Recognizing Externalities in Practice

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Abstract

This article is based on the concept "externalities" (third-party impacts), and attempts to recognize both positive and negative externalities generated by economic activities including consumption and production. The methodology of the study was quantitative, and entirely based on secondary data.

The study reveals that certain benefits of tourism industry can be recognized as positive externalities. They include the creation of indirect emplyment opportunities, the value added to GDP from hotel and restaurant sector, cargo services, and domestic trade and infrastructure development in tourists sites. The government expenditure on education generates positive externalities to the entire society. In the Sri Lankan context, this can be seen in terms of the satisfactory level of labour productivity and increased rate of rural sector labour force participation. The study found that there is a "parallel move" of public expenditure on education and the rate of rural sector labour force participation in Sri Lanka.

Keywords: Education; Externalities; Pollution; Recognition; Tourism

Theoretical Framework

Market transactions are about exchange. We buy something (it may be a good or service) when we are willing and able to pay for that. Therefore, it involves exchange of money. A transaction occurs when value of a particular good or service is believed to be over-weighing the amount of money that is paid to acquire it. On the other hand, we sell something when we are willing to accept what is offered for that, and again it involves exchange of money. This occurs when value of money that we receive is greater than the cost of producing the latter. Thus, market transactions, *i.e.* exchange between buyers and sellers, occur when both parties agree upon the benefits to be received from the particular transactions. But, market transactions may affect certain parties other than buyers and sellers. These certain parties are referred to as the "Third Party". If a third party is affected by a market transaction, then an "Externality" or "Third Party Effect"

occurs. The topic "Externalities" is discussed specially under Welfare Economics, which is considered as a major branch of economics. In addition, the particular topic is related to another branch of economics, called Environmental Economics. However, firstly, one needs to know what is meant by *externality*. As emphasized earlier, some economic agents have benefits or costs, which are separate from the immediate producers and consumers involved in the transaction. These benefits or costs that accrue to an external party, however, not through market mechanism, are known as externalities, and can emanate social benefits or costs to the society.

There is a clear relationship between public goods and externalities. The theory of social goods provides a rationale for the allocation function of budget policy. ... The market cannot solve the entire economic problem. First and most important in the present context, it cannot function effectively if there are externalities (Musgrave and Musgrave, 1984). According to Bhatia (2000), pure public goods are characterized by the existence of externalities, that is economic effects, which flow from their production or use to other parties or economic units. Such economic effects may also be called spillover effects, neighbourhood effects or third party effects. Therefore, an externality is an activity of one entity that unconventionally affects the welfare of another and is not reflected in market prices. According to the definition, there are two requirements that must be met in order to consider an incident an externality, namely, there should be a positive or negative effect to an external party resulting from one's economic activities, and these positive or negative effects should occur out of the market framework, or without any involvement of the market framework.

In addition to the above-mentioned requirements, some important characteristics regarding externalities can also be identified as follows:

1. can be either favorable or adverse
2. occur when one either produces something or consumes something
3. occur due to individual or organizational economic activities
4. can be seen outside the market system or accrue to external parties without any involvement of market mechanism

Positive and Negative Externalities

Positive externalities occur, when external benefits exist. Therefore, *an unpaid for benefit enjoyed by others in the society can be considered as positive externalities*. In other words, a positive externality is one in which a third party benefits from a market transaction. This situation can be explained by using a simple diagram as follows (Figure 01):

Figure 01:Positive Externalities: A Graphical Presentation
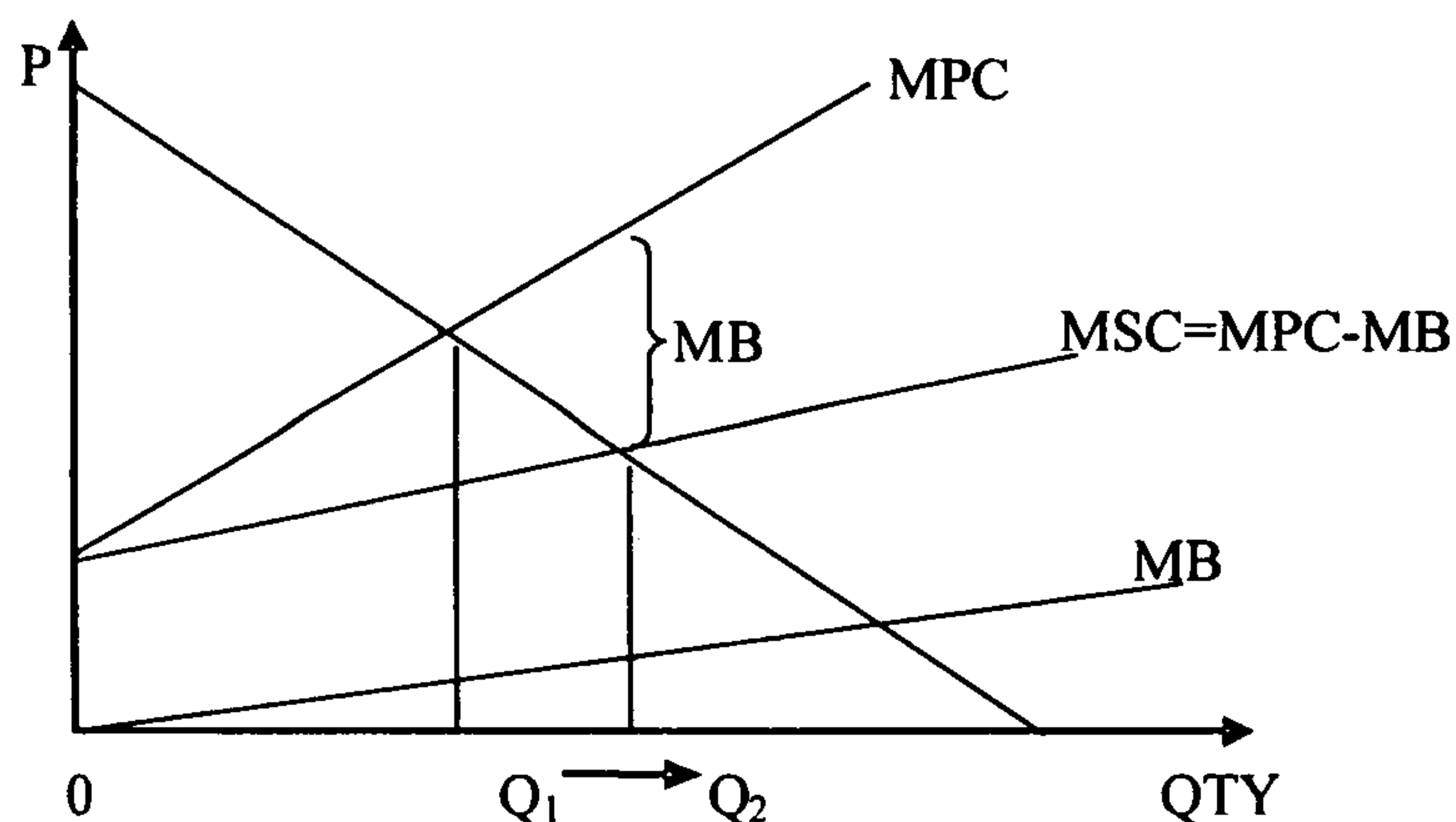
In the above diagram,

