

MEC-108
Economics of Social
Sector and Environment**Block****6****INSTITUTIONS AND POLICIES**

UNIT 16**Education Sector****5**

UNIT 17**Health Sector****21**

UNIT 18**Environmental Sector I****46**

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BLOCK INTRODUCTION

The last block of this course (Block 6) is devoted to ‘Institutions and Policies’. The various theoretical aspects discussed in the five blocks has equipped you with the required insight to understand and appreciate how optimality levels (be it in the education or the health or the environmental sectors) can be attained by paying priority to issues of ‘social optimum’ over ‘private optimum’. The practical aspects of achieving such a social optimum can be met only by paying attention to the requirement of developing suitable institutions by necessary policy backing.

Unit 16 deals with the requirement for education sector. Recapitulating why situations of ‘market failure’ occur most of the times, and in its presence how the conditions required for achievement of social optimum are naturally eroded, the unit explains the ‘need for and the functions of’ a ‘regulatory authority’. The concept of ‘quasi markets’ and the conditions necessary for its success is explained. The presence of ‘demographic dividend’ in the Indian context and how without a critical focus required for the concerns of ‘quality education’ the said dividend can become a major social issue is then indicated. The importance of how ‘accreditation and ranking’ of various educational institutions with an emphasis on ‘skill development’ in the various educational programmes can help in this regard is highlighted towards the conclusion of the unit.

Unit 17 deals with the issues of healthcare sector. Beginning with a distinction of how ‘healthcare market’ differs from that of ‘conventional markets’, the unit explains Arrow’s perspective of healthcare market followed by the more recent Sen’s perspective on the role of health in enhancing the ‘capability’ of individuals. The role of ‘health insurance’ is then explained with the help of two models – one in which ‘free riders’ are assumed to be absent and the other in which their presence is also accounted for. Pointing out the need for regulating the private health insurance sector, particularly in the face of moral hazard issues crucially involved, the strategies to regulate the insurance sector and the importance of addressing the issue of ‘bureaucracy and failure’ are finally explained.

The importance of ‘institutions and policies’ for tackling the larger challenges of the environment sector is explained over two units (units 18 and 19). Unit 18 explains the concept of ‘externality’ in environment and then proceeds to highlight the importance of adopting the Pigouvian solution by instituting a disincentive to the polluter. The unit then recapitulates the details of Coase Theorem (read by you in Unit 2 in detail) in view of its relevance in instituting the required policy measures to tackle the problem of environmental pollution. The options of ‘pollution abatement’ and in this light how the ‘market based instruments’ have scored over in recent times in their application are explained. The role of informal regulations and NGOs is also covered in this unit. In conclusion, Unit 19 deals with the specifics of important environmental control laws and legislations instituted in India.



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UNIT 16 EDUCATION SECTOR

Structure

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16.1 Introduction

16.2 Market Failure and the Role of Policy

16.2.1 Goals of Public Policy

16.2.2 Instruments

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16.0 OBJECTIVES

After reading this unit, you will be able to:

- explain the concepts of 'market' and 'market failure' in education services;
- distinguish the market for education vis-à-vis the conventional markets;
- describe the concept of quasi-markets in the provisioning of public services;
- indicate the need for regulation in the education sector;
- state the concept of demographic dividend and indicate how its benefits can be reaped;
- define quality of education and its need;
- explain the role of skill development; and
- discuss the framework underlying the vocational and technical education in India.

16.1 INTRODUCTION

The discussion in Units 4 and 5 highlighted several important characteristics of education as a consumption good (or service) and as an investment. Because of these characteristics, the market in education sector differs from the conventional markets. Below, we recapitulate these and also discuss their consequences for the market for education.

1. **Externalities:** Education being a mixed or ‘quasi-public’ good has features of both the public as well as private goods. It is not a pure public good since the marginal cost of educating an additional child is not zero and there is no difficulty in excluding someone from using the service if one does not pay. However, there are significant positive externalities associated with education. This means the benefits of education are not just confined to the buyer but extend to the society. Educated workforce plays a key role in the economic growth of a nation by *inter alia* facilitating adoption of new technology and increasing productivity. The educated electorate is vital to the functioning of a democracy. Thus, the externalities from education cannot be ignored. This is not the case with most other goods (especially private goods) where the buyer pays the price and enjoys the entire utility associated with its consumption. When we consider the three levels of education (primary, secondary and tertiary/higher), we can see the gaps between private benefits and social benefits of education, which are due to the differential degrees of externalities associated with the three levels of education. If parents ignore the externalities associated with education while deciding expenditure on their children’s education, the demand and the spending on education will be far less than the socially optimum level.
2. **Principle-Agent Problem:** The principal-agent problem occurs when one party (agent) makes decision on behalf of the other (principal). In the childhood, children often do not make the decision for their schooling. The parents decide whether to and how much to invest in education. Since the benefits of education are not immediate, the level of spending will depend *inter alia* on the degree of parental altruism. If the parents place a low value on their children’s returns to education they may under-invest in the education of their children.
3. **Information Asymmetries:** Information asymmetry refers to a situation when one side (of the market players) has access to more or better information than the other. Information asymmetries are present both in the demand for and supply side of the education sector. Credit market constraints are one source of imperfection in the market for education since the money lending institution may not be able to observe the quality of the student who wants to borrow. If households face constraints in borrowing (despite the low rate of interest on education loans), they may under-invest in the education of the children. Similarly, students or parents may not be easily able to gauge the quality of educational institutes as the latter have more information about the quality. Similarly, employers encounter information asymmetries while assessing and recruiting persons for jobs (especially teachers in the education sector).
4. **Lack of Competition:** Education, especially a quality higher education, is almost like a monopoly because of supply side constraints and economies of scale. Market power may be concentrated in the hands of a few players who can behave like a cartel. With regard to the latter, consider the establishment of scientific laboratories, which entail a huge initial cost and may not be viable on a small scale. A monopolist would like to maximize his profit. Generally, the optimal level of production in

monopoly is lower than that in perfect competition. Hence, in the presence of monopoly, the supply of education will be less than the socially optimum level.

5. **Long Gestation Period:** Benefits of investment in education often accrue after a long delay. In such situations, market signals may be slow to change and perverse market effects (such as ‘cobwebs’) may be generated due to the lag effect. Also, if the decision to invest in education depends on its expected future benefits, the long gestation period makes it difficult to envisage a future macroeconomic scenario creating uncertainty about the benefits.

Thus, the above characteristics lead to several imperfections in the market for education requiring policy interventions to tackle them.

16.2 MARKET FAILURE AND THE ROLE OF POLICY

Because of the features of education mentioned in section 16.1 above, the market in education sector may not lead to efficient outcomes. This phenomenon is known as ‘market failure’. In other words, the utility maximizing behaviour of agents (viz. households) and the profit maximizing behaviour of firms (viz. schools) may not always result in efficient outcomes. A market outcome is said to be efficient if it is ‘Pareto optimal’ i.e. no one could be made better off without making someone else worse off. Since market failure in education is largely due to its positive externalities (which lead to sub-optimal production and consumption of education services) if left to the market forces, a large number of children may be excluded from its consumption. Even if the market failure was less severe as in the case of professional job-oriented education (where the gap between the private and social returns from education is narrower), market equilibrium would lead to exclusion of those who are not able to pay for such education. This might be called ‘ethical failure’ as it implies undesirable consequences for distributive justice.

16.2.1 Goals of Public Policy

How do we avoid the challenges imposed by market failure? The answer is through government policies and institutions. However, before discussing the role of state and its policy, we can ask: given the possibility of market failure in education sector, why do we need to invoke the markets? In other words, why can’t we leave the provisioning of education exclusively to the state? As a matter of fact, as discussed in Unit 5, public expenditure in education is considered by some as wasteful leading to inefficiency. Also, the supporters of market consider the government subsidies regressive in nature with some others believing that state funding would make educational institutions dependent on the state restricting their institutional autonomy.

One obvious reason why the state needs to play any role in education sector is purely economic. Because there are positive externalities with education, private investment in education has to be supplemented with public investment to make total investment commensurate with the sum of private and social benefits. The second reason for the state’s intervention in the education sector is equity or distributive justice.

At this point, the confusion surrounding the issue of merit and efficiency has to be cleared. One might argue on efficiency ground that the scarce resources of the state should be allocated to educate those who are most meritorious. While ideally merit is supposed to be distributed randomly across the population, irrespective of economic or social classes, the way it is commonly characterised has a strong correlation with the

amount of investment one is able to make on ‘merit-enhancing’ activities. Thus, a merit-based public policy not only excludes the disadvantaged groups, it also perpetuates inequity beyond the present generation. While there may thus appear to be a trade-off between efficiency and equity, there is no reason why economic and social policies should not keep pluralistic goals that would include both. The Twelfth Five Year Plan of India aptly observes that: “education is an important tool for socioeconomic mobility and a key instrument for building an equitable and just society”.

16.2.2 Instruments

The state’s intervention in the education sector usually takes certain combination of the following instruments: (i) Direct provisioning, (ii) Financing but not direct provisioning, and (iii) Regulation. Direct provisioning by the state is still the dominant mode in the education sector in India in spite of a fast growth in the private market in education at all three levels. Ideally, the state’s financing role and the provisioning role can be unbundled, whereby the service is provided by private providers but the consumers (or parents) do not have to pay the market price as the state finances the service either fully or partially. The school voucher system is an example of this. But the applicability of this idea is limited in the Indian context mainly because of the limited suppliers of quality education in the private sector in rural areas. Regulation means that the government imposes restrictions to control and thereby influence an individual’s and an organization’s behaviour in terms of their freedom to decide and exercise their rights and liberties. Regulation is one way of correcting the market failure as well as the ethical failure.

16.2.3 Types of Regulation

Regulation can be classified into three types: (i) command and control, (ii) self-regulation and (iii) market regulation.

- Command and control is a way by which the State enforces rules and regulations. A demerit of this type of regulation is that it hinders framing of pro-market policies.
- Self-regulation implies ‘professionalization of workplace where specialized knowledge of products and commodities require expert interventions’. This mode is also criticized for being self-serving and inefficient. Besides, it can also suffer from lack of transparency and vested interests of the leadership.
- Market regulation involves encouraging competition and informed decision-making by consumers. Creation of quasi-markets (discussed in section 16.3) is one instrument of market regulation.

16.2.4 Functions of a Regulatory Authority

The basic purpose of regulation is to avoid adverse consequences of market failure to ensure the smooth functioning of market. Regulatory authorities are supposed to help achieve this objective by curbing and restraining the competitive elements on the one hand and encourage pro-market competitive policies on the other. Since there is a possibility of conflict between efficiency and social goals, regulation involves walking a tightrope. Regulators also play a vital role in keeping a check on the quality of education. This is achieved by governance mechanisms like ensuring the existence and maintenance of specified infrastructure facilities, requiring to obtain accreditation from bodies earmarked for the purpose, etc. They can also institute a grading system whereby institutions on their own work towards acquiring a higher grade by self compliance of standards stipulated.

16.3 QUASI-MARKETS FOR EDUCATION

The term quasi-market refers to a situation where the delivery of public services (such as education and health) is no longer confined to the state with independent private players also allowed to participate in the market. Bartlett and Le Grand define quasi-markets as institutional arrangements designed to extend the principle of markets and competition to the provision of the services while safeguarding free and universal access which is fundamental to the concept of the welfare state. The term quasi markets owes its origin to developments in the 1980s in the UK where the government implemented market oriented reforms by introducing the process of competitive bidding in the public sector. Competitive bidding is supposed to lead to reduction in cost and increase in productivity. It was believed that the quasi-markets will enable more efficient production of services without putting social welfare in jeopardy. Competition is central to quasi-markets since one of the objectives behind promoting quasi-markets is to raise competition between the different service providers.

16.3.1 Quasi-Markets and the Conventional Markets

Quasi-markets bear a resemblance to the conventional markets in terms of its basic characteristic of competitive market structure i.e. there is a lack of government monopoly in the service provision. In fact, the quasi markets have been viewed as an attempt to dismantle the bureaucratic structure of welfare provisioning. Quasi-markets are 'quasi' since both the supply and demand sides differ from the conventional markets in terms of the following:

- Quasi-markets are allowed to be established by the government. The latter controls the markets by promoting competition through well defined legal or legislative provisions.
- Services produced in quasi-markets usually pertain to social welfare.
- The government or the public sector (and not the consumer) is usually the subscriber, regulator and purchaser of the service.
- The user does not normally pay for service at the point of consumption i.e. money flows between the purchaser and the provider.

Quasi-markets thus provide a safeguard against the possibilities of market failure which in case of conventional markets can occur due to the self-interest of agents involved (e.g. politicians, bureaucrats) as they both can ignore the interest of the consumers.

16.3.2 Conditions for Success of Quasi-Markets

Julian Le Grand and Robert Bartlett, in their book titled Quasi Markets and Social Policy, have specified five conditions that are critical for the success of quasi-markets. These are:

- Competitive market structure
- Adequate information to the users so that they can make an informed choice
- Low transactions cost and uncertainty
- Motivation (by financial consideration) to the service providers
- Absence of selection/avoidance of cream skinning (concern for equality)

16.3.3 Quasi-Market Failure: Consumer and Producer Sovereignty

How does one evaluate whether quasi-markets have been successful? On the basis of the conditions specified for their success above, if any of the pre-conditions are not met, the quasi-markets may be considered to have failed in the sense that an 'ideal market outcome' may not be attained. Sovereignty (i.e. autonomy or freedom) of consumers and producers are such ideal market outcomes. In the traditional well-functioning markets, both consumers (students) and producers (institutions) enjoy sovereignty as follows:

- **Consumer Sovereignty:** (i) freedom to decide service provider, (ii) freedom to decide service/product, and (iii) availability of information on prices and quality.
- **Producer Sovereignty:** (i) freedom of entry into the market, (ii) freedom to specify service/product, and (iii) determination of prices.

It is not difficult to see that consumer sovereignty does not always arise. For instance, in case of vouchers for education, the consumers may lack sufficient information about the service. So also the case of children or minors where they are too young to decide on their good.

Check Your Progress 1 [answer the questions in about 100 words in the space given]

- 1) Why is it important not to neglect the 'externalities' of education to the society? What happens if private investment to education does not come forth in an economy?

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- 2) What is meant by the principle-agent problem in the matter of investing in school education?

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- 3) In the case of monopoly, why is the supply of education less than the social optimum?

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- 4) How can you describe the phenomenon of market failure in education? What is its immediate consequence?

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5) Do you consider 'regulation' as important in education? Why?

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6) Into which three categories can regulation be classified? Which one of the three types of regulation do you consider as ideal? Why?

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7) What is meant by Quasi-markets? How has Bartlett and Le Grand defined this?

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8) State any three distinctive features of quasi-markets from that of conventional markets.

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9) How do quasi-markets provide a safeguard from market failure?

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10) What are the conditions necessary for the success of quasi-markets?

16.4 DEMOGRAPHIC DIVIDEND

The term demographic dividend refers to the economic opportunities offered by a large young working age population. A large population in the younger age-groups is beneficial for an economy because of at least three reasons. One, it is the population in younger age-groups which primarily forms the productive workforce of a country. Thus, there is potential for higher economic growth in a country with substantial young population. Second, a large young population means a sizable market for consumption of modern goods and services. A by-product of both these two benefits of demographic dividend is, therefore, enhancement in a country's ability to attract foreign investors. The third reason why an economy benefits by having a higher share of the population in the younger age-groups is lower fiscal burden on the government. Since the dependency ratio (i.e. the ratio of elderly to the working age population) will be relatively low in such an economy, the expenditure on social security and other types of care for elderly is lower. This effect is, however, true for countries where social security system is operational than is the case for economies like India.

16.4.1 Prerequisite for Realising the Benefits of Demographic Dividend

The fruits of demographic dividend may not, however, be realised unless the population is educated and skilled. That is, unskilled workforce may hamper economic growth and the economy may remain trapped in low-level equilibrium despite possessing a sizable workforce. Similarly, a healthy workforce is equally important to harness the potential offered by demographic dividend. Several studies have established a positive correlation between better health outcomes and the economic prosperity of nations. Thus, while the availability of a large population in working age-group is a plus for India and its economy, the relatively poor attainments in education and health are a hindrance to the realization of demographic dividend. In addition to the poor levels, inequality in education and health is quite high in the country with several studies on human development demonstrating a substantial loss in human development due to these inequalities. It is therefore necessary to improve the educational and health attainments of the population. In other words, to get the benefit of the 'dividend' present in the current demographic structure of the country (since it will not last for ever and is expected to prevail up to 2045), we have to focus on our institutional development and policies aimed at reducing the inequalities in education and health services available to the population. In so far as this concerns the education sector (to which the present unit is concerned), we need to focus on the quality of education and skill development.

16.5 QUALITY OF EDUCATION

In determining the labour market outcomes, both the quantity and the quality of education matter. The quantity of educational services is measured using indicators like literacy rate and its attainment at different levels of schooling. Because quantity is more easily amenable to measure, it has received more attention in the empirical analyses of economics of education. For assessing the quality of education, indicators like pupil-teacher ratio, share of out-of-school children in different population sub-groups, repetition and dropout rates, availability of infrastructure, share of wages and earnings, performance of students in cognitive skills in subjects like mathematics and science, etc. are used as indirect indicators to gauge the quality of education. Focusing only on the quantity may give us an incomplete picture about the performance of the education sector. For instance, while enrolment rates have grown in the developing countries, the concerns regarding quality have remained. Recognising its importance, in the 1970s and 1980s, various

international agencies such as the World Bank supported several quality improvement programmes in the developing countries. It is often pointed out that a system of evaluation based on examinations (such as what prevails in Indian educational system) does not encourage development of analytical skills or creativity in students but focuses more on rote-learning. This view is supported by the results of surveys on education [like the *Annual Status of Education Reports (ASER)* for India] which have all revealed that children as well as teachers are unable to solve even simple arithmetic problems. Problems of quality is more prominent in, but not limited to, the rural areas and the government schools. While physical infrastructure is lacking in the schools located in rural areas, teacher absenteeism too is rampant. In addition, in urban areas the cut-throat competition among private educational institutions, and in particular the mushrooming of private coaching institutes, have distorted the attention meriting to be given for the civic and social aspects of 'quality of education' from a much broader perspective. Quality of education in this broader perspective, as defined by UNICEF (2000), includes the following interdependent characteristics:

- **Pupils**: Pupils must be physically and psychosocially healthy and well-nourished. Pupils need to have the support of their families and communities to facilitate their regular attendance in school.
- **Learning Environment**: The learning environment comprises three components viz. physical, psychosocial and service delivery. Physical environment refers to building, wash rooms, drinking water, electricity supply, library, playground, classrooms, furniture and other infrastructure. Psychosocial elements include safe and gender-sensitive environment, teachers' behaviour, and school discipline policies. Service delivery means provision of first-aid and healthcare, guidance and counselling, and facilities for extra-curricular activities.
- **Content**: Content refers to the curriculum and teaching material which should be balanced in terms of imparting numeracy and life skills. It should be student-centric and non-discriminatory.
- **Pedagogy**: Pedagogy refers to the processes which the teachers follow to impart knowledge. Quality teaching requires competent and trained teachers, student-centric and participatory learning, good working conditions for teachers, and feedback and assessment mechanisms.

A system established to take care of the above characteristics would contribute to quality outcomes. The outlining of above broader approach suggests that quality is not a static concept and the definition must therefore be open to changing contexts and educational challenges. There are two main approaches to understanding the quality of education. The first is based on the human capital theory and the other on human rights. The human capital approach stresses on the contribution of education in terms of economic growth, poverty reduction, women empowerment, and welfare. It thus mainly provides an economic rationale to focus on quality education. Studies based on this approach often use some indicator of student achievement to measure the quality of education. The rights based approach, on the other hand, sees human rights as 'fundamental, indivisible and integral to the development process'. This approach to quality of education therefore has its thrust on teaching approaches that are learner-centric with democratic school structures established within the human rights approach.

Criticizing the two approaches, Tikly and Barrett (2011) put forward an alternative framework based on the social justice perspective. This framework takes into account three dimensions of quality of education viz. inclusion, relevance and democratic. The

inclusion dimension is concerned with the ‘access’ that different segments of population can have to the kind of education which offers the opportunities for achieving the desired outcomes. The relevance dimension is concerned with the extent to which learning outcomes are meaningful for the learners and further by the yardstick of ‘whether such education is consistent with national development priorities in a changing global context’. The democratic dimension emphasizes on the role of ‘participatory social justice in relation to educational quality’.

16.5.1 Accreditation and Ranking

Even after the conceptual issue of quality of education is resolved, its measurement continues to pose its own challenges. One of the reasons for this is the issue of ‘information asymmetry’ which is a major barrier to optimal choice. The question, therefore, is how to overcome the limitations posed by it? A partial answer, as discussed in Section 16.2, is regulation. Further, to some extent, lack of knowledge about quality differences across different providers can be overcome through certification and accreditation. Accreditation can be particularly useful for higher educational sector which in many countries is made a pre-requisite for ranking the institutions. In India, the National Assessment and Accreditation Council (NAAC) was established in 1994 as an autonomous body, under the aegis of the University Grant Commission, to assess and accredit institutions of higher education in the country. Accreditation has at least two benefits. First, it assures the consumers that a pre-determined set of quality standards is conformed. Second, it encourages institutions to make efforts for improving their ranking. However, ranking has its own limitations. One, ranking is sensible and meaningful only across a comparable (homogeneous) set of institutions. Two, if we consider university as a multi-product firm, ranking may ignore some of these products as it would be based on certain common attributes. There are also other methodological issues like ‘aggregation of indicators’ which plague ranking.

16.6 SKILL DEVELOPMENT

Towards skill development of a country’s labour force, one of the first goals for any country is to achieve universalisation of school level education. Once a country makes sufficient progress on this front, it then needs to focus on skills. The word ‘skills’ is a broad term encompassing cognitive, non-cognitive and technical skills. Cognitive skills are the basic mental abilities used to think, study, reason, and learn. Non-cognitive skills refer to personality traits and behaviours. These include motivation, integrity, personal communication, etc. which are all together known as ‘soft’ skills. Technical skills, in particular, is often related to a specific field of employment. Skills are acquired through various means. Formal education is one way of acquiring skills. Informal education, specialized training, and learning by experience are other ways. The latter are mostly relevant for acquisition of non-cognitive and technical skills.

