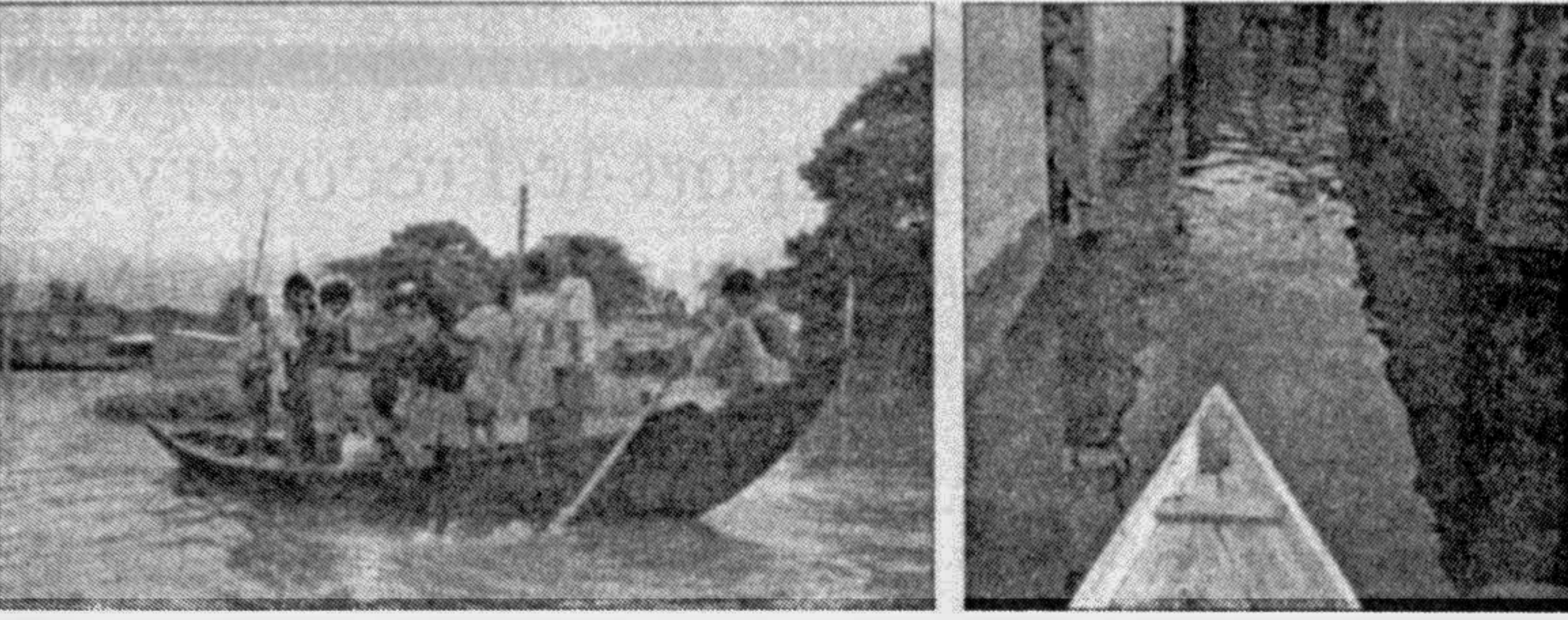


Strategy for Control of Floods in Bangladesh

by Dr A K M Kafiluddin



BANGLADESH, with an area of 145,000 square kilometres and a population of about 120 million, lies in the flood plains of three great rivers, the Ganges, the Brahmaputra and the Meghna. The river system shapes the daily life of the people and also brings with it during the monsoon the perennial threat of floods. Heavy rainfall over the area intensifies this threat.

Causes of Floods in Bangladesh

i) The north-eastern Bangladesh receives some of the highest recorded rainfalls in the world. 70-80 per cent of the annual rainfall is concentrated in the monsoon season from May to September (highest rainfall). Flooding is, therefore, a regular occurrence in Bangladesh during the pre-monsoon and monsoon seasons. While monsoon rains are the dominant cause, the flooding results from various factors such as rapid run-off, the effect of the confluences of the major rivers, the topography of the delta and surges in the Bay of Bengal.

ii) Geomorphological processes occurring in Bangladesh (Topography of Delta).

iii) Excessive snowfalls in the Himalayan and the subsequent melting of snow.

iv) Excessive rainfall in the north-central India and the Indian states of Assam, Arunachal and Meghalaya, etc. (on rush of water down slopes).

