with privatization. Competition can be introduced for all or certain market segments, and can range from duopolies (i.e. two providers) to an unlimited number of service providers.

It is generally recommended to establish a regulatory body to determine the rules of the game before licensing competitive service providers. The regulator must prescribe conditions for easy entry of operators at various levels from network operations to individual value-added services. It may also be necessary to protect new entrants from unhealthy competitive practices and prescribe suitable conditions for interconnection with the networks of the dominant operator(s).

Regulatory reforms

Whatever the specific regulatory structure, successful regulatory reform requires:

1) political will in the government to make it work;
2) strong regulatory leadership committed to serving the public interest;
3) good management of the regulatory process, including knowledge of the sector;
4) qualified professional staff in the various related disciplines;
5) fair and open decision-making mechanisms accessible to all the parties affected; and
6) actions that respond to the broad political goals of the government.

Establishment of a regulatory body

Incorporating the key objectives for the country's telecommunication sector into the legislative mandate establishing the regulatory body is a sound approach for passing a clear and concise message from the government to the regulator.

When establishing the regulatory body, an essential consideration is budgetary autonomy and sufficiency.

Funding may be generated from a general assessment on all regulated operators through annual licensing fees, regulatory user fees, spectrum usage fees, etc.

The evolution of the regulatory body should parallel the development of the sector as the telecommunication market becomes more competitive.

Certain periodic duties may be contracted out to expert consulting entities, or specific expertise from more developed regulatory bodies in more mature economies may be retained to provide short-term assistance to newly formed and developing bodies.

For additional information, refer to Annex 3.

ANNEX 3

Guidelines on the regulatory body

It is widely accepted that a government's regulatory functions should be separated from its operational and ownership functions.

The regulatory body may take a variety of forms, ranging from an office within a larger executive branch entity (or ministry) to a separate agency whose actions are reviewable only by the judicial system:

a) *a regulatory department* within the ministry separate from the policy-making and the ownership functions;

b) *a separate regulatory body* reporting to the ministry or prime minister's office;

c) *an independent commission* or regulatory body, where the term "independent" refers to its reporting procedure and its funding;

d) *no telecommunication regulatory body* – telecommunications are regulated generally under anti-trust, competition and consumer rules and regulations, etc.

Locating the regulatory function within a ministry [case a)], rather than in an autonomous agency, may make regulation more responsive to broad government policy directions. However, this must be balanced against the risk that the ruling powers may co-opt the regulator for self-serving political purposes, which may not be consistent with developing truly open and competitive markets or with effectively controlling the operator of monopoly services. As the regulator, the ministry is, above all, responsible for fair competition; in a way, it acts as a referee vis-à-vis all market players involved.

In some countries, the regulatory function is divided among several ministries, e.g.:

– the ministry of transport, posts and telecommunications determines policy and conditions for telecommunication services provision, and has the authority to license certain services;

– the ministry of finance, in conjunction with the ministry responsible, determines tariffs in the area, where a monopoly is still present or where an operator has a dominant position;

– the ministry of trade or commerce is often the representative to WTO and has the responsibility for making commitments to liberalize telecommunication equipment and services;

– ministry of justice makes determinations regarding legal matters;

– ministry of information is often responsible for broadcasting and media.

Locating the telecommunication regulatory authority in a separate or independent agency [cases b) and c)] that is at least partly insulated from party politics and changes of government is more likely to keep these forces in check and be conducive to increasing investor certainty and reducing investor risk and, thereby, promoting the legal and regulatory atmosphere that encourages investment to meet demand.

Autonomy can be enhanced by full public exposure of all regulatory actions, rules that restrict channels for the government to insert its political will in the regulatory agency's decisions, and financing that is independent from the annual budgetary cycle.

Policy and legislative formulation is typically incumbent upon the government through its ministry. In cases where a formal regulatory function is initially introduced and issues such as liberalization,

corporatization and privatization are addressed for the first time, it may be prudent for a government to phase-in regulatory responsibilities gradually in parallel with the liberalization process.

The presence of certain characteristics further strengthens the regulatory authority's independence:

- sufficient budgetary autonomy and resources;
- senior officials that are appointed for a fixed term and are removable prior to the expiration of the term only for grave fault or serious crimes; and
- rules of eligibility and conduct for senior officials and key staff that emphasize financial independence from regulated entities, and encourage selection of individuals with relevant experience.

The regulatory body's independence from outside financial interests and partisan politics also affects its ability to act effectively and inspire public confidence.

The regulatory body should be empowered to exercise broad discretion in the methods it selects, for example, issuing licences for services, operators or facilities, such as telephony, mobile, satellite and broadcasting. This discretion would also include the authority not to impose administrative requirements on certain types of services, operators or facilities.

Typical regulatory functions

Rule-making and enforcement

Prior to making new rules or changing existing rules or regulations, a regulator may enter into a rule-making process. This can be initiated by sources outside the regulator or by the regulator itself. A typical first step in a rule-making is a request or petition for rule-making which is made public, and all interested parties are asked to comment. After reviewing comments, the regulator can issue a proposed rule-making proposing specific rules and requesting public comment. Once the rule-making proceeding is completed, the regulator decides whether to amend its rules/regulations or to make a new rule.

To enable the regulatory body to carry out enforcement functions, the regulator must be given investigative powers and the authority to impose appropriate sanctions and penalties for violations of the telecommunication laws and regulations. Such sanctions or penalties can include fines, or revocation of licences/authorizations, etc.

Licensing

Authority to license may be with the sector ministry, with the regulator, or divided between them. If the sector ministry has the authority to license, licensing would be considered to be the exclusive right of the minister and a matter of public policy. With a division of the licensing function, the ministry may determine the degree of liberalization and in which market segments, while the regulator will determine the number of entrants and the related terms and conditions.

Another option is to grant the minister the authority to give either general or specific directions to the regulator on licensing matters.

A further option is to segment the licensing process by differentiating the approval procedures based on the type of licence to be granted. Under this option, approval for value-added service providers could be granted by the regulator pursuant to a government policy objective to liberalize that particular market segment.

There are four types of licensing procedures:

- free regime;

- registration and other similar regimes;
- class licence or blanket licence;
- individual licence.

Two kinds of conditions can be imposed on the applicant or licensee:

- qualifying conditions, which must be met by the service provider in order to be authorized to provide the service;
- operating conditions, which are rules that must be complied with while providing the service.

Management of scarce resources

Management of scarce resources (e.g. frequencies, numbers, and orbital positions) is an important, permanent element of the national regulatory framework. Procedures for the allocation and use of scarce resources must be objective, timely, transparent and non-discriminatory. To have a mutual understanding, a common economic definition should be elaborated for the limited resources.

The different types of limited resources require different management techniques for their efficient use:

- *natural scarce resources*, like frequencies or orbital positions, may require usage fees and global coordination. Most natural resources should be distributed among countries by consensus based on existing and expected future usage;
- *contemporary scarce resources*, like calling numbers and broadcasting sites, require national, regional and global coordination;
- *technology dependent bottlenecks*, like shortage of conduits and cable capacity, should be handled under the principle of open network obligation.