At the individual level, skills are important determinants of labour market outcomes as it determines his/her employability and also productivity. Eric Hanushek (and others: 2015), in a recent study based on a survey of 22 countries, estimated that one standard deviation increase in numeracy skills is associated with 18 percent increase in wages, though there is considerable heterogeneity across the countries. There is a similar evidence on non-cognitive skills by Heckman and others who find that non-cognitive skills matter not just for wages but also the early schooling decisions. At the national level, skill development helps an economy to attain higher levels of economic growth and to respond to the changing global scenario. Examining why the expansion of school attainment has not guaranteed better economic conditions, Hanushek and Woessmann

(2008) have argued that the skills of the population – rather than mere school attainment – is a stronger determinant of individual earnings than the factors like distribution of income and economic growth. In order to improve the well-being of their citizens, all countries – and developing countries in particular – need to focus on attainment of skill development of its labour force to aid the process of achievement of higher economic growth. One way of doing this is to improve productivity. Given the rapid technological change, improvements in productivity require not just the investments in capital, but also investments made on work force to make them competitive and flexible in order that they can acquire new skills required for the jobs generated as a result of technological change. Labour productivity and flexibility of the workforce enable a country to produce quality goods and services at low cost and adapt easily to the changing technological needs of shifts in the production systems to cater to new markets and products. Thus, in an era of knowledge-based economies, skill development becomes ever more important. The emerging production technologies favour skilled workers over the unskilled ones. This trend has been termed as skill-biased technical change (SBTC). Several economists have argued that SBTC creates a wedge between different sub-groups of workers. Thus, workers equipped with certain skills are likely to be rewarded more than those without skills because of a rise in the former's relative productivity. Such a change might lead to a rise in wage inequality. A typical example of the SBTC is use of the Information Technology based devices in offices which has led to virtual automation of work. Several empirical studies have documented that imparting IT skills significantly improves the employee performance. The IT infrastructure of a firm, IT skills of its employees, and the firm's ability to leverage IT resources serve as firm-specific resources and these resources together create a firm-wide IT capability, which in turn leads to enhanced output.

16.6.1 Initiatives Towards Skill Development in India

In India, skill development has remained on its policy agenda of several ministries of the government. Among these, the Ministry of Human Resource Development and the Ministry of Labour and Employment are the major ones. The government's policy has been responsive to the changing needs of the global scenario. For instance, recognising that 'skill-building is not a static process and individual's skills need to be upgraded continuously for the workforce to remain relevant and employable', the *Twelfth Five Year Plan* (2012-17) incorporated specific provisions for skill development. The *National Skill Development Policy*, released in 2009, also stressed, among other things, the importance of improving India's competitiveness in the global market. Nevertheless, a major shortcoming has been in terms of its timing which has not been optimal.

A major policy push to skill development in the country came in November 2014 when the newly elected government created a dedicated *Ministry of Skill Development and Entrepreneurship*. Several organisations such as Directorate General of Training, National Skill Development Agency, and National Skill Development Corporation were brought under this Ministry. The government also launched *Skill India* initiative on the occasion of World Youth Skills Day on 15 July 2015. As a part of Skill India, the government also released the *National Policy for Skill Development and Entrepreneurship 2015*. Skill development was also the theme of the Delhi Book Fair 2015.

16.6.2 Vocational and Technical Education

Generally speaking, vocational education and training (VET) refers to skill-based programmes that focus on specific trades imparting the practical skills which allow

individuals to engage in a specific occupational activity. In India, the VET programmes are aimed at creating employment opportunities and imparting suitable skills needed for self-employment particularly in the rural and unorganised sectors.

Different terminologies are used to refer to the VET programs in different parts of the world. In Europe and Australia the term vocational education and training (VET) is used to refer to vocational and technical education undertaken in schools and tertiary institutions. Further, a distinction is made in Europe between the initial vocational education and training (IVET) and continuing vocational education and training (CVET). The former is aimed at 'young learners' whereas the latter is aimed at upgrading the skills and competencies of adults. In the United States, a term 'career and technical education' (CTE) is used. The UNESCO's centre for technical and vocational education and training, UNESCO-UNEVOC, uses the term technical and vocational education and training (TVET). This usage is more popular in Asia. However, in the Indian context, it is preferable not to split the term vocational and technical education (into vocational education and technical education) as the separation could lead to confusion. This is because technical education is sometimes interpreted as a different domain altogether, though quite often the two terms 'technical education' and 'vocational education' are also used synonymously. When interpreted differently, the former mostly refers to post-secondary courses of study and practical training aimed at preparation of technicians to work as supervisory staff whereas the latter refers to lower level education and training for skilled or semi-skilled workers in various trades.

The Kothari Commission (1966) had observed that nearly half of the students completing the 10th standard may be diverted to the vocational stream. This observation was made with a view to not only reducing the pressure on the higher education sector but also to help prepare large number of students (who may for various reasons either not be able or interested to go for higher education) enter the 'world of work' (employment). Thereafter, the vocational education scheme at the senior secondary (10+2) level came into existence in the 1970s. In the mid-1980s, the Working Group on Vocationalisation of Education (1985) reviewed the vocational education program. This led to the scheme of Vocationalisation of Secondary Education launched in 1988. The main objective of the scheme was to improve the employment opportunities available for individuals by enhancing the individual employability level thereby reducing the demand and supply mismatch of skilled manpower. Since the inception of the scheme, the intake capacity in the more than 10,000 schools/institutions has reached nearly 10 lakh (cumulative) students. The scheme, however, had only a limited success as the subsequent evaluation exercises undertaken by different agencies [such as the Operation Research Group (1996) and the National Council of Educational Research and Training (1998)] pointed out. These studies revealed several problems in the operation of the scheme such as: (i) low priority accorded to vocational education; (ii) lack of coordination among different government departments; (iii) quality of teachers and training; (iv) lack of financial resources; and (v) lack of integration with the various levels of school education. The scheme was once again revised during the Tenth Plan (2002-07) to address some of these issues. In 2011, several more changes were made with the scheme renamed as Vocationalisation of Secondary and Higher Secondary Education. Some of these changes made are:

- Introduction of vocational education at the secondary stage (class IX onwards);
- Changes in the pattern of sharing funds between the centre and the states;
- Identification and implementation of demand-driven modular vocational courses in collaboration with industry/employers;

- Engagement with the Industry/Sector Skill Councils for training, assessment and certification; and
- Implementation of the National Vocational Education Qualification Framework (NVEQF).

Check Your Progress 2 [answer the questions in about 100 words in the space given]

1) What is meant by 'demographic dividend'?

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2) State the three reasons why demographic dividend is beneficial for an economy.

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3) What indicators have commonly been considered for measuring the quantitative and qualitative sides of education?

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4) What are the four inter-dependent characteristics of quality of education provided by the UNICEF? Why is quality of education considered a dynamic concept?

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5) What are the two main theoretical approaches developed to understand the concept of 'quality' in education? What are its major thrust and in what terms do they basically differ?

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- 6) What alternative approach to assessment of quality education is advanced by Tikly and Barrett? Mainly, which three dimensions does it cover?

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- 7) How is 'accreditation' useful? In this context, what are the limitations of 'ranking' of institutions?

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- 8) What are the three components into which 'skills' are broadly classified? What is the reference that is usually made to indicate 'soft skills'?

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- 9) What is SBTC? Is it employment enhancing or productivity enhancing?

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- 10) What are the major factors identified by different agencies as contributing to the limited success of 'Vocationalisation of Secondary Education' launched in 1988?

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- 11) State some of the major changes made in the Vocationalisation Policy of Education in India in 2011?

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16.7 LET US SUM UP

Education is important to both individuals and countries. The United Nations has termed education as the real wealth of nations. The present unit began with a brief description of the market for education. Since education is a quasi-public good and has significant externalities, its provision is fraught with several problems. Hence, there is a role for government to regulate and balance the efficiency and equity considerations. Quasi-markets emerged first in 1980s in some of the European countries. The Unit has discussed issues of demographic dividend and hindrances to its realisation, quality of education and its measurement, skill development and its importance, and vocational and technical education.

16.8 KEY WORDS

Market failure	: Inability of the market forces to deliver efficient (Pareto optimal) outcomes. In the case of merit goods, such as education, market mechanisms often fail to do so, necessitating government intervention.
Cobwebs	: If there is a time lag between the demand and supply decisions, the prices usually fluctuate in periodic manner. Because of this, oscillating disequilibrium might occur leading to absence of the demand-supply equilibrium. This phenomenon is known as cobweb cycle.
Quasi-markets	: These are institutional arrangements designed to extend the principle of markets and competition to the provision of the services while safeguarding free and universal access fundamental to the concept of the welfare state.
Demographic dividend	: Refers to the potential opportunities offered by having a large young and working age population.

16.9 SUGGESTED REFERENCES FOR FURTHER READING

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6. Lowery, David (1998), 'Consumer Sovereignty and Quasi-Market Failure', *Journal of Public Administration Research and Theory*, April 1998:137-172.

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16.10 ANSWERS/HINTS TO CYP EXERCISES

Check Your Progress 1

- 1) See 16.1 and answer.
- 2) See 16.1 and answer.
- 3) See 16.1 and answer.
- 4) See 16.1 and answer.
- 5) See 16.2.1 and answer.
- 6) See 16.2.2 and answer.
- 7) See 16.3 and answer.
- 8) See 16.3.1 and answer.
- 9) See 16.3.1 and answer.
- 10) See 16.3.2 and answer.

Check Your Progress 2

- 1) See 16.4 and answer.
- 2) See 16.4 and answer.
- 3) See 16.5 and answer.
- 4) See 16.5 and answer.
- 5) See 16.5 and answer.
- 6) See 16.5 and answer.
- 7) See 16.5.1 and answer.
- 8) See 16.6 and answer.
- 9) See 16.6 and answer.
- 10) See 16.6.2 and answer.
- 11) See 16.6.2 and answer.

UNIT 17 POLICIES FOR HEALTH SECTOR

Structure

- 17.0 Objectives
- 17.1 Introduction
- 17.2 Health Care Market and Conventional Market: Distinction
- 17.3 Arrow's Perspective of Healthcare Market
- 17.4 Health as Human Capital
 - 17.4.1 Capabilities and Health: Sen's Perspective
- 17.5 Financing of Health Services
 - 17.5.1 Alternative Sources of Financing Healthcare: Implications for Efficiency and Equity
 - 17.5.2 Healthcare Financing in India
 - 17.5.3 Universal Health Coverage
- 17.6 Health Insurance
 - 17.6.1 The Basic Model (Without Free Riders)
 - 17.6.2 Extended Model (With Free Riders)
 - 17.6.3 Asymmetric Information and Adverse Selection
- 17.7 Moral Hazard in Healthcare Insurance
 - 17.7.1 Supply Induced Demand: A Principal Agent Relation
 - 17.7.2 Tackling Moral Hazard
- 17.8 Regulating Private Health Insurance Sector
 - 17.8.1 Strategies to Regulate
 - 17.8.2 Insurance Regulatory and Development Authority (IRDA) of India
- 17.9 Government Failure
 - 17.9.1 Bureaucracy and Efficiency
- 17.10 Let Us Sum Up
- 17.11 Key Words
- 17.12 Suggested References for Further Reading
- 17.13 Answers/Hints to CYP Exercises

17.0 OBJECTIVES

After going through this unit, you will be able to:

- examine whether healthcare market differs from the conventional market;
- present the perspective of healthcare market provided by Arrow;
- indicate how health is incorporated as Human Capital in Growth Models;
- outline Sen's perspective of capabilities and health;
- evaluate the implications of alternative sources of health financing for Efficiency and Equity;
- explain the methods of healthcare financing in India;

- discuss the concept of ‘universal health coverage’;
- derive the conditions of optimality for buying health insurance in cases of absence/presence of free riders;
- define the concepts of ‘asymmetric information’, ‘adverse selection’ and ‘moral hazard’ in the context of health insurance market;
- illustrate a method of tackling the issue of ‘moral hazard’ in health insurance market;
- relate the issue of ‘government failure’ in the context of ‘instituting regulations for economic efficiency’ in the healthcare insurance sector; and
- describe the mechanism for regulating the private health insurance sector in India.

17.1 INTRODUCTION

Health sector comprises of many players of which the two important ones are the physician (one of the key suppliers of healthcare services) and the patient (consumer of such services). Its other players include agents and institutions connected with the provision of healthcare services like: (i) nurses, para-medicals, hospitals, etc., (ii) pharmaceutical industries, (iii) health insurance companies, etc. The interaction of these players, many of them from the private sector guided by their own interests, lead to different types of market failures, calling for government intervention. This brings to focus the question of issues of financing of health services and regulation of private health and insurance markets. We begin by examining the features of healthcare markets in order to draw a distinction between the healthcare market and the conventional market.

17.2 HEALTHCARE MARKET AND CONVENTIONAL MARKET: DISTINCTION

Initially, the healthcare market was considered similar to a conventional market [whose main characteristics are: (a) There should be numerous producers; (b) consumers are fully informed and knowledgeable about the product; (c) prevailing distribution of income is fair; (d) consumer is sovereign; and (e) no externalities]. In view of this, just as conventional markets had failures arising from a departure of the assumptions of perfectly competitive markets, healthcare markets also was expected to fail. This approach suggested that government intervention in the health sector would be required due to the common economic features like monopolies, economies of scale, externalities, public goods and incomplete markets. While this basic understanding has not changed, more nuanced differences between the two markets have since come into focus with the development of many sub-sectors of health for specialized services like health insurance. This has resulted in a need to relook at some of these features more carefully in relation to healthcare market.

Economies of Scale: Economies of scale refer to reduction in unit cost of production as output increases. Since it may not be possible for private players to operate at a level sufficiently large enough to ensure economies of scale, several national health schemes in various countries [e.g. the National Health Service (England), the National Rural Health Mission – NRHM – (India)] are operated covering large sections of the population or even the whole country by the governments.

Monopoly: A profit maximising monopolist produces to the level at which marginal revenue equals marginal cost. Since the monopolist reduces production below competitive levels, and charges price at a level above the marginal cost of production,

there is a welfare loss compared to the situation in the competitive equilibrium level. Welfare losses would also arise in geographical regions with few hospitals and pharmaceutical products protected by patents. The potential for monopoly power further arise in markets for doctors where regulations in the form of licenses restrict entry into the profession. In all these situations, price controls can theoretically reduce the welfare loss caused by monopoly. However, direct intervention through public provision or price controls could sometimes worsen the situation especially where anti-trust laws are vigorously enforced. By imposing a price ceiling of P_R from the monopolistic price level of P_M the reduction of 'welfare loss' can be minimised by an amount equal to the area of BCFE, the new welfare loss being equal to the area represented by AEF (Figure 17.1).

Public Goods: Two important characteristics of public goods are non-rivalry and non-excludability. Health services provided to one person are not at the same time in general consumed by others as those who do not pay can be excluded from receiving the same. Such healthcare services are therefore private merit goods unless they are universally provided by a national health service. However, certain components of healthcare like information and re-distribution are exceptions. Information can be thought of as an economic good with a large public content as one consumer's obtaining information does not reduce the same being available to another. In other words, although those who do not pay can be excluded from receiving information, the marginal cost of providing information to another individual is often relatively small. Because of this, there is scope for information to be under-produced in private markets warranting government intervention to increase its availability. The government's role may take on two distinct approaches: first in helping disseminate the existing knowledge to the public (either through direct provision or through subsidizing private sector activities) and second, by expanding the stock of knowledge by taking an active role in scientific research (again either by direct provision or through subsidizing private sector research). Likewise, voluntary contributions like donations (helpful in redistribution) has a public goods dimension in helping raise the income of poor persons' standard of consumption including consumption of healthcare. However, since by assuming that one's marginal contribution will have little impact on total donation many individuals might not donate, the government may insist on mandatory donation as a compulsory contribution for a national health cause.

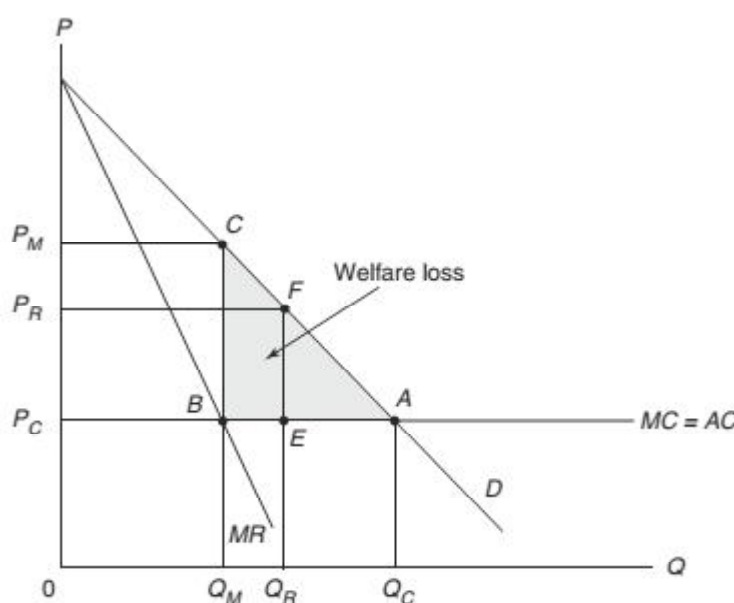


Figure 17.1: Welfare Gain from Price Fixing

Externalities: Externalities refer to spill-over effects of consumption or production. Generally, the benefits (or consequences) of consumption accrue to the consumer. Likewise, the costs and benefits of production normally accrue to the producer. Externalities occur when spill-over results in part of the costs being borne by (or benefits being enjoyed by) other members of society. Besides, to be considered an externality, the effects must be transmitted *outside the price* system. With a negative externality, such as pollution (where a marginal external cost to every consumer is created), a competitive market tends to overproduce the polluting good relative to the socially efficient quantity. Conversely, competitive markets tend to under-supply goods that create beneficial (positive) externalities. Positive externalities can be important in healthcare when a charitably minded person derives satisfaction from knowing that the sick, poor, or the uninsured would consume more healthcare. More tangible externalities occur when others are inoculated against communicable diseases. In view of this, subsidies that lead to improved health are often supported on the ground that the recipients will benefit society by being more productive. However, the gains from an individual's increased productivity being largely private (increased income and hence consumption), the effects of the consumption of healthcare on productivity are not externalities.

Merit Goods: Merit goods are commodities considered good for someone regardless of the person's own preferences. It is based on the argument that individuals do not always know what is in their best interests. For instance, public policy with respect to use of seat belts, non-consumption of alcohol, tobacco, drug-use, etc. reflect the merit goods idea. The crucial importance of health in the modern welfare state has led to the designing and implementation of policies of universal access to healthcare facilities by reducing the burden of healthcare costs through alternative health financing policies.

Incomplete Markets: Government intervention is warranted in cases of incomplete markets where private markets fail to meet an existing demand. Examples of incomplete markets in healthcare could be insurance markets for patients with cancer, HIV/AIDS, etc. as private insurance may be out of reach of many people from marginalized sections suffering from such health problems. Government's role in filling these gaps would arise by providing insurance for such cases. The Rashtriya Swasthya Bima Yojana, covering below poverty line households in India is another example.

In light of the above, we may conclude that healthcare markets have certain characteristics that make it different from conventional markets. In particular, uncertainties and asymmetric information constitutes two unique features of healthcare markets leading to specific types of market failures. This point was seminal made by Kenneth Arrow when he identified some unique characteristics of healthcare market to argue that such characteristics (besides leading to market failures) would lead to situations of 'failure to reach an optimal state in the sense of Pareto' necessitating government intervention.

17.3 ARROW'S PERSPECTIVE OF HEALTHCARE MARKET

Kenneth Arrow (1963) argued that healthcare markets are characterised by extremely high levels of uncertainty and, in particular, patient's uncertainty about the consequences of purchasing medical treatments. For instance, patients' have an inherent uncertainty about the effectiveness of medical treatments i.e. about which treatment can best cure their illness or relieve their pain. The success of treatment depends not only upon the effectiveness of treatment but on idiosyncratic factors unique to the patient. Thus, two patients suffering from the same disease and treated in a similar way may have varying

levels of recovery depending upon random factors like individual immunity, mental strength, etc. Even for the same person, there will be difference between two episodes of the same disease, making each episode unique in itself. This makes it extremely difficult for patient's to learn about and evaluate the quality of medical care services. As Arrow explains: uncertainty about the quality of the product is perhaps more intense in medical markets than in any other. Recovery from disease is as unpredictable as is its incidence. Further, the amount of uncertainty (measured by the utility variable) is certainly much greater for medical care in severe cases than for articles like houses or automobiles even though these are also expenditure incurred infrequently like a costly medical treatment for a major disease.

Secondly, under conditions of uncertainty, accurate 'information' becomes very valuable. However, the 'elusive character' of information limits its marketability on both demand and supply fronts. In particular, there are limits on consumers' abilities to acquire and process information. In conventional markets, tackling uncertainties is learnt by repeated transactions which enable one to identify an optimal course by a process of trial and error. This is not possible in the case of healthcare markets as transactions may not be repeated or even if repeated are repeated at long intervals when the underlying parameters would have changed. Specifically, for cases of severe illness, the limits on acquiring information are set by the inadequate number of trials to learn from and 'the intrinsic difficulty of prediction'.

On the limits of consumers' abilities to process information, Arrow describes consumers as not knowing the value of information being bought from physicians. Patients, in general, are not able to assess issues like whether the diagnostic tests being recommended are necessary, whether all the medicines recommended are relevant for the disease, whether cheaper or better substitutes of the same medicines are available, etc. Even if the patient has the necessary skill and knowledge to evaluate the quality and relevance of treatment in normal times, the disease may impair the functioning and ability to process information. In particular, in case of severe ailments the risk from disability (or even impending death) may aggravate the problem of evaluation. Further, individuals confronted with new illness often have limited time to collect information since the effectiveness of a medical treatment depend upon the minimisation of time between the onset of illness and the start of its treatment. In the absence of ability to evaluate the effectiveness of treatment prescribed, the patient often has no recourse but to place trust on the physician and rely. This implies that the behaviour expected from physicians and other supply side agents is different from that of other instances in conventional markets. While an element of trust is present in all service-oriented products, the ethically understood restrictions on the activities of a physician are much more severe than in the case of others (e.g. a barber). There is thus a 'collective-orientation' which distinguishes medicine and other professions where 'self-interest' on the part of participants is the expected norm. The relative unimportance of the profit motive in healthcare markets is important as it can ensure repeated interactions between parties i.e. with patients preferring to seek treatment from, or refer others to, from a physician who is trusted. In fact, trust may itself act as a placebo and help to increase the efficacy of treatment.

Fourth, Arrow recognized that some market participants will be better informed than others (i.e. there is variability in the extent of information gathered and processed). Like other commodities, information has a cost of production and a cost of transmission, and so it is natural not to freely share it. The quantity of information acquired by each consumer depends upon the individual's expected costs and benefits of acquiring information. Consumers will vary in these costs and benefits due to differences in income

(or opportunity costs of time), analytical abilities and other factors. It is in view of this that it was suggested before that some information could be regarded as public good requiring government intervention and provisioning.

According to Arrow, therefore, the four characteristics of healthcare market are: (i) uncertainty; (ii) criticality of obtaining accurate or reliable information; (iii) trust vis-a-vis limited consumer's 'ability' to process information received; and (iv) variability in information received and processed.

17.4 HEALTH AS HUMAN CAPITAL

One of the important justifications for government's intervention in healthcare markets is the potential of health to enrich the 'human capital' of a country. The significance of health to economic growth was first suggested by Mushkin (1958) in the sense that investment in health is important in enabling the persons to take benefit from other social sector investments like in education. This idea was later extended by Grossman (1972) who held that each individual is both a producer and a consumer of health as health represents a 'stock' which degrades over time unless due 'investment' is made from time to time for its maintenance. Later, the endogenous growth theorists extended the growth model proposed by Solow by including 'human capital' as a specific input variable in determining the economic growth. Such models were tested by including the four input variables viz. capital (in money terms), labour input (in number of hours), average level of education attained by labour (in terms of years of schooling) and health status of labour. Applying the first order conditions, they found that 'improvement in health indicators raised the incentive to invest in education and an increase in health capital lowered the rate of depreciation of health'. Investment in health did not, however, figure in the first generation endogenous growth models (which focused only on education) which was partly due to the difficulty in disentangling the effects of schooling and health on productivity. It was, however, gradually realized that the impact of health is distinct from that of education in the sense that health runs through the entire course of life and not merely linked to the working years. The endogenous growth models were thus an improvement over the neo-classical models (of Solow and Swan which argued that health affects the national income only in the long run) in establishing that health has a more lasting impact on the growth rate of GDP. In subsequent improvement of growth models (referred to as the 'Schumpeterian' growth theory), six different channels (viz. productive efficiency, life expectancy, learning capacity, creativity, coping skills and inequality) through which improvement in the earning ability of a country's workforce is achieved were distinctly accorded a place. In particular, increase in the life expectancy was found to reduce the skill-adjusted death rate thereby raising the skill per effective worker and hence the steady state stock of human capital contributing to the country's overall productivity levels. The other influences of increased life/earning expectancy on growth were in terms of increase in savings and retention in education.

17.4.1 Capabilities and Health – Sen's Perspective

Arguing in favour of developing the inherent capabilities of individuals so as to increase their productivity levels, Amartya Sen propounded that the 'endowments set' in an individual should be developed to enable him to achieve his 'entitlement set'. This would depend upon the human capital invested in the individual comprising of both education and health. Further, since taking advantage of educational facilities provided by the government requires good health, the capability of the individual can be primarily improved by focusing upon his health. Sen further pointed out that health is also important from a macro-economic sense. Since market incentives are focused on short run growth

prospects (and maximising private returns), when allocating investible resources one often concentrates on production to the neglect of investment in social sector. However, if the focus of the state is to invest in human capital for harnessing the capabilities of individuals (which can even be at the expense of slow growth rate of economy in the short run), the long term impact of such investment on growth would be higher. To illustrate this fact, Sen cites the example of Kerala (for having invested heavily in human capital promoting sectors for long) which is presently reaping the dividend of accelerated economic growth rate in recent years.

Like Arrow, Sen also justifies public intervention in healthcare markets on the ground of information asymmetry. Sen argues that asymmetric information creates exploitation of the relatively ignorant even when there is market competition. The situation aggravates further when medical personnel are scarce (resulting in less competition and a worsening of the predicament of the buyer of medical treatment). Furthermore, when the provider of healthcare is not himself trained (as is often the case in many countries with deficient health systems), the situation is catastrophic to patients as they unwittingly become dependent on unqualified medical practitioners. While such a concerning situation can be found in several countries, there are countries (or states within countries) that demonstrate the rewards of having a functional universal public healthcare system. This is because with higher growth and income people choose to pay for additional private healthcare. Moreover, since the private services have to compete with what the state provides, the quality of private medical services tend to be better in such states where public medical services are universally available, than in regions where they are poor. In India, while Kerala is an example of a state of the progressive kind, states like Madhya Pradesh and Uttar Pradesh are examples of exploitative and inefficient healthcare for the bulk of the population.

Check Your Progress 1 [answer the questions in about 100 words in the space given]

- 1) Are health services public goods in general? In which situation, can the health services be regarded as 'public goods'?

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- 2) Illustrate the two components of healthcare services, having the characteristics of public goods, which warrant to be produced for larger reach by government intervention.

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- 3) Would you say the benefits of healthcare consumption by individuals on their productivity levels qualify to make it 'positive externality'?

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- 4) State the four characteristics of healthcare market identified by Arrow. Which one of these is governed by ‘collective orientation’ making healthcare market different from others?

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- 5) How did the endogenous growth theorists formulate their model and what findings emerge from their testing?

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- 6) How did the Schumpeterian growth models further improve the specification of the productive efficiency of workers and what were their major findings?

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- 7) What was the emphasis of Sen on the priority of public investment? In what respect Sen’s argument for public intervention in health sector matches with that of Arrow?

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- 8) How does universal health spending by government results in better health services by private health providers?

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17.5 FINANCING OF HEALTH SERVICES

Given that good health is essential for sustained economic and social development and poverty reduction, ensuring access to the required health services is important. However, only in developed or industrialized countries (i.e. in perhaps 40 out of the world's 200 countries), there are established universal healthcare systems. Most of the other nations are too poor and disorganised to provide universal healthcare. This makes the patients to incur significant out-of-pocket expenditure to finance their health needs. WHO estimates that while at least a billion people suffer each year due to inadequate health services, another about 150 million people are subjected to financial catastrophe annually. As many as 100 million are estimated to be pushed below the poverty line as a result of such huge expenditure on health.

17.5.1 Alternative Sources of Financing Healthcare: Implications for Efficiency and Equity

The structure of a nation's healthcare system is influenced by its societal norms, economy, customs, economic status, political history, etc. In light of this, several models of healthcare financing have evolved. These models may be distinguished for their relative emphasis on issues of efficiency and equity as follows.

- (i) **User Fee Model:** Under this system, the cost of provision of healthcare services is raised by the levy of user charges. The system has several advantages like: (i) efficient consumption by a reduction in unnecessary consumption of health services; (ii) exercising of right to quality service; (iii) cost-effective health services; and (iv) establishment of accountability of health workers to the patients. However, the main drawback of this model is that poor households either get discriminated against or become impoverished. Even when subsidies are provided, affluent households crowd out poor patients making the approach inequitable.
- (ii) **Voluntary Health Insurance Model:** The method relies on voluntary payment by individuals to insurance companies for financing payments for medical services against premiums paid. The method is similar to the user-fee-model with third party agencies (TPAs) competing for market share. However, since it is generally the affluent who can afford to become members, the system is inequitable between the members. The method can only serve as a complementary source of healthcare finance with its suitability for low and middle income countries requiring a strong regulatory system.
- (iii) **Beveridge Model:** The model is named after William Beveridge, a social reformer who designed Britain's National Health Service. Under this system, healthcare is financed by the government through tax payments. The system operates with majority of hospitals and clinics run by the government. Private doctors are also allowed to participate with their payment made by the government. The system tends to have low per capita cost. Many countries (e.g. Spain, Hong Kong, New Zealand, Cuba), with some variations, have implemented this model making it the most popular of the schemes under government control.
- (iv) **Social Health Insurance Model (Bismarck Model):** This model is followed in Germany using an insurance system financed jointly by employers and employees through payroll deduction. The system is welfarist as it is marked for universal coverage and hence expensive to run. The scheme is critiqued for its poor coverage of preventive services and chronic conditions.

- (v) **National Health Insurance Model:** This system has elements of both the Beveridge and the Bismarck models. It uses the private sector health providers but payment comes from a government-run insurance program. The risks are thus pooled for the whole population. The system does not need marketing and hence carries no motive to deny claims and make profit. The single payer enjoys considerable market power to negotiate for lower prices and is hence cost controlling. The most popular NHI system is in Canada but many industrialised countries (e.g. Taiwan, South Korea) have also adopted the NHI model. The system is, however, potentially inefficient as it does not provide any incentive for the health sector to operate efficiently. The system is also unstable as the budgetary allocation could vary over time affecting the smooth running of the programme.
- (vi) **Community-based Health Insurance:** The system is based on not-for-profit prepayment plans for healthcare. With community control and voluntary membership, health services are generally provided through NGOs or private facilities. The small scale of operation limits the range of access and financial protection provided. The system suffers from a lack of financial sustainability.

17.5.2 Healthcare Financing in India

The different sources of healthcare financing in India can be grouped under the following heads:

- (a) **Public sector spending**
 - (i) Ministry of Health & Family Welfare
 - (ii) Other public/government departments/undertakings
 - (iii) Local municipal and regional government authorities
 - (iv) Compulsory government health insurance schemes
- (b) **Private sector spending**
 - (i) Household out-of-pocket expenditure
 - (ii) Employer healthcare contributions
 - (iii) Private/corporate health insurance schemes
 - (iv) Expenditure by NGOs
- (c) **Miscellaneous sources**
 - (i) Community financing
 - (ii) Expenditure by religious and charitable trusts
- (d) **Bi-lateral/multi-lateral external sources**

Since the introduction of the economic reforms in the early-1990s, India's public healthcare system has further weakened. The Central theme of the Eleventh Five-Year Plan (2007-12) was to deepen the role of the market in healthcare under the Public-Private Partnership (PPP) mode. Though the professed objective of the National Rural Health Mission (NRHM) was to strengthen primary healthcare infrastructure, reviews of NRHM indicate that its intended objectives are inadequately achieved. After early progress in domains like safe delivery and immunization through Accredited Social Health Activists (ASHAs), the reduction

of monetary incentives to health personnel was identified as a major factor for this declining performance. Owing to this, the share of public sector expenditure in India has come down sharply from its 30 percent level in 1987 to below 20 percent in recent years (post-2000). In contrast, in the developed economies, more than 80 percent of health expenditure is borne by the exchequer. As a proportion of GDP, our public sector share is just around one percent which is the same as in countries like Burundi, Myanmar and Sudan. Among the South Asian countries, in terms of health outcomes, India's infant mortality rate of 56 per 1,000 live births in 2005 is better than that of only Pakistan. This compares unfavourably with the figures for other countries in the region like 12 in Sri Lanka. Likewise, life expectancy at birth of 64 years in India (which compares favourably only with that of 63 in Nepal) is substantially lower than Sri Lanka's life expectancy of 75.

In India, the share of healthcare expenditure borne by insurance companies is less than 3 percent. Under the 2015-16 Union Budget, there is an indication for a significant expansion of the health insurance business. However, this approach ignores certain facts. Firstly, insurance covers only the cost of hospitalisation and not expenditure on outpatient care. Close to 70 percent of the out-of-pocket expenditure of the household is for outpatient care which will not be covered by insurance. Secondly, even in a rich country like U.S., over 15 percent of the population do not have any health insurance cover as they do not have employers to pay the premiums. In the Indian situation, where a majority of the people are self-employed, universal coverage is even more distant. Thirdly, many villages in India do not have a hospital within accessible distance. In light of this, the publicly funded Rashtriya Swasthya Bima Yojana (RSBY), primarily meant for the poor, is unlikely to make a major dent into the real healthcare needs of the rural people. With the present level of funding, real health needs of only a small proportion of people can be actually met.

There is thus a serious mismatch in India between the requirements of the declared objectives of universal healthcare through the public health system and the actual level of public health budgetary allocation for healthcare. This mismatch is at the heart of the inadequacies and inequities of the healthcare system in India.

17.5.3 Universal Health Coverage

In recent years, as a result of rising health costs and increasing inequity in access to healthcare services, universal health coverage has emerged as a major goal for health reform in many countries. *Universal health coverage* is defined as ensuring all people have access to needed promotive, preventive, curative and rehabilitative health services of sufficient quality, while also ensuring that people do not suffer financial hardship when paying for these services. For a community or country to achieve universal health coverage, several factors must be in place. These factors are the following.

- A strong, efficient, well-run health system that meets priority health needs through people-centric integrated care (including services for HIV, tuberculosis, malaria, non-communicable diseases, maternal and child health) by:
 - informing and encouraging people to stay healthy and prevent illness;
 - detecting health conditions early;
 - having the capacity to treat disease; and
 - helping patients with rehabilitation.

- If people have to pay most of the cost out of their own pockets, the poor will be unable to obtain many of the services they need and even the moderately rich will be exposed to financial hardship in the event of severe or long-term illness. Forms of financial risk protection that pool funds (through tax, other government revenues, and/or insurance contributions) to spread the financial risks of illness across the population, and allow for cross subsidy from rich to poor and from healthy to ill, increase the access to both the services needed and risk protection. Affordability (i.e. a system for financing health services so that people do not suffer financial hardship at the time of critical illness) thus becomes a major issue.

Universal health coverage has a direct impact on a population's health. Access to health services enable people to be more productive contributors to their families and communities. It encourages retention of children in schools leading to human capital formation. At the same time, financial risk protection prevents people from being pushed into poverty when they have to pay for health services out of their own pockets. Universal health coverage is thus a critical component of sustainable development and poverty reduction besides being a key element of any effort to reduce social inequities. Universal coverage is thus the hallmark of a government's commitment to improve the wellbeing of all its citizens.

17.6 HEALTH INSURANCE

High healthcare expenses have the potential to reduce access to healthcare thereby increasing inequities in the healthcare market. Further, the presence of asymmetric information in the health insurance market (arising typically when the insurance companies fail to distinguish between the high risk and the low risk purchasers of insurance) can lead to the low risk consumers (who the insurance companies ideally prefer) getting squeezed out. The contraction of the market pushes up insurance prices (premium) adversely affecting the potential customers from lower income groups.

17.6.1 The Basic Model (Without Free Riders)

The assumptions of the basic model are:

- an individual falls sick with probability 'P' and remains in good health with probability (1-P); ($0 < P < 1$);
- the cost of treatment is a fixed value 'M';
- the premium is P_r (to be paid irrespective of state of health) and insurance benefit is I_b ($0 \leq I_b \leq M$);
- gross income of the individual is Y with his utility function is $U(Y)$; and
- $U'(Y) > 0$ and $U''(Y) < 0$ which means that individuals are risk averse.

Under the above situation, if the individual is in good state of health the net disposable income is given by: $Y_H = Y - P_r$ and in case of sickness it is: $Y_S = Y - P_r - M + I_b$. Since individuals are presumed to maximise their expected utility, the expression for the same is given by:

$$EU = (1-P) U(Y_H) + P U(Y_S) = (1-P) U(Y - P_r) + P U(Y - P_r - M + I_b) \quad \dots\dots\dots(1)$$

Here $(M - I_b)$ is called *deductible* (implying that coverage is not complete and individual has to bear a part of the loss). It is also assumed that: (i) insurers do not incur any administrative expenses so as to maximize their expected profits; (ii) the market for

health insurance is characterised by perfect competition; and (iii) insurers offer *actuarially fair contracts* (implying that $P_r = P I_b$ or that the premium is equal to the expected benefits). The optimal quantity of insurance benefits I_b can now be obtained by solving:

$$\begin{aligned} \text{Max } EU &= (1-P) U(Y - P I_b) + P U(Y - P I_b - M + I_b) \\ &= (1-P) U(Y - P I_b) + P U\{Y - M + (1-P) I_b\} \end{aligned} \quad \dots\dots\dots(2)$$

The first order condition is given by

$$\frac{dEU}{dI_b} = (1-P)U'[Y - P I_b](-P) + P U'[Y - M + (1-P) I_b](1-P) = 0$$

and rearranging we get:

$$U'[Y - P I_b] = U'[Y - M + (1-P) I_b] \quad \dots\dots\dots(3)$$

This means that the marginal utility must be the same in both the states (i.e. the sickness state and the healthy state). Since $U''(Y) < 0$, (3) implies that disposable income must be identical in both the states of health. Therefore, full insurance with $I_b^* = M$ is optimal when the individual has the income $Y_H = Y_S = Y - PM$. This result characterises an *efficient outcome*: i.e. if insurance is actuarially fair i.e. if insurers can insure at no cost, then it is optimal when consumers are fully insured.

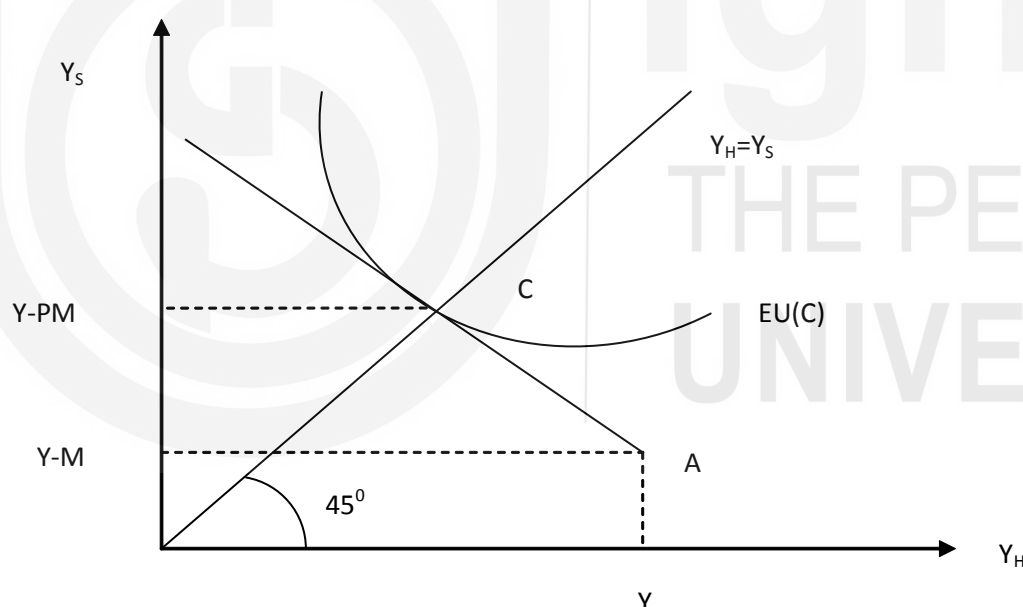


Figure 17.2: Optimum Insurance Coverage

17.6.2 Extended Model (With Free Riders)

To make provision for ‘free riders’ we extend the basic model with the following set of further assumptions:

- (i) every individual in the society is guaranteed a minimum income ($Y_{\min}$);
- (ii) individuals differ in gross income, Y , while probability of illness P and treatment cost M are identical for all individuals;
- (iii) treatment is not denied to anyone; and

- (iv) individuals should pay for their treatment, but since their net income cannot fall below $Y_{\min}$, the government takes care of individuals for whom

$$Y - P_r - M + I_b < Y_{\min}$$

Hence, government incurs expenses of $Y_{\min} - (Y - P_r - M + I_b)$ as subsidy.

The fact that income cannot fall below $Y_{\min}$ implies that income at sick state will be:

$$Y_s = \max \{Y - P_r - M + I_b; Y_{\min}\}.$$

With $P_r = P I_b$, the expected utility is given by

$$EU = (1-P) U(Y - P I_b) + P U(\max \{Y - P_r - M + I_b; Y_{\min}\}) \quad \text{.....(4)}$$

We first analyse the optimal amount of insurance I_b^* depending on individual's gross income. If $(Y-M) \geq Y_{\min}$, income when ill is above $Y_{\min}$, i.e. $\max \{Y - P_r - M + I_b; Y_{\min}\} = Y - P_r - M + I_b$, and individual's decision problem is the same as in (2) i.e. the individual will choose *full insurance* with $I_b^* = M$. However, if $(Y-M) < Y_{\min}$, it may be optimal for an individual not to buy insurance.

Case-I

Let $(1-P)I_b < (Y_{\min} - Y + M)$ or $I_b < [(Y_{\min} - Y + M)/(1-P)] \equiv \hat{I}$. This implies:

$Y - P I_b - M + I_b < Y_{\min}$. Hence, the second term in equation (4) is not a function of I_b . The change in expected utility associated with an increase in I_b is, therefore, given by:

$$\left. \frac{dEU}{dI_b} \right|_{I_b \leq \hat{I}} = (1-P)U'[Y_H](-P) < 0 \quad (5)$$

Since disposable income when ill remains at $Y_{\min}$, and income when the person is healthy falls due to buying insurance, the expected utility is lowered if $I_b \leq \hat{I}$.

Case-II

If $I_b > \hat{I}$, expected utility starts rising again with I_b until a local maximum is reached at $I_b = M$. Further,

$$\left. \frac{dEU}{dI_b} \right|_{\hat{I} < I_b < M} = (1-P)P[U'(Y_s) - (U'(Y_H))] > 0 \quad (6)$$

where $U'(Y_s) > U'(Y_H)$ as long as $I_b < M$.

The two cases imply that there are two local optima, $I_b = 0$ and $I_b = M$. Hence the question arises whether the difference in expected utilities i.e. $EU[I_b = M] - EU[I_b = 0]$ is positive or negative or equal to zero. Since the difference is increasing with gross income Y , there must be a critical value of Y , say Y^* , such that individuals with income above Y^* prefer to buy full insurance and those with income below Y^* buy no insurance at all. That is:

$$I_b^* = \begin{cases} 0 & \text{if } Y < Y^* \\ M & \text{if } Y \geq Y^* \end{cases}$$

Hence, it is a matter of concern that low income individuals do not buy health insurance. Therefore, individuals whose gross income is below $Y_{\min}$ need to be insured completely through government transfers.

The issue is different for individuals having income greater than $Y_{\min}$. But for individuals with income, $Y = Y_{\min} + PM$, we find that:

$$EU[I_b=M] - EU[I_b=0] = U(Y_{\min}) - [(1-P) U(Y_{\min} + PM) + P U(Y_{\min})] < 0 \quad (7)$$

These individuals will therefore act as *free riders*.

The free rider problem provides a rationale for making health insurance *mandatory*. A health insurance market without such a mandate 'fails' in the sense that some individuals with low insurance do not buy insurance since they can count on receiving a transfer, designed to guarantee a minimum income, when sick.

We should, however, note that free riding is not an inherent problem of market failure but a problem caused by government interference. Without the *implicit insurance* provided by the government (in the form of minimum income), more individuals could be expected to buy full insurance. But those who are unable to afford health insurance would not be able to finance their treatment costs.

17.6.3 Asymmetric Information and Adverse Selection

A risk averse individual is better off by buying insurance against unforeseen calamities. An insurance company can, however, make profit by providing insurance which is not actuarially fair (i.e. the company prefers larger premium payment than the expected benefit). A major informational problem with the provision of insurance contracts is that the insurance company has less information than the customer about the risks involved as the customer would have better knowledge about his actual health status (or probability of sickness) than the insurance company. This is the case of *asymmetric information*. In this context, *adverse selection* is defined as *strategic behaviour* by the more informed partner in a contract against the interest of the less informed partner. It is expected that as the insurance market becomes more competitive, and individuals are brought to face the true marginal cost of health insurance, the phenomenon of adverse selection will become more severe.

In a situation of information asymmetry, insurance companies try to limit the amount of insurance guaranteed. It is established that the market 'sorts' out low risk individuals from high-risks in what is called as a '*separating equilibrium*', by offering plans with less than optimal coverage. In case of *adverse selection*, the average expected cost in a plan will be higher than what the insurer planned. If the insurer raises the premium, the higher premium causes a decline in the purchase of insurance. Consequently, the insurer loses money. Adverse selection can cause problems for consumers as well when they are unable to get health insurance at fair prices. Several measures have been attempted to reduce the consequences of adverse selection. Some of these are:

- (i) Setting more accurate premiums by gathering accurate information on purchasers of insurance. This, however, makes chronically-ill and high risk people pay higher premiums.
- (ii) Restricting consumer choice by offering only one insurance plan for a group of persons. This, however, reduces consumer choice and reduces the insurance bought.
- (iii) Restricting the timing of consumer choice by requiring 'waiting periods' before offering insurance or by stipulating 'pre conditions'. This again restricts the chronic or high risk persons from being eligible to buy insurance

Check Your Progress 2 [answer the questions in about 100 words in the space given]

- 1) State the drawbacks of the 'user fee model' of financing the healthcare services.

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- 2) Which of the alternative models of public healthcare finance is the most popular? Why?

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- 3) What has been the approach to healthcare financing in India in recent years? How does this compare with the corresponding practices in other countries?

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- 4) How is 'universal health coverage' defined? What are its advantages?

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- 5) Under what conditions complete or full insurance is optimal in a situation of no free-riders?

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- 6) How does the 'free rider problem' provide a rationale for making health insurance mandatory? Is free riding a problem of market failure?

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- 7) How are the concepts of 'asymmetric information' and 'adverse selection' defined in the context of health insurance?

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- 8) State some methods practiced to reduce the consequences of *adverse selection*?

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17.7 MORAL HAZARD IN HEALTHCARE INSURANCE

Information asymmetry in the healthcare markets may also create incentives to maximise one's own welfare at the cost of the other party. This is called moral hazard. In insurance markets, there are two types of moral hazards: consumer moral hazard and producer moral hazard. Consumer moral hazard occurs when the behaviour of the insured party changes in a way that raises costs for the insurer. At the time of treatment, since the insured individuals do not bear the cost of medical services, they have an added incentive to ask for costlier and more elaborate medical service which would otherwise may not be necessary. In these instances, individuals have an incentive to over consume simply because they no longer bear the full cost of medical services.

Typically, two types of behavioural changes can result. One is the behaviour in what is called as '*ex ante*' moral hazard. In this case, insured parties behave in a more risky manner, resulting in more negative consequences for the insurer. For instance, after purchasing the health insurance, the individual may take less care of his health than before. A second type of behaviour could be the reaction to the negative consequences of risk, after they have occurred and once insurance is provided to cover their costs. This is called '*ex post*' moral hazard. In this case, insured parties do not behave in a more risky manner that results in more negative consequences, but they expect the insurer to pay for the negative consequences. For instance, without medical insurance, some may forgo medical treatment due to its costs and simply cope with substandard health. But after insurance is taken they may ask an insurance provider to pay for the cost of medical treatment which would not have occurred otherwise.

Sometimes, moral hazard is so severe it makes insurance policies impossible. In India, the system of cashless transactions led to hospitals over-charging patients outrageously and recommending unnecessary diagnostic tests and procedures. Patients were not dissatisfied as the costs were paid directly by the insurance companies. This led to banning cashless treatment procedures requiring patients to first have to incur the expenditure and then seek reimbursement from insurance companies. Options like coinsurance, co-payments and deductibles reduce the risk of moral hazard by increasing the out-of-pocket spending of consumers but decrease their incentive to consume. In such cases, the insured have a financial incentive to avoid making a claim.

17.7.1 Supply Induced Demand: A Principal Agent Relation

This is what is referred to above as the producer moral hazard. Specialized information possessed by the physicians has an important implication. It is the physicians who determine the healthcare expenditure of patients by prescribing drugs, recommending diagnostic tests and treatment procedure (e.g. non-invasive or invasive surgical procedure) and further influence the choice on the place of treatment. Their dual role as provider of services and advisor to patients enables physicians to influence the demand. This often leads to what is known as the principal-agent relationship. This relationship exists when an individual (the principal) allows someone else (the agent) to act on his behalf. Given the barriers to enforcement of written contracts, the agent may have the incentive to act in a way that his welfare is maximised to the detriment of the principal. In healthcare markets, in particular, the absence of (or the inability to process) the relevant information about the correct diagnostic and treatment procedure with the patient creates a reliance on the physician (the agent). This often creates a conflict of interest (which Arrow refers to as ‘hidden information’) creating an incentive to maximise physician’s income at the cost of patients’ welfare. Taking advantage of the constraints on the patients’ ability to collect and process information in infrequent transactions, physicians may suggest a plan of treatment containing unnecessary and costly procedures. This situation may be explained in terms of a simple demand-supply graph (Figure 17.3). The original demand and supply curves are given by D_0 and S_0 , resulting in equilibrium at ‘a’. In the standard model, demand and supply curves are assumed to be independent of each other. A given increase in supply results in a new equilibrium at ‘b’, reached by moving down the demand curve D_0 . The equilibrium price falls to P_1 , and more healthcare is demanded and supplied. In the healthcare market, however, the shift in supply curve from S_0 to S_1 will cause the demand curve to shift to D_1 as physicians advise their patients to buy more of healthcare. The equilibrium will be at ‘c’ with more of health services being provided – at a higher price of P_2 .

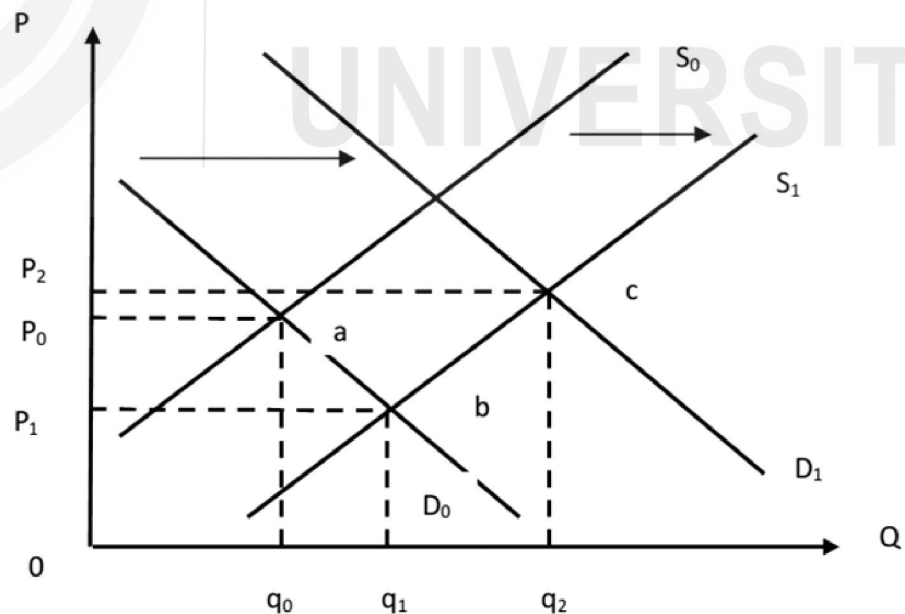


Figure 17.3: Supply Induced Demand in Healthcare Market

Testing for the actual extent of moral hazard is difficult given the uncertainty and lack of information in healthcare markets. Further, over-prescribing may be combined with the patients’ desire to seek more expensive treatment when the latter is covered – a situation referred to as *double moral hazard*. There is considerable evidence of potential

conflict of interest where physicians hold interest in diagnostic laboratories, physical therapy centres, imaging centres, etc.

17.7.2 Tackling Moral Hazard

In USA, doctors and hospitals bill insurance companies with patients paying only a fraction of the costs. As the out-of-pocket expenditure by patients was low, they have little incentive to look around for the more economical provider or opt for less complex procedures. As doctors and hospitals were paid only if they had performed the procedures, they carried an incentive for doctors to over-medicate and over-bill the patients. i.e. the double moral hazard situation. Although the insurance companies were aware of this, they were unable to intervene as the relevance of the treatment to specific patients was known only to the doctors concerned. Since the healthcare costs had risen sharply in US, to tackle the situation Health Maintenance Organisations (HMOs) were introduced. Under this, doctors were assigned a fixed client base of patients. Since the routine visits and procedures were handled by primary care physicians, the HMOs costs was minimised 'if the patients are cured at the primary level'. This ensured that only the essential cases for additional tests and treatments were recommended at an early stage of the disease for specialised treatment. Such a focus on prevention, acted as an effective control over moral hazard. To ensure its effective functioning, the contract of primary care physicians (who are the agents in this principal-agent model), was split into two components. In the first, the primary care physicians were paid a fixed monthly fee – called the 'capitation fee' for every member under his care irrespective of whether they sought treatment or not. This implied that the doctor will try to maximise his welfare by reducing his per-patient time and also not endanger the health of the patient by unnecessary tests and procedures. To curb the tendency of doctors to increase his income through unwarranted expensive and complex diagnostic tests and procedures, a second component of the contract specified 'withholds/bonus'. Under this, the expenses for referrals were charged to the HMO, and wherever the referrals exceeded a certain limit, the additional amount was deducted from the capitation fee of the physician. On the other hand, if the referral expenses are less than the budgeted amount, the surplus was distributed in the form of a bonus. In this way, primary care physicians were discouraged from making unnecessary referrals and encouraged to treat diseases at an early stage to minimise treatment costs.

17.8 REGULATING PRIVATE HEALTH INSURANCE SECTOR

Given the uncertainties and information asymmetry characterising the health insurance market, there are three reasons for market failure in health insurance viz. adverse selection, moral hazard and economies of scale. All these three leads to market failure in health insurance and thereby a sub-optimal equilibrium. Further, the health insurance markets will not provide enough coverage in cases where society values the provision of healthcare services to all its members beyond the effective demand i.e. when: (i) they are considered a merit good, or (ii) they involve positive externalities. This calls for government regulation of the health insurance sector. In general, there can be three types of strategies to control and regulate the private health insurance sector.

17.8.1 Strategies to Regulate

There are three strategies to regulate health insurance markets. One, health insurance could be left completely unregulated, governed only by markets, allowing the insurer and the insured to negotiate the terms and price of coverage. Presumably, the insurer

would insist on full disclosure of known risks, charging a premium proportionate to the risk and imposing limitations of coverage necessary for self-protection against adverse selection and moral hazard. If the insurer is subsequently unwilling or unable to cover claims, it would suffer reputational injury causing a harder time finding customers in the future. This approach would, however, adversely affect claimants who are treated unfairly by insured companies. The market, therefore, needs to be supplemented by judicial oversight mechanisms to minimise the possibility of lawsuits for breach of contract – common in insurance law. Insurers generally draft insurance contracts so as to give them an advantage in contract litigation. Recognizing the imbalance of bargaining power in such cases, the courts have often come to the aid of the insured through the common law doctrine of *contra preferentum* i.e. the doctrine of protecting the reasonable expectations of insured persons. In some countries, courts have also permitted exemplary damages in bad faith breach of contract actions against insurers who have blatantly violated their contractual obligations.

Two, rights of insured persons can be supplemented by statutory rights enforceable through ‘private litigation’. These can take the form of general consumer protection statutes or address particular insurance abuses (such as unfair claims settlement practices statutes). Such statutes can set basic standards for insurer obligations making it more likely for insurance contracts to offer the terms insured persons are likely to expect fairly. They could also encourage insured persons to protect their rights through litigation by offering statutory penalties on insurance companies (or attorney fees) for violating the genuine rights of insured persons. Private litigation, however, has certain limitations. First, it is very costly, time consuming, and generally inefficient. Second, it is the insurance companies who draft contracts which the insured often never even see before a claim is made and hence insured persons usually face an uphill battle. Moreover, insurers are ‘repeat players’ in litigation, while insured persons are not. Insurers are, thus, usually in a superior position to understand and control the litigation process. For all these reasons, insurers have good reason to discount the likelihood of losing, or even facing litigation, and thus relying on litigation is unlikely to result in optimal protection of insured persons. The high costs and inefficiencies of litigation can be avoided through alternative dispute resolution mechanisms. Currently, the state and federal governments require health insurers to offer internal review mechanisms to provide for a quick and inexpensive approach to clear up mistaken or ill-considered claim denials. Other strategies are based on regulation which can take different forms. Some administrative regimes, for example, operate through *ex-post* case-by-case adjudication and enforcement. The administrator simply waits until a statute is violated and then takes enforcement action, either through administrative adjudication or through litigation. Beyond this, administrators can promulgate regulations that expand and elaborate on a statutory scheme. In some instances, issuing regulations require explicit authorization while in others it is assumed to be within the general power of the regulator. Some regulators also offer advisory opinions or rulings, interpreting general regulations in the context of specific circumstances.

Finally, a regulator can become actively involved *ex ante* in: (i) supervising regulated entities; (ii) ensuring compliance with solvency and reserve requirements as a condition of granting licensure; (iii) reviewing pre-filed insurance policies and rates before use; and (iv) examining periodically the regulated entities by auditing its books or requiring regular reports. This form of oversight can be very prescriptive and intrusive involving the regulator deeply in the operation of the regulated entity.

17.8.2 Insurance Regulatory and Development Authority of India

The Indian insurance industry is regulated by the Insurance Regulatory and Development

Authority (IRDA). It protects the interests of the policyholders and work for the orderly growth of the industry. The origin of IRDA was the backdrop of the economic reforms programme and financial sector reforms of the 1990s. The IRDA was set up as autonomous body under the IRDA Act, 1999. The objective of IRDA was to protect the interests of policyholders, and to regulate, promote and ensure the orderly growth of the insurance industry and for matters connected therewith or incidental thereto. In order to achieve these objectives, IRDA has framed regulations for insurance industry. It monitors the activities of the insurance sector for healthy development of the industry and protection of policyholders' interests.

Specifically, for the health insurance sector, IRDA has brought out the IRDA (Health Insurance) Regulations in 2013. These regulations promote the growth of the health insurance sector while simultaneously protecting the consumer through instruments like: (i) provisioning of a free lock period; (ii) creation of insurance (electronic) repository system; (iii) ensuring the companies to renew the policies except in exceptional cases; (iv) allowing portability of benefits between insurance policies; (v) ensuring the creation of Consumer Protection Committees by companies compulsory; (vi) restraining companies from rejecting legitimate claims on technical grounds; (vii) standardizing terms/definitions/conditions used in health insurance policies, etc.

17.9 GOVERNMENT FAILURE

Market failure is a necessary condition for government intervention. Government policies, in principle, can correct mis-allocations resulting from market failure through various instruments at its disposal. But does such government intervention, in practice, always improve efficiency and better meet society's equity objectives? The difficulties of agreeing on objectives, choosing from many different policy instruments, and selecting the correct values of these instruments create many occasions for 'government failure'. Literature on public choice illustrates many problems in developing and implementing policy. It attempts to model how decisions are made through the political process. While many models of public choice have been created, here we discuss two features relevant to efficiency viz. special interest groups and bureaucratic behaviour.

A relevant question in this context is: who does the regulator represent? One of the common assumptions in the theory of regulation is that the regulator knows the right actions to take. The regulator is treated as representing an omniscient but benevolent despot who knows what is good for the economy and regulates accordingly. However, there is evidence that regulations in many markets are often influenced by the interested players moulded to suit their own interests. In support of this, a section of economists (associated with the University of Chicago) have argued that the regulation process, like many others, is a 'maximising' process in which a regulator seeks 'votes' from potential beneficiaries. These votes allow the transfer of wealth (such as monopoly profits), from those regulated to those who benefit from the regulations. Thus, assuming that regulator seeks supporters by imposing a percentage 'tax' on those who are regulated, with the tax receipts being transferred to the beneficiaries, a higher tax rate on those who are regulated would win more supporters. But it also may mobilize more opponents. Thus, a successful regulator seeks an optimum transfer of wealth while simultaneously gathering votes to effect the transfer efficiently. Let us consider the following case.

Suppose the regulator starts with a modest tax rate. The imposition and increase of this rate yields favourable votes for two reasons:

- (a) The revenues increase the probability of support from the potential beneficiaries.
- (b) The revenues increase the value of the transfer to the beneficiaries.

Those who would be regulated will oppose a transfer because it is coming from them. Their opposition will grow as the tax rate increases. Expressing this ‘opposition effect’ in monetary terms, the regulator’s optimum is at the point where the ‘marginal benefits from regulation equals the marginal costs’. That is:

Marginal opposition from increased taxes = Marginal increase in probability of support × Marginal revenue product from those regulated

The two terms on the right-hand side of the above equation suggest that regulation will be sought if there is a large group of supporters (term 1) or if there is a smaller, well-organised group that perceives large expected gains (term 2). Thus, one may see regulations imposed that benefit special interest groups i.e. relatively small but well-organised groups of potential gainers.

While the above analysis does not negate the economic arguments in favour of regulation, it provides insights into how regulations may be implemented. Regulators respond to similar economic incentives as do others. The resulting regulations, although possibly address the issues of economic efficiency, will most likely reflect the particular preferences of the beneficiaries, moderated by the opposition of those who stand to lose under the regulations.

17.9.1 Bureaucracy and Efficiency

Lawmakers pass legislation but bureaucrats are responsible for their implementation. While we know relatively little about the technical efficiency of bureaucracy, it is clear that government operations do not face the discipline of the marketplace. In view of this, the hypothesis that governments operate at lower levels of technical efficiency than the private sector is a plausible one. Aside from the inefficiency associated with failure to minimise the costs of bureaucracy, government programs are subject to critical issues of allocative inefficiencies i.e. there may be too little or too much of a program. The more likely scenario is one where programs become too large because their supporters (lobbyists, legislators who support it, top bureaucrats who will run it) are motivated by self-interest to overstate the benefits and understate the costs.

These arguments warn us against the danger of concluding that government intervention necessarily improves social welfare whenever there is market failure. Equally serious, government failure can result from inappropriate policies and high levels of technical and allocative inefficiencies. Just as the fact that many countries that have national health insurance programs suggest limitations of the mixed private-public system (such as that has evolved in the United States), the fact that most countries face serious problems with their healthcare systems highlights the limits to higher levels of government intervention. A recent OECD report that examined the performance of different systems observes that there is no healthcare system that performs *systematically* better in delivering cost-effective healthcare in all economic and political settings. Both market-based and centralized command-and-control systems show their own strengths and weaknesses. This implies that it is not the type of system that matters, but rather how the system is managed that is important.

Check Your Progress 3 [answer the questions in about 50 words in the space given]

- 1) Define the two types of moral hazards with the expected behaviour from the parties involved in the health insurance market.

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- 2) What are the limitations of ‘private litigation’ as a strategy to regulate the health insurance market?

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- 3) What specific health insurance regulatory provisions are made in the IRDA, 2013?

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- 4) State the equation to bring out the ‘opposition effect’ of insurance companies sought to be regulated with a ‘moderate tax rate’ for wealth transfer. In what way does this illustration provide an insight on the efficacy of ‘regulation’ as an useful policy instrument?

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17.10 LET US SUM UP

The healthcare sector is also subject to the common economic laws that govern the issues of providing optimum service in the face of situations of market failure. Government interference does have potential to increase the welfare of consumers to an extent. However, given the fact that economic theories have recognised the issue of ‘health’ as an important ‘good’, not to be left entirely to market forces, different models of health coverage, approaching universal coverage in their limits, have been implemented in different economic settings. The development of health insurance markets have required to evolve strategies to cope with the issues of moral hazard. Against this backdrop, the unit has dealt with both the theoretical and practical experiences of institutional and policy relevance.

17.11 KEY WORDS

- Catastrophic Expenditure** : Refers to high degree of out-of-pocket expenditure on health treatments defined as exceeding 10 percent of total household expenditure or 40 percent of expenditure on food. Studies have shown that out-of-pocket expenditure on health is a major contributory factor underlying Indian households' decline to poverty.
- Actuarially Fair Contracts** : Refers to insurance contracts where the premium is equal to the expected benefits to be financed by the insurance companies in the event of claims by the insurer.
- Risk Averse** : Refers to the dominant attitude of the population towards risks depicted by the marginal utility of income. When evaluating two alternatives with the same expected value, a risk-averse individual will choose a 'certain' prospect over the 'uncertain' prospect.

17.12 SUGGESTED REFERENCES FOR FURTHER READING

- (1) Arrow K.J. (1973), 'Uncertainty and the welfare economics of medical care', *The American Economic Review*, 53: 941-73.
- (2) Grossman (1972), 'On the Concept of Health Capital and the Demand for Health', *Journal of Political Economy*, 80: 223-255.
- (3) Mushkin, S.J. (1958) 'Toward a definition of health economics', *Public Health Reports*, 73:785-794.
- (4) National Commission on Macroeconomics & Health (2005), *Financing and Delivery of Healthcare Services in India*, Ministry of Health & Family Welfare, Government of India, New Delhi.
- (5) Rothschild, M. & Stiglitz, J. (1973), 'Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information', *Quarterly Journal of Economics*, 90:629-49.

17.13 ANSWERS/HINTS TO CYP EXERCISES

Check Your Progress 1

- 1) See 17.2 and answer.
- 2) See 17.2 and answer.
- 3) See 17.2 and answer.
- 4) See 17.3 and answer (Uncertainty, accurate information, *trust* vis-à-vis limited consumer's 'ability' to process information and variability (in information received and processed)).

- 5) See 17.4 and answer.
- 6) See 17.4 and answer.
- 7) See 17.4.1 and answer.
- 8) See 17.4.1 and answer.

Check Your Progress 2

- 1) See 17.5.1 and answer.
- 2) See 17.5.1 and answer.
- 3) See 17.5.2 and answer.
- 4) See 17.5.3 and answer.
- 5) See 17.6.1 and answer.
- 6) See 17.6.2 and answer.
- 7) See 17.7.2 and answer.
- 8) See 17.6.3 and answer.
- 9) See 17.6.3 and answer.

Check Your Progress 3

- 1) See 17.7 and answer.
- 2) See 17.8.1 and answer.
- 3) See 17.8.2 and answer.
- 4) See 17.9 and answer.

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UNIT 18 ENVIRONMENT SECTOR I

Structure

- 18.0 Objectives
- 18.1 Introduction
- 18.2 Externality and Pigouvian Tax
- 18.3 Coase Bargaining Solution and Collective Action
- 18.4 Pollution Abatement Options
- 18.5 Market-based Instruments
 - 18.5.1 Advantages of MBIs
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18.0 OBJECTIVES

After going through this Unit you will be in a position to

- explain the divergence between private costs and social costs in the presence of environmental pollution;
- discuss the options available for controlling environmental pollution;
- distinguish between command and control measures, and market-based instruments for controlling environmental pollution;
- identify the various types of market-based instruments with their advantages;
- indicate the efficacy of informal regulations on environmental pollution;
- describe the nature of climate change and abatement cost of greenhouse gases; and
- explain the factors that should be considered while choosing among policy options.

18.1 INTRODUCTION

The disposal of 'public bads' (i.e. negative externalities of economic activities) under normal course is done in various forms through natural environmental resources like air, water and land by treating these as natural sinks. If such disposal exceeds the natural

assimilative capacity, ecological balance gets repaired. Hence, the main issue is how to reduce pollution load to stay within safe limits so that development can continue sustainably.

The neoclassical economics mainly deals with efficient allocation of resources through market mechanism. In the production process, in addition to the private (or public) good, public 'bad' also emerges in the form of solid, liquid, gas or noise pollution. For instance, when production of cement takes place, there is emission of dust and harmful chemicals into the atmosphere. Neoclassical theory with its emphasis on market mechanism takes care of the production of cement but ignores the management of air pollution arising out of cement production. Public bad is produced not only during production activities but also in the course of consumption. For instance, when we consume packaged food, we throw away the polythene cover (which is not biodegradable) as a result of which land pollution takes place. Public bads is a classic case of negative externalities which we will discuss later in this Unit.

Management of externalities is difficult due to two basic issues viz. i) proper valuation of 'public bad', and ii) well-defined property rights. We have already discussed issues related to valuation of environmental resources in Unit 11. We have discussed how pollution problem under various property rights framework can be addressed in unit 2 in the section on Coase theorem. In the present Unit, we primarily deal with two issues: one, divergence between social and private costs due to externalities, and two, the mechanisms available in the literature to internalize the externalities. These mechanisms could be in the form of policy measures taken by the government or non-state actors. We begin with the concept of externalities and solutions provided by A C Pigou and Ronald Coase.

18.2 EXTERNALITY AND PIGOUVIAN TAX

The problem of externality may be interpreted as an unintended and uncompensated side effect of a person's or firm's activity on others. In a formal way, environmental externalities occur when the consumption and production choices of one person or firm enters the utility or production function of another entity without the said entity's consent or compensation. The example of air pollution due to production of cement thus falls into the realm of externalities. Externalities are not limited to the actions of private individuals. In many instances, the problem of externality creeps into many government policies having spill over effects. For instance, free electricity offered to farmers for irrigation purposes results in over-extraction of ground water, which depletes the water table. In this case, the private cost of lift irrigation borne by the farmer is the price paid by him, but a larger social cost is involved in terms of reduced availability of water to others. Overall, there is a difference between 'private marginal cost' and 'social marginal cost' in the presence of externalities. In the case of economic activities having negative externalities, social marginal cost is always higher than private marginal cost. As the producer of a polluting good takes into account the private cost while deciding the level of output, there is excessive supply than the optimal level.

An economic solution to the problem was evolved as early as in the 1920s by the well-known British economist Arthur C. Pigou in the form of pollution tax popularly known as *Pigouvian tax*. According to Pigou, the social damage or the social cost imposed by a firm by its pollution activity on society may be neutralised by imposing a pollution tax on the firm. The rate of the tax, according to him is equal to the marginal environmental cost or marginal social damage by the polluting firm on society.

The situation is explained in Figure 18.1 where MC_s is the social marginal cost and MC_p is the private marginal cost of production of a good (in the diagram only the upward sloping segment of the MC curves is shown). As more output is produced, total pollution load on environment increases. This is indicated by the increasing gap between MC_p and MC_s . The demand for the polluting good is given by the demand curve DD' (representing marginal revenue curve, MR). As per market mechanism, the equilibrium output is q_1 and price is P_1 where $MC_p = MR$. Socially optimum level of output, however, is q^* for price P' with $MC_s = MR$. If the producer was made to pay for the social costs also, equilibrium output would have been at the level q^* . Thus, we observe from Figure 18.1 that the difference between MC_s and MC_p at the socially optimum level output is 'ac'. Hence, in order to internalize the externalities Pigou suggests imposition of a tax 't' per unit of output where $t = ac$, ac being the difference between MC_p and MC_s at the socially optimum level. Here it is assumed that pollution emitted per unit of output remains unchanged as level of output changes.

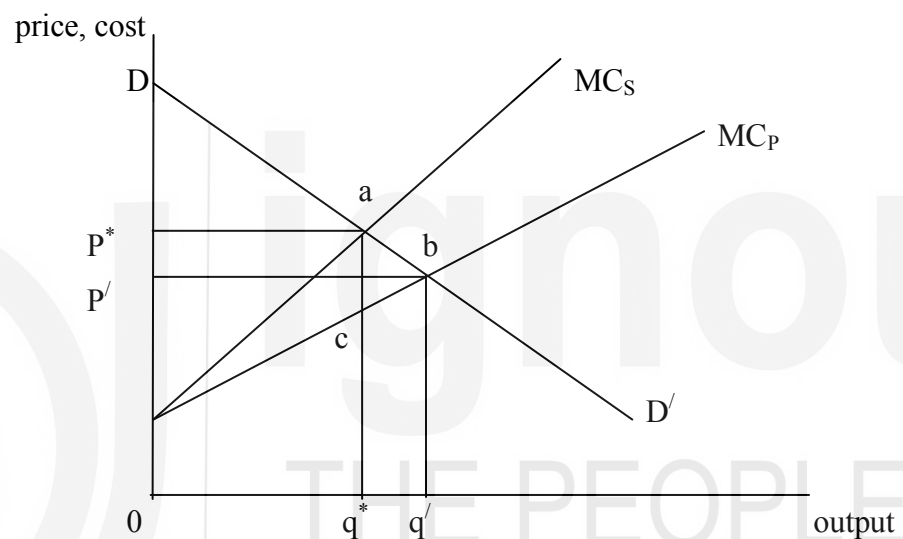


Figure 18.1: Pigouvian Tax

Implementation of Pigouvian tax is complex as measurement and valuation of externalities is not possible in most cases. However, the 'polluter pays principle' appears to have a basis in the Pigouvian tax. Even if we could reach a precise valuation of the externalities, it may not be possible to impose Pigouvian taxes due to ambiguities in 'property rights' which we discuss below.

18.3 COASE BARGAINING SOLUTION AND COLLECTIVE ACTION

Property rights refer to certain attributes of an economic good such as the right to use the good, the right to earn income from the good and the right to transfer ownership of the good to others. In many cases property rights is well-defined but in certain cases, much ambiguity exist (e.g. ownership of air or environment). Let us take the case of ownership of a plot of land. If the ownership is absolute, the owner can use it in whatever way (s)he likes — say even to dump the garbage on it. If the ownership is limited, then his/her actions are subject to those limitations.

The property rights approach acquires importance when either the community or individuals possess well-defined property rights in carrying out environment related activities. The property rights approach, developed by Ronald Coase in 1960, suggests that an efficient solution to the problem of externality may be arrived at if the property

rights are well-defined. This solution, popularly known as ‘Coase theorem’, states that efficient allocation of resources and solution to Pareto relevant externality is possible, if the parting holding property rights is appropriately compensated. We take an example to illustrate the theorem.

Let us consider the case of a polluting paper mill which dumps its effluents to the nearby river as a result of which the water downstream gets polluted. The water pollution has adverse effects on the health and property of the nearby community who use the river water. Therefore, they want the pollution load released into the river to be zero. It is possible for the paper mill to adopt pollution abatement measures which can purify the effluents and reduce the pollution load to zero level. Installation of such technology, however, would increase the cost of production for the paper mill and keeping up with its objective of profit maximization the factory may not want to install pollution abatement measures. Thus, a conflict in interest between the factory and the community is generated.

Let us explain the position through Figure 18.2 using typical economics analogy. On the X-axis we measure pollution abatement expenditure by the factory and on the Y-axis we measure environmental cost of pollution load. The nearby community faces a downward sloping pollution abatement benefit curve (AB) which indicates that as pollution abatement expenditure increases, environmental cost to the community decreases. On the other hand, the paper mill has an upward sloping pollution abatement cost curve indicating the increasing marginal cost of abatement (OD).

Let us take the situation that the community is holding the property rights for clean environment. Now, the community can dictate terms to the paper mill about the pollution load to be released to the river. For various welfare reasons, the factory cannot be closed down and financial constraints have made the factory to apply limited pollution abatement measures. In this context, negotiation is the only solution to resolve the conflict. In the negotiation, the community can accept a slightly lower level of pollution emission ‘g’ (i.e corresponding to the point ‘n’ on the x-axis) than the maximum level

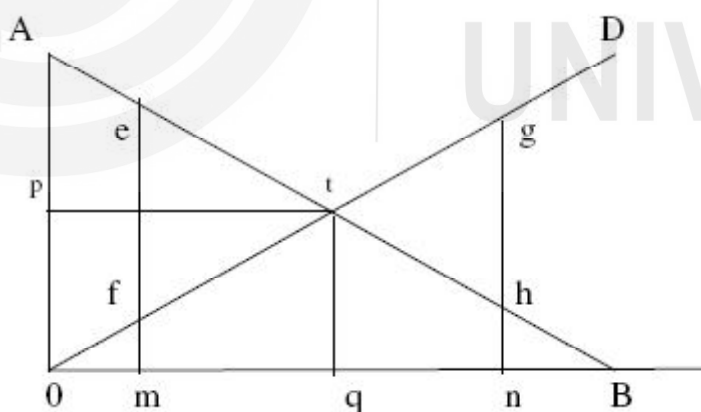


Figure 18.2: Quantity of Pollution Abatement

‘B’ with some compensation to the community, and the community should have willingness to accept the same. In this situation, the paper mill has to incur higher marginal abatement cost per unit of pollution ‘g’, which in turn is higher than the minimum compensation ‘h’ demanded by the community. Hence, through negotiation, the paper mill is willing to give compensation ‘gh’ to the community for lower level of pollution abatement (Figure 18.2). Hence, the negotiation has ended up in the pollution abatement level between optimum (t) corresponding to x-axis and maximum (B) levels.

Let us consider the opposite scenario where the paper mill has the property rights. Since, the polluter has the property rights, the starting point is zero pollution abatement

(i.e. no production abatement). Suppose the community wants to the paper mill to reduce pollution level upto the level of m . Obviously, for welfare measure the community has to pay to the paper mill for reduction in the pollution level from 0 to m . In this situation, the payment by the community to the factory is 'ef' in order to achieve the reduced pollution level which is in between m and zero levels of pollution abatement. However, by regulation, the optimum pollution abatement level is q , beyond which it is very expensive to abate pollution. Due to bargain, the factory may reduce pollution level to m for which the marginal abatement cost is 'f' at which the benefit to the community is 'e'. Hence, community has to pay 'ef' units to the factory to have the pollution abatement level increased from 0 to m level. Hence, the Coasean principle can be seen as an alternative to the government policies to solve the externality problem.

The above is a simple case of bargaining between one polluter and one group of victims. There could be many complex situations with multiple polluters and multiple victims. The Coasian solution is beset with certain limitations. It is based on the assumption that bargaining between polluter and victim is easy, which is not the case in real world. Bargaining process gets more and more complex as the number of stakeholders increase and property rights is ill-defined. Bargaining process may break down just because there is no agreement on the division of gains. Secondly, it assumes that there is no transaction cost. Transaction cost is the cost over and above the value of exchange. We observe that bargaining process involves various costs of entering into an agreement such as commission paid to a middleman, cost of meetings and taxes.

Thirdly, we can visualise Coase theorem as a motivation for 'emission trading'. For example, suppose a firm has the rights to emit 50 tons per day of emission. The firm can sell part of this emission rights to other parties. In the process, the firm reduces its own emission and makes some money in return. This provides incentive to the firm to innovate on clean technology and reduce its emission as much as possible (with the implication that it sells its emission permit to the maximum). Fourthly, the government can exercise its rights to redefine property rights keeping environment management and pollution problem in view.

Check Your Progress 1

- 1) Why does Pigou suggest imposition of taxes on polluting agents?

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- 2) Explain how, according to Pigou, the rate of pollution tax is decided?

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- 3) Explain how, according to Coase, externalities can be internalized in the production process.

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18.4 POLLUTION ABATEMENT OPTIONS

Control of pollution is a major goal for all countries now, particularly since the second half of the twentieth century. Several regulations and policy measures have been instituted by national governments in this direction, individually and collectively, in the form of guidelines, standard setting and incentives for enabling emitters to revisit their actions. Some of these measures have been effective in curbing pollution while others have not. In other words, there are certain policy instruments that work in some context while in others, not. When we evaluate an environmental policy, we look into two major issues viz. efficiency in production and effectiveness of the policy instruments in controlling pollution.

In order to control pollution, there are certain 'direct policy measures' which can regulate the level of the pollutants. In many cases, however, it is difficult to measure the pollution load originating from a polluting agent. However, it might be easier to link certain output produced (or input used) to the pollution load. For instance, given the level of technology, the emission from a cement factory is proportional to the quantity of cement produced. Similarly, the effluents discharged from a paper mill would be proportional to the wood pulp used or energy consumed. By regulating the production of such output (or the use of inputs) we can keep pollution under check. Thus, they become 'indirect policy measures' where the impact point is not the pollutant but some other factor.

Researchers have attempted to categorize the policy measures on environment management, although there is no consensus in terms of the typologies and the nomenclature. According to Meral (2015), Baumol and Oates (1979) were among the first to develop a typology of pollution abatement measures. The terminology they used however was different from the terminology used these days. Baumol and Oates (1979), for instance, classified the policy instruments into four types viz. i) moral suasion, ii) direct control, iii) market processes, and iv) direct government investment. The suitability of these instruments and their efficacy are different according to the nature and extent of the environmental degradation. Baumol and Oates (1979) were highly sceptical about the effectiveness of moral suasion as they perceived virtuous behaviour of people and voluntarism to be diversionary tactics. According to them, direct controls are necessary, particularly when pollution level is so high that concerned polluting activities must be prohibited. They visualized certain limitations of direct control measures viz. i) it may not be effective due to red-tapism and delays, ii) it discourages technological innovation, and iii) pollution standards set by the regulating authorities are often not based on reality.

In modern day literature on environment management, three broad types of policy measures are in vogue viz. i) moral suasion, ii) command and control (CAC) measures and iii) market-based instruments (MBI). Under the moral suasion approach, the government attempts to change people's behaviour through moral appeals. Several instances of this approach can be seen around us. The government often issues advertisements appealing people to use public transport, not to litter around, not to waste water, etc. Many non-governmental organisations (NGOs) support government initiatives through creation of awareness among people towards conservation of environment. The efficacy of moral suasion in pollution control is however doubtful in many cases. It has been effective in situations where there is virtually no compliance

cost, circumstances where people do not have to pay much in terms of money, time or choices. It has not been successful in situations where compliance cost is high or the polluting activity is widely and traditionally practiced (for instance, burning of crackers during Diwali festival).

Under the CAC approach, the government or certain regulatory authority regulates the polluting agents to adhere to certain standards in the production process. Under this approach, certain economic activities, considered to be polluting, are prohibited. In other cases, a quota for certain polluting activities is determined and allocated among firms through licensing. In the CAC approach, either the government or its designated body fixes the standards for various pollutants (liquid, gas, noise, etc.) emerging out of various pollution sources. The standards are fixed by keeping the assimilative capacity of the ambient environment as well as the adverse impact on human beings and environment. These standards could thus be of two types: a) ambient environment standards, b) industry specific standards. The ambient environment standards refer to the limits set for various pollutants that is considered to be safe for living beings and property. These standards have been prescribed for ingredients of the environment such as air, water and noise. The recently introduced Air Quality Index (AQI) in India is an instance of such standards. Industry specific standards refer to limits prescribed for the pollutants emerging out of specific industrial processes. For instance, the Central Pollution Control Board (CPCB) of India has set the maximum limits of the parameters such as acidity (pH), biological oxygen demand (BOD) and chemical oxygen demand (COD) contained in the effluents discharged into water bodies from various water-polluting industrial activities. These standards vary across industries keeping the nature of the production activity and technology of production available in view.

The CAC measures are considered to have two limitations. First, it imposes higher cost on society for realizing a target. Second, it does not leave any scope for innovation in clean technology. The CAC does not distinguish between polluting agents and puts a universal ban on certain activities. We can cite examples from Rittenberg and Tregarthen (2009) to explain the above. Suppose two firms, A and B, dump 500 tons per month of certain pollutant (i.e. total emission is 1000 tons per month) and no fee is imposed by the government on these firms. Suppose the government plans to cut down the emission level load on the society by half i.e. both the firms are instructed to cut down their emissions to the tune of 250 tons per month. This is a CAC measure in the sense that both firms are required to cap their emissions to 250 tons per month. Such a CAC measure appears fair as there is equitable distribution of emission on both the firms. However, as we will see below, the cost to the society is much higher in the case of CAC and the same objective can be attained at a lower cost to society.

Suppose firm A is quite old and it is extremely costly to reduce emission to the level of 250 tons per month. On the other hand, firm B is much newer and has some pollution abatement equipment in place. Suppose, cost involved in reducing the 251st ton of emission is \$1000 to firm A and \$100 for firm B. In a regime where there is no fee imposed on the polluting firms, the marginal benefit to firm A is \$1000 and that to firm B is \$100. Under CAC, for realizing emission level of 500 tons per month, cost to the society is \$1100. Let us consider an alternative scenario, where firm B is required to reduce the emission to the level of 249 tons while firm A is permitted to emit 251 tons. Firm A saves \$1000 while firm B incurs additional cost of \$100. Here again, total emission reduced is 500 tons per month, but there is a substantial gain to the society – there is a saving of \$900. Thus, if the marginal costs of pollution abatement are different, resource allocation under CAC is inefficient. If firm A and firm B are allowed to trade their emission levels (say, through some sort of tradable permit), the society can attain

the same target of 500 tons per month of emission at a much lower cost. Such trading will continue till the marginal abatement cost is the same for both the polluters. Further, such a policy will provide incentives to firms to go for cleaner technology as it saves on costs to them.

The inefficiency of the CAC measures is explained in Figure 18.3. We measure the level of output and emissions of both the firms on the X-axis. On the Y-axis we measure costs and prices. Output of firm B is measured horizontally from left to right while that of firm A is measured from right to left. The abatement cost curves of firm A and firm B are given by the lines 'cd' and 'ab' respectively. The abatement cost curves are upward sloping with the implication that as a firm resorts to more and more reduction in pollution, per unit cost of pollution abatement increases. In Figure 18.3 we find that abatement cost for firm A is much higher than that for firm B. If there is no regulation on emissions, both the firms will not take into account their pollution levels and operate at levels which maximise their profits. When a cap (or upper limit) is imposed on the firms (through a CAC measure), firms A and B produce cQ and aQ (equal quantity and the allocation of output between the firms is at Q) levels of emissions. In this case, for firm A, the compliance cost would be the area (E+D+C+H). On the other hand, compliance cost for firm B would be area B only. Thus, it is cheaper for firm B to comply with the government decision than firm A.

Let us look into the alternative policy option of MBI. The efficient level of production for the society is when firm A produces quantity cR and firm B produces quantity aR, the intersection point of the abatement cost curves. Here, abatement cost for firm A is area E and that for firm B is area (B+D). Thus MBI imposes a lower cost on society than CAC. Now suppose, the government imposes a tax at the rate of 't' per unit of output if pollution abatement is not installed by the firms. The government generates revenue equal to area (A+B+C+D+E+F). However, the firms will have the incentive to install pollution abatement equipment rather than payment of tax, if it is cheaper. Thus, if we evaluate the effectiveness and efficiency of the three policy options viz. moral suasion, CAC and MBI, while the efficacy of moral suasion is doubtful being in conflict with profit maximisation, CAC is effective but it is achieved at a higher cost while MBI is both effective and efficient.

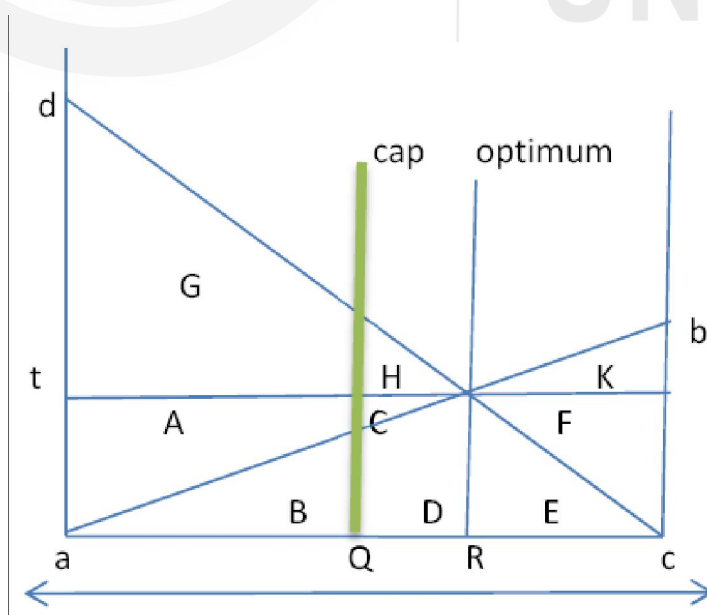


Figure 18.3: Inefficiency of CAC Measure

Under MBIs we have a number of policy instruments, each having its own importance and relevance. Section 18.5 elaborates on the MBIs.

18.5 MARKET-BASED INSTRUMENTS

As mentioned earlier, there is a divergence between private cost and social cost in the case of polluting activities. In order to regulate these activities the CAC approach puts emphasis on imposition of bans and controls. The MBIs, on the other hand, use economic incentives or market stimuli for internalizing the environmental costs. The main aim of the MBIs is creation of a market mechanism where the social cost of pollution will be borne by the polluters. Thus, the divergence between private cost and social cost will be avoided and polluting goods will be produced at their socially optimum level.

18.5.1 Advantages of MBIs

There are several advantages of market-based instruments: i) they are efficient in allocation of resources; ii) they provide incentives for innovations in clean technology; iii) they are more appropriate when policy emphasis is shifted towards a preventive measure, and iv) they can be an important source of revenue for the government. In fact, the MBIs are considered to provide ‘double dividend’, in the sense that they control pollution on the one hand, and generate revenue to the government on the other. The revenue generated through MBIs can further be utilized for environmental protection.

18.5.2 Categories of MBIs

Although many researchers have attempted to categorise the MBIs, there is no consensus on it [Meral, 2015]. The MBIs can be broadly put under seven categories on the basis of the type of economic instruments. These are: i) property rights, ii) market creation, iii) fiscal instruments, iv) charge instruments, v) financial instruments, vi) bonds and deposit-refund system, and vii) liability systems (Table 18.1). Most of the instruments under these categories are self-explanatory and hence are not elaborated here. Some specific issues however need to be pointed out.

Under property rights, the government defines property rights (or makes modifications in it) so that environment degradation is moderated. Policy instruments under market creation have the common thread that a market, which did not exist earlier, is created. Such markets (as shown in the previous section in the instance on trading between two firms A and B), help in reducing inefficiency and production is at the least cost. Fiscal instruments and charge instruments have the advantage that they reduce compliance cost of attaining a set target thereby enhancing economy wide performance. The disadvantage with fiscal instruments and charge instruments, however, is that it is politically difficult to raise them to optimal level.

Financial instruments or subsidies are the incentives given to the polluting agents to abate pollution. It may be in various forms like financial subsidy, soft loan and grants, sectoral/revolving funds, financial aid in installing new technology, subsidies for environmental R&D expenditure, etc. Financial instruments, particularly subsidies and soft loans/grants on pollution abatement inputs, are highly popular both in developed and developing countries. In these cases, there is however a danger of dead-weight loss (defined as the difference between the monetary value of what the government loses and what the beneficiaries gain due to the subsidy) largely due to high costs relative to benefits. A question therefore arises: Why does the incentive mechanism work? It has been theoretically proved that paying pollution tax is always costlier to the polluter than adopting pollution control measures. Thus, it is cheaper for a firm to adopt pollution abatement measures (installation of clean technology, effluent treatment plants and more efficient utilization of exhaustible resource) than paying the taxes.

Table 18.1: Taxonomy of Market-based Instruments

Sl No.	Broad Category	Description
1	Property Rights	1. Ownership rights (land titles, water rights, mining rights) 2. Use and development rights
2	Market Creation	1. Tradable emission permit 2. Tradable catch quotas 3. Tradable development quotas 4. Tradable water shares 5. Tradable resource shares
3	Fiscal Instruments	1. Pollution taxes (effluent charges, emission taxes) 2. Input taxes 3. Product taxes 4. Export/Import tariff 5. Tax differentiation
4	Charge Instruments	1. Effluent charges 2. User charges 3. Betterment charges 4. Administrative charges 5. Impact fees 6. Access fees 7. Road tolls
2	Financial Instruments	1. Financial subsidy 2. Soft loan and grants 3. Location/relocation incentives 4. Sectoral/revolving funds 5. Financial aid in installing new technology 6. Subsidies for environmental R&D
4	Bonds and Deposit - Refund Systems	1. Deposit - refund schemes to encourage recycling 2. Environmental performance bonds (e.g. forest management) 3. Land reclamation bonds (e.g. mining) 4. Waste delivery bonds 5. Environmental accident bonds (e.g. oil spills)
5	Liability Systems	1. Legal liability 2. Non-compliance charges 3. Joint and several liabilities 4. Natural resource damage liability 5. Liability insurance 6. Enforcement incentives

Source: Panayotou (1994)

In the literature on environmental economics, both taxes and charges are often used interchangeably indicating that a negative price is levied in proportion to the amount of damage imposed on the society due to pollution. It is also known as the price to be paid to internalize the social cost emerging out of environmental problems. However, while tax has a straightforward single connotation, user charge has many. Some of the charge instruments can be elaborated as follows:

- Effluent charge - charge levied on the pollutant to internalize the social damage emerging out of pollution activities.
- User charge – fee levied for using the environmental resources;
- Administrative charge - fee levied by the government for implementation or monitoring various environment associated legislation.

Environmental taxes imposed and collected on various environmental items can be used exclusively for environmental protection activities in the form of soft loans or grants for the development of improved technologies and resources, and related infrastructure development. In a way, such an encouragement could be very effective in environmental management.

18.5.3 Choice Among MBIs

MBIs influence decision-making in such a way that the chosen alternatives would lead to an environmentally more desirable situation than in the absence of the instrument. Hence, economic instruments allow the polluting agents the freedom to opt for instruments in a way they themselves think are most beneficial to abate pollution. The presence of a number of policy instruments makes it difficult to choose the correct one. Some of the factors that should be taken into consideration while evaluating a policy instrument are:

- a) **Effectiveness:** A policy instrument should be judged on the basis of its effectiveness in controlling pollution. If the particular policy instrument does not give intended results it should be avoided.
- b) **Socio-economic efficiency:** The environmental objective should be realized at the minimum cost so that society's resources are utilized in an optimal way i.e. without any wastage or additional costs. For a policy to be considered 'efficient', the total costs (including costs to the government, individuals and firms) involved in implementing the policy must not outweigh the total benefits.
- c) **Dynamic efficiency:** The policy instrument should provide incentives for environmental improvement over time and space. A policy instrument may also be judged by the extent to which it can be adapted to changing market, technology, knowledge, social, political and environmental conditions.
- d) **Equity:** The costs and benefits of the policy instrument should be distributed equitably among sections of society i.e. the interest of the poor and vulnerable sections should be particularly protected. Moreover, the richer section should not be in a position to influence policy-making to safeguard their interest.
- e) **Operational feasibility:** Given the level of socio-economic development of the economy, it should be feasible to implement the policy instrument. The political and bureaucratic machineries should be capable of backing its implementation.
- f) **Community acceptance:** The success of a policy instrument critically depends on the degree to which the community accepts it. In order to make the community understand the objectives and benefits of the policy instrument there should be public consultations and education programmes.

18.5.4 MBIs in Developing Economies

In developing economies, use of MBIs for pollution control is yet to emerge as a major policy tool. Several reasons could be ascribed to this. Market is not fully developed as production is for self-consumption in quite a few cases. There is considerable unemployment and under-employment that prompts people to venture into nearby forests to collect fuel wood and other forest products. In the industrial sector, R&D is barest minimum which restricts innovations in pollution abatement devices. The scale of operation in many cases, particularly in the MSME sector, is such that installation of pollution abatement technology is not cost-effective. Moreover, in many developing economies

growth gets priority over environmental concerns. In order to attract investment governments in developing economies often make provisions for subsidized raw materials and land to industries [a phenomenon known as the ‘pollution heaven hypothesis’]. Under such circumstances, adoption of MBIs need to be made with caution. In particular, the following points should be paid attention.

- a) There should be adequate knowledge base on the benefits and costs of policy instruments i.e. institutional and technological constraints should be kept in mind while designing the MBIs.
- b) There should be a strong legal structure i.e. clear definition of property rights and the ability to transfer such rights.
- c) Many of the policy instruments, particularly tradable permits, require the existence of a competitive market. If competitive market does not exist, and cannot be created, the policy instrument may not be effective.
- d) Enforcement is one of the major problem areas in developing economies. There should be adequate administrative capacity to design, implement, monitor and enforce the MBIs.

We have mentioned earlier that MBIs offer ‘double dividend’. If environmental taxes are introduced mainly as revenue raising instruments rather than as an environmental protection measure, it may boomerang leading to inefficiency in resource allocation. Notwithstanding their limitations, MBIs are making its headway in advanced developing countries like Korea, Malaysia, Chile, China, Thailand and Taiwan including many Latin American and African countries.

18.6 INFORMAL REGULATIONS FOR POLLUTION ABATEMENT

It is observed that in developing countries environmental problems has been attributed, in addition to other constraints, to inefficient enforcement mechanism for pollution control. As a result, other agents like non-governmental organisations (NGOs), self-regulation by corporate sector (corporate social responsibility – CSR, for instance) and judiciary (National Green Tribunal, for instance) have played important roles in moderating environmental degradation. Informal regulation can be of various forms such as stoppage of work, demand for compensation, social movements, etc.

18.6.1 Role of NGOs

There are several NGOs, international as well as Indian, working in the area of environment management. Increasing public awareness on adverse effects of environmental degradation has also resulted in several social movements for protection of environment. NGOs have taken initiatives in regulating polluting activities in many countries including India. For instance, Narmada Bachao Andolan (Save Narmada Movement), Chipko Movement, Balco Movement are examples of public concern for environment protection in India. According to the ‘central pollution control board’ (CPCB), NGOs are assisting the State Pollution Control Boards by carrying out activities like:

- conducting preliminary surveys in river basins and air pollution control areas for identification of sources of pollution.
- keeping a vigil on extraction of water/discharge of effluents to water bodies.

- conducting analysis of water quality to ascertain quality of water supply by local bodies.
- providing information on requirement of prohibition on disposal of polluting matters on any river stretch – for notification under Section 24 of the Water Act.
- providing information on violation of permits by polluting agents such as discharge of excessive effluents in odd hours.
- providing information on violation of prescribed standards by polluting agents.
- providing information on sudden damages to the environment not noticed by the State Pollution Control Board.

18.6.2 Self Regulation by Corporate Sector

Of late, corporate sector has come to realise that it is in the interest of the industry to comply with environmental standards and contribute to environment management. Traditionally, corporate sector has been associated with creation of awareness among people towards environment conservation, creation of public conveniences, afforestation activities, etc. These activities are in the form of charity, as part of corporate social responsibility. In recent years, there is a surge in dissemination of information on performance of industries such as use of raw materials, production process, pollution abatement policy, conservation of resources, and disposal of effluents/emission. On the basis of such information, investors have formed opinion on the performance of the firms and its long term sustainability. The stock market also has begun evaluating the environmental performance of industries through stock values.

The regulation process works as follows. Normally, an investor will look into overall performance of a unit before investing in it. If its production is not efficient due to various environmental problems, this will obviously reflect on the overall performance, and hence, the financial benefits. As a result, the environmentally inefficient industrial units with its weak performance have been rated low compared to the units with good performance. As a consequence, the industrial units with bad environmental performance have significant impact on stock values. Though this has been practiced in both developed and developing countries, it has yielded good results in developed countries who are better able to effectively regulate the pollution levels of the industrial units. Some studies have estimated the loss of polluting firms in the stock market as shown in Table 18.3.

Table 18.3: Performance of Stock Markets and Polluting Industry

Author/Country	Impact on Stock Market
Mugoghalu et al (1990)	Average loss of 1.2%
Lanoie, Laplante (1994)	Average loss of 1.6% to 2%
Klassen, McLaughlin (1996)	Average loss of 1.5%
Hamilton (1995)	Average loss of 0.3%
Lanoie, Laplante and Roy (1997)	Average loss of 2%
Gupta and Goldar (2005), India	Average loss of 11%

Source: World Bank, 2000; Gupta and Goldar, 2005.

In recent years, the corporate sector has come to realise that environmental management benefits a firm in several respects such as expansion of marketing opportunities, higher profits, and increased production due to smooth functioning of the units. In view of this, several leading corporate firms have started the process of self-regulation in meeting environmental standards voluntarily without the compulsion of the regulatory bodies.

The process has got identified with the ISO certification in the form of ISO-14000 series which pertain to performance of firms with respect to environmental efficiency. The International Standards Organisation (ISO) is a standard-setting body comprising of representatives from various national standards organisations including India. According to ISO, the process is set 'to promote more effective and efficient environmental management in organizations and to provide useful and usable tools – ones that are cost-effective, system-based, flexible, and reflect the best organizations and the best organizational practices available for gathering, interpreting, and communicating environmentally relevant information'. ISO-14000 is a voluntary approach to environmental regulation. Certification is provided by third-party organisations i.e. ISO does not provide certification directly. If an industry is holding the ISO-14000 certificate it means that it has all the characteristics of global competence in the environmental standards. Hence, self-regulation has also emerged as an important instrument for pollution control.

18.6.4 Judiciary and Pollution Control

The judiciary has been very active in environmental protection throughout the world in recent years. Notwithstanding the fact that there are several limitations of the judiciary in handling environmental issues, it has several advantages also. Some of the issues related to the involvement of judiciary in environmental protection are listed below.

- a) The judiciary often encounters the problem that the judges are usually non-specialists in environmental aspects. However, they have an overall vision of sustainable development and they are aware of national policies and strategy.
- b) The judiciary only acts upon cases and issues brought up for litigation. Thus, a comprehensive policy framework may be missing.
- c) Very often, it is observed that government does not take unpopular decision as political parties resort to populist measures. In the process, there is inaction or passivity on the part of the government towards conservation of environment. The autonomy of judiciary from bureaucracy and political process, however, helps the judges in taking many unpopular decisions to protect the environment.

In India, judiciary is involved in several landmark judgments concerning environment protection in cases such as the Bhopal gas tragedy, pollution of river Ganga, Tehri Dam project, Narmada valley project, and relocation of industries in Delhi, etc. Though association of judiciary with environmental protection is age old, it has been more prominent since the mid-1990s. Divan and Roseancranz (2001) analyse the number of cases handled by judiciary in India for the period up to 2000. According to them, judiciary handled 409 cases during this period of which about 40 percent (163 cases out of 409) pertain to the period 1996-2000. In terms of the environmental issues handled, although it has handled all related issues, more prominently the issues relating to the ecosystem (27.6 percent of the total) followed by urban development and air pollution dominates.

For effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources, the government of India established the National Green Tribunal (NGT) in 2010. The tribunal has jurisdiction over all the major environmental legislations in India including its various components like water, air, forest and biodiversity. The NGT is equipped to handle environmental issues as it includes judicial as well as environmental experts. Each bench of the NGT will have at least one judicial member and one professional expert in the field of environment. The NGT has taken several strong decisions including imposition of ban on diesel vehicles

older than ten years in Delhi, imposition of environmental tax on commercial vehicles entering Delhi and ban on constructions in Sundarbans.

Check Your Progress 2

- 1) Explain the advantages of MBIs over CAC measures in controlling pollution.

- 2) What are the factors that should be kept in mind while evaluating a market-based instrument?

- 3) Why should developing countries be more careful in adopting market-based instruments?

- 4) State the role of judiciary in environmental protection.

18.7 LET US SUM UP

Environmental pollution is considered as ‘public bad’ that arises mostly due to the problem of externalities and the lack of property rights. As the polluter does not take into account the social cost due to pollution in his decision-making, there is more than optimal supply of polluting goods. Earlier, public policy to control pollution was in the form of command and control measures. In recent years, however, policy instruments in the form of taxes, charges and tradable permits, based on market incentives and polluter pays principles, have become quite popular, particularly in developed countries. These instruments are considered to be better than CAC regulations as the compliance cost is lower providing scope for innovation. Although MBIs have made inroads into developing countries, they are not used extensively. The level of economic development, nature of technology used and priority assigned to growth over environment are some of the factors responsible for the slow pace of MBIs in developing countries. In such circumstances informal regulations – by judiciary, corporate firms, and community groups – have been quite popular in developing countries.

18.8 KEY WORDS

- Assimilative Capacity** : It reflects the extent to which the pollutants can be absorbed by the environment. For instance, the air can assimilate gaseous emissions to a limited extent, beyond which its quality will deteriorate.
- Carrying Capacity** : The carrying capacity of an ecosystem is defined as the size of the population or community that can be supported by the resources available in the ecosystem.
- Command and Control** : CAC regulations demand very specific actions from pollution sources for compliance, such as installing a specific type of scrubber or following a strict emissions rate. It lacks the flexibility of MBIs.
- Deposit Refund System** : Under this system, a surcharge is collected on the price of potentially polluting products. When pollution is avoided by returning the products or their residuals, a refund of the surcharge is granted. An instance could be the requirement to deposit certain security while purchasing a dry cell which would be refunded after the used dry cell is returned.
- Ecological Balance** : Ecology is the study of the interaction of the living organisms to one another, and to their surrounding. Similar categories of animals compete among themselves for food (e.g. plant eaters like cow, horse, deer, etc. compete for grass; flesh eaters like lion and tiger compete for their food on other animals in the forest). Thus, on the whole, a food chain is maintained where one species depends upon others. The relation between different species of plants and animals, including human beings, should be such that each group gets adequate food and shelter and leads a healthy life. In the ecosystem, a balance is maintained naturally.
- Emissions Trading** : Under this approach, a firm which releases less pollutants than the limits specified, is allowed to sell its permit to another firm with higher emission. The objective is to maintain total emission at a constant level, which could be set at the assimilative capacity of the environment. Thus, reduced emission of one firm is offset by higher emission by another.
- Natural Sink** : Environment acts as a natural sink for many pollutants as it assimilates these pollutants. Trees and plants are instances of 'carbon sink' as they

	absorb compounds of carbon from the atmosphere and store it.
Tradable Permit	: Refers to a governmentally granted license to pollute the environment that can be bought and sold. Theoretically, the government provides property rights to a firm to pollute the environment to a certain extent. Tradable permits are allocated on the basis of auctioning so that the auction price will eventually approach the pollution abatement cost through installation of better technology.
User Charge	: A payment made for the direct benefit derived from using a good or service. It is different from a tax in the sense that a tax is paid without receiving a reciprocal benefit.

18.9 SOME USEFUL BOOKS/REFERENCES

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4. Rittenberg, Libby and Timothy Tregarthen, 2013, *Principles of Microeconomics*, Flat World Knowledge Inc., Chapter 18.
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18.10 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Elaborate on the point that MC_s and MC_p are different in the case of a polluting firm. Pigou suggested the imposition of pollution tax so that both are made equal.
2. Explain by using Fig. 9.1. The rate of tax is equal to the divergence between MC_p and MC_s at the point of equilibrium.
3. Your answer should include issues such as property rights, bargaining and trading.

Check Your Progress 2

1. Basically, two criticisms are levelled against Pigouvian taxes. One, externalities can be internalized through a bargaining process. Two, it does not talk about compensation principle.
2. The criteria for evaluation of a policy instrument are effectiveness, efficiency, equity, operational feasibility, and community acceptance. See Sub-section 9.5.3.
3. See Sub-section 9.5.4 and answer.
4. Go through Sub-section 9.6.3 and answer.

UNIT 19 ENVIRONMENTAL SECTOR II

Structure

- 19.0 Objectives
- 19.1 Introduction
- 19.2 Environmental Problems in India
- 19.3 Environmental Policies in India – Air & Water
 - 19.3.1 The Water (Prevention and Control of Pollution) Act, 1974
 - 19.3.2 The Air (Prevention and Control of Pollution) Act, 1981
 - 19.3.3 Environmental Protection Act (EPA), 1986
 - 19.3.4 Shortcomings of the Existing Pollution Control System
- 19.4 Forest Policy in India
- 19.5 National Environmental Policy (NEP), 2006
- 19.6 National Action Plan on Climate Change (NAPCC) 2009
- 19.7 Energy
 - 19.7.1 Energy Consumption Pattern
 - 19.7.2 Energy Security
 - 19.7.3 Energy Pricing
- 19.8 Mining Policy
- 19.9 Land Acquisition
- 19.10 Alternative Institutional Mechanisms for Pollution Control
 - 19.10.1 Choice of Instruments
 - 19.10.2 Policy Instruments Adopted in India
- 19.11 Let Us Sum Up
- 19.12 Key Words
- 19.13 Suggested References for Further Reading
- 19.14 Answers/Hints to CYP Exercises

19.0 OBJECTIVES

After going through this unit, you will be able to:

- explain the critical nature of environmental problems in India;
- outline the evolution of environmental policies in India (with a focus on Air and Water);
- state the shortcomings in the existing pollution control systems in operation in India;
- describe the evolution of Forest Policy in India over time;
- specify the various national missions of NAPCC, 2009;
- analyse the status of energy consumption and energy security in India;

- explain the methods of energy pricing adopted in India;
- discuss the Mining Policy in India;
- critique the issues behind the debate on the Land Acquisition Policy in India; and
- indicate the alternative institutional mechanisms in application for pollution control in India.

19.1 INTRODUCTION

Governments in various countries have enacted legislations to prevent pollution of natural resources such as air and water and to conserve and ensure sustainable use of forest resources. In India various Acts have been put in place to protect the environmental resources. In the theoretical literature on environmental policies, there is a choice among policy instruments ranging from ‘command and control’ (CAC) instruments to ‘market based instruments’ (MBI). Until the early-1970s, most countries including the developed ones, relied heavily on the CAC instruments. Since the 1970s, many developed countries have been using MBIs for environmental conservation with a perceptible difference in the choice of MBIs made. The United States, for instance, has preferred ‘tradable emission permits’ (mainly because of its reliance on the principles of allocative efficiency of market resources) while countries in Europe have preferred the fiscal approach to address the problems of pollution (in view of their commitment to welfare state).

19.2 ENVIRONMENTAL PROBLEMS IN INDIA

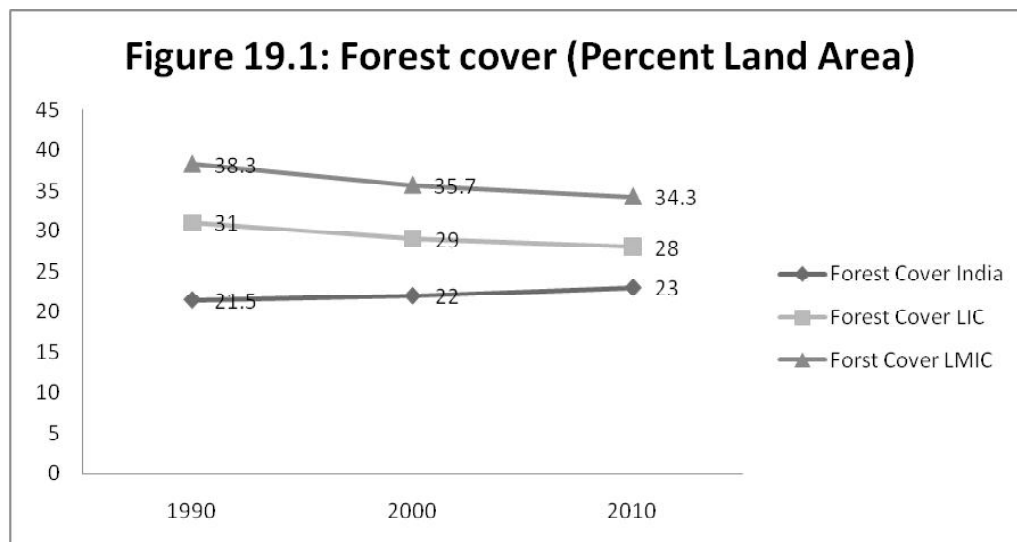
A country’s dimension of environmental problems vary with its stage of development, structure of its economy, production technologies in use and its environmental policies. While some problems may be associated with the lack of economic development (e.g. inadequate sanitation and clean drinking water), others are exacerbated by the particular choice of methods and techniques used in the economic activity (e.g. air and water polluting). Poverty, in particular, presents special problems for a densely populated country like India. The major sources/dimensions of environmental problems (in India) can be identified as follows.