v) Excessive local rainfall leading to excess run-off in ex-

cess of safe channel conveyance capacity.

vi) Silting of rivers within the country.

vii) Anthropogenic perturbations of the environment and the greenhouse effect of global warming.

viii) Deterioration of damage channel by natural silting-up, shoal formation or obstruction.

ix) Drainage congestions due to faulty development programmes and encroachment on flood-plans (Rain Flood).

x) Effect of construction of embankments and polders causing increase in flooding elsewhere.

xi) Failure of water retaining structures, dams, breaches in embankments.

xii) Tidal surges and seawaves in the Bay of Bengal.

xiii) Flash-floods in the eastern and northern hilly areas. Here hydrographs rise sharply and fall rapidly.

xiv) Earthquake induced floods (Tsunami).

xv) Whenever 90 per cent inflow water from India is greater than the carrying capacity of the rivers of Bangladesh there flood results.

xvi) Wetness of the underlying surface at the time of rainfall.

Strategies

Bangladesh has been living with floods counting on its people especially its farmers, to withstand the frequent flooding and minimise agricultural losses within a short period.

Methods of flood control: Controlling floods demands significant resources and care-

ful planning. The principle options for controlling floods are:

Flood Control: 1. Dhaka City flood control project; and 2. Flood control polders in Atrai Basin caused increased flood level which can be reduced by strong flood waters in some storage. Flood is common in Bangladesh in Pre-monsoon and Monsoon (May to September) due to heavy monsoon rain.

Action Plan

Financed by World Bank for the period 1990-1995 action plan consists of the following structural and NON structural methods.

Structural methods consists of: (i) Upstream storage Dams, (ii) Channel improvement by dredging of rivers, (iii) Shallow storage by constructing reservoirs in plains, (iv) Embankments provide permanent solution for effective flood protection. These will save flood dependent crops, in impede drainage of local run-off, change morphology of the main rivers. Social attitude makes savings of high capital and recurring costs. (v) Compartmentalisation in case of breach of embankments, (vi) Develop minor river interceptor drains, head regulators and link channel.

Non Structural Measures Consists: (vii) Flood Preparedness (viii) Flood forecasting systems to be improved-expansion of telecommunication, training, use of computers. Translation of Forecast ineffective warning. (ix) Community passed flood preparedness activities which will include evacuation, sheltering, flood

fighting, organizing response, stock-piling of food, medical supplies, tools for communication.

Action Plan (World Bank) deals with:

a. Extension of embankments on both sides of Brahmaputra, Padma, Meghna.

b. Conducting continuous studies

c. Riparian co-operation for long term solution

d. Effective co-ordination, and

e. Flood Action Plan and Environment

A new approach to flood control includes:

i. Flood Action must be integrated with sustainable development with environmental programme.

ii. Studies to be conducted to evaluate past flood control measures to know the re-settlement problems, to identify the impacts of flood control projects, people's adaptation to flood situation, low-cost structural measures, embankment regulators, compartmentalization of pilot projects.

iii. Space Research and Remote Sensing Organization (SPARRO) adopted by Bangladesh Meteorological Department.

iv. B-SATELLITE from USA and Japan can be used to determine height of flood, image of flood etc.

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Intellectual Property Rights: Software Copyright Law

by M Abdus Sobhan

The patent law was enacted in USA in 1790. By the 1800s, and others to enact the law were France, Holland, Norway, Sweden and Japan. Germany did it in 1903 and Canada in 1925.



A feature of the computer technology is the speed at which it has developed and will continue to develop in the future. The information and data processing and transmission via computer and telecommunications media have been named the information technology (IT). The pace of change and improvement in the design of computer hardware and the scope and sophistication of computer software has been little short of phenomenal. It is not surprising that the response of legal system to this evolving technology seems to lag far behind.

There has been a number of offenses and misuses of computer hardware and software, namely, hacking, using data/software of others without permission, causing computer crimes by making viruses, liability for defective software and hardware, particularly in the case of safety critical systems, which have become issues of growing concern. Often, law develops in a reactive manner, responding to some new mischief long after it has become clear that it is a serious problem. Incredibly, the copyright protection of computer software was not confirmed until as late as 1985.

Although the developed and most of the developing countries have enforced laws for protecting and safeguarding the interests of the Organizations and individuals dealing with the development and transactions of IT products, unfortunately in Bangladesh, no such law has yet been enacted for the healthy growth of Information Technology Industry.