Key regulatory issues

Provision of service

The process to select a service provider typically involves the following steps:

1) public announcement that the independent regulatory body or the equivalent will be initiating a process to select a licensee to provide a given telecommunication service, including the selection criteria;
2) all interested parties would have a reasonable period of time within which to apply for the licence, or make suggestions or inquiries;
3) the regulatory body, applying appropriate selection methods, would announce its decision of who will be granted licences;
4) any interested party that considers the decision unjust would have the right to appeal against the decision directly to the regulatory body or to a higher body. Judicial recourse would also be available.

Interconnection

Because the interconnection of one network to another is what allows the subscribers of one network to be able to communicate with the subscribers of another, the interconnection of different supplier networks is fundamental to instituting a competitive environment.

In a fully competitive market, the regulator will still maintain the arbitrator role for interconnection agreements. Any dispute relating to negotiations on an interconnection agreement between two

operators may be referred jointly to the regulatory body for settlement. The regulatory authority shall decide on the case, taking into due consideration the interests of both parties. Also, where no interconnection agreement is reached between operators, either of the parties concerned may appeal to the regulatory body.

Of course, in any decision the regulatory body shall take into due consideration the interests of the users and the entrepreneurial freedom of each operator to configure its own network.

Further objectives need to be addressed such as: unbundled access to all network elements, including unbundled access to the local loop, requirements of housing on an operator's premises the equipment necessary for use of the offering ("physical collocation") and granting the user access to the equipment at any time.

Interconnection to the state-owned firm or dominant network operator should be at transparent, non-discriminatory, cost-based rates, and on terms and conditions that are reasonable and fair.

It is also advisable for the regulator to require interconnection to be equal in type and quality to that provided to the dominant public network operator for competitive services, and that interconnection be priced not higher than that provided by the dominant operator to itself or its subsidiaries.

Universal access/service

Typically, governments impose some universal access/service obligations on telecommunication operators, in the form of objectives or parameters for quality of service, ceilings on tariffs, public telephones in rural areas, provision of emergency services, etc.

The role of ensuring that the provision of universal access/service is successful is linked to the regulator's enforcement function. However, its definition as well as the procedures should be as simple as possible.

Regulatory policy can promote cost-effective progress towards the achievement of universal service/access goals in a variety of ways. Choices must be made among the alternative regulatory approaches at several different levels, varying from the broad strategic level to many important matters of detail.

In general, there are six approaches that a regulator can take to translate its vision of universal access/service into practical regulatory policy:

1) broad regulatory oversight;
2) detailed direction by the regulator of universal access/service activities;
3) broad regulatory oversight without payment of cross-subsidy by new operators;
4) broad regulatory oversight with bundled cross-subsidy mechanisms;
5) detailed direction by the regulator of universal access/service activities, with explicit but bundled funding mechanisms;
6) broad regulatory oversight with unbundled funding mechanisms.

Tariffing

Usually, operators should file tariffs for services that are regulated by the regulatory body. The tariffs should be published, thereby reducing the possibility of discrimination.

The regulatory authority should intervene if an operator abuses its dominant position.

To make a competitive regime possible, suitably rebalanced, cost-orientated tariffs are required.

Factors to be taken into consideration include the granting of appropriate service areas to local operators, the application of adequate rules for transport between different urban areas, the establishment of a reasonable access charge (i.e. the charge that long-distance operators have to pay to the local operator to originate or terminate calls), and possibly, in light of the rebalancing referred to above, the introduction of higher tariffs for local communications and truly cost-orientated accounting rates, which would permit fair competition in domestic long-distance and international traffic.

Frequency allocation and assignment

The prime objective of national spectrum management is to enable a country to manage effectively its use of the finite resources of the radio-frequency spectrum and satellite orbits, within the framework of ITU treaty obligations. Regulation regarding the use of the spectrum should be targeted at:

- giving effect to international obligations;
- defining and implementing overall spectrum strategy;
- promoting competition and innovation; and
- ensuring fair and open access to spectrum for a diversity of users, including small businesses, essential services, and cultural, scientific and social uses.

For additional information, refer to Annex 4.

Broadcasting

Broadcasting, which is handled differently in different countries, can be covered by the general telecommunication law or in separate legislation. For some countries, the transmission of the broadcasting signal falls under the telecommunication law, but content issues are dealt with in other legislation. Consequently, the responsibility of the telecommunication regulator varies from spectrum manager to the general supervision of broadcasting, including licensing the service provider.

In countries where traditional broadcasting (freely received by the public) continues to be one of the primary sources of information, education and entertainment, it is essential that a balanced and fair relationship be established between these and other audio and video distribution services.

A challenge for governments is to facilitate the introduction of new services for users that result in more diversity of programming, information and choices, while at the same time preserving free over-the-air broadcasting.

Unless a given country has adequate mechanisms or other legal means of ensuring balanced coverage of events such as elections, it may be prudent to have corresponding provisions in the framework of the telecommunication legislation.

The legislation and the regulatory body should avoid encroaching on the freedom of expression of the broadcaster. The broadcaster is also normally required to cover issues that are of importance to the community it is licensed to serve. This very delicate matter involves freedom of expression and is up to each country to produce legislation to provide optimum protection of the public and social interest.

With respect to cable TV, the legislation may establish parameters and procedures and indicate in each case where the regulatory responsibilities lie.

Quality of service

Regulation of the quality of services offered by a dominant or monopoly enterprise is a necessary complement to tariff regulation. For the sake of customer protection, a set of customer oriented parameters should be defined to ensure quality of service (e.g. installation and repair time).

Standardization/type approval

Standardization is becoming an increasingly important economic factor in telecommunications. It plays a crucial role in determining the cost and pace of developing new innovative telecommunication services. The integration of telecommunication infrastructures throughout the world requires that interoperable standards be used, as far as possible. The main focus in telecommunications is put on harmonization required for designing networks and services. Worldwide standardization is also increasingly affected by concerns of national sovereignty.

The approval, placement and availability of telecommunication equipment on the market, its compliance with essential requirements, and its connection to public telecommunication networks may also be assigned to the regulator.

Numbering

Numbers are needed for the provision of switched telecommunication services, including switched telephone services and packet-switched data communications, etc. The government or its designate, taking into consideration ITU Recommendations in this domain, must administer the numbering plan and allocate numbers to operators and service providers in such a way that competition is not affected. The providers of switched services should be able to obtain numbers from the relevant authorities by means of a transparent and non-discriminatory procedure.

Number allocation should occur on the basis of long-term plans drawn up by the government. The plans will seek to ensure, as far as possible, that certain applications are recognizable in certain numbers (e.g. special call rates).

One important issue likely to arise in the near future is number portability (i.e. the opportunity for end-users to retain the same number when they switch to another operator). Such a system is beneficial to the user and promotes competition.

Competitive safeguards

Competitive safeguards are necessary to ensure that dominant or major suppliers do not engage in anti-competitive cross-subsidization, do not use information in an anti-competitive manner, and do not withhold essential technical and commercial information.

ANNEX 4

Guidelines for regulating spectrum management

The prime objective of national frequency management is to enable a country to manage effectively its use of the finite resources of the radio-frequency spectrum and satellite orbits, within the framework of ITU treaty obligations.

The general model for spectrum management organizations is a central authority responsible for national coordination of all frequency use and international representation, with responsibility for specialized government use (e.g. defence) delegated to the department concerned.

For civil use, the spectrum management authority may either undertake all the functions described in this annex, or delegate specific functions to organizations in the private sector or special user groups. Delegation of some routine functions such as frequency assignment and licensing to spectrum management organizations which have a direct financial or operational interest in the use of spectrum may provide the incentive to improve spectrum efficiency and respond better to the needs of end-users.

There is a need for an identifiable authority in each country having the necessary legal powers and resources to carry out spectrum management functions. The organizational structure may differ from country to country according to particular requirements and resources but the following functions will need to be undertaken:

1) Strategic national spectrum planning

The primary goal of strategic national spectrum planning is to determine and periodically update the existing and future requirements for the various radiocommunication services. From this information, long-term national policy and plans relating to the use of the radio spectrum can be developed taking into account factors such as general government policy initiatives, advances in technology, and major changes in user requirements.

Technical and economic studies related to the use of the radio spectrum are important to assist the development of strategic plans and policy. Research should be targeted both to extend the usable spectrum, as new technologies develop, and to make greater use of existing spectrum through better sharing and more efficient modulation and coding techniques.

2) International representation, frequency coordination and technical cooperation

Frequency management cannot be considered in national isolation because of the international nature of radiocommunications. In order to promote and safeguard national interests relating to radiocommunications, participation and representation in world and regional radiocommunication conferences of ITU is important, since the Final Acts of such conferences have treaty status.

International frequency coordination is necessary for many services in order to minimize the possibility of interference with the services of other countries. For some services (especially satellite networks) the ITU Radio Regulations require administrations to undertake notification and coordination procedures via the ITU Radiocommunication Bureau. For other services, bilateral or multilateral arrangements with neighbouring countries may be established to simplify coordination of frequency use in border areas.

A broad oversight of the work of international organizations responsible for the preparation of radio equipment and planning standards should be maintained, although a more detailed involvement is

necessary for those parts of standards which have an impact on the efficient use of the spectrum and, in certain cases, interoperability.

3) National coordination of frequency allocations

A table of national frequency allocations should be established, in accordance with national priorities, to contain the detailed subdivision of frequency bands for particular categories of services, for example, emergency, government, public and private-sector services. Appropriate interdepartmental and public consultative machinery must be established to review and make changes to the table which may be required as a result of the outcome from strategic planning exercises or world or regional radiocommunication conferences.

4) Standards-making and conformity assessment

The technical analysis of requests for frequency assignments takes into account planning standards (concerned with the overall system performance requirements) and radio equipment standards (concerned with equipment technical characteristics). The use of some standards is an international requirement (in particular for safety-of-life services) or a national requirement.

In the development of standards, those aspects which have an interaction with the efficient use of the spectrum should be agreed between frequency managers, users and industry.

Some form of assessment for conformity with standards is required. This will usually involve the establishment and authorization of one or more laboratories capable of providing conformance assessment services.

5) Assignment of frequencies and licensing

The assignment of frequencies to stations in accordance with the agreed national allocations for particular user categories is a routine process of application, technical analysis, assignment and recording in a (national) frequency register. For some services, there may be international frequency coordination obligations.

Licensing is the final part of the process which gives the licensee legal authority to use the frequency in accordance with the licence conditions. Fees are normally charged for the issue of a licence.

6) Spectrum pricing

The aim of spectrum pricing is to ensure, in the interests of spectrum efficiency, and of increasing the economic benefits derived from radio, that users pay an amount for spectrum that more closely matches the cost of its national and international management or the value that they, or alternative users, place upon it. They will also take the value of the spectrum into account at the time they make investment decisions, for example, on whether to invest in more spectrum-efficient technology, to move to a less congested band or to switch to an alternative service or communication medium. It should be noted, however, that there are differing views with regard to spectrum pricing, whether it should take place at all in some parts of the radio spectrum, and if it does, who should pay, what spectrum should be priced (e.g. domestic versus international services), and what spectrum pricing model should be used. This matter is under study in the ITU-R.

7) Monitoring and enforcement

Monitoring is closely associated with inspection and compliance in that it enables the identification of interference sources, the verification of proper technical and operational characteristics of radiated signals and the detection of illegal transmitters.

RECOMMENDATION ITU-D 2

IMPACT OF THE INTRODUCTION AND UTILIZATION OF NEW TECHNOLOGIES ON THE COMMERCIAL AND REGULATORY ENVIRONMENT OF TELECOMMUNICATIONS

Question 3/1: ***Impact of the introduction and utilization of new services on the commercial and regulatory environment of telecommunications***

The World Telecommunication Development Conference (Valletta, 1998),

recognizing

a) the sovereign right of each Member State to regulate its telecommunications sector and the need to implement the instruments of the International Telecommunication Union (ITU);

b) the importance of maintaining a fair and competitive telecommunication market and guaranteeing fair network access to all players on an equitable basis;

c) the need for regulation in developing countries so as to ensure that new monopolies are not created,

noting

the report by the ITU-D Study Group 1 on Question 3/1 "Impact of the introduction and utilization of new technologies on the commercial and regulatory environment of telecommunications",

noting also

a) that the more important common features and characteristics of new telecommunication technologies and applications are portability, globality, and the ability to support the convergence of different media (multimedia);

b) that some measures to regulate integration between operators and/or "content providers" may be required so as to ensure that old monopolies are not simply replaced by new ones,

considering

a) that interactivity, intelligence in systems and global mobility (e.g., Global Mobile Personal Communications by Satellite – GMPCS) are features inherent in new technologies and applications that provide additional and enhanced capabilities for improved communication;

b) that new technologies increase accessibility of communication;

c) that certain systems are essential for services such as home-banking, home-shopping, telemedicine, etc., and that other services facilitate access to remote areas not currently served by existing terrestrial networks,

recommends that governments/regulators

1 ensure a fair and competitive telecommunication environment and prevent anti-competitive practices;

2 continue to study the regulatory implications of new technologies in order to maximize the benefits that these technologies can provide for the expansion and improvement of telecommunication services;

3 guarantee access to networks;

4 ensure that access costs are fair, non-discriminatory and cost-based.

RECOMMENDATION ITU-D 3

TARIFF POLICIES AND METHODS OF DETERMINING COSTS

Question 4/1: *Policies and ways for financing telecommunication infrastructures in developing countries*

The World Telecommunication Development Conference (Valletta, 1998),

recognizing

the sovereign right of each Member State to regulate its telecommunications,

noting

the report of ITU-D Study Group 1 on Question 4/1 "Policies and ways for financing telecommunication infrastructures in developing countries",

convinced

a) that, with the prospect of gradual liberalization of the telecommunication sector, developing country administrations and operators need to draw up and implement tariff policies that take greater account of the real costs incurred in the provision of telecommunication services;

b) that the operators concerned should be encouraged to use methods and tools for determining the costs of the services offered and thus evaluate the measures to be taken for rebalancing their tariffs,

recommends

that public authorities and administrations should take account of the following guidelines:

1 In order gradually to introduce cost-orientated tariffs, developing country operators should be invited to develop analytical tools through the stage-by-stage implementation of a cost-accounting system.