- Production cost without externality is along MPC [Marginal Private Cost]
- Consumption without externality is along MPB [Marginal Private Benefit]
- Producers would prefer to produce at Q_1
- There is a positive externality with MB [Marginal Benefit to Third Party]
- The real cost (Marginal Social Cost) is therefore, MSC = MPC-MB
- The optimal production for the whole economy is at Q_2

According to the above figure, two major production levels called *"profit maximizing production level"* and *"socially efficient production level"* can be identified. Profit maximizing production level occurs, when MPB is equal to MPC. Positive externalities cause reductions of marginal private cost, and accordingly, marginal social cost will be as follows:

MSC   =   MPC   -   MB

Therefore, positive externality is seen as a movement of MB curve to the left and the socially efficient output level, which occurs when, MPB is equal to MSC can be identified.

Under these conditions, if there is a positive externality, socially efficient output level will be greater than the profit maximizing output level. Nevertheless, as elaborated graphically, producers should increase their production level from Q_1 to Q_2 in order to reach the socially efficient output level.

BOX 01

Mathematical Illustration of Positive Externalities

Consider the following situation:
The marginal benefits of producing a commodity are given by (200 - 3x), where, x is the number of units produced. The marginal private cost is given by (40 + x). For each unit of production, an external benefit of Rs. 0.60 is inflicted upon the society.

According to the above situation, the profit maximizing level of output can be identified when,

$$MPC = MPB$$
$$200 - 3x = 40 + x$$
$$4x = 160$$
$$x = 40 \text{ units}$$

Accordingly, the firm maximizes profits when it produces 40 units of ouput. A positive externality causes to reduce the real marginal cost or marginal social cost. Therefore,

$$MSC = MPC - MEB$$
$$MSC = (40 + x) - 0.6x$$
$$MSC = 40 + 0.4x$$

The socially efficient output level occurs when,

$$MPB = MSC$$
$$200 - 3x = 40 + 0.4x$$
$$3.4x = 160$$
$$x = 47.06 \text{ units}$$

Thus, producers should increase their output by 7.06 units, in order to yeild the socially efficient output

Note: MPB: Marginal Private Benefit, MPC: Marginal Private Cost,
MSC: Marginal Social Cost,
MEB: Marginal External Benefit

NEGATIVE EXTERNALITIES

As pointed out earlier, some externalities are positive while others are negative. *A negative externality is an uncompensated human caused harm to others in the society.* Therefore, a negative externality is one in which a third party is injured. Environmental pollution is the prime example for negative externalities. The harms created by pollution are known as external costs. This situation can be explained by using a graphical presentation as follows:

Figure 02:Negative Externalities: A Graphical Presentation
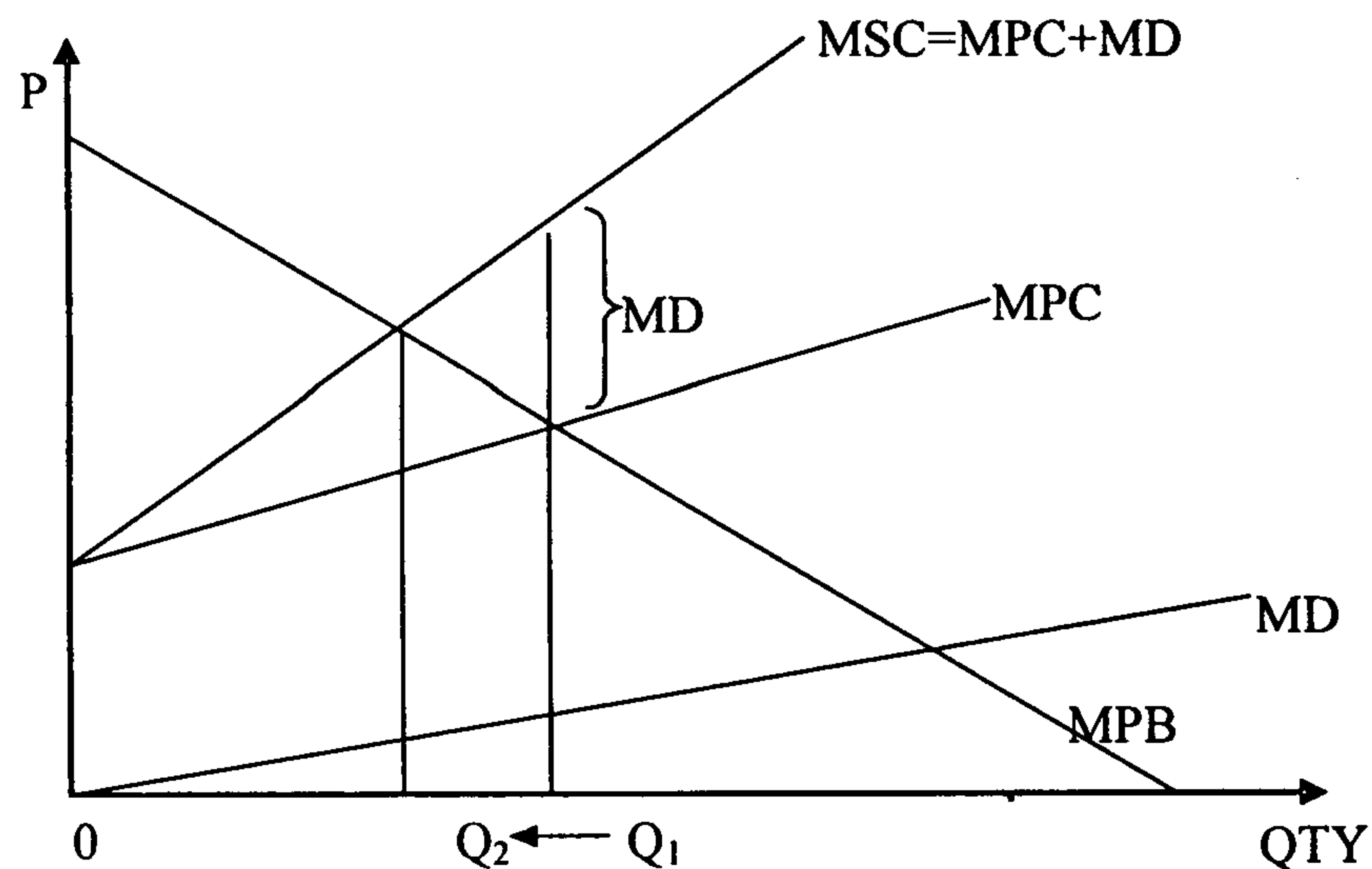
In the above figure,

- Marginal private cost without externality   = MPC
- Marginal Private Benefit   = MPB
- Marginal Damage   = MD
- Producers would prefer to produce at Q_1
- The real cost (Marginal Social Cost) is therefore, MSC = MPC + MD
- The optimal production level (the socially efficient production level) is at Q_2

Under normal conditions, producers produce at marginal private cost (MPC) and consumers consume at marginal private benefit (MPB). Without externalities, the optimum position is where these two coincide at Q_1. However, the negative effects on the environment is an added cost, and the real production cost or marginal social cost is MPC+MD. In the whole economic context, the optimal production point is Q_2. Hence, production level should be reduced from Q_1 to Q_2 in order to acquire the socially efficient level of output.

BOX 02
Mathematical Illustration of Negative Externalities

Consider the following situation:
The marginal benefits of producing a commodity are given by (100 -3x),
where x is the number of units produced. Marginal private cost is given by
(20 + x). For each unit of production, an external cost of Rs: 4 is imposed on
members of the society.

According to above information, profit -maximizing output level can be
calculated, and at the profit -maximizing out put level,