2.0 Intellectual Property and Computer Software

2.1 Intellectual Property Intellectual property is attributed to legal right, which protects the creative works, inventions and commercial goodwill. The intellectual property (IP) shares many of the same characteristics associated with real and personal property. For example, IP is an asset and as such it can be bought, sold, licensed, exchanged or generously given away like other forms of property. The most noticeable difference between IP and other forms of property, however, is that IP is intangible, i.e., it cannot be defined or identified by its own physical parameters. Thus IP will be expressed in some discernible way so that it can be protected. For protection of IP, thus, laws have been made to foster innovation by regulating the copying of inventions, identifying symbols and expressions. These laws encompass four separate and distinct types of intangible property, namely:

Patent Law, Trademarks and Service Marks, Trade Secrets and Copyright are collectively called Intellectual Property.

How can a computer program become an IP? If some one develops a computer program to serve for some purpose, and if it is protected by law against use by others without the permission of the programmer, then definitely it is a property of him. He can earn money by selling this product. There can be many other such types of IP, generated by computers, namely, music, video games etc. Apparently, information technology has opened up means to produce enormous amount of IP by which we can earn huge revenue for building our nation. The protection of one's IP is important because, a second party can very easily mass copy this kind of property using presently available equipments and can make huge profits by selling it unlawfully.

Patent Law

The patent is concerned with inventions such as a new type of computer hardware, or a new process for use in the manufacture of integrated circuits. As is well-known, patents came into existence as a legal institution in the republic of Venice in 1474. The Venetian concept of legal protection of inventions was adopted by the English government in the 16th century. However, in the English monarchs started to abuse the patent right by granting patents to their relatives and sycophants. Such abuses provoked public indignation which pressured the English Parliament to enact the Statute of Monopolies in 1673 which became current patent laws. In this Statute, the 'first and true' inventor was recognized for the first time to have the right to be granted a patent. The patent law was enacted in USA in 1790. By the 1800s, and others to enact the law were France, Holland, Norway, Sweden and Japan. Germany did it in 1903 and Canada in 1925.

For an invention, to be protected by patent, the inventor is to make an application to the patent office. If patent right is granted, the inventor is given the exclusive right to prevent

others from making, using and selling the patented innovation for a fixed period of time in return for the inventor disclosing the details of the invention to the public. The duration of patent exclusively varies from country to country. A patent rewards the investment of time, money and effort associated with research. It stimulates further research as competitors invent alternatives to patented innovations. It also encourages innovation and investment by permitting companies to recover their research and development cost during the period of exclusive rights.

Trade Marks and Service Marks

Trademarks and Service Marks are primarily intended to indicate the source of goods and services and to distinguish those goods and services from those of others. They also symbolize the quality of the goods or services with which they are used. Most Trade Marks and Service Marks (called 'Marks') are words, but they can be almost anything that can distinguish one product or service from another, such as symbols, logos, sounds, designs or even distinctive nonfunctional product configurations. While virtually all countries recognize and offer protection for Trade Marks, many but not all countries recognize and protect service marks. In some countries, protection for a mark is acquired by using the mark on goods or services. In other countries, the owner must register the mark with the national Trade Mark office before protection in that country is granted.

Trade Secret

A trade secret is an information that is secret or not generally known in the relevant industry and that gives its owner an advantage over competitors. Trade secret protection exists as long as the information is kept secret or confidential by its owner and is not lawfully and independently obtained by others. Examples of trade secrets include formulas, patterns, methods, programs, techniques, processes or compilations of information that provide one's business with a competitive advantage. The owner of a trade secret may recover damages resulting from the improper disclosure or use of its trade secret by another.

Copyright Law

As its name suggests, copyright protects works from being copied without permission. However copyright goes beyond mere copying and extends to other activities such as making an adaptation of the work. The types of works protected by copyright are literary works (including computer programs), dramatic, musical and artistic works, sound recordings, films, broadcasts, cable programs and typographical arrangements of published editions. Copyright protection has a long duration, the general yardstick being the lifetime of the author plus 50 years or more.

Software Copyright Law

The relevance to copyright of computer software comes mainly in two areas: the first concerns the protection of computer software and, in particular computer program and databases from piracy or unauthorized copying; the second area concerns works of various types which have been created by or with the aid of a computer. Copyright law protects computer software, whether it be programs, databases, computer files or printed documentation whereas patent law protects new and inventive forms of computer hardware. The copyright protection extends beyond the computer program itself and will cover written or printed listings of programs, flowcharts, specifications and notes.