Such a system serves, *inter alia*, to collect and classify various cost data, analyse expenditure and expenditure groups, identify and classify cost and profit centres and allocate and distribute costs by network element or service, thereby permitting the introduction of cost-orientated tariffs.

2 As of now, developing country operators should be encouraged to use the cost-determination methods developed by the regional tariff groups within ITU-T Study Group 3.

RECOMMENDATION ITU-D 4

POLICIES AND WAYS FOR FINANCING TELECOMMUNICATION INFRASTRUCTURES IN DEVELOPING COUNTRIES

Question 4/1: *Policies and ways for financing telecommunication infrastructures in developing countries*

The World Telecommunication Development Conference (Valletta, 1998),

considering

Article 1 of the Constitution (Geneva, 1992) and in particular No. 19 thereof, as well as the Buenos Aires Action Plan,

recognizing

the sovereign right of each Member State to regulate its telecommunications and the need to implement the ITU's instruments,

taking into account

relevant national laws and regulations, including those concerning licensing and investments,

convinced

that developing countries should have access to different ways, methods and tools for financing investments with a view to promoting the development of the telecommunication sector, increasing operating efficiency and broadening the supply of services,

recommends

that governments and administrations consider the following principles and guidelines when establishing and implementing their telecommunication investment policies.

1 Investment financing policies

a) In view of the profitable nature of telecommunications, the reinvestment of profits should be encouraged and the transfer of revenue between the State and the operator should be limited to the payment of dividends for the State's share in the operator's capital, to the payment of interest on the credits invested by the State or to the business tax levied on telecommunication operators.

b) In the case of concessions for public service, the approving authorities must choose experienced partners, ready to commit themselves on a long-term basis, capable of assuming important risks, who will respect basic principles of public service (regular operation, equal treatment for users, and adapting the service to relevant evolutions) and fulfil the obligation of universal service/access.

c) Financing based on BOT, BTO, BLT or joint ventures may facilitate the rapid development of telecommunications in developing countries provided considerable negotiating skills and relevant guarantees are available. Where these conditions are not fulfilled it may be preferable to consider other options. It may be necessary to simplify the legal regime in order to facilitate such arrangements.

NOTE – BOT: Build – Operate – Transfer
BTO: Build – Transfer – Operate
BLT: Build – Lease – Transfer

2 Privatization

a) Privatization, with or without transferring the majority of the shares, should occur within an adequate legal and regulatory environment. Whether privatization is carried out in stages or as a whole, consideration should be given to whether the objectives of infrastructure investments are being met, while permitting the investors to achieve the desired profitability.

b) In certain cases of privatization, the conversion of the incumbent operator's debt into shares in the new telecommunication operator's capital may resolve difficult financial issues and may facilitate the recapitalization of the incumbent operator.

c) The real value of an operator is determined by the market. An operator evaluating its assets should take account of the effects of currency fluctuations and high inflation and apply appropriate measures such as non-distribution of profits and dividends, amortization of replacement cost, re-evaluation of the balance sheet and debt restructuring in foreign currency, and expected future profits.

3 Factors favourable to investment

a) In order to increase the attractiveness of investment in telecommunications, the following measures can be considered:

- acceding the World Trade Organization (WTO) Agreements;
- displaying the resolve to implement the following necessary regulatory and legal changes and setting a precise timetable:
  - i) commitment from the State on a clear telecommunication development policy, including a separation of posts and telecommunications;
  - ii) separation of the regulatory and operating functions, in order to allow operators to adopt a commercial approach;
  - iii) opening services to competition e.g. mobile or value-added services;
  - iv) opening basic services and telecommunication infrastructures to private investment and competition whenever appropriate;
- establishing fair competition legislation;
- considering tax exemptions;
- ensuring the free circulation of capital;
- ensuring the possible repatriation of profits;
- considering cooperation with neighbouring countries in order to establish multilateral investment guidelines and to achieve economies of scale.

b) In order to enable greater capital mobility and to reduce some of the risks which are important to investors, it would be desirable to encourage access to capital markets in conjunction with other solutions such as debt conversion, equity investment, project financing, joint ventures, supplier credit, etc.

RECOMMENDATION ITU-D 5

INDUSTRIALIZATION AND TRANSFER OF TECHNOLOGY

Question 5/1: *Industrialization and transfer of technology*

The World Telecommunication Development Conference (Valletta, 1998),

recognizing

the sovereign right of each Member State to regulate its telecommunications sector and the implementation of the ITU's instruments,

recognizing also

that technology transfer is one of the keys to a country's industrial restructuring,

noting

the report of the ITU-D Study Group 1 on Question 5/1 "Industrialization and transfer of technology",

taking into account

a) that the introduction and use of technology can contribute to substantial gains in terms of increased productivity, creation of employment and enhanced added value in the economy;

b) that technological change may also lead to significant problems such as rising unemployment and increased costs of imports;

c) that while the impact of introduction of new technologies or the process of transfer of technology may vary from country to country, it is imperative that policies be fashioned so as to maximize the beneficial effects of technology transfer and to assuage the negative effects,

recommends

that governments and administrations take account of the following principles when addressing industrialization and technology transfer.

1 Market analysis

The introduction of new technologies requires a thorough market analysis. Knowledge of the requirements of the market is essential in order to understand, for example, in what segments of the market (large customers, business or residential customers) is there demand for what types of technologies and services? Is there heavy demand for existing services, or is there demand for new services? A primary role for policy makers is to track the growth of the market and encourage technology transfer when the time is ripe. While the product mix of industrial production within a country depends on the strategies adopted for industrialization (e.g. import substitution, export promotion, assembly/full manufacturing) and the future changes in technology, the amount of value added can be increased by strengthening vertical integration where feasible through assembly or manufacture of final products and intermediate products.

The international transfer of technology involves the issue of importing, utilization, further developing, and the whole question of technological institutionalization by a country other than that in which this technological knowledge originated. For the developing countries, it is not only a

problem of importing machinery and components, but importing the types that can be diffused and institutionalized by the importing country. Technology transfer should therefore involve the following elements which may vary across countries, sectors and enterprises:

i) **Assessment of technology** – In most industries, one sole technology is rarely the best for all circumstances. Resources vary from one country to another, as does the nature of intermediate inputs. Therefore, when choosing among alternative technologies, the recipient enterprises must find the most appropriate technology, that is, the one that makes optimum use of available resources.

The first step to take in assessing and selecting a technology is to identify local needs and conditions. This is essential in developing countries, where the needs and conditions are often very different from those in the countries that supply most of the technology. The second step is to search out the available technologies on the international market. This requires extensive information about different technology suppliers. The third step in assessing new technologies is to evaluate their associated benefits and cost. This involves essentially economic considerations, but social and environmental aspects could also be analysed. The fourth step is to decide if the capabilities that can be acquired from experience with different technologies will enable the enterprise to make future improvements and innovations in order to increase productivity, or move on to new activities. One way for developing countries to improve access to the latest technology is through establishing common procurement procedures for equipment. Developing countries could thus pool their knowledge of dealing with manufacturers and equipment suppliers, create economies of scale and be able to negotiate improved contract terms.

ii) **Assimilation and adaptation of technology to local conditions** – Once the different technological possibilities have been properly assessed, the enterprise should then move on to the phase of assimilating and adapting the selected technology to local market conditions. The aim of this is to understand the technology and use it to fit local conditions. The challenge is to take advantage of local demand and supply conditions to improve productivity and international competitiveness. This phase will most likely involve minor innovations or modifications of the technology to increase productivity, reduce costs, stretch capacity or improve quality.

iii) **Diffusion of technology** – When the enterprise has gained sufficient knowledge of the technology's potential and some experience in its use, the technology can be diffused on a larger scale. Additionally, efficient diffusion requires knowledge of capable construction companies, relevant management capabilities, ability to bargain with local authorities, and economic resources to acquire production site.

iv) **Innovation** – This will be the result of efforts to overcome constraints on the enterprise's production capacity. It may involve invention of new devices, products and production processes or improvement of the existing technology. The lessons of the Telebras inductive card phone system case study illustrate several preconditions which are necessary for successful transfer, in this case as an indigenous effort. An important lesson to be drawn from the Brazilian project is the relationship between the developer of the technology, manufacturers and the end user (the operator) that accounted for the success. The project not only met the needs of the operator but also created 3,000 jobs in the industry, while at the same time giving Brazil a comparative advantage in the export markets. The equipment supplied by the developed countries is not designed for developing country environments. The high cost of imported equipment and spare parts adversely affects operation, maintenance and capacity utilization. Increasingly shorter product cycles create problems of supply of spare parts for equipment that still has economic life. Equipment designed and

produced elsewhere does not provide access to engineering design, know-how and know-why. Low or non-existent research and development capacities in the developing countries is a major bottleneck in technology development and transfer, where as R&D in the developed countries is normally geared towards meeting the needs of the developed country markets. Establishing manufacturing plans to cater for the demands of the region or a subregion and development of local R&D capabilities in association with manufacturing units are a desirable priority for developing countries.

Clearly spelt out conditions on the rights and obligations of the supplier of technology and the recipient on aspects relating to access to markets, quality assurance, intellectual property and licensing conditions are integral to the process of successful trechnology transfer. It is important that the quality of the product must fully match that of the same product manufactured elsewhere and carrying the same brand name. Appropriate quality assurance arrangements and compliance specification in collaboration with the technical staff from the transferring company are important aspects of the process.

2 The role of government

The growth of telecommunications technology depends on the State and government policy. The government therefore has an integral role to play in formulating a comprehensive and coherent national policy for the strengthening of the country's technological capacity. Such a policy should create and reinforce an autonomous decision-making capacity in technological matters consistant with the realities of its political, economic and social situation and its development objectives. The technology policy should be implemented through the adoption of technology plans as integral parts of national development plans. The technology plans should embrace essential responsibilities, such as budgeting,

management, coordination, stimulation and execution or technological activities and cover specific requirements at the sectoral and intersectoral levels for the assessment, transfer, acquisition, adaptation and development of technology. They should reflect short-term, medium-term, and long-term strategies, including determination of technological priorities, mobilization of natural resources, dissemination of the existing national stock of technology, identification of sectors in which imported technology would be required and determination of research and developmental priorities for the development and improvement of endogenous technologies.

Regarding safety and health, governments should make effort to: enforce laws and regulations which make provisions for the use of safety and health monitoring equipment and strategies; develop the necessary capability to choose technology in such a manner as to ensure proper safety and health provisions and working conditions for the workers; develop the necessary occupational safety and health infrastructure to deal adequately with all problems related to safety and health and working conditions involved in technology transfer.

3 Investment policies

Expansion of the telecommunications sector involves huge investment in building up networks, training facilities and the development of proper technologies. Development of capital markets for both domestic and foreign investors is a crucial aspect of investment policies. Liberal investment policies are therefore encouraged to attract and mobilize resources into the telecommunication sector. In India, for example, expansion of the telecommunication sector has been sustained by appropriate investment policies. A summary of such policies and procedures governing foreign investment into that country include:

i) Import Policies – All capital goods are allowed on Open General Licence; and imports of all telecommunication equipment, other than consumer telecommunication equipment, are allowed without any licence and at lower customs duty.

ii) Export Policies – Value addition of 30%, and automatic approval for imported capital goods within 15 days are allowed; establishment of export-oriented Electronic Hardware Technology Parks (EHTP) and Software Technology Parks (STP) for export of software.

4 Institutional framework

The legal and institutional arrangements in many developing countries are often quite weak and do not facilitate the effective participation of private enterprise and capital. Examples of inadequacies include lack of or ineffective laws and enforcement mechanisms to protect private property; absent or outmoded trade laws; a complex tax regime that is often anti-business; and controls on access to foreign exchange. The institutional arrangements are also often quite weak. Examples include a judiciary that lacks independence from the executive power or is prone to manipulation by interest groups; a legislative branch that is either captured by the executive branch or paralyzed by party fragmentation; unstable governments; and slow, ineffective, and sometimes corrupt government administration.

The establishment and sustenance of an appropriate economic environment, legal and regulatory framework, as well as political environment is therefore a prerequisite for enhancing technology transfer in developing countries. The laws and regulations guiding the transfer of technology from advanced nations to developing countries should be designed to strengthen the hands of negotiators in commercial technology transfer deals, maximize gains from the transfer, and enhance the development and successful adoption and diffusion of imported technologies. Laws should be designed to direct and control the importation of foreign technologies for the benefit of individual countries.

5 Intellectual property rights

Protection of intellectual property is integral in developing a country's technological capacities. Effective protection of know-how through copyrights, patents and licences will enhance the transfer of technology. This is especially true with machinery, equipment and chemical formulations. Under broader national laws governing intellectual property, in the case of technology transfer agreements the recipients need to respect the provisions setting out the details of the design of hardware and software, but also require other valuable knowledge such as manufacturing techniques and market information.

For example, China, in pursuit of the development of its information technology industry, has made fast progress in the promotion of its intellectual property system. In fact, a legal system has been set up for the protection of computer software in China in which copyright law, trademark law, patent law, anti-competitive law and technical contract play an important role in the protection of intellectual property.

6 Human resource development

Investments must not be confined solely to the acquisition of new technology; it is also vital to invest in human capital in order to guarantee the quality of the technology or service. The process of acquiring technological capabilities must be complemented by investment in human capital (training of personnel and hiring of advisors) which will create a capacity for change and adaptation. A key aspect of educational system in developing countries is the need for development of practical-oriented educational curricula at the universities with a view to enhancing utilization of products of these institutions. Technological know-how is absorbed by people and if there is a scarcity of people available, the technology transfer process will be halted. Industrial organizations in many developing countries are characterized by shortage of industrial skills on the one hand and at the same time high turn-over of trained staff largely owing to adequate incentives.

An adequate education and training strategy should include:

- the recruitment and retention of indigenous staff;
- on-the-job training for technical staff and users;
- data processing and project management training with appropriate elements of the behavioural, social and political dimensions of computerization for relevant computer staff;
- streamlining curriculum development on a regional basis to ensure uniformity of standards;
- professional development programmes;
- development of local information technology literature and resource materials.

For example, Telebras, the single largest employer in the telecommunication sector in Brazil, has a training policy for its personnel. It provides vocational training both in Brazil and overseas. At the national level, it has several exchange programmes with federal technical schools and research institutions, and it also sponsors employees to pursue tertiary education. Through the United Nations Development Programme, technicians are sent on missions to Japan, the United States, Canada and France, and international specialists are frequently invited to provide training and consulting services.

In Singapore likewise, in the country's effort to increase its technical capabilities, education and training have received high priority in the government's industrial policies. Technical institutes have been established: to train human resources with technical capabilities required to attract high-tech industries; to train human resources with attractive profiles for major investors; to provide an outlet for the country to learn about new work processes and technologies; and to ensure a supply of highly technically trained people for the key sectors of the economy.

It has been recognized that the shift towards a knowledge-based economy can have particularly adverse effects on employment of unskilled manual workers. Consequently, a world employment strategy must embrace not only intensive training programmes for long-term solutions, but also job creation programmes for unskilled workers.

The International Labour Organisation's approach has focused on identifying the training needs and priorities of workers and industries engaged in advanced technology-based production. Technical cooperation activities that endeavour to assist countries in developing their new technology-related training programmes should be increasingly promoted.

7 Health and working conditions

The transfer of technology arouses concern in terms of its effects on the safety and health, and the working lives of those involved.

Some factors to be considered in the transfer of technology have been advocated by the International Labour Organisation. These include:

- any appropriate or necessary adaptations should be made to the original technology to ensure that the processes, plants and equipment take due account of the differences between the receiving and the supplying country;
- technology should not be selected for transfer on purely economic or technical criteria;
- technology should be transferred only after careful consideration of all factors affecting occupational safety and health and working conditions;
- the proper use and safe operation of the processes, plants and equipment by the country receiving the technology should be ensured through appropriate training and instruction; and
- facilities for the proper repair and maintenance of processes, plants and equipment should be available to or within the developing country.

In recognition that technology should take safety, health and working conditions into account, a Code of Practice has been drawn up by the International Labour Organisation providing recommendations for all those with responsibility for safety, and health hazards arising from the transfer of technology. The objectives of this code are many and include:

- the need for the appropriate design, proper installation and safe operation and use of new equipment, processes, projects and related products being transferred to developing countries;
- the means of analysing, from the standpoint of safety and health and conditions of work, existing technologies imported by developing countries, and of modifying them to remove the hazards discovered by the analyses; and
- guidance in the setting up of administrative, legal and educational frameworks within which preventive and remedial measures can be implemented.

8 International affiliations

Developing countries should consider membership of international and regional telecommunication organizations as one way to gain access to the latest technology, to promote the development of services, to receive training and to obtain support in developing appropriate technology. Thus far, many have come together at regional and subregional levels to create organizations for mutual cooperation in telecommunications. These include the Pan-African Telecommunications Union (PATU), the African Postal and Telecommunications Union (UAPT), Asia-Pacific Telecommunity

(APT), the Arab Telecommunication Union (ATU), and the Inter-American Telecommunications Conference (CITEL).

RECOMMENDATION ITU-D 6

APPROPRIATE LOW-COST TECHNOLOGY OPTIONS FOR RURAL TELECOMMUNICATIONS

Question 4/2: ***Communications for rural and remote areas***

The World Telecommunication Development Conference (Valletta, 1998),

considering

a) the report on telecommunications for rural and remote areas;

b) the modularity and adaptability of new technologies, making it possible to meet different requirements for providing services to rural and remote areas;

c) the complementary nature of the technologies,

bearing in mind

a) that the profitability of an investment depends largely on the judicious choice of technology or technologies, the services offered and the operating costs;

b) that the choice of technologies depends on a set of complex parameters (geographical, socio-economic, accessibility, performance, etc.),

noting

that there is no single technology meeting all requirements for the provision of services to rural and remote areas,

recommends

that administrations, as policy-makers and regulators, and recognized operating agencies[1)], draw up representative models of the conditions encountered, enabling them subsequently to compare combinations of technologies and choose the most appropriate solution.

[1)] Recognized operating agency (ROA): an ITU category of Sector Member.

RECOMMENDATION ITU-D 7

PLANNING AND IMPLEMENTATION OF NATIONAL TELECOMMUNICATION DEVELOPMENT PLANS FOR RURAL AND REMOTE AREAS

Question 4/2: ***Communications for rural and remote areas***

The World Telecommunication Development Conference (Valletta, 1998),

considering

a) that telecommunications are a powerful means of conveying information of all kinds;

b) that the implementation of telecommunication infrastructures in rural and remote areas promotes economic, social and cultural development;

c) that such activities are absolutely essential in rural and remote areas for improving the quality of human life in these regions;

d) that substantial, planned rural programmes achieve major economies of scale in terms of the costs of both equipment and recognized operating agencies' construction programmes[1)];

e) that the telecommunication industry is inherently commercial in nature;

f) that there is extensive evidence that the provision of rural telecommunication services can generally be arranged so as to be profitable,

noting

the low telephone penetration in the rural and remote areas of developing countries,

recommends

a) that administrations, as policy-makers and regulators, and ROAs:

1 include rural telecommunication development among their high priorities;

2 define, approve and implement national development plans which specifically include rural and remote telecommunications;

3 participate in the promotion and financing of rural telecommunication development programmes in general, with the appropriate authorities at the national level;

4 organize and implement national rural telecommunication development initiatives through a carefully planned, orderly, progressive, multi-year programme, as part of the national telecommunication development master plan, to ensure that such programmes are implemented efficiently and economically;

b) that administrations make arrangements for national rural telecommunication development initiatives to be the responsibility of ROAs which are managed as commercial entities.

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1) Recognized operating agency (ROA): an ITU category of Sector Member.

RECOMMENDATION ITU-D 8

PROMOTION OF THE APPLICATION OF TELECOMMUNICATION FACILITIES FOR DEVELOPING VARIOUS SECTORS OF RURAL INFRASTRUCTURE AND RURAL ECONOMY

Question 4/2: ***Communications for rural and remote areas***

The World Telecommunication Development Conference (Valletta, 1998),

considering

a) that the main demand for telecommunication services in the rural and remote areas is for calls between small local communities and elsewhere;

b) that the provision of services to individual residences in remote communities is relatively costly;

c) that there is a need for supporting facilities, such as power and security, and for assistance to inexperienced users;

d) that the provision of a small number of lines at a centrally located public call office (PCO) is both effective and efficient;

e) that establishing the PCO provides a valuable opportunity to involve the community and promote local entrepreneurial possibilities;

f) that the PCO can add functions, features and capability as the community needs them,

noting

a) the general recognition that universal access to telecommunication services in rural and remote areas is appropriate and adequate;

b) the opportunity for government support of social and cultural development to be provided more effectively at much lower cost through telecommunications,

recommends

that recognized operating agencies[1)] servicing rural and remote areas:

1 make it their objective to provide universal access to telecommunication services at an affordable price to the entire population of a country, with uniform availability of services and quality standards across the entire country;

2 provide "universal access to telecommunication services" in rural and remote communities through the provision of several lines which are made available at a convenient central location, with appropriate commercial management, and with, in addition, lines made available on cost-based terms to public sector institutions, to business enterprises and to private subscribers;

3 establish, as a policy objective, that PCOs should be encouraged and should be helped to evolve, over time, as local needs and wants dictate, into "multipurpose community telecentres" (MCT);

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1) Recognized operating agency (ROA): an ITU category of Sector Member.

4 establish the MCT as the focal point to make available, distribute and promote the many social and cultural development opportunities that rural telecommunications make possible;

5 cooperate with public institutions in order to make emergency services available at all PCOs and MCTs, preferably with a free call and a unique call number.

RECOMMENDATION ITU-D 9

APPROPRIATE REGULATORY STRUCTURES AS A MEANS OF ENCOURAGING THE EXTENSION OF TELECOMMUNICATION SERVICES TO REMOTE AND RURAL AREAS

Question 4/2: ***Communications for rural and remote areas***

The World Telecommunication Development Conference (Valletta, 1998),

considering

a) that the need to establish a regulatory function that is independent of political influence is widely recognized;

b) that the regulation of telecommunication services in rural and remote areas of developing countries must address all appropriate regulatory facets and elements;

c) that experience clearly indicates that an entrepreneurially oriented recognized operating agency[1)] under effective regulation can generally be profitable in providing telecommunication services to rural and remote areas;

d) that it is generally agreed that the best vehicle to implement service obligations is concession to ROAs,

noting

a) that a considerable body of knowledge and experience regarding regulation exists and is available;

b) there are good examples of concessions which have successfully mandated the provision of telecommunication services throughout a country's rural and remote areas,

recommends

that administrations of developing countries:

1 put into place regulatory arrangements to foster the development of rural telecommunications, which include the following conditions:

- a regulatory authority is established which is as independent as possible;
- appropriate tariffs and revenue settlement arrangements are in place;
- the access obligation takes into account the financial viability and sustainability of the rural telecommunication service;
- interconnection terms and conditions are addressed and defined;
- effective spectrum management ensures efficient spectrum utilization;
- appropriate regulatory policies are exercised through licensing and concession arrangements;
- licensing arrangements are consistent with efficient network structure;

[1)] Recognized operating agency (ROA): an ITU category of Sector Member.

2 take steps to ensure that the provision of telecommunication services to rural and remote areas includes the following principles:

- service is provided through PCOs and MCTs, and to other users on a commercial basis;
- rural investment is encouraged, in ways which are generally consistent with price/cost relationships;
- innovation is encouraged in providing rural service;
- the operation of rural PCOs and MCTs is franchised, preferably to local entrepreneurs.

RECOMMENDATION ITU-D 10

OPTIONS AVAILABLE FOR FINANCING RURAL AND REMOTE TELECOMMUNICATION PROGRAMMES AND PROJECTS

Question 4/2: ***Communications for rural and remote areas***

The World Telecommunication Development Conference (Valletta, 1998),

considering

a) that it is clearly established that the provision of telecommunication services in the rural and remote areas is generally profitable, mainly on account of long-distance revenue, including both national and international calling, and both originating and terminating calls;

b) that there are many good opportunities to promote the use of profitable long-distance services, and other profitable services, recognizing that good quality services which are readily available at an attractive price will enjoy extensive usage;

c) that private sector investment, both national and international, follows efficiency and financial opportunity;

d) that the amount of funding available through both international funding institutions and official development assistance is currently small and is becoming smaller,

noting

a) that national stability, both political and economic, is a prerequisite for attracting international investment;

b) that any government-imposed cost of providing telecommunication services, such as, *inter alia*, equipment import tariffs and spectrum licensing fees, imposes a direct financial burden on the users of the services,

recommends

that administrations and recognized operating agencies[1)] of developing countries:

1 realize that the three major sources of funding for financing communications for the rural and remote areas are:

1) internally generated funds (the best way of achieving sound and effective financing of operation in rural and remote areas);

2) private sector investment (through licensing, joint ventures, franchises, rural development funds, etc.);

3) other resources;

2 take advantage of a wide range of innovative and entrepreneurial financial and promotional approaches, to minimize costs and maximize revenue in providing telecommunications to rural and remote areas.

[1)] Recognized operating agency (ROA): an ITU category of Sector Member.

RECOMMENDATION ITU-D 11

IMPACT OF TELECOMMUNICATIONS IN HEALTH-CARE AND OTHER SOCIAL SERVICES

Question 6/2: ***Impact of telecommunications in health care and other social services***

The World Telecommunication Development Conference (Valletta, 1998),

recognizing

a) that the first requirement of developing countries is for more information about telemedicine, what it is and how it might be able to help solve some of their problems in medical and health care;

b) that, unlike Europe, Canada, the United States and Japan, few developing countries have any experience in the application of telemedicine, even in urban areas equipped with telecommunication infrastructures;

c) that there is, nevertheless, an overwhelming need for the provision of medical and health-care services, especially in areas outside the cities,

being of the view

a) that telemedicine services could be an economical means of achieving national health-policy objectives with regard to improvement and/or extension of medical and health care, especially to non-urban areas;

b) that telemedicine services and delivery in developing countries should be affordable, practical, self-sustaining and available to as many people in need as possible;

c) that few developing countries can afford the very sophisticated telemedicine solutions involving ATM, virtual reality, etc;

d) that their most pressing need is for low-cost telecommunications and associated facilities for telemedicine applications,

considering

that those responsible for health-care planning may wish to take telemedicine into account within the framework of national health policy and that planners should consider at least four aspects of health care where telemedicine could play a role:

1 *Administration*: Telemedicine could help in the administrative tasks involved in implementing national health-policies, which is currently a problem in many developing countries;

2 *Reinforcing national health structures*: Telemedicine could help improve linkages between rural district hospitals and the main national hospitals using telecommunications;

3 *Education*: Telemedicine services could help provide training and education to health-care professionals in rural areas;

4 *Quality and efficiency of health-care services*,

considering also

a) the importance of establishing a national telemedicine policy and/or strategy, in the context of a national “health for all” policy;

b) that such a policy or strategy could identify health-care priorities and include consideration about how telecommunication facilities for telemedicine can be funded, whether by government, by industry, as part of universal service obligations for telecommunication operators or by other means;

c) that the medical profession should take the lead in determining their needs and how telemedicine might help;

d) that doctors and other health-care professionals might be able to identify needs, but implementation of telemedicine requires multidisciplinary collaboration, with the active participation of telecommunication operators,

recommends

1 that national ministries of health and ministries of telecommunications be encouraged, therefore, to work together towards introduction of a telemedicine policy;

2 that telecommunication operators be encouraged to take an active interest in telemedicine as a potential business opportunity, and that telecommunication operators and telemedicine experts, equipment suppliers and service providers be also encouraged to work together;

3 that developing countries interested in telemedicine should support the guidelines contained in the *Report on Telemedicine and Developing Countries*;

4 that developing countries should consider undertaking some telemedicine pilot projects, especially involving rural and remote areas, in order to help identify the most cost-effective telecommunication solutions for the provision of health care, especially to those living in remote and rural areas. The second African Regional Telecommunication Development Conference (AR-RTDC-96) recognized that it would be desirable to see at least two large-scale trials of telemedicine somewhere in Africa which would serve as "test beds" and as models for the successful implementation of telemedicine in other developing countries. The first World Telemedicine Symposium for Developing Countries (Portugal, 1997) also concluded that while large-scale trials, as recommended by AR-RTDC-96), would be useful, a number of small pilot projects should be initiated in developing countries at the earliest opportunity;

5 that, while there are various national, regional and international organizations from which some funding for telemedicine projects can be sought, developing countries should endeavour to ensure that telemedicine services are self-sustaining in the medium to long term in order to avoid raising false expectations; developing countries should share the results of their experiences so as to identify the most appropriate, cost-effective and sustainable solutions;

6 that there is a need for some quantitative analysis based on actual telemedicine experience, for example, from pilot projects, which could demonstrate to policy-makers and funding bodies the cost-benefits of telemedicine; on the basis of such an analysis, politicians could be encouraged to devote a percentage of the health-care budget to telemedicine and to solicit matching funds from the large funding institutions such as the World Bank;

7 that there is a need to bridge the gap between the telecommunication and health-care communities at all levels; consequently, ITU and WHO should further enhance their links and collaboration, promote collaboration between their respective constituencies and identify solutions to meet health-care needs, especially in remote and rural areas, for those on the move and for those who might not otherwise have access to the quality of care available in urban hospitals;

8 that ITU/BDT should take further steps to raise the awareness of decision-makers, telecommunication operators, donors and others about telemedicine and how it might be able to help

solve some health-care needs; wide dissemination of the Telemedicine Report could help in this regard;

9 that ITU-D Study Group 2 should bear in mind that:

a) telemedicine workshops or symposia are another useful means of raising awareness and bringing together representatives from the telecommunication and health-care sectors, from developed and developing countries;

b) ITU/BDT was requested by the African and Arab States Regional Telecommunication Development Conferences to organize a workshop or seminar on telecommunications for telemedicine in order to consider and review the Telemedicine Report, to consider the modalities for implementing telemedicine, to share experience and ideas, especially in regard to the costs and benefits of telemedicine, and to foster the adoption of global solutions;

c) as a result, ITU/BDT convened the first World Telemedicine Symposium for Developing Countries in Portugal from 30 June to 4 July 1997 which, in turn, recommended that another such symposium be held in Latin America in 1998;

10 that ITU should also establish a database which could be updated annually and which would provide a source of information about the different pilot projects in developing countries, what financing mechanisms and technologies have been used, what services have been provided, what the results of the pilot projects have been, what lessons to learn, what mistakes to avoid;

11 that ITU/BDT should help developing countries by identifying appropriate telecommunication technologies and applications for telemedicine and to show how, through effective use of telecommunications, telemedicine can optimize the use of the limited human health-care resources in developing countries.

RECOMMENDATION ITU-D 12

TELECOMMUNICATION SUPPORT FOR THE PROTECTION OF THE ENVIRONMENT

Question 7/2: ***Telecommunication support for the protection of the environment***

The World Telecommunication Development Conference (Valletta, 1998),

considering

that Agenda 21, in particular Chapters 35 and 40 thereof, Resolution 8 of the World Telecommunication Development Conference (Buenos Aires, 1994) and Resolution 35 of the ITU Plenipotentiary Conference (Kyoto, 1994), recognize that the telecommunication network can offer, among other services, reliable means of supporting programmes planned by environmental protection agencies, mainly by carrying timely information from point to point,

endorsing

the conclusions and recommendations of the Symposium on the Role of Telecommunication and Information Technology in the Protection of the Environment (Tunis, 1996) and Resolutions 8 and 11 dealing with the same matter and adopted, respectively, by the second African Regional Telecommunication Development Conference (Abidjan, 1996) and the second Arab States Regional Telecommunication Development Conference (Beirut, 1996),

recognizing

a) that the telecommunication technologies in use today can offer effective facilities for monitoring natural hazards and environmental damage caused by human activities such as accidents in chemical factories, harmful forestry activities and pollution in harbours, rivers and lakes;

b) that the importance of using telecommunications as a powerful tool in the protection of the environment is not focused enough in the environmental policies of many countries;

c) that it is important for the telecommunication environmental communities at the national and international level to set up and to strengthen cooperation between them;

d) that information communication will help in resolving environmental problems through the dissemination and sharing of environmental information for international cooperation and by fostering environmental awareness;

e) that various problems have arisen due to overcrowding of urban areas, resulting in increasing concerns in areas such as waste management and unauthorized human settlements;

f) that telecommunication networks will provide attractive alternatives for the benefit of the environment, such as:

– improving efficiency of physical distribution and human transportation;

– promoting and facilitating telecommuting, tele-education, etc.;

– improving efficiency and levels of waste management;

– disseminating information on waste recycling initiatives,

recommends that ITU Member States and Sector Members

1 take a real initiative, through their respective telecommunication authorities, to provide all the possible support, directly or indirectly, in collaboration with the respective environmental authorities, in promoting telecommunication applications devoted to the protection of their environments and encouraging training and human resources development in that field;

2 consider all technologies which could assist in environmental protection activities such as monitoring of air, river, harbour and sea pollution, remote sensing, wildlife studies, forestry development, etc.;

3 recognize the need for a national environmental protection policy with due emphasis on the important role which telecommunications can play in providing such assistance;

4 create special awareness among policy/decision-makers to help them gain a better understanding of the issue of telecommunications and the environment;

5 take into account the importance of an integrated approach for collecting, processing and disseminating environmental information at national, regional and international levels and take all necessary steps towards implementing such an approach;

6 pay particular attention to satisfying the basic telecommunication needs of small communities living in rural and remote areas, in order to help them establish industries in accordance with the concept of sustainable development, to be extended to other social and economic activities, and promote sustainable development of other social and economic activities, thereby minimizing migration of these communities into urban areas which ultimately causes urban congestion;

7 utilize telecommunication networks and services effectively in situations where a reduction of energy consumption could be achieved, such as teleconferencing, substituting telecommunications for travel, which will reduce the degree of pollution as well as the potential risk of accidents, and reducing paperwork, thereby ultimately saving the environmental resources and preserving nature,

requests BDT

1 to enlarge its current activities focused on conducting pilot projects in developing countries, in partnership with development partners, which are vital in the follow-up of Question 7/2;

2 to work with administrations and regional telecommunication organizations on the telecommunication provisions of the draft International Convention on Natural Disaster Mitigation, taking into account, on one hand, the decisions of the Istanbul Conference in June 1996 and the Caribbean regional workshop (CTU/ITU/UNDHA) in November 1996 and, on the other hand, the current efforts of the Working Group on Emergency Telecommunications (WGET) and UNDHA, e.g. in the Washington meeting (September 1997) and the Rome meeting (November 1997), leading up to the Intergovernmental Conference on Emergency Telecommunications in June 1998 in Finland.