$$MPC = MB$$
$$100 - 3x = 20 + x$$
$$4x = 80$$
$$x = 20 \text{ units}$$

In effect, when the firm produces 20 units, they maximize their profits. Then,
the socially efficient level of output can be derived, and in order to findout the
level, first the real cost or marginal social cost function must be developed. It
can be obtained by adding marginal damage function to marginal private cost
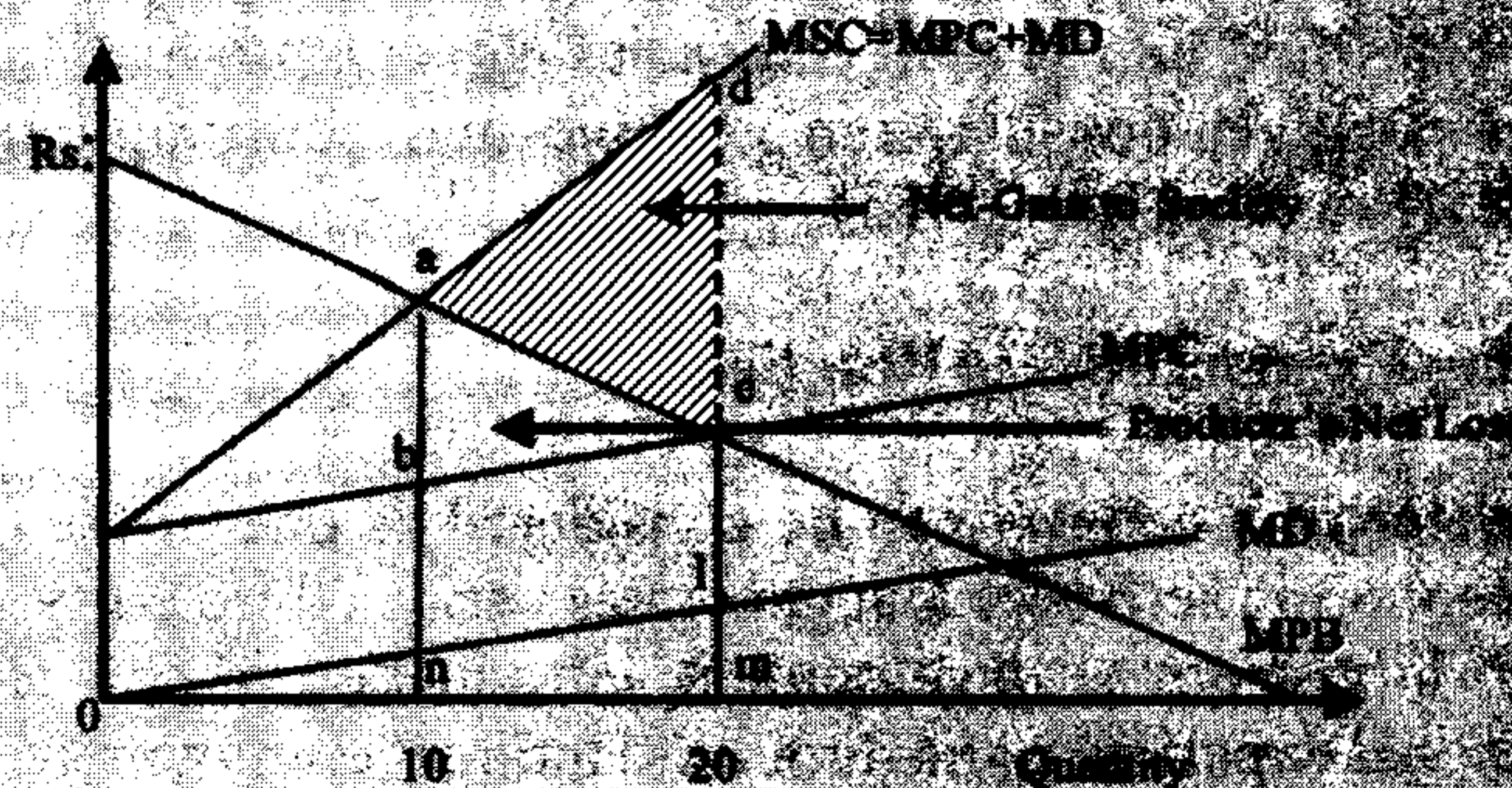function as follows:

$$MSC = MPC + MD$$
$$MSC = (20+x) + 4x$$
$$MSC = 5x + 20$$

At the socially efficient output level,

$$MSC = MB$$
$$5x + 20 = 100 - 3x$$
$$8x = 80$$
$$x = 10 \text{ units}$$

Therefore, 10 units of output should be reduced by the firm in order to yield the
socially efficient output level.
Note: MD: Marginal Damage

BOX 03

Producer's Net Loss and Net-Gain to the Society in Negative Externalities

Moving producer from profit maximizing output level to socially efficient output level will have an impact on the producer as well as on the entire society. As a result of reducing output level, social damage is reduced by the area of "klmn". This is equal to the area of "abcd", because the difference between "MSC" and "MPC" curves is just equal to "MD". Further, producer's net-loss, which is involved in moving from profit-maximizing level of output to socially efficient level of output can be shown by the area of "abc", while the net-gain to society, which results in from the move can be shown by the area of "adc".

Therefore, producer's net-loss (the area "abc"),

$$\int MB - \int MPC$$

$$\int (100 - 3x) - \int (20 + x)$$

$$= \underline{200}$$

Net-gain to society (the area "acd"),

$$\int MSC - \int MB$$

$$\int (5x + 20) - \int (100 - 3x)$$

$$= \underline{400}$$

Externalities occur in the act of producing something. Those are called *"production externalities"*. In production externalities the production set of one firm is directly affected by the actions of another agent. For example, the production of smoke by a steel mill may directly affect the production of clean clothes by a laundry. Consumption externalities occur when we use what we have bought. Those are called *"Consumption Externalities"*. Therefore, in consumption externalities, the utility of one consumer is

directly affected by the actions of another consumer. For example, some consumers may be affected by the consumption of tobacco, alcohol, loud music and so on of some others' consumption.

According to the theoretical background of externalities, externalities can be simply classified into several categories namely, production negative, production positive, consumption positive and consumption negative externalities (Prest and Barr, 1985).

Recognizing Externalities in Practice

Tourism sector of a country can be considered as one of the drastically changing economic activities that generates various third party impacts in the form of infrastructure development, introduction of new technology, and educational experience and direct and indirect employment. Thus, the tourism industry positively contributes to the social and economic development of the country as a whole. According to recent statistics, tourism provides about 10 per cent of the world's income and employs almost one tenth of the world's workforce (Mirbabayev and Shagaztora, 2006). When considering the impact of tourism sector on economy, economists identify three categories; direct, indirect and ¡nduced economic effects. Indirect and induced effects are sometimes called secondary effects (Stynes, 2005). Indirect effects are the production changes resulting from various rounds of re-spending of hotel industry's receipts in other backward-linked industries. Induced effects are the changes in economic activity resulting from household spending of income earned directly or indirectly as a result of tourism spending.

Firstly, improvements in tourist industry has imposed positive externalities on related indirect employments. Acordingly, related indirect employees can be considered as a third party. More generally, related employments consist of small scale hand craft production, diamonds, gems and jewells. During the period from 1998 to 2003, the above mentioned fields of indirect employment have expanded, except a slight downfall in year 2001, as a result of developments in tourism in Sri Lanka as shown in the following table:

Table 01: Indirect Employment Statistics 1998-2003

Year	1999	2000	2001	2002	2003	2004	2005
Total Indirect Employment (No:)	51,184	53,120	47,194	51,100	65,000	75,272	72,919

Source: Annual Report of Central Bank of Sri Lanka -2003 - 2005

As pointed out above, in 2001, number of indirect employments have come down resulting from the degeneration in the tourism sector in Sri Lanka. This further proves that related indirect employments are positively affected by the improvements in tourism industry. Further, the rate of economic growth of the country is stimulated through higher value added to the GDP from domestic trade, hotel and restaurant and cargo handling, storage and warehousing. There is an increasing trend in aforesaid national income headings with the increasing number of tourists arrivals. The entire society is benefited through the higher rate of economic growth, and this is entirely external to the market mechanism, thus, referring to a positive externality generated through the industry.

Table 02: The Value Addtion to GNP at Contant Factor Cost Price (Rs: Million)

Year	Domestic Trade	Hotel and Restaurant	Cargo Handling, Storage and Warehousing
2001	79,423	4,970	7,364
2002	82,499	4,868	7,521
2003	86,216	6,153	5,262
2004	87,947	6,958	9,316
2005	91,669	4,943	10,231

Source: Annual Report of Central Bank of Sri Lanka, 2005

According to World Tourism Organization (2006), stimulation of infrastructure investment can be considered as one of the main third party positive impacts created. Tourism can induce the local government to make infrastructure improvements such as better water and sewage systems, roads, electricity, telephone and public transport networks, all of which can improve the quality of life of residents.

Once considering the transportation sector in Sri Lanka, civil aviation sector plays an important role in improving various aspects of the economy. The civil aviation sector of Sri Lanka includes air passenger transportation by the national career, foreign air lines and related infrastructure developments, which were undertaken during the last three years. As a result, the scale of operations, in terms of hours and passenger kilometers flown, has expanded substantially during the period as shown in the following table:

Table 03: Salient Features of Sri Lankan Air Lines

| Year	1999	2000	2001	2002	2003	2004	2005
Hours Flown	35,970	52,819	47,402	41,935	49,144	61,790	63,700
Passenger Kilometers Flown	5,185	6,860	6,556	6,180	6,926	8,316	8,545

Source: Annual Report of Central Bank of Sri Lanka -2003 - 2005

In turn, as a third party, tourism industry has been positively affected by these developments in the transportation sector. In other words, developments in Sri Lankan air lines have imposed positive externalities on tourism industry in Sri Lanka. As a result, tourist arrivals have drastically increased in year 2003 once compared with the year 2002. In 2003, tourist arrivals have been 5,00,642, which was a 27.3% increase in contrast to 3,93,174 arrivals in 2002. Thus, developments in Sri Lankan air lines have invariably been one reason for the improvements in tourism, and these improvements in tourism can be considered in terms of tourist arrivals, tourist guest nights and gross tourist receipts.

In the 1990s, the government of Sri Lanka took initiatives to revive the tourism sector, including the introduction of the tourism master plan. Attractive incentives were provided for foreign investors in tourism sector development. Since then, tourists arrivals have been on the rise. It is worth noting that stimulation of infrastructure facilities is highlighted at the local and provincial level in Sri Lanka and they are responsible for presenting tourism plans and budgets to the central government (Mathews, 2000 cited in Lai, 2002). In addtion, a number of non-governmental organizations and research institutes, such as Wildlife Conservation Society, Young Biologists' Association and the recently formed Ecotourism Society of Sri Lanka, are actively involved in the development, protection and management of tourism resources in Sri Lanka. To facilitate tourism development, and attract foreign investment in tourism projects, the Sri Lanka Board of Investment offers various incentives, such as preferential tax rate and duty free imports of raw materials and equipment. Rapid expansion of the transport network around the country is in progress and this will provide easy access to tourist destinations.

Moreover, when considering the industrial sector of Sri Lanka, the output of chemicals, petroleum, rubber and plastic products, the third largest category in private sector industries, can be considered as an originator of negative externalities on the environment. This is because, there is a direct and strong relationship between emissions of carbon dioxide (CO_2) and the value of industrial product. The following table clearly demonstrates this particular relationship:

Figure 03: The Relatioship between Industrial Sector Expansion and the Level of Air Pollution in Sri Lanka
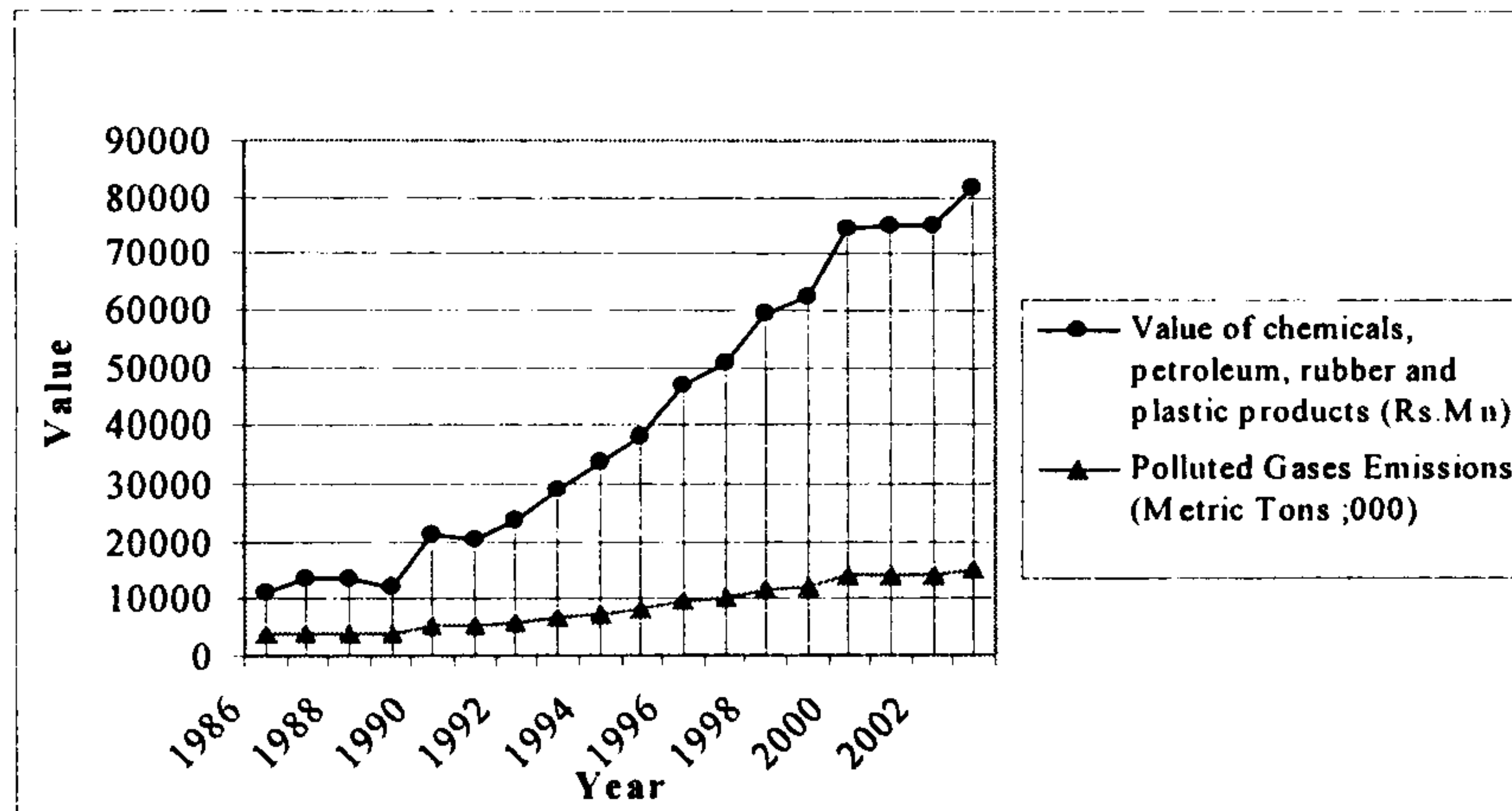
Source-: Annual Report of Central Bank of Sri Lanka, 2001 and United Nations Statistics Division, 2003

When it comes to Sri Lankan commercial consumption, 78% is fulfilled by petroleum while the rest, which is 22%, is by hydroelectric power. Therefore, petroleum products have become increasingly important in generating energy. However, this usage has generated a negative externality on the environment by emitting carbon dioxide to air. Hence, it is evident that, air is becoming polluted with the expansion of the industrial sector.

Many studies published in the *Journal of the American Medical Association (2002)* provides strong evidence, that air pollution, which is common to many metropolitan areas, significantly increases the risk of residents in dying from lung cancer and heart disease. In addition, air pollution can be considered as a causative factor in development of childhood "asthma". In order to diagnose, whether air pollution actually causes asthma, researchers have studied kids in defferent age groups living in different cities. In highly polluted cities, kids who played outdoor sports were 3 to 4 times more likely to develop asthma than kids who played no sports. Therefore, asthma is a major public health problem of increasing concern in the United States. Further, carbon monoxide is a colourless gas that can cause sudden illness and death. Carbon monoxide is found in combustion fumes such as those produced by cars and trucks, small gasoline engines, and burning charcoal. People and animals in these spaces can be poisoned by breathing such air, and the most common symptoms of carbon monoxide poisoning are headache, vomiting, chest pain and confusion. Further, high levels of carbon monoxide ingestion can cause loss of conciousness and death.

Externality as a Rational for Public Sector Intervention in Education

Even Adam Smith, often regarded as a champion of laissez-faire, recognized a need for govrnment intervention and provision in a number of selected areas, including the establishment of Justice System, the enactment and enforcement of laws, protection againsts invasion and the provision of schools and other public goods (Cornes and Sandler, 2006). After Adam Smith's justification through his book of "Wealth of Nation", Pigou (1946) introduced another rationale for government intervention into the market place that at first appeared not to invlove public goods *per se*. The Pigouvian correction concerned externalities, in which the action of one economic agent influences the utility or production function of another and no mechanism for compensation exists.

When one examines what governments do, a variety of activities can be seen at all fiscal levels. Governments allocate resources for those goods and services for which the private sector fails to assign sufficient resources. Defense, education, and highways can be mentioned as examples (*op.cit, 2006*). Therefore, it is very much clear that in relation to public goods, there are two output levels namely, profit maximizing output level and socially efficient output level. Specially, private sector organizations are providing goods and services up to the profit maximizing output level. The socially desired output level indicates the total requirement of goods and services that is needed for fulfilling all the requirements of the people in a country. Hence, socially desired output level is greater than that of profit maximization in most cases, generating a lacuna between the two output levels. How this gap should be bridged? There should be an intermediary organization willing to mediate in bridging that gap in spite of profit maximizing conditions. What is that organization? That is no other organization, but the government sector. Accordingly, public goods like national defense and education can be considered as special cases of externalities. Thus, externalities represent a source of market failure regarded as justifying government intervention.

According to Hall (2006), government intervention in education is justified on the ground that there are positive externalities. In theoretical speaking, positive externalities occur when an external benefit is generated by the producer of a good [service] but, there is no market for the externality to compensate for producing the particular external benefit. The positive externality argument is perhaps the most commonly cited justification for government involvement in education (Poterba, 1996; cited in ibid, 2006).

Education is often seen as a personal learning process by which information, skills, and values are acquired and processed for the

development of such mental functions as understanding, thinking and evaluation (Nanayakkara, 2004). Hence, the process of education creates many favourable neighborhood effects (positive externalities) by which the entire society is benefited. Accordingly, system of education should function as the motive power impelling individuals and groups toward achieving major national goals. According to Nanayakkara (2004), there are four primary purposes of education namely, creative thinking, hard work, social skills and pride in nation. This study underscores positive externalities of education in terms of pride in nation through national interest. Development of a country is a collective process in which each and every member of the society should take part in the decision making process through any mode of participation available. In other words, every individual should have a stake (interest) in participating in the development process of the country.

...some argue that education increases civic engagement and thereby contributes to a stable and democratic society (Hall, 2006). The level of citizen participation in the development process is a direct function of the level of education. One of the direct modes of absorbing the participation of citizenry is voting in national elections. The degree of civic engagement through voting is directly influenced by the level of education of people in a particular country. To what extent people are interested in participating in elections (voting) can be measured by using percentage polled in an election. Regardless of certain personal benefits, the percentage polled (number of people voted/total number of registered voters* 100) shows to what extent people are with the development move of the country. The following table shows the percentages polled at different elections held in Sri Lanka:

Table 04: Percentage Polled in certain elections in Sri Lanka

Election	Percentage Polled
General Election-1956	69.0%
General Election-1960 (March)	77.6%
General Election-1960 (July)	75.8%
General Election-1965	82.1%
General Election-1970	85.2%
General Election-1977	86.7%
General Election-1994	95.2%
Presidential Election-1994	70.5%
General Election-2001	75.83%

Source: General Secretariat of Elections, Sri Lanka, 2007

Once reflecting upon the percentage polled in several elections held in Sri Lanka, it can be stated that the average polled is 80 per cent. Thus, as in many civilized societies, in Sri Lanka, the level of civic engagement

through voting is at a satifactory level. Voting for a particular political party at an election means extending support for a specific set of policies. Having understood public policy agenda presented to the general public during pre-elections, voters select a party or candidate to be voted. This further shows ability to realizing election manifestos presented by various political parties, recognizing different kinds of policies and orientation towards participation, which in turn is highly dependent upon one's level of education resorting to a stable and democratic society. As Hall (2006) argues, a stable and democratic society is impossible without a minimum degree of literacy and knowledge on some common set of values. The presumed existence of a positive relationship between an educated citizenry and a well-functioning democracy was a core justification for the common school movement of the early nineteenth century (Dee, 2004).

Moreover, the extensive political science literature almost uniformly shows a positive relationship education and voting (Wolfinger and Rosestone, 1990). When considering the number of rejected votes in Sri Lanka elections, the rate is almost negligible, standing at an average of approximately 3.5 per cent. Hence, correct participation of the populace in national decision making is an outcome of education, making the society more democratic and stable.

The government involvement in education can again be rationalized since there is a positive impact on economic growth through increased labour productivity. Labour productivity is the output of a worker in a given amount of time (Kaylor, 2007). Conceptually, there are a number of ways of measuring labour productivity, and basically, one can measure output per worker. Alternatively, productivity can be measured per hour worked (Lindsay, 2004). Many studies have been conducted to show the positive relationship between labour productivity and public expenditure on education. Most of the academics in the field of public finance argue that the increased labour productivity of a country is a result of generating positive externalities through education.

> *Using data for sixteen OECD[1] countries from 1973 to 2000, we show that growth in labour productivity is highly responsive to business research and development (R and D) expenditure. Increasing business R and D intensity by 10 per cent increases labour productivity in the long run by 2.4 to 5.0 per cent. R and D expenditures on higher education also have a significant positive effect on labour productivity growth (Acharya and Coulombe, 2006).*

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[1] OECD- Organization for Economic Corporation and Development

Hence, it is apparent that labour productivity can be increased by increasing the skills of the workforce through education. According to Lindsay (2004), better skills make workers more efficient and as a result, human capital is one of the major drives behind explaining differences in productivity.

When it comes to Sri Lankan situation, labour productivity is estimated on the basis of annual value added per employee in constant terms at 1996 prices (Central Bank of Sri Lanka, 2005). Accordingly, for instance, labour productivity in 2005 was Rs: 138,300 and it was the highest for the period 2001 to 2005 (ibid). When comparing the statistics of Sri Lankan labour productivity with the countries in the South Asian region, Sri Lanka is ahead of five countries in terms of the index of GDP per capita developed by the World Bank. Thus, the positive externality of education on economy can be seen through GDP per capita index.

**Table 05**: Labour Productivity in Terms of GDP Per Capita in South Asia

Country	GDP Per Capita Index (Constant 2000 US$)
Maldives	2363
Sri Lanka	1004
Bhutan	694
Pakistan	596
India	586
Bangladesh	415
Nepal	232

Source: World Development Indicators Database, 2006

When analyzing the special features of education, it is worth noting that steps have been taken to improve the infrastructure facilities of schools in rural and semi urban areas. According to the Central Bank of Sri Lanka (2005), this was accomplished by introducing the activity based learning approaches, inclusion of ICT[2] education in the curriculum, the establishment of student counseling and career guidance programmes and the promotion of English education. Accordingly, several projects have been implemented by Sri Lankan governments successively, aiming at enhancing the quality of education in the rural sector. The resultant positive externalities can be viewed in terms of enhanced quality of life at rural level through satisfactory rate of rural sector labour force participation. The following graph indicates the "parallel movement" (similar movement of two variables in four sections of the time period) of the rate of rural sector labour force participation and the public expenditure on education.

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[2] ICT-Information and Communication Technology

Figure 04: The Parallel Movement of the Rate of Rural Sector Labour Force Participation and the Public Expenditure on Education
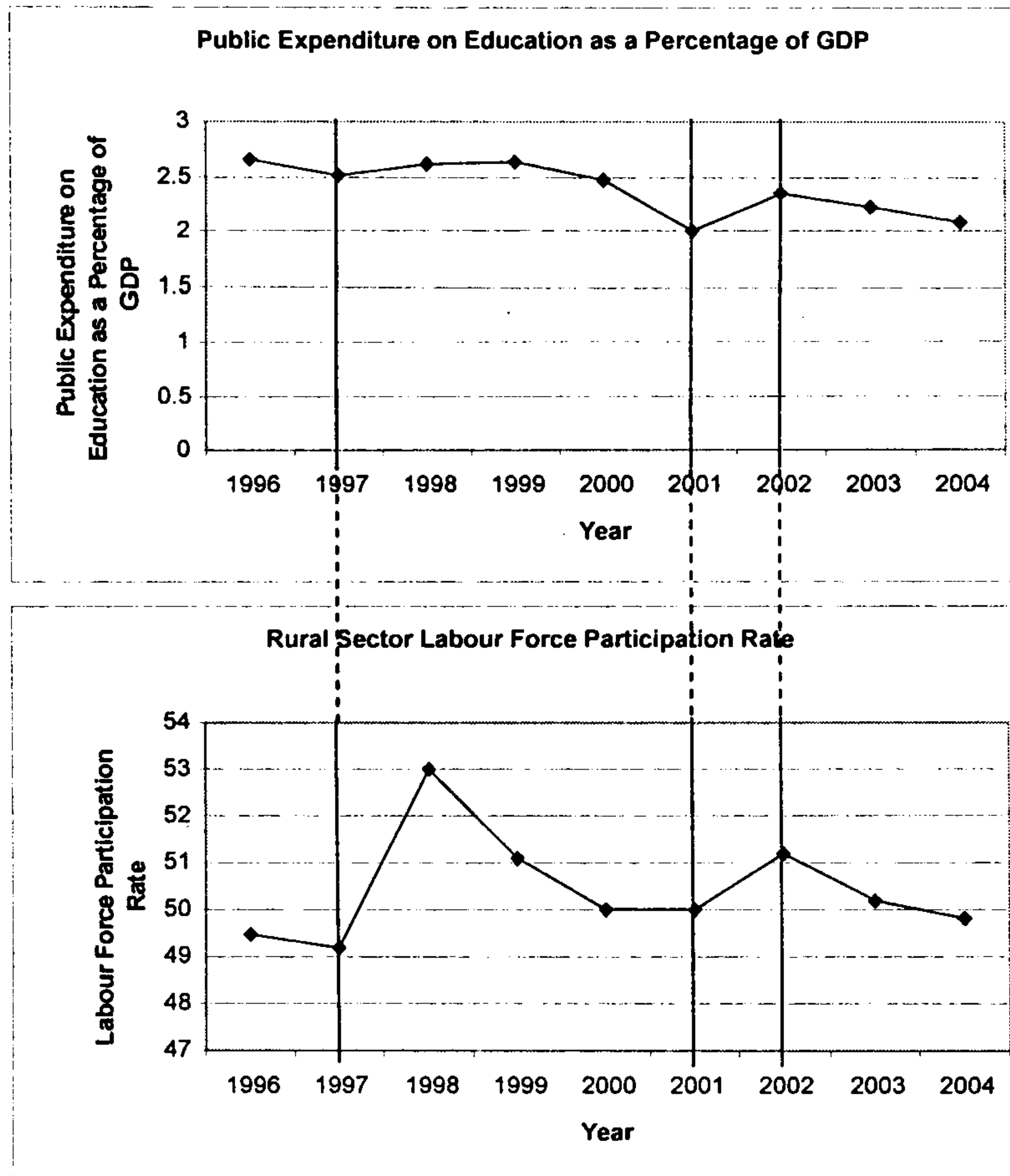
Source: Annual Report of Central Bank of Sri Lanka, 2005

This move has resulted in minimizing the rural-urban disparity in terms of quality of life through increased rural sector labour force participation, which can be regarded as a positive externality of education.

Conclusion

The government intervention in certain economic activities can be rationalized through externalities. Theoretical background suggests that there are two output levels namely, profit maximizing and socially desired output level due to externalities or neighborhood effects. The government of any country should try to encourage private sector people to maintain a socially efficient output level. When there are negative externalities, the

socially efficient output level is lower than the profit maximizing output level. Thus, the government should encourage private sector organizations to reduce their level of production through taxation. But, in case of positive externalities, private sector organizations should be encouraged to produce more and more goods and services through subsidized schemes.

When it comes to the "recognition of externality in practice", certain indirect and induced benefits are considered as positive externalities. Further, polluted air is a consequence of expanding industrial sector of Sri Lanka and a primal example for negative externalities. Finally, positive externality argument is the most frequently cited justification for government involvement in education (Hall, 2006). The service of education is being provided both by public and private sectors and therefore, it is a semi-public good. But, the private sector educational institutions are not willing to provide that service upto the socially desired output level. Thus, there is a gap existing between the profit maximizing output level and socially desired output level of education, and this gap should be bridged by the government as an intermediary mechanism by correcting "market failure".

Even though, there were positive externalities from education, they are parato relevent. Thus, the magnitude of market failure must be weighted against the ability of government to provide a remedy (High, 1985). In theory, government would solve market failure by determining the solution that maximizes social welfare and then by implementing that solution. According to Hall (2006), in practice, however, government frequently lacks the ability to even determine the solution that maximizes social welfare, let alone implement it. This conclusion would present niches in this area of study in relation to justification of government involvement in certain activities due to externalities. Most often, they might include *failure of government to correct market failure* and alternative ways of correcting market failure.

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