Exceptions to Copyright Infringements for Computer Programs

When it is decided to classify computer programs as literary works for copyright purposes, the exceptions to copyright infringement arises. The exceptions called the permitted acts such as fair dealing for research or private study or for criticism, review or news reporting. Three particular issues are:

- * the right, under certain circumstances, to decompile an existing computer program;
- * a right to take necessary backup copies, for safety against the damage or corruption of the original copy;
- * a right to copy and adapt including error correction.

Protection of Data and Databases

Databases are generally protected by copyright, usually as literary works. A database containing information relating to bibliographic references including abstracts will be a literary work. The data protection act should be also made and enacted. This act is in action in many countries. The security of data and information of individuals stored in computer is an important issue. Control of those who store or process such data and information using computers is to be provided for adequate civil/criminal procedure.

Computer Contracts

Contracts for the acquisition of computer equipment and software present special problems, many of which flow from the unique nature of computer technology. For example, we cannot see or touch a computer program running in a computer, all we can do is experience its effects through a peripheral device such as a monitor or a printer. It may be possible to read a listing of a computer program and perhaps make some sense of it but, certainly to many of us who have used computer programmes, they take on a quasi-mystical nature as they are, after all, intangible. It is the difficulty in coming to terms with the nature, effects and implications of computer equipment and software that is a direct cause of many of the contractual problems associated with computers. The role of the equipment or software is intended to fulfil must be clearly identified and qualified, a comprehensive and precise specification must be drawn up. The lack of, or defects in, the specification are probably at the heart of most disputes resulting from the acquisition of computer equipment and software. A mistake in the choice of equipment or software coupled with a poor contract can be disastrous for a purchasing company. If the acquiring company refuses to provide, or is incapable of providing, clear instructions, if it refuses to accept and/or pay for the equipment or software, if it tampers with the programs, misuses them and allows employees to copy them freely, the supplier will need to take action. The company making the acquisition will need to decide:

- * how the contract can protect it if the equipment or software fails to perform as it should;
- * about maintenance and training;
- * what to do if the software or hardware infringes a third party's copyright or patent.

One thing is clear, whatever form of contract is used, and that is that great care must be taken in drafting the contract. Judges will normally interpret contracts strictly and will use certain principles when it comes to resolving inconsistencies and ambiguities. If a contract is silent on a particular matter, judges will usually imply terms and try to give the contract business efficacy. Balanced, fair and through negotiation is the key to a smooth running contract and all the relevant contractual terms and mechanisms should be considered and agreed before the parties become committed to the contract.

Although there are some common ground and some similarity in other provisions, contracts for hardware and software are governed by different legal rules. Computer hardware, if it is sold, will be subject to Sale of Goods Act whereas an agreement for specially written software will be within the scope of the Supply of Goods and Services Act. This simple distinction is not always easy to apply in practice because hardware equipment often incorporates software and the contractual position of "off-the-shelf" software is far from clear.

Computer Crime

Three areas of criminal activity associated with the use of computers may be identified:

- * Software piracy;
- * Computer fraud;
- * Hacking and damage to programs and data.

Software piracy is of special concern wherein uncensored package software is being used both at private and institutional levels. Also software products developed by local individuals and software companies are not adequately protected by IPR laws which acts as a disincentive to the development of local software industry and foreign participation/investment in this field.

Computer Theft

Computer technology has impacted on criminal law in two ways. It has facilitated the commission of existing crimes such as fraud and theft but it has also given birth to a new range of activities such as hacking and the development and distribution of computer viruses. The criminal law was perceived to be patchy in its application, both to existing and new forms of crime, and this caused considerable concern to the computer industry and financial institutions. Computer misuse may include Fraud, Theft, Hacking and Viruses.

Computer Theft covers theft of data or software, using illicit copies of software or using a computer for unauthorized work. The loss here is low because, for example, if an employee makes an unauthorised copy of a computer program for use at home, the employer has suffered no

direct loss, he still has the original copy.

Computer Fraud is used to describe stealing money or property by means of a computer, that is using a computer to obtain dishonestly property, including money and cheques or credit or services or to evade dishonestly some debt or liability. It might involve dishonestly giving an instruction to a computer to transfer funds into a bank account or using a forged bankcard to obtain money from a cash dispenser (automated teller machine).

Computer Hacking is the accessing of a computer system without the expression or implied permission of the owner of that computer system. A hacker may be motivated by the mere thrill of being able to outwit the security systems contained in a computer. There is danger, however, that such innocent hackers can cause damage to computer systems inadvertently and they may pave the way for other, more malicious persons.

Computer Virus is a self-replicating program which spreads throughout a computer system, attaching copies of itself to ordinary programs. Some viruses are relatively harmless but others are more pernicious and may completely corrupt a hard disk. A person is guilty of blackmail who inserted a destructive process into a computer system and demanded money or undue favour in return for details of how to disable it. If the owner of the computer of the computer system has already discovered and removed it when the demand is made, it makes no difference, the offence has still been committed.

Copyright Protection

As noted, intellectual property is protected on a national basis. Thus the specific scope of protection and the requirements for obtaining protection will vary from country to country. There are, however, similarities among national legal arrangements. Moreover, the current worldwide trend is toward harmonizing the national laws. Even though copyright law is governed by national laws, most countries have adopted similar requirements. Under the TRIPS agreement, protection of Computer Software and Databases have been also included. Bangladesh is a signatory of the agreement.

Status of Software Copyright Law in Bangladesh

In the existing Copyright Ordinance of Bangladesh, 1962 (amended up to the 12th June, 1978), copyright covers only, "dramatic and musical works, cinematographic works and records". This should be amended to include, "Computer software, programs, files, databases etc.". Also in the existing copyright ordinance of Bangladesh, neither the detailed description of IPRs is included nor are mentioned the protective measures for these. For this, the software development in home and export abroad are really suffering from local and foreign incentives. There are two main reasons, why intellectual property protection is vital to the growth of domestic and export oriented software business in Bangladesh:

- * If local software enterprises believe that their software can be pirated with impunity then there will be little motivation to apply money and manpower to the development, marketing and support of software products.
- * If international companies believe the package software products or custom software from a particular country are likely to contain pirated code because of a country's reputation for lack of enforcement of IPR then they will be less likely to buy or license that software due to increased legal risks.

Conclusion

It has been stated that a wide variety of criminal offences can be committed using or involving computer technology. In absence of any type of Copyright/Criminal Law or Computer Misuse Act, it is not possible at the present time to prosecute the offenders and thus protect the interest of computer users and suppliers/manufacturers for healthy and rapid growth of Information Technology in our country.

High Copyright Law protection could confer dynamic benefits by inducing competition in software and IT. This would encourage the industrial nations to go for more international transfer of technology agreements. Efficient dealing of the Agreement, particularly providing high protection may assist in attracting the foreign investment and foreign technology, because a strong Copyright Law is required to a serious reform program in the IT sector.

The writer is the Executive Director of Bangladesh Computer Council

In Search of "Good Health at Low Cost"

by Dr M Zakir Husain

Like other goods and services in a free market, health care too is driven by profit motive. Profit is maximised by pushing consumption to a high level reflected often by unnecessary procedures, medicines, and length of stay or frequency of visits. When providers are few and demand is high the market assumes certain features of monopoly.

IN the market economy, health is virtually a commodity. Like many other commodities, health care has a price. In a free market, those who can afford may buy health care. The buyer of health care is at a disadvantage because the buyer has little control over the need or the type of care necessary or even the price. The demand is often unpredictable. Health care market is not in effect a free or strictly speaking a highly competitive market.

Inevitably due to buyer's uneducated demand or the provider's decision the type and mix of care is not always determined by actual need of the buyer. Like other goods and services in a free market, health care too is driven by profit motive. Profit is maximised by pushing consumption to a high level reflected often by unnecessary procedures, medicines, and length of stay or frequency of visits. When providers are few and demand is high the market assumes certain features of monopoly.

There is currently a popular trend of seeking specialist care even for very routine and minor illness which do not require specialist. As a result many specialists are doing general practice without referral from general practitioners. This high social demand for specialist doctors is drawing many graduates to those specialty training while training of good competent general/family doctors is getting less attractive. Apart from pushing costs up, it also leads to inefficient and inappropriate of specialist skills.

Expensive health care is not necessarily better health care. A free market presumably gives effective choice to the consumer. But in health care market, the consumer usually does not have a free choice of the type of care needed nor effective control over cost. Therefore, there is a good case for "good health at low cost". A good case both at individual and population level.

Good Health at Low Cost?

Good health at low cost is desirable but is it feasible? Conventional wisdom would have us think that good care is expensive and low cost care is of poor quality. This perception prevails in minds in the absence of public information and education on matters of health and disease. Let us take the case of the health services facilities in the country. In a poor country like Bangladesh, the public sector health facilities are expected to provide a variety of general and specialised health care. What are the ways of securing reasonably good service at low cost in these facilities?

First, the drugs and medicines. It has been established conclusively that for the majority of illnesses, essential drugs of generic (original name) will do just as well as the more expensive proprietary (brand name) drugs, and do well at a lower cost.

Most illnesses are treated quite well by drugs from within a restricted list such as "essential drugs list". WHO has established sound guidelines for selecting essential drugs for primary health care which has been adopted flexibly to meet the needs in many countries successfully. This has had two major effects. It has brought down the cost of drugs and the drug bill without lowering the efficacy. It has encouraged rational use of drugs cutting down the tendency to over-prescribe and use multiple drugs without scientific or clinical justification.

In a poor country like Bangladesh, the public sector health facilities are expected to provide a variety of general and specialised health care. What are the ways of securing reasonably good service at low cost in these facilities?

Incidentally, much of the resistance of germs to drugs that is the cause of so much alarm has arisen due to years of indiscriminate and inappropriate use of multiple drugs when a single drug could have treated the condition well enough or should have been given the full course in proper dose.

Drugs and medicines account for a major cost and is also a major factor in maintaining client attendance at health facilities. Thus, savings due to essential drugs and their rational use are indeed a significant contribution. All public facilities should adhere to the list of essential drugs and rational drug prescription by the medical practitioners. The total saving of public money and personal/family expenditure will be significant. Doctors should also inform and educate their clients on rational and effective drug use since in Bangladesh, the majority of drugs including antibiotic drugs are freely sold over-the-counter in medicine shops. A prescription is not required.

Second, many studies conducted in organised public or private health care systems in several countries show that primary care doctors — family doctors and general practitioners — can provide good patient

care for most conditions of ill health and that specialist care is really needed for a relatively small number of conditions. Therefore, the induction of well trained general doctors rather than specialists will reduce the staff costs and produce good health outcomes for many at lower cost and perhaps with more patient satisfaction — a neglected indicator of quality of care. It will also conserve the time of the specialists whose skills can more appropriately be applied to the few who need them most.

In health care — private or public — the personnel cost (doctors, nurses, technicians) is the main cost factor. Any saving here by full and appropriate utilisation of time and skills of personnel will produce higher savings at no loss of quality and population coverage.

Third, health is not the result of drugs or medical care alone. The individual and the family have the right and duty to take all possible actions for disease prevention and protection of health. This is good health at low cost by way of voluntary action for health promotion. But people require valid information and knowledge of means to adopt such styles of life and living which are conducive to health. There is a good deal of self care that can give so much benefit to personal health.

Apart from simple first aid and treatment of injuries, other measures such as food and diet, exercise, rest and recreation, personal hygiene, immunisation, sanitation in the house and the neighbourhood etc., do make a lot of difference and at such a low cost. Behavioural alternatives to medical interventions are becoming popular for disease prevention and promotion of positive health rather than getting ill and seeking treatment thereafter.

In modern societies, the individual, the family, and the community are assuming a greater role in deciding what kind of health care they need and taking active part in the provision and management of many elements of health care.

Fourth, the public money which, by definition, remains limited need to be invested cost-

effectively in health actions that bring the greatest health outcome to the largest population. These are essential public health functions that protect all sections of the society and which individuals are not well equipped to carry out. Control of air, water, soil pollution, acute epidemics, food contamination, accident prevention, health information and education, special public health programmes are some of these. Health care of the underprivileged, the vulnerable and special population groups is also a prime public sector charge. Securing health security and international health cooperation are State functions that produce so much health and economic benefits at relatively modest cost.

Concluding Thoughts

Good health at low cost is not only feasible but it is an imperative. It is particularly important as many countries are debt-ridden and under structural adjustment regime. Economic turmoil worsens health inequality.

Private market in health care can have negative impact on equity; the poor and the vulnerable have reduced access to much-needed care.

To make things worse, new health threats are emerging and old threats are re-emerging, costs are rising and resources are declining.

At personal and State level, there is need to find ways and means of getting a higher health return at low cost. There are certain clear ways to bring about reduction of costs of health care without fall in the quality or population coverage.

There are other means of good health at low cost the search for which has to continue.

Responsibility of personal and family health has to be shared; people can and should take charge of their own health with better information, knowledge, and practice.

Good health is not the business of health care establishment alone; the health care market needs some regulatory measures; public and private sector in health need to work together in a responsible partnership.

Health system reforms to cut unnecessary cost and to make most efficient use of scarce resources must continue. Robust health policy, with radical changes where needed, must be implemented.

The author is a health consultant.