In the previous chapter, the major developments in welfare economics were briefly discussed. There has been a substantial progress in welfare analysis in terms of theory whereas the developments on the measurement side have been less remarkable. From the scattered ideas of Adam Smith, welfare economics has taken a systematic shape in the forms of social choice theory and theory of consumer surplus. Most of the welfare analysis has been aimed at enabling the economists to make judgement on the various end-states. Social choice theory views the basic problem in terms of making a choice from various end-states available to a society. The answer or solution to such a problem, however, could not be attained. Even at a theoretical level, Arrow (1963) ruled out the possibility of devising some criterion for making decisions for society as a whole in an indisputable manner. The basic reason for the failure of welfare theories to evolve a method for making judgements for the society is the slow progress towards measurement of welfare. There has been a lack of concerted efforts towards measuring the level of welfare. Those who have attempted to measure it tended to ignore the relevant theoretical developments. Slesnick (1998) recognised the lack of relationship between theory and measurement of welfare and the importance of a measure of well-being while making this observation - "A full consideration of taxes, subsidies, transfer programs, health care reform, regulation, environmental policy, the social security system, and educational reforms must ultimately address the question of how these policies affect the well-being of individuals. While centrally important to
many problems of economic analysis, confusion persists concerning the relationship between commonly used welfare indicators and well-established theoretical formulations.

Though, the concept of consumer surplus was closer to the measurement of welfare, there is hardly any practical value that could be attached to this concept. Slesnick (1998) recognised the lack of usefulness of the concept while saying, “despite its ubiquity, it is now widely accepted that consumer surplus should not be used as a welfare measure, although there is less agreement as to why”. The concept of consumer surplus was aimed at measuring the welfare at micro level. At macro level, the problem is even more severe. The need for such a measure has always been there and there has always been a practice to make comparisons about the welfare levels across nations and regions by assuming that gross domestic product or income is a good proxy for the welfare level of an economy. At the micro level, the income of an individual is taken as a good proxy for the level of individual well-being.

There are several limitations of income or GNP approach to welfare. In brief, one could say that income or GNP approach tends to ignore the nature of human needs and the difference in importance of human needs from the well-being point of view. Due to inadequate analysis of human needs, the relevance of welfare measurement and theories and comparison based on income gets marginalized substantially. It is argued in this chapter that the alternative indicators of well-being are more meaningful and relevant for the purpose of welfare analysis.
3.1 Limitations of Existing Welfare Theories

The major limitations of the existing welfare analysis are discussed in the following sub-sections.

3.1.1 Lack of a Satisfactory Measure of Welfare

As discussed above, the existing welfare theories do not provide a satisfactory measure of welfare, in fact, most of the welfare theories did not attempt to devise one. In the absence of such a measure, GDP or GNP has been considered to be a suitable proxy of welfare for all practical purposes. The limitations of the GDP as a proxy for welfare are, however, well recognised. Beckerman (1988) discussed some of these limitations in detail. It is recognised that GNP includes many goods which may have negative contribution to welfare. At the same time, GNP excludes the goods and services which contribute positively to welfare. Some of the goods or items such as defence expenditure, which is a component of GNP, have been called 'regrettable necessities' (Beckerman 1988). There is no direct contribution of these goods to human well-being.

The use of market prices while estimating GNP is considered to be an inappropriate practice for welfare purpose. The market prices reflect the supply side of goods in relation to their demand. Hicks (1940) noted that prices used in the GNP calculations are indicative of the productive capacity and cost of production and there is a need to assign different weights to goods to make GNP an indicative of welfare or utility. The GNP also does not take into account the factors which might be affecting the welfare providing capacities of goods. The satisfaction derived by an individual from the consumption of a good depends on the
factors such as climatic conditions, region, religion, cultural differences etc. For instance, the utility from a woollen garment will depend on the cold conditions in a region. The same garment may be of no use or of little use where winters are not known. There are several goods, which are produced without considering the needs of the society. The consumption of these goods is then triggered by various methods of salesmanship and advertising.