Land/Soil Degradation

Most of the land area in India show evidence of degradation affecting the productive resource base of the economy. Out of the total geographical area of 329 million hectares, as much as 175 million hectares (53.2 percent) is considered degraded. Erosion by water and wind are the most significant contributors to soil erosion with other factors like water logging, salination, etc. adding to the ‘*in situ*’ degradation.

Deforestation

Forests are a renewable resource and contribute substantially to the economic development by providing goods and services to forest dwellers, people at large and forest based industries, besides generating substantial volume of employment. Forests also play a vital role in enhancing the quality of environment by influencing the ecological balance and life support system (e.g. checking soil erosion, maintaining soil fertility, conserving water, regulating water cycle and floods, balancing carbon dioxide and oxygen content in atmosphere, etc.). As per ‘India State of Forest Report 2013’, the total area of forest and tree cover in the country is 78.92 million hectare or about 24 percent of the total geographical area of the country. The National Forest Policy (1988)

Figure 19.1: Forest cover (Percent Land Area)

Source: CSE, 2013

has set a target of 33 percent forest cover for the country. Though there has been some improvement in forest cover in recent years, major part of the increase in forest cover has been in 'open forest category' (i.e. outside the forest area). There has, in fact, been a net decline of 627 sq kms in forest cover in the north eastern states. The mangrove cover in coastal areas in India too have declined by 34 sq kms.

Bio-diversity

With only 2.4 percent of the total land area of the world, India contributes 8 percent of the known global biological diversity. Loss of biodiversity, owing to increased economic growth, has become a major cause of environmental threat worldwide. The major causes of the loss of biological diversity are: (i) depletion of vegetative cover to expand agriculture; (ii) mining; (iii) poaching; (iv) illegal trade of wildlife products; etc. The biodiversity loss is of serious concern in view of its ecological and economic values. The main sources of these values of biodiversity are: pharmaceuticals, ecosystem (as loss of biodiversity may impact agriculture and human health), tourism (like Silent Valley National Park in Kerala) and existence.

Atmospheric Pollution

Air pollution is widespread in the country and regular monitoring is carried out (under the National Ambient Air Quality Monitoring System) with the quality of air expressed in terms of Suspended Particulate Matter (SPM). The main factors contributing to urban air quality deterioration are growing industrialization and increasing vehicular emission. Small scale industries, especially foundries, chemical manufacturing and brick making, are also significant polluters. In the power sector, thermal power (which constitutes bulk of the installed capacity for electricity generation), is an important source of air pollution. It is estimated that two/three wheelers constitute about 75 percent of the total vehicles and contribute to more than 50 percent of the total vehicular pollution load. In 2014, WHO assessed 1,622 cities worldwide (for PM 2.5 i.e. particulate matter of less than 2.5 micron size) and found that India is home to 13 of the 20 cities with the most polluted air. Indoor pollution in India, inhaled from dung-fuelled fires and paraffin stoves and lights, are estimated to take the lives of more than 1m persons a year. The human cost in terms of indoor and outdoor pollution combined is estimated to cause the death of over 1.6 million lives a year.

Water Pollution

The water quality data on rivers, lakes, ponds, tanks and groundwater locations (monitored under the Water Quality Monitoring network) are evaluated against the water quality criteria. The monitoring results for 2010 indicate organic pollution [measured in terms of bio-chemical oxygen demand (BOD) & Coliform bacterial count which gives indication of extent of water quality degradation] continues to be the predominant pollution of aquatic resources. For rivers, domestic sewage is identified as the major cause of contamination. A 2012 central pollution control board (CPCB) report reveals that 2723 million litres a day (MLD) of domestic sewage is generated along the main stretch of the river Ganges whereas industrial waste accounts for about 500 MLD. Thus, the pollution from domestic sewage accounts for roughly 85 percent of the total contamination. Recent assessments show that there is a massive gap between generation of domestic sewage and its treatment capacity with the existing treatment capacity estimated at only 44.3 percent of actual requirement.

Solid Wastes

Rapid growth and lack of appropriate management of urban waste without necessary infrastructural services and proper collection, transportation, treatment and disposal of solid wastes have resulted in increased pollution and health hazard from these wastes. Urban Municipal Wastes which is a heterogeneous mixture of paper, plastic, cloth, metal, glass, organic matter, etc. are generated from households, commercial establishments and markets. The per capita waste generation rate in India has increased from 0.44 kg per day in 2001 to 0.5 kg per day in 2011.

Coastal and Marine Pollution

The coastal areas of India, with a coastline of over 7500 km. harbour a variety of specialized marine ecosystems (e.g. mangroves, coral reefs, salt lakes, etc.) which form the habitat for endangered marine species and commercially important marine flora and fauna. These areas are exposed to multiple stresses like: ship breaking, transport, tourism, industrial activities including oil spills, discharge of sewage and industrial effluents, etc. The cumulative impact of the above sources/factors on coastal ecosystem is believed to have impacted the overall ecosystem service flow and bio-diversity. These have been exacerbated by rising temperature, changing rainfall pattern, ground water depletion, glacier melt, sea level rise, etc. commonly referred under 'global warming'. It is in this context that we need to study specific policy measures initiated to control environmental degradation of air, water, etc.

19.3 ENVIRONMENTAL POLICIES IN INDIA – AIR & WATER

Environmental policy collectively refers to strategies and actions needed to maintain the non declining flow of services from environmental resources like air, water, etc. It also refers to the steps necessary to address the threat of global warming. The first systematic assessment of India's environment was undertaken in 1971. Later, as a follow up of UN's Stockholm Conference in 1972, the government set up the National Committee on Environmental Planning and Coordination. This marked the first institutional arrangement for formally addressing environmental concerns. The Indian Constitution, which did not originally contain explicit provisions on environmental protection, was amended in 1976 (by way of the 42nd Amendment) to make environmental protection a fundamental duty of citizens and an obligation on the part of the state. To address the

emerging problems, the Department of Environment was established in 1980 and later was revamped into a full-fledged Ministry of Environment & Forests (MoEF) in 1985. The ministry is currently the apex body for making policy and supportive legislation in respect of environmental matters. In this section, we shall discuss some important air and water Acts formulated to control pollution in India.

19.3.1 The Water (Prevention and Control of Pollution) Act, 1974

The Act prohibits the release or discharge of ‘any poisonous, noxious or polluting matter’ into any water stream or well. The Act specifies the effluent standards to be complied with while causing discharge of sewage or sullage or both. The Act provides for obtaining the consent from the State Pollution Control Board (SPCB) for any type of new discharge into any new stream or well. This also includes consent for temperature discharges as done by cooling tower users. Penalties for non-compliance in terms of imprisonment and fine per day of violation or both plus expenses incurred for sampling, analysis, inspection etc. are specified by the Act. Penalties are also imposed for obstructing any person acting under the orders or direction of the Board or for damages to any work or property of the Board.

A Water (Prevention and Control of Pollution) Cess Act, 1977 provides for the levy and collection of a cess on water (consumed by persons or for running of industries by individuals or local authorities) with a view to augment the resources of the Central and State Boards engaged in the prevention and control of water pollution. The industries specified for coverage in Schedule I are: metallurgical, mining, ore processing, petroleum, petro-chemical, chemicals, ceramic, cement, textiles, paper, fertilizer, coal, power generating (thermal and diesel) and processing of animal or vegetable products. Collection of Cess is based on the quantity of water consumed. The state government has the jurisdiction to collect the cess from the industry.

19.3.2 The Air (Prevention and Control of Pollution) Act, 1981

This Act was passed for the prevention, control and abatement of air pollution. The Act defines air pollutant as ‘any solid, liquid or gaseous substance present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment’. The Act accords power to the state governments (i.e. the SPCB) to prohibit the burning of certain materials in the specified areas and requires the obtaining of prior approval to operate an industrial plant. The government may also insist on the installation of ‘pollution control equipment’ prior to giving its consent to an industry for its operation. In case of any new technology coming up for better control of emissions, the SPCBs can insist on the same to being installed. Besides specifying standards to industries, the Act provides for the imposition of penalty (a fine of up to Rs. 5,000 for every day during which contravention continues after conviction) including imprisonment for cases of contravention of its orders. The law further makes it clear that when a company commits offence, the officers of the company would be held responsible and punished.

19.3.3 Environmental Protection Act (EPA), 1986

EPA was enacted to deal with the catastrophic reality brought home by the Bhopal gas tragedy. It took a comprehensive view of the environment and extended the scope of regulation to cover almost all forms of pollution. Using this Act, the government framed wide-ranging laws for pollution control like hazardous substance regulation,

environmental impact assessment, protection of the coasts and other ecologically fragile areas, etc. In particular, for pollution control, the govt. notified detailed standards for discharge of effluents, emissions and noise. Norms for hazardous waste management were designed to fix responsibility on persons generating the waste which required a permit to regulate its handling and disposal. Similar notifications specifying the provisions and regulations concerning development in ecologically sensitive areas have been made. The Act gave the SPCBs vast administrative powers to directly ensure compliance with the laws instead of taking legal recourse as was the case before. The Act also gave the central pollution control board (CPCB) overriding authority over the SPCBs. A development of utmost importance was that the Act gave 'citizens' the right to initiate proceedings against the defaulting industries and the boards.

19.3.4 Shortcomings of the Existing Pollution Control System

There are many shortcomings of the existing pollution control system. These are:

- (a) the standards are source-specific, either technology-based or performance-based. This gives very little option to the polluters to search for cleaner technologies or improved abatement technologies. As the marginal abatement costs vary among firms, this policy will not achieve cost minimization.
- (b) the penalties for non-compliance with the standards are unrelated to the compliance costs. The prosecution decisions, including the court decisions, are based on compliance or non-compliance and not on the extent of compliance.
- (c) there are many enforcement problems. For instance, polluters can escape liability by establishing diligence or lack of knowledge about the extent of emissions. Further, most SPCBs do not have adequate trained manpower and equipment to detect violations and prepare cases. The judicial system too is characterized by lack of expertise on environmental matters leading to long delays in delivering judgements.
- (d) there is no viable alternative dispute settlement/conciliation mechanism. Other channels for enforcements like adverse publicity affecting firms' market prospects, innovative auditing procedures and involvement of local people/agencies in monitoring have not yet been tried.
- (e) the ambient and source standards are laid down independent of the volume of pollution generation activities. In light of this, it is quite conceivable that the quality of environment could continue to deteriorate even with a high degree of compliance.

19.4 FOREST POLICY IN INDIA

Independent India inherited and continued with the colonial forest policy. In the Indian Constitution, forests were originally placed in the state list of subjects. They were managed by the forest departments of respective states through laws enacted by them under the Indian Forest Act, 1927. The Act empowered state governments to declare forests on specified non-private lands as 'reserved forests'. This declaration had the effect of removing any existing private rights on the access of forests and their resources. Later, in 1952, the government announced its first National Forest Policy. The policy, in principle, recognised the ecological functions of forests by laying down that at least one-third of the country's land area should be brought under forests.

The subsequent two decades witnessed massive deforestation as states were unable to protect forests in the face of perceived needs of enhanced economic development.

Major expansion of forest-based industries, aided by subsidized wood prices, put great stress on forests. Forests were cleared for cultivation, extraction of timber, mining and quarrying, industrial projects, construction of dams, etc. As a result, forest cover was reduced to less than one-fifth of geographical area as against the prescribed one-third. Apart from seriously endangering the ecological balance, it resulted in widespread uprooting of forest dwellers from their habitats.

To rectify the situation, in 1976, an important policy decision was taken to transfer the subject of forests from the state to the Concurrent List (42nd Constitution Amendment, 1976). This empowered the central government to act directly in the management of forests. To check rapid deforestation, a Forest Conservation Act was enacted in 1980. This Act mandated prior approval of the central government before a state government could de-reserve a reserved forest, use forest land for non-forest purpose, or assign forest land to a private person or corporation. The transfer of responsibility to the central government did not, however, significantly improve the situation, as at its core, the forest policy continued to consist of 'fencing of forest' to protect it from the people! As a result, over time, with the growth in population, scarcity of fuel and fodder assumed such crisis proportions in different parts of the country that it led to organized protests. It became clear that a policy based on centralized policing would be impossible to implement effectively.

A new National Forest Policy announced in 1988 marked for a significant departure from the past in respect of conservation strategy. The new policy stressed that henceforth forests would be maintained only for ecological functions and for meeting the subsistence need of the people. It recommended that industry must meet its needs from farm forestry. More significantly, recognizing the people's rights over forest resources, it suggested that the forest departments should work together with village communities and voluntary agencies for 'joint management of forests' (JMF). Following the guidelines issued to this effect in 1990, most state governments took steps to establish JFM-groups. Under this, village communities were given conditional access to forest products like fuel wood, fodder, and non-timber products. In return, the village community was to undertake to protect the forest against encroachment, poaching, and timber smuggling. The JFM programmes have met with a fair degree of success as evidenced by their geographical spread, increased number of JFM-groups and increased forest cover area. Despite this, the conflict between the need for conservation and the needs of local people has continued to persist. A proposed Scheduled Tribes (Recognition of Forest Rights) Bill seeks to accord legal recognition to the rights of tribals to forest lands and their produce.

Table 19.1: Forest Policies, Acts and Regulations – 1865 to 2012

Act	Broad Objective
Indian Forest Act, 1865	Forests were declared as state property
Indian Forest Act, 1878	Provided for the constitution of Reserved Forests and Protected Forests.
Forest Policy, 1894	The State was declared the sole regulator of the management and use of forests (including the forests land not owned by the state). The claims of the cultivation were given priority over forest preservation.
Indian Forest Act, 1927	Provisioned the taking over of private forests by the government.
Government of India Act, 1935	Forests were made entirely the concern of the provinces.
National Forest Policy, 1952	Monopoly rights of State over forests continued.
Wildlife Protection Act, 1972	Government's right to decide on the areas for Wildlife protection stipulated.

National Commission of Agriculture, 1976	Recommended an aggressive programme of reforestation on denuded lands for meeting the needs of villages. Coined the term 'social forestry programme' as an attempt to reconcile industrial forestry and livelihood needs of the poor.
42 nd Amendment of Constitution, 1976.	The subject 'forest', originally included in the State list was transferred to the Concurrent list to ensure a uniform policy and management of forests.
The Forest Conservation Act, 1980	Granted legal sanction to state forest departments to appropriate forest resources from traditional forest dwellers.
National Forest Policy, 1988	Acknowledging the linkage between lives of tribal population and forests, the policy stipulated that forests cannot be exploited for commercial purposes but must be conserved and used for subsistence needs of forest-dependent communities.
Panchayat Extension to Scheduled Areas (PESA) Act, 1996	Aimed at protection of tribal land.
The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, 2008 & 2012	Granted protection for tribals from eviction (2006). Recognized the rights of the Scheduled Tribes and Other Traditional Forest Dwellers (2008, 2012).

Source: Compiled from different sources.

Check Your Progress 1 [answer the questions in about 100 words in the space given]

1) In what way 'forests' contribute to enhancing the quality of environment?

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2) What are the major causes for the loss of bio-diversity?

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3) How is the functional jurisdiction between the States and the Centre specified in the EPA, 2006? What in particular is a notable feature of this Act?

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4) State the major shortcomings of the EPA, 2006.

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- 5) What was the major initiative taken in mid-1970s to improve the condition of 'forests' in India? What are its main features?

- 6) Was the initiative of 1976 helpful in improving the position on 'forests' in India? What was the important lesson learnt and by what means the anomaly set-in was rectified?

19.5 NATIONAL ENVIRONMENTAL POLICY (NEP), 2006

A National Environment Policy (NEP) was announced in 2006 with the following broad objectives:

- (i) protect and conserve critical ecological systems and resources;
- (ii) ensure equitable access to environmental resources and quality for all sections of society (i.e. inter-generational equality and livelihood security for poor);
- (iii) ensure judicious use of environmental resources to meet the needs and aspirations of present and future generations (i.e. intergenerational equity);
- (iv) integrate environmental concerns into policies, plans, programmes and projects for economic and social development (i.e. integration of environmental concerns to economic and social development);
- (v) ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output to minimize adverse environmental impacts (i.e. efficiency in environmental resource use);
- (vi) apply the principles of good governance (transparency, rationality, accountability, reduction in time and costs, and participation) to the management and regulation for use of environmental resources (i.e. environmental governance); and
- (vii) ensure higher resource flows (comprising finance, technology, management skills, traditional knowledge, and social capital) for environment conservation through mutually beneficial multi-stakeholder partnerships between local communities, public agencies and investors (i.e. enhancement of resources for environmental conservation).

Enforcement and Monitoring

The NEP-2006 proposes the following two measures to improve the enforcement and monitoring of environmental regulations:

1. Give greater legal standing to local community-based organizations to undertake monitoring of environmental compliance and report violations to the concerned enforcement authorities.
2. Develop feasible models of public-private partnerships to leverage financial, technical and management of resources of the private sector in setting up and operating infrastructure for monitoring of environmental compliance, with suitable safeguards against conflict of interest or collusion with the monitored entities.

To improve the effectiveness of environmental standards, the NEP-2006 advocates the following three specific measures:

1. Set up a permanent machinery comprising experts in all relevant disciplines to review notified ambient and emission standards in the light of new scientific and technological information and changing national circumstances ensuring adequate participation by potentially impacted communities and industry;
2. Strengthen the network for monitoring ambient environmental quality, including monitoring through participation by local communities and public-private partnerships; and
3. Progressively ensure real-time and on-line availability of the monitoring data.

To forge an effective public-private partnership, the NEP identifies a number of specific themes. These include: (i) Joint Forest Management, (ii) monitoring of environment quality, (iii) afforestation of degraded forests, (iv) raising environmental awareness, (v) running of sewage and effluent treatment plants on 'Build, Own, Operate' (BOP) basis, etc.

Drawbacks of NEP, 2006

Despite the above innovative approaches indicated, the NEP 2006 is critiqued to suffer from many drawbacks. These include:

1. Lack of Transparency and Participatory Approach: The process of policy formulation followed has been opaque and undemocratic with no known plans for consultations with local communities.
2. Lack of Statement of a Vision with well Defined Goals and Objectives: A Policy must have clarity of a long-term vision (with goals and objectives) with an identification of the problems that it seeks to address. The NEP falls short of the essential elements of such a policy orientation.
3. Lack of Specification of an Organisational Structure and Governance System: The NEP does not specify any particular organization structure or management system for implementing the policy and monitoring of its progress. Nor has it a decentralized governance and grassroots empowerment vision.
4. Materialistic Stance and Lacking in Gender Perspective: The NEP is critiqued to demonstrate a predominantly materialistic view of the environment. It ignores the fact that environment cannot be improved on a sustained basis unless it is considered a joint responsibility of women and men.

19.6 NATIONAL ACTION PLAN ON CLIMATE CHANGE (NAPCC), 2008

A National Action Plan on Climate Change (NAPCC) was announced in 2008. As part of this action plan, eight national missions, comprising inter-sectoral groups involving government/private/local players, have been constituted. These are:

1. National Solar Mission aimed at significantly increasing the share of solar energy in the total energy mix.
2. National Mission for Enhanced Energy Efficiency for initiating schemes and programmes to enhance energy efficiency in the country.
3. National Mission on Sustainable Habitat aimed at: (a) developing an energy conservation building code for addressing the design of new and large commercial buildings to optimize their energy demand; and (b) initiating steps for recycling of material and urban waste management to ensure ecologically sustainable economic development.
4. National Water Mission aimed at developing integrated water resource management to conserve water, minimize wastage, and recycle waste water and to evolve new regulatory structures combined with appropriate entitlement and pricing.
5. National Mission for Sustaining the Himalayan Ecosystem aimed at initiating measures for sustaining and safeguarding the Himalayan glacier and mountain ecosystem. The Himalayan ecosystem has 51 million people engaged in hill agriculture. The vulnerability of these people is expected to increase on account of climate change.
6. National Mission for Green India for enhancing ecosystem services, including carbon sinks. As part of this, Green India Campaign for the afforestation of 6 million hectares to achieve the national forest-cover target of 33% (from the current 23%) is launched. Projects under the Green India Campaign will be taken up on degraded forest land. An Initial corpus of over Rs. 60000 million has been earmarked for the programme through the Compensatory Afforestation Management and Planning Authority (CAMPA).
7. National Mission for Sustainable Agriculture for developing new varieties of crops with a special focus on thermal resistance. The mission aims at developing alternative cropping pattern that can withstand extreme weather conditions, long dry spells, flooding, and variable moisture availability. This is expected to be achieved through the convergence and integration of traditional knowledge and practice systems, information technology, geospatial technologies, and biotechnologies.
8. National Mission on Strategic Knowledge on Climate Change for identifying the challenges of and responses to climate change. High quality research into various aspects of climate change will be undertaken through this mission particularly to assess the socio-economic impacts of climate change such as implications on health, demography, migration patterns, and livelihood status of coastal communities.

Although the NAPCC is an important initiative, its challenge lies in the implementation of the above missions. Any implementation mechanism will be ineffective unless the stakeholders are fully involved. In view of this, the paramount priority of the government should be to: (i) create highest degree of awareness about the perils of environmental degradation; (ii) promote change of energy habits; and (iii) stipulate industry to take local measures to compensate for the adverse impact of the energy systems they operate.

19.7 ENERGY

Energy is an indispensable ingredient of all the human activities on earth. The energy requirement of India is increasing sharply because of rapid industrialisation, urbanisation, commercialisation, population growth and changing lifestyles of the people. Energy sources may be classified into two categories – commercial and non-commercial. The energy sources that are available in the market for a definite price are known as commercial energy. About one-third of energy use in India comes from non-commercial energy like fuelwood. The major sources of commercial energy are coal, oil, natural gas, hydroelectric power and nuclear power.

19.7.1 Energy Consumption Pattern

Economic growth is desirable for developing countries for which energy is a crucial necessity. However, the relationship between economic growth and increased energy demand is not always linear. For instance, under present conditions, it is estimated that 6 percent increase in India's Gross Domestic Product (GDP) would impose an increased demand of 9 percent on its energy sector. The per capita energy consumption (PEC) for India is too low as compared to developed countries (it is just 4 percent of USA and 20 percent of the world average). The per-capita energy consumption during a year is computed as the ratio of the estimated total energy consumption during the year to the estimated mid-year population of that year. The PEC has increased from 1,204.3 KWh in 1970-71 to 6419.5 KWh in 2011-12 [i.e. a CAGR (compound annual growth rate) of 4.1 percent] in India. Of this, the average annual increase in PEC from 2010-11 to 2011-12 alone is 3.4 percent. Considering that the Indian economy during these years registered high growth rates in its GDP, the relationship between economic growth and energy requirement is underscored. In this context, 'energy intensity', defined as energy consumption per unit of GDP, taken to indicate the development stage of the country, stands at 3.7 times of Japan, 1.6 times of USA, 1.5 times of Asia and 1.5 times of World average. A profile of source-wise energy consumption pattern is presented in Table 19.2 and a sector-wise consumption profile in Figure 19.2. Industry remains the biggest consumer of commercial energy and its share in the overall consumption is 49%, followed by transport (22%), residential (10%), agriculture (5%) and others (14%) (reference year: 1999-2000). Agriculture in India is also a large user of energy with an estimated consumption of about 20 percent of high speed diesel (HSD) and electricity use in the country.

Table 19.2: Energy Consumption in India by Source

Source	1970-71		2011-12		CAGR (1970-71 to 2011-12)
	Consumption (peta joules)	Percent	Consumption (peta joules)	Percent	
Coal and Lignite	1491	38.6	9410	19.9	4.5
Crude Petroleum	770	20.0	8852	18.7	6.0
Natural Gas	25	0.7	1,790	3.8	10.7
Electricity	1574	40.8	27210	57.6	7.0
Total	3860	100	47262	100	6.2

Source: Energy Statistics, MOSPI, 2014

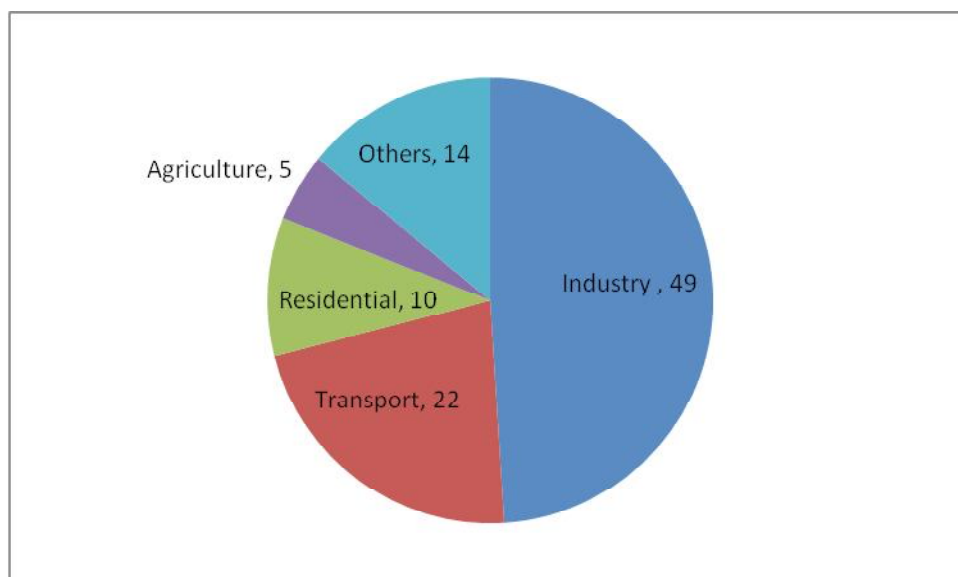


Figure 19.2: Sector-wise Consumption of Energy

19.7.2 Energy Security

Energy security (commercial energy) has been measured using two indicators of energy dependence – energy in terms of imports (ESIM) measured as a ratio of energy imports to energy consumption (multiplied by 100), and security in terms of production (ESIP) measured as a ratio of energy production to energy consumption (multiplied by 100).

An increase in ESIP and a decline in ESIM indicates declining energy dependence and hence an increase in energy security. These ratios are computed and structural shift analysis applied to verify the changes in energy security over a period of time. An illustration of this is provided by the results of the following model:

$$Y_t = b_0 + a_1 D_1 + a_2 D_2 + b_1 t + b_2 D_1 t + b_3 D_2 t + \text{error term (for the period 1981 to 2010)}$$

where Y_t is a measure of energy security, $D_1 = 0$ for 1980-81 to 1990-91 and $D_1 = 1$ for the rest of the period (i.e. 1991-2010); $D_2 = 0$ for 1990-91 to 2000-01 and $D_2 = 1$ for remaining period; and t indicates time. The results of regression indicates increasing energy import dependence in India (Table 19.3) or ‘energy insecurity’ which is seen to have increased in the second sub-period 1992-2001 with a further increase in it during the third period 2002-2010. Looking at energy security in terms of energy production (i.e. ESIP), the opposite trend of continuous decline over the three periods supports the result of ‘energy insecurity’ for ESIM. In other words, there is evidence of ‘energy insecurity’ in India beginning from 1990-91.

Table 19.3: Trends in Energy Security in India (1980-81 to 2009-10)

	1980-81 to 1990-91	1991-92 to 2000-01	2001-02 to 2009-10
ESIM	-1.0	0.0	1.0
ESIP	2.0	-1.0	-2.0

Source: Bhaskar, 2013.

The second important aspect of the energy-environment related problem is that so far as energy use is concerned, the poor of India (as well as those of the world) suffer from 'energy poverty' due to the lack of access to modern energy services like electricity or clean cooking fuel like LPG. About 1.6 billion people in the world have no electricity connection in their homes with another 2.5 billion people (i.e. 40 percent of the world's population) having to rely on bio-fuel like wood and dung-cake (an agricultural residue) for meeting their cooking needs. The share of such traditional fuel constitutes about 30 percent of total primary energy supply in the Indian economy. A major part (90 percent) of such non-commercial energy resources is used for meeting their cooking needs. As per the NSS Survey 61st round for 2004-05, about 71.5 percent of population in India continue to live in villages with 84 percent of rural households and 23 percent of urban households continuing to depend on bio-energy fuel for cooking. For the lighting need, 51.4 percent of the rural households and 7.7 percent of the urban households have no access to electricity either due to lack of income/poverty or due to lack of energy infrastructure (NSSO, 2007).

19.7.3 Energy Pricing

In an energy-deficient country like India, fixing the prices of energy in a way affordable to citizens from every strata of society is a huge challenge. In view of this, price of energy does not reflect true cost to society. Further, the basic assumption underlying efficiency of markets is difficult to apply till the stage where 'energy losses' (both due to transmission and theft) are effectively plugged. The task of providing energy at a reasonable cost for fuel, cooking, heating, electricity, and transportation to approximately 400 million people who do not have access to commercial energy is very intricate. Energy pricing also plays a critical role in enhancing the energy efficiency of an economy since erroneous pricing mechanisms not only affects the gross domestic product (GDP) of the country but also lead to excessive or irrational use of energy resources.

Coal Pricing: Since 2000, the coal pricing is deregulated and on an annualized basis the increase in the price of coal over the period 2000-10 is 4.9 percent which is lower than the average inflation rate in India during this period. Coal prices are determined on the basis of cost incurred in its production by adding up three components viz. basic coal price, incidental charges and statutory charges. While the incidental charges include cost incurred on account of transportation, sizing/crushing, loading and washing, the statutory charges include costs incurred towards royalties, clean energy cess, excise duty, etc.

Oil Pricing: India imports about 3/4ths of its crude oil requirements and hence its price fixation is influenced by factors of market. The sector was completely deregulated in 2002 and the oil marketing companies (OMCs) are now allowed to change the price of petroleum products (like petrol, diesel, LPG and kerosene) keeping in line with the market conditions. However, concerns for the vulnerable population depending on kerosene and LPG has constrained the government to keep these two products subsidized.

Electricity Pricing: Electricity tariffs in India are structured depending on whether they fall in high tension or low tension category. While high-tension consumers are charged based on both demand (kVA) and energy-consumption (kWh), the low-tension (LT) consumers are priced only for the energy consumed (kWh). The pricing is as per the tariff system prevalent in the state electricity boards. The price per kWh varies significantly across States as well as customer segments within a State. Tariffs in India have been modified to consider the time of usage and voltage level of supply. In addition

to the base tariffs, some State Electricity Boards make additional recovery from customers in the form of fuel surcharges, electricity duties and taxes.

Check Your Progress 2 [answer the questions in about 100 words in the space given]

- 1) State the objective of NEP, 2006 implicitly recommending the PPP ventures.

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- 2) Mention the specific measure advocated by NEP, 2006 that involves the application of IT. What specific themes are identified by it for forging effective PPP application?

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- 3) What are the four areas in which the NEP, 2006 is critiqued to suffer from drawbacks?

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- 4) In which three areas, strengthening of stakeholder's involvement is required for effective implementation of NAPCC, 2008?

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- 5) How is PEC measured? During which period, the PEC in India has increased more? What inference can be drawn from this increasing trend?

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- 6) By source of energy consumption, over the period 1971-2012, which source has evidenced a steep decline and which one has registered a steep increase in India?

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- 7) How is 'energy security' measured? What does the available empirical evidence suggest in this respect for India for the period 1981-2010?

- 8) What is meant by 'energy poverty'? What empirical evidence is available for India in this respect?

- 9) Why is 'energy pricing' important? What factors are taken into account for determining the 'electricity pricing' in India?

19.8 MINING POLICY

The Mining industry contributes about 10 percent of the total industrial sector's contribution to the GDP of India. More importantly, mining done on small scale contributes 6 percent of the total value of mineral production. Indian mining industry provides employment to around 700,000 persons. India is the largest producer of mica, third largest producer of iron ore and fifth largest producer of bauxite in the world. However, the mining industry in India is also infamous for human right violations and environmental pollution. In pursuance of the reforms initiated by the government in 1991, the National Mineral Policy announced in 1993 recognises the need for encouraging private investment [including Foreign Direct Investment (FDI)] and for attracting state-of-art technology in the mineral sector. Subsequently, the Mines and Minerals (Regulation and Development) Amendment Act, 1999 was passed. The Act provides for: (a) a new concept of 'reconnaissance operations' distinct from prospecting; (b) delegation of powers to the State Governments to grant mineral concessions for limestone; (c) granting of mineral concessions in non-compact and non-contiguous areas; (d) liberalizing the maximum area limits for prospecting licences and mining leases; and (e) empowering the state governments to make rules to curb illegal mining. A bill introduced in 2011 [by the name Mines and Minerals (Development and Regulation) Bill, 2011] further makes the following specific provisions for the development of mining sector in India.

- Allows state governments to provide for 'preferential' grant of mineral concession, of small deposits in isolated patches, to cooperatives of Scheduled Tribes in the Schedule V and VI areas.
- Prospecting companies shall pay compensation and damages to the persons holding occupation rights to the land.
- Mine leases will be given based on competitive bidding.
- The mine leaseholder will pay compensation to the person holding the traditional rights to the land.
- The bill makes provision for the constitution of a trust called District Mineral Foundation (DMF). Its primary function is the distribution of monetary benefits to persons/families affected by mining operations in the district.
- Profit sharing concept is introduced for the first time in mining laws of the country. A mine leaseholder is to pay annually to the DMF, an amount equal to 26 percent of profit after tax (for coal) or a sum equivalent to the royalty paid during the year (for major minerals). For minor minerals, the state government is to decide the profit sharing percentage in consultation with the proposed National Mining Regulatory Authority.
- The mining company has to provide employment and other assistance as per rehabilitation package of the state government to the people/families holding occupation or traditional surface rights to the land over which the lease has been granted.
- After the termination of a mineral concession, the state government is to assess damages to the land and determine the compensation amount to be paid to the persons holding the traditional rights to the land. The owners of land shall be included in the process of deciding the compensation.
- Notification of public lands for inviting applications to bid for prospecting license or mining lease is to be done in consultation with the gram sabha. The gram sabha or the district council is to be consulted before granting the mineral concession. They are also to be consulted for developing the mine closure plan.
- The central government, in consultation with the state governments, will form a National Sustainable Development Framework (NSDF). The main function of the NSDF is to facilitate and ensure scientific development and exploration of minerals, protection of environment and prevention and control of pollution. There is also a provision for the formation of a State Sustainable Development Framework (SSDF).

More than half of the country's electricity generation is coal based. Of the new capacity for power generation coming up by 2016-17 also, close to 85 percent is coal based. The new mining policy must ease the situation on availability of coal as the country's loss on account of energy generation by coal and its non-availability is contributing to peak power deficit of close to 11 percent. The iron-ore mining is also beset with a political-industry-bureaucracy nexus leading to leases allotted in violation of norms. Such anomalies are needed to be minimised by a transparent policy environment.

19.9 LAND ACQUISITION

Pattern of economic growth in the recent decades has increased demand for land from many quarters like: infrastructure, industry, mining, urbanisation, real estate, etc. The

history of the land acquisition laws stretches back to the Land Acquisition Act of 1870 formulated for making land available for public works. Owing to high litigations and acquisition expenses under the 1870 Act, a new Act was passed with the intention of reducing the resources spent on litigation. The 1894 colonial law too has been quite hostile to the interests of the landowners as it attempts to make land available to government at a minimal price using the legal powers of 'eminent domain'. The present Land Acquisition Bill, called the LARR (Land Acquisition, Rehabilitation and Resettlement) Bill of 2011 was first introduced in the Parliament in September 2011 as

an alternative to the Land Acquisition Act of 1894. The bill was later passed in August, 2013. The salient features of this Act, juxtaposed with the difference with that of its earlier 1894 Act, is presented in Table 19.4. An amended version of the LARR Act, 2013 [in the name of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Bill, 2015] was introduced in the Lok Sabha in February, 2015. Pending its passage in both the houses of the parliament, the amended version is issued for implementation as an Ordinance in December 2014 [in the name of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Amendment) Ordinance, 2014]. The new bill was passed by Lok Sabha in March, 2015 but is pending passage in the Rajya Sabha. The bill creates five special categories of land use viz. defence, rural infrastructure, affordable housing, industrial corridors and infrastructure projects [including public private partnership (PPP) Projects] exempting these five categories from the provisions of LARR Act, 2013 requiring the consent of 80 percent of land owners for private project and 70 percent of land owners for PPP Projects. The bill also exempts projects in the above five categories from social impact assessment (SIA) on land losers. It also removes the restrictions on buying irrigated multi-cropped land imposed by LARR Act, 2013. The bill brings provisions for compensation, rehabilitation and resettlement under other related acts (e.g. the National Highways Act, the Railways Act) in consonance with LARR Act.

Table 19.4: Salient Features of LARR Act, 2013

Salient Features	1894 Act	2013 Act
Consent from Affected People	No provision	Mandatory consent of owners of the Land - 70% for Private Public Participation (PPP) project and 80% for private projects, which could be raised to 100% by State Governments.
Social Impact Assessment (SIA)	No provision	Compulsory SIA for every acquisition.
Multi Crop Land	No provision	Only in extreme situations, with an upper cap of 5% acquisition of multi crop land per district.
Return of land if left unused for 5 years	No provision	Clause present
Consideration of Food Security	No provision	Clause present
Role of Panchayat	No provision	Required public hearing and Gram Sabha.
Land Acquisition can be done by	Public sector	Public Sector and Private Companies

Source: Compiled from the two Acts

Critique of Land Acquisition Acts: The continued use of the old Act of 1894 for the acquisition of land through the 19th/20th century is critiqued for the sovereign power vested with the state by the Act under the phrase ‘eminent domain’ to take over private property and give it to private companies for ‘projects’ regarded by the state as serving ‘public purpose’. In light of this, there was a strong body of opinion in favour of limiting the power of acquisition by the state for private entities. The 2013 Act met this demand partially by limiting the acquisition by the state to 20 percent in the case of private companies and 30 per cent in case of a public-private partnership (PPP) project so long as the owners’ consent for the transfer of the bulk of the remaining land (i.e. 80 per cent of land in the case of the private companies and 70 per cent in case of PPP projects) had been obtained by the private companies. This meant that the view of the majority community on the transfer of land had a priority weight. This safeguard has been taken away in the 2014 Ordinance by virtually dropping the clause of community consent. This change is critiqued to mean the return of the ‘eminent domain’ of the state in full strength and hence non-democratic and authoritarian in its stance.

19.10 ALTERNATIVE INSTITUTIONAL MECHANISMS FOR POLLUTION CONTROL

The institutional alternatives for the management of environment broadly fall under three institutional alternatives viz. (a) market, (b) government, and (c) community or associations of people. The management of environment cannot be left to any one of these institutions as practical policy considerations would involve a mix of all these institutional alternatives. As already explained in section 19.1, there are problems in leaving the management of environment to the free market. In this context, policy instruments suggested in the standard literature can be broadly classified into four categories: (i) ‘command and control’ laws requiring polluters to cut back on emissions or to institute specified treatment procedures; (ii) ‘economic instruments’ [or market based instruments (MBIs)] like the levying of effluent charges or taxes on polluters with the levy varying directly with the level of emissions; (iii) ‘suasive instruments’ like appeals to polluters to cut back or to eliminate altogether their waste discharges for the sake of public welfare; and (iv) ‘government investment’ on common effluent treatment plants constructed at public expense.

19.10.1 Choice of Instruments

The arguments in favour of MBIs is that they can achieve the desired effect at least cost (both in enforcement and compliance – Static Efficiency). They present fewer opportunities for rent seeking than regulations and thus are likely to be more effective. Further, they generate revenues which can be used to strengthen the enforcement administration. However, since in a dynamic world it is critical that environmental policies encourage technological change for pollution control, one of the main advantages of ‘emission charges’ is that they provide strong incentives for this. In spite of the advantages of market-based instruments, CAC systems continue to be popular for the following reasons: (i) They are a source of power and influence for bureaucrats in charge of administering such system; (ii) the regulations are often a sure and predictable way of environmental protection; (iii) there is a lack of understanding on how economic instruments work and their impact on growth and income distribution; (iv) the market-based instruments may raise the costs of production leading to inflation; (v) the levy might be considered as giving a right to pollute; (vi) pollution taxes can be objected on equity grounds and can over-penalise firms in terms of what is conventionally understood

about 'polluter pays principle' (PPP); and (vii) pollution taxes can also be objected on uncertainty grounds.

19.10.2 Policy Instruments Adopted in India

Both regulatory and fiscal instruments have been employed for control and prevention of pollution in India. The government has mainly used three types of regulatory instruments: (i) no objection certificate (NOC) [required in the case of new industries as a certificate of site clearance to be obtained by the entrepreneur from the concerned state PCB for the proposed project]; (ii) consent (required to be obtained after the completion of the industrial project but before the commissioning of the industrial process) which is given subject to the installation of all required pollution control equipment to abate pollution; and (iii) standards referring to specific quantified parameters with respect to measures like disposal, discharge and emission of solid, liquid and gaseous waste in the environment. In addition to the regulatory and judicial means, financial instruments like fines/taxes and subsidies & depreciation allowances are also employed to encourage pollution abatement. For instance, the Water Cess Act (1977 amended in 1988) which provides for : (a) levying a tax or cess on water consumed by certain industries and by local authorities, (b) tax rebates for investment in pollution control equipment, provision of punitive measures like imprisonment with fine for non-compliance with environmental norms, etc. Thus, having maintained a regulatory regime for long, economic instruments are of late being considered as a viable option to internalize the negative externalities of pollution by the application of the 'polluter pays principle'.

Check Your Progress 3 [answer the questions in about 100 words in the space given]

- 1) How is peoples' participation ensured in the Mines and Minerals (Development and Regulation) Bill, 2011?

- 2) On what grounds is the LARR (Amendment) Bill of 2015 criticised?

- 3) State the reasons for the continued implementation of the CAC system for environmental protection over that of the MBIs?

19.11 LET US SUM UP

A country's environmental problems vary with its stage of development, structure of its economy, production technologies in use, environmental policies, etc. The overall position of environmental sector in India can be understood by looking at policies for protection of resources like forest, land, minerals, etc. There are many environmental problems like land/soil degradation, deforestation, air pollution, water pollution, solid wastes, coastal and marine pollution, etc. all of which together contribute significantly to resulting in climate change. Various Acts have been passed and various policies have been framed to combat pollution. There are instruments (based on markets and regulatory mechanisms) to deal with environmental issues with each having their own advantages and disadvantages. In this context, issues of energy security, energy pricing and land acquisition carry important implications as they directly affect the livelihood concerns of poor and sustainable development. The unit has dealt with some of these aspects exposing the learners to the challenges and benefits inherent in addressing these issues.

19.12 KEY WORDS

Act : Statute which has been approved by a law making body; decision which has been approved by Parliament and so becomes a law.

Command and Control (CAC) : refers to the direct regulation of an industry or activity by legislation that states what is permitted and what is not.

Energy Security : IEA defines energy security as the uninterrupted availability of energy sources at an affordable price. Long-term energy security requires timely investments to produce/procure energy and establish supply lines to aid the process of economic development. Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance.

Administered Price Mechanism (APM) : The price of a good or service as dictated by a governmental or other governing agency. Administered prices are not determined by regular market forces of supply and demand.

19.13 SUGGESTED REFERENCES FOR FURTHER READING

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19.14 ANSWERS/HINTS TO CYP QUESTIONS

Check Your Progress 1

- 1) See 19.2 and answer.
- 2) See 19.2 and answer.
- 3) See 19.3.3 and answer.
- 4) See 19.3.4 and answer.
- 5) See 19.4 and answer.
- 6) See 19.4 and answer.

Check Your Progress 2

- 1) See 19.5 and answer.
- 2) See 19.5 and answer.
- 3) See 19.5 and answer.
- 4) See 19.6 and answer.
- 5) See 19.7 and answer.
- 6) See 19.7.1 and Table 19.2 and answer.
- 7) See 19.7.2 and answer.
- 8) See 19.7.2 and answer.
- 9) See 19.7.3 and answer.

Check Your Progress 3

- 1) See 19.8 and answer.
- 2) See 19.9 and answer.
- 3) See 19.10.1 and answer.