Nordhaus and Tobin (1972) explained the insufficiency of GNP to represent welfare in a more explicit manner while pointing out that “an obvious shortcoming of the GNP is that it is an index of production, not consumption”. They further asserted that the goal of economic activity, after all, is consumption. In the light of these demerits of GNP approach towards measuring the level of welfare, Nordhaus and Tobin attempted to devise a new measure of welfare. Their measure of economic welfare (MEW) was basically a derivation from the GNP by some rearrangement of items of the national income accounts. The adjustments made by Nordhaus and Tobin, and similar adjustments by other authors have been discussed in brief in the previous chapter.

The adjustments in GNP could not solve the problem of measurement in welfare economics, as the problems associated with higher level of production remain inadequately addressed. The problems of environmental degradation and social congestion have been extensively discussed in the literature. Meadows et al. (1972) and Fred Hirsch (1977) elaborated the limitations of GNP on account of these factors. The main idea flowing from these writings is that increase in production of goods and services may rather lead to decline in welfare level.
3.1.2 No Difference between ‘Inputs’ and ‘Outputs’

The existing theory of welfare does not make a difference between ‘output’ and ‘inputs’ (Dasgupta 1993). The lack of such a distinction makes the concept of ‘final goods’ less relevant for the welfare purpose. The distinction between ‘inputs’ and ‘output’ requires that all the goods and services should be considered as inputs which are used by human beings to produce output such as health, number of years one lives, pleasure, satisfaction etc. Such a distinction between inputs and output is a must for arriving at some meaningful measure of welfare.

3.1.3 Economic and Non-Economic Welfare

It is a well recognised fact that welfare is not confined to economic well-being and there is a difference between social and economic welfare - the latter being only a part of the former, however, analysts have normally disregarded the possible divergence between social and economic welfare, as noted by Abramovitz on Pigou’s assertion “that there is a clear presumption that changes in economic welfare indicate changes in social welfare in the same direction, if not in the same degree” (Easterlin 1974, p.20) The presumption that there is a direct relationship between economic and social welfare has resulted in serious problems in the development of a comprehensive theory of welfare. The assumed relationship between social welfare and economic welfare led to a neglect of non-economic component of welfare. The ramification of this neglect ruled out the possibility of substitution between economic and non-economic components of welfare, which would have enabled achieving the same level of welfare with lesser use of resources.
In a set up where majority of people are chasing materialistic things, it becomes hard to believe that there can be non-materialistic welfare providing alternatives as well. In reality, the sad truth is that a stage has come where some of us can not even think better of mankind because a larger segment of the society has not been motivated to give at least equal importance to non-economic vis-à-vis economic sources of welfare. Consequently, we have started judging the social welfare by the present values where majority is motivated to satisfy more and more of economic needs irrespective of its effect on non-economic sources of welfare.

3.1.4 No Interpersonal Comparison

The traditional welfare theory ruled out the possibility of interpersonal or international comparisons. Arrow (1963) confirmed this in the form of 'Impossibility Theorems'. The sad fact, however, as asserted by Sen (1976), is that we make such comparisons almost everyday. Sen further argued that on the basis of existing theory of economic welfare it is difficult to answer simple questions like- why poor should be helped? Why distribution of income should be equal? Why UDC’s should be given aid? etc. More importantly this type of situation seems to have resulted in unnecessary controversies, which can be considered as a source of digression from the fundamental problem of formulating an appropriate theory of welfare. The query by Robbins as to how he could argue with an Indian mystic who claimed to obtain far more sublime sensation from his meagre consumption that could ever possibly be experienced by a materialistic LSE professor raised some important issues. It clearly revealed the inapplicability of economic welfare as a proxy for social welfare and the possibility of substitution between economic and non-economic welfare for different individuals to
attain a specific level of social welfare - social welfare being sum of economic and non-economic welfare. It further revealed the need, as Robbins felt, for efforts in the direction of improving the existing theory of economic and social welfare measurements for answering such questions. But instead of taking queries like above in the right spirit and making an effort to make required improvements in the theory of welfare, economists got trapped in irrelevant or unrewarding controversies.

In actual life the cases of inter-personal comparison are most common. Even in economics literature the importance of the comparison is well recognised. Mirrlees (1971) made use of interpersonally comparable cardinal utility in his taxation model. Ng (1997) argued for the need and possibility of interpersonal comparability of utility and welfare. In fact, main reason for impasse in welfare theory in the form of Arrow’s impossibility theorems lies in the ruling out of interpersonal comparison of welfare or utility.

3.1.5 Conceptualisation and Perception of Economic Welfare

The economists have an incorrect perception of economic welfare itself. The procedure adopted by economists to define and measure economic welfare is based implicitly upon the value judgement that human beings have economic needs (goods and services), fulfilment of which leads to human happiness and their non-fulfilment to human suffering. This, in turn, led to the belief that consumption and hence production of more and more goods and services is always welfare increasing as higher quantities of consumption implies satisfaction of greater human economic needs. This led to the specification of
consumer's basic problem of choice of \((X_1, X_2 \ldots X_n)\) so as to maximise utility

\[ U = f(X_1, X_2 \ldots X_n) \]

subject to budget constraint

\[ P_1 X_1 + P_2 X_2 \ldots + P_n X_n \leq I \]

This, in turn, led to celebrated principle of equi-marginal utility and marginal rates of substitution equal to the ratio of the prices. A similar model was suggested for producers as well.

Under the assumption of constancy of marginal utility of money spent on each good i.e. price of a good also became yardstick (proxy) for welfare content of that good. This led to the conclusion that given a proportionate increase in income or expenditure also implies the same proportionate increase in welfare and thus to the result that more of income and hence goods and services are always better, irrespective of the nature and type of human needs they satisfy. It, therefore, becomes impossible with the help of these theories to properly account for the effect of some goods like drugs, cigarettes etc. on welfare, which are well known to be extremely harmful - not to mention so many other less harmful goods and services.

The economists took too narrow a view of economic welfare from the day they assumed constancy of marginal utility of money and started associating economic welfare content of various goods and services with their prices and consumption level. This is quite evident from some of the strong doubts which have lately been expressed about the
capability of increased production and hence consumption of various goods and services in influencing economic and hence social welfare.

It has been felt by some economists that consumers do not always aim at welfare maximisation by equating marginal rate of substitution equal to prices, and the motivation underlying their choices is much more complex and is influenced by various other factors. Consequently, the analysis of welfare measurement, which is based only on the assumption of maximisation of utility, can be nothing else but imperfect.

The theories of economic welfare should have been based on value-in-use rather than value-in-exchange. But in the absence of any concerted effort to develop a theory of welfare based upon value-in-use, the theories of welfare remained based on prices and quantities only and it was presumed that whatever consumer does is the best and will provide him the maximum satisfaction. No effort to incorporate the type of needs various goods serve, usefulness of those needs to human beings or the type, nature and importance of their utility to human beings was made which only can provide means to make value judgement about value-in-use of various goods. Thus, questions like why he buys what he buys? What is the real importance of what he buys? Why he buys some goods before he buys others? and so on, remained outside the scope of these theories. These questions are directly related to value-in-use, incorporation of which was/is necessary for developing a comprehensive theory of welfare.
3.1.6 Lack of Micro basis of Welfare Measurement

The various attempts at measurement of welfare from GDP were aimed at devising a measure of welfare at macro level. This approach presumes that the aggregate welfare is the simple sum of the welfare of individuals which is evident in the writings of Bentham who asserted that society is no more than the sum of the individuals that constitute it (Michaelis 2000). In such an aggregative form it is difficult to account for the difference in the individuals needs of human beings. Moreover, the rearrangement of GDP was not based on the study of human needs. The welfare or well-being of an individual depends on the extent to which his needs are fulfilled. In addition, the real welfare improvement also depends on the nature of needs, which have been fulfilled. The assessment of the well-being, thus, calls for a comprehensive analysis of the nature and types of human needs.

In order to analyse the well-being in broader sense, there is need to study the human needs more closely. Not only the basic needs but all the needs should be analysed properly in an exhaustive manner. And one should also take into account the influence of fulfilment of these needs on the human well-being.

3.2 Classification of Human Needs

The human beings are different than animals in the sense that the needs of human being are wider than physiological needs of food and shelter. For other animals the physiological needs seems to be enough for sustaining a life. Ghabbour (1982) put other than physiological needs of human beings in historical perspective while referring to them as metaphysical needs which include aesthetic, spiritual and innovative needs. The artistic expression, for example, has appeared early in
human history. Neolithic pot decorations, cave paintings, rock drawings etc. indicate that these needs have been there since the early times. The search for dignity is inherent in man and is an ultimate basic human need in itself. There is a variety of needs that one may like to fulfil and spend resources. These needs are different than the physiological needs like food and shelter.

The importance of various needs depends on their urgency. Galbraith (1958) questioned the production process where several needs are generated by the production process itself. He pointed out that these needs cannot be called urgent as they are, in most cases, concocted for human being. Maslow (1958) developed a theory of human motivation, which was the first major attempt of the systematic classification of human needs. He described what he proposed as a hierarchy of needs. The most needs would be most pressing as long as they remained unsatisfied, but once they are satisfied the next needs in the hierarchy would become the most urgent. The hierarchy suggested by Maslow moved from physiological needs such as hunger to safety, then needs for belongingness and love, then esteem, and then actualisation. Maslow's hierarchy of needs was criticised by several analysts on account of various reasons. For example, Ghabbour (1982) termed the Maslow's hierarchy as reflection of the conditions prevailing in a society advanced in industrialisation but weak in social ties. Douglas et al. (1998) criticised the needs hierarchy of Maslow on the grounds that frequent instances can be found where people have chosen to address 'higher' level needs before more basic ones. In particular, people have often been known to place belongingness or esteem before survival. Maslow himself recognised that the hierarchy is often inverted.
The criticism of the Maslow's hierarchy underscores the need for an alternative classification of human needs. Such a classification should be universally applicable and should also be relevant for the assessment of well-being level. An alternate classification of the human needs, in context of well-being was done by Naveen (1994). All human needs can be classified according to their nature and importance or the welfare providing capacities (WPCs) of needs. This classification can be used to segregate economic activities, which would enable determining the level of welfare and cost of welfare involved in the national income or expenditure. In general, the economic activities, which do not serve the needs of human being directly but serve the need of economic system, will represent the social cost. Here we will discuss the human needs and then their WPCs according to nature of needs.

3.2.1 Nature and Types of Human Needs

All human needs can be divided into two broad categories (i) Direct Needs and (ii) Indirect Needs. The needs, which are a direct source of welfare, are called or can be termed as direct needs. These needs are directly related to human being and can be divided further in two categories. Biological needs, which are involuntary needs and are innate to human being. These needs are physiological in nature such as need of food, cloth, shelter etc. The second category of needs does not relate to human body but to mind. These needs can be termed as psychological needs. Such needs are need of love, ego, status, power, self-actualisation etc.

1 Discussion on the human needs is based on Naveen (1994).
Both of these needs are directly related to human beings, fulfilment of which directly influence the welfare of individual. These needs can be economic and non-economic based on whether they are fulfilled through economic means or non-economic means. In addition to these needs, there are indirect needs which are instrumental in the fulfilment of direct needs, for example, the need of food grains is a direct need and need of fertilisers, irrigation etc. are intermediate or indirect needs. The intermediate needs are not of less importance. Their fulfilment is necessary to fulfil the direct needs.

Naveen (1994) analyses further the welfare providing capacities (WPCs) of human needs, where human needs are classified into avoidable and unavoidable categories. The needs, which cannot be avoided without adversely influencing the development of human being, are innate needs. In contrast, the needs like need of status can be avoided without adversely influencing the well-being. The welfare providing capacity of unavoidable needs is quite high whereas the avoidable needs have relatively low WPCs. Similarly, a need having adverse implication for other individuals when fulfilled by any one in the society should be seen as having less welfare providing capacity for the society as a whole. This inference may be seen in the context of the conclusion derived by Hirsch (1977) where higher production of goods does not improve the welfare of a society.

3.3 Human Needs and Measure of Well-being

It is clear from the discussion on human needs and their nature that human well-being depends on the fulfilment of variety of needs. The difference in nature of human needs is indicative of the fact that some needs may be fulfilled in a well-being neutral manner or even fulfilment
of some needs may reduce the level of human well-being. Most crucial aspect of the nature of human needs is that for some of the needs there is an upper limit, for example, hunger can be satisfied within a limit.

The nature of human needs determines the welfare providing capacity of various goods and services consumed by individuals. The difference in the utility of goods and services has been discussed in the literature in somewhat different context. Lancaster's (1966) characteristic approach towards theory of demand indicates that demand of a commodity depends on various characteristics of the commodity and requirement of the consumers. The same characteristic and utility may, however, be derived from more than one commodity and the choice of a particular commodity will depend on the prices of commodities, as the consumer wants to derive maximum utility from a given level of income. This implies that a commodity will have different utility for different persons. Also an individual may find the same commodity more useful at one point of time and less at some other time. The utility from consumption of a drug, for example, will be different for a patient and that for an addict. In this example, the particular commodity is having two characteristics and accordingly satisfies two different needs – need of a patient and need of an addict.

Sen's (1985) capability and functioning approach towards well-being also explains how a commodity may have different levels of utility for different individuals. He illustrated that each individual has different capabilities to derive satisfaction from commodities. In some of the cases, same commodity may satisfy different needs for different individuals due to differences in capabilities. The implication of capability and functioning approach to human well-being is that the same level of
goods and services may produce different level of well-being for different individuals. A close analysis of the Sen's approach towards commodities indicates that the level of income may affect the capabilities of human being. For example, in some of the cases the capabilities of a person are reduced due to lack of time. Those who spend more time on working hours may be running short of time to enjoy the higher level of income earned through more working hours. In addition, several ailments like diabetes and blood pressure, widespread in the urban areas, put restrictions on the consumption pattern of the individuals suffering from these ailments. In Sen’s terminology, these types of ailments reduce the individual’s capabilities to derive satisfaction from his earning.

The final effect of these conditions on the human well-being is likely to be reflected in the form of deterioration in health and reduced number of years one may expect to live. There is a possibility of increase in dissatisfaction with various domains of life. The reduction in capabilities of human well-being reduces the real value of commodities for the mankind. With lower capabilities, a society will derive less utility from the same amount of goods and services. Another situation where the satisfying capacity of goods and services is limited or reduced is related with the purpose of consumption of a commodity. It is a well-recognised fact that the consumption of a wide range of commodities is aimed at improving one’s position in society. Harrod referred to this type of consumption or income as ‘oligarchic wealth’ (Ng 1978). Fred Hirsch (1977) gave a more lucid explanation of this category of consumption while defining these commodities as ‘positional goods’. The consumption of ‘positional goods’ is aimed at improving one’s status or position in the society. The nature of the mechanism of status
improvement in a society makes the utility of a positional good for any individual dependent on the non-availability of the same good to other members of the society. In terms of nature of needs, as defined above, ‘positional goods’ are aimed at satisfying the psychological avoidable needs of human beings. The WPCs of these goods are very low or even negative in some of the cases. The production of these goods implies net cost to the society in terms of use of resources, as it is not possible to improve the comparative position of all the individuals. An improvement in the position of some individuals does not mean the improvement for a society, as there will be an associated decline in the position of other individuals. It is useful to take cognisance of the example given by Hirsch where a large number of persons gather to view some stage show. Initially all of them are sitting comfortably and viewing the show and then one person, trying to improve his position as to view the show better than others, stands up in the crowd of sitting persons. It will cause other viewers inconvenience and they will also stand in order to improve their position. This will make the crowd to end up in viewing the same show with same quality but standing on their toes which is an additional cost to the gathering, which they have to bear while competing for a better position. The same is true with the consumption of positional goods where net cost to a society increases without similar increase in the satisfaction.

The consumption of several goods including positional ones is pushed beyond optimal level through excessive information or misinformation to the consumers. A large number of advertisements is displayed in newspapers or screened on televisions in the pretext of giving information to consumers. The production process in the economy becomes supply driven instead of demand driven.
maximise the sales and profits, the manufacturers produce goods and services (at least in some lines of production) in much excess of the level what could be sustained by the demand conditions in the economy. The adequate demand is then generated with the help of advertisements, which very often aim at changing the mindset of society (Mishan 1968).

A close examination of the goods and services, produced in the profit driven competitive environment, in context of the nature of human needs would reveal that welfare providing capacity (WPC) of several commodities is too low to justify their production. Baran (1973) pointed out that the choice is not whether consumer or a central planner should exercise sovereignty but whether and how the producers’ power to ignore some consumers and influence the preferences of others should be curbed, modified or shared in some ways. The power of producers to influence the preferences and to change the consumption pattern of the society according to their own benefits indicates the inherent gaps in fulfilment of human needs despite rapid economic growth. Individuals are forced to derive satisfaction from psychological avoidable needs. The analysis of human needs, however, implies that more and more resources being put in the production of goods and services satisfying psychological avoidable needs are wastage and net cost to the society. These needs have been designated as unreal needs fulfilment of which does not earn any welfare for the society. The production pattern in favour of these needs means, more and more resources are being put in the welfare neutral or welfare diminishing activities. A reassessment of the present pattern of development would call for putting all the goods and services parallel to human needs.
We can think of a general model where all the goods and services are used to satisfy N set of human needs which includes all the needs (biological and psychological). Reformulation of GDP so as to get a measure of economic welfare (MEW) would call for assigning appropriate WPCs instead of market prices to each of the economic activity. The difference between GDP and a measure of welfare is shown in the following equations.

\[ GDP = P_1X_1 + P_2X_2 + \ldots + P_jX_j \]

\[ MEW = WPC_1X_1 + WPC_2X_2 + \ldots + WPC_jX_j \]

If we were in a position to assign a cardinal number to WPC of various goods and services, it would have been possible to arrive at or fix the optimum level of each good and service. Given the resource constraints, the marginalistic principles could have been used to arrive at some optimal level of production. It should, however, be acknowledged that WPCs can not be assigned a cardinal number and for the empirical purpose the relevance of the concept is marginalized to a great extent. It is in acknowledgement of this difficulty that we are not aiming at developing a magic number, which can be called welfare of an individual or society.

Even without giving a cardinal number to the fulfilment of various needs, it is possible to conceptualise the utility function of the conventional form, where utility may be considered as a function of fulfilment of various needs. For an individual q, the utility function may be defined as follows:

\[ U_q = f(N_q) \quad \text{Where N is a set of human needs.} \]
Had it been possible to assign some cardinal number to WPCs of various needs, we could have arrived at some number for utility or welfare. A typical problem of optimisation then would have called for drawing a distinction between ‘inputs’ and ‘output’. The concept of ‘inputs’ and ‘output’ is similar in essence to one that is used for the manufacturing process. The various inputs in the manufacturing process are converted into output through use of labour and technology. The efficiency of a manufacturing unit is measured in terms of value of its output in relation to value of inputs. The typical problem of a firm is to increase the value of output while keeping the use of inputs at a minimum level.

The same conceptualisation might be applied or thought of in context of human being. The human body might be considered as a manufacturing unit, which makes use of several inputs, by and large captured or measured by level of income, and produces well-being. The standard economic principle of optimisation, then, should have been applied to human body also. In addition to the inputs captured or measured by level of income, human body makes use of several other inputs like ecological environment, social environment etc. The level of income may not capture most of other inputs.

Such an attempt of maximisation is not the aim of the present study. A framework, however, is attempted where we can draw a distinction between ‘inputs, and ‘output’ and at the same time the role of various needs and their nature could also be accounted for.
It may be noted that all the economic activities involved in the consumption by human beings are aimed at direct fulfilment of human needs. The economic activities other than consumption are instrumental in the fulfilment of direct needs. As noted above, the fulfilment of different needs contributes differentially to human well-being and the contribution of each need depends on its nature.

Such a distinction of human needs is not a new one. Similar distinction of the human needs has been drawn by Alderfer (1972) who categorised the human needs into three groups viz. existence, relatedness and growth needs. He asserted that all these needs are active in all the human beings. Their intensity and strength, however, differ from person to person. The interpersonal differences in the intensity of needs are one side of the aspect. The relevant feature for the present purpose is, however, the differential importance of needs themselves for the society as a whole. There are certain needs, mostly positional ones, fulfilment of which depends on non-fulfilment of the same by other individuals of society. At the macro level, the increase in utility of an individual through improvement in positional goods is nullified by the disutility of another person who has lost in terms of position in the society.

Turning back to the notion of drawing a distinction between ‘inputs’ and ‘output’, the fact needs to be recognised that human development is the end – economic growth the means, as recognised in the Human Development Report (1996) of the UNDP. Following Dasgupta (1993), the various components of well-being from the health point of view may be captured through anthropometric parameters where height is the most crucial variable to reflect the status of
nutritional level. It has been observed that nutritional sufficiency among the children enables them to attain a better or higher height for a given age. Similarly, the weight for a given height also indicates the nutritional level of an individual. The second indicator of health is mortality index, which captures the life expectancy at birth. And third one is the morbidity, which may be ascertained from the medical records or through questionnaires. Infant mortality rate is another crucial indicator for measuring the health aspect of human well-being. Dasgupta (1993) has taken education as a proxy for knowledge and have treated knowledge as ‘output’ for the well-being purpose. There is, however, difference of opinion in this regard. The way knowledge is perceived and pursued makes education more of a kind of means to attain higher level of income and less of a kind of ‘output’ in itself.

3.4 Relationship between ‘inputs’ and ‘output’

The relationship between ‘inputs’ (various goods and services and non-economic resources) and ‘output’ (health, longevity, satisfaction etc.) may be analysed in the framework discussed by Sen (1985) for establishing a relationship between goods and services and human well-being. This may be outlined as follows:

\[ R_i = \text{a vector of economic and non-economic resources at } ith \text{ individual’s command.} \]

\[ C(. ) = \text{the function converting } R_i \text{ into various characteristics.} \]

[These characteristics may be thought of as explained by Lancaster (1966)].

\[ f_i (.) = \text{A personal utilisation function pattern of the use of resources.} \]

\[ n_i (.) = \text{type of needs satisfied through } f_i (.) \text{.} \]
Thus, the fulfilment of various needs will finally determine the level of well-being one could achieve. It may be noted that utilisation function depends partially on the preferences of an individual and partially on his capabilities, which may constrain the choice regarding the utilisation pattern. To the extent the choices are limited, the level of well-being one could attain from a given level of resources might be influenced. Similarly, the needs one fosters and satisfies also make a difference for the well-being level. The well-being function can assume the following form.

$$WB = N_i(f, (C_i (R_i)))$$

The empirical test and measurement of this function require a number to be assigned to well-being. As acknowledged earlier, it is not possible on the basis of existing welfare theories to assign such a number to well-being in an indisputable manner. Though the attempts have been made towards measurement of well-being but controversies could not be cleared so as to evolve a consensus on a single measure (Dasgupta 1993, Morriss 1979, and UNDP 1990). All of these studies have considered well-being as consisting of components such as health, longevity, basic liberties and real income (Dasgupta 1993). For the sake of convenience and for the reasons stated below, it is proposed to measure the level of well-being through life expectancy (LE) and the level of happiness (H). The former will capture or measure the level of objective well-being and the latter will measure the subjective well-being.

$$WB = f(LE, H)$$
3.5 Life Expectancy

To measure the objective part of well-being, the indicators like mortality, morbidity, nutritional status, infant mortality, and health have been mainly considered in the literature (Dasgupta 1993). The life expectancy, however, could reasonably and sufficiently represent most of these indicators. Waterlow et al. (1972) showed that a child’s height-for-age and weight-for-height are good indicators of his state of health and thereby his nutritional status. Height is considered to be a summary statistics of past nutritional status and morbidity conditions of an individual. Weight-for-height, on the other hand, is a summary statistics of an individual’s current nutritional status (Falkner and Tanner 1986). It is evident from these findings that height and weight are reasonably good indicators of morbidity and nutritional status. In another study Chen, Chowdhury and Huffman (1980) showed clear threshold effects in both height-for-age and weight-for-height where the risk of death was found higher for those who reached a threshold limit of deficits in these anthropometric measures. Waller (as quoted by Dasgupta 1993) showed that even among the adult males there exists an association between anthropometric measures and mortality. Waller in fact tried to show that height could be used as an indicator of mortality risk. It is evident from these arguments that life expectancy is related with most of the major indicators of health and it can be used as a representative indicator.

This is not to say that mortality or life expectancy can capture all other indicators correctly but to show that all other measures are aimed at explaining the chances of living longer. In addition, the longevity has an intrinsic value as explained by Sen (1998). In the absence of a single measure on which economists or analysts tends to form a
consensus, it is useful and meaningful to consider life expectancy as an indicator of objective well-being. Though, life expectancy or mortality rate is not an economic phenomenon, the connection lies in the fact that the influences that increase or reduce mortality often have distinctly economic causes. Sen (1998) brings out the reasons, which make mortality an important variable to measure the success or failure of economic performance. A healthy person is expected to live longer than a person with poor health. In Sen’s words “So the extension of life expectancy is not only, typically, valuable for its own sake, but also for its associated characteristics (such as lowering of morbidity)”. There is a high positive correlation between health and longevity implying that two variables move together. In particular, Sen brings forward three main arguments in favour of life expectancy for it to be considered as an important variable.

1) The intrinsic importance we attach to living,
2) The fact that many other capabilities that we value are contingent on our being alive, and
3) The data on aggregate age-specific mortality can, to some extent, serve as proxy for associated failures and achievements to which we may attach importance.

One would like to see the relative advantage of life expectancy over more promising source of information about well-being. It may be argued that it is better to look at morbidity rather than mortality since the sufferings of people have their roots in illness, and once dead, there is no further agony. There is no doubt about the usefulness of the information about morbidity. The problem with morbidity data, normally
gathered through survey, is that it may not be comparable across individuals.

For the present study, it is proposed to measure the objective well-being with a single measure i.e. life expectancy. The implicit assumption behind taking the life expectancy as a measure of 'output' is that longer life is a desired thing. There may, however, be difference of opinion in this regard. One may think about optimal years of life where neither longer nor shorter life is desired. Given the total resources of an individual, a shorter life might be more well-lived.

Furthermore, the purpose of the present study is to examine the micro foundation of the relationship between well-being and its determinants. The data available on life expectancy is not of much use for the micro level analysis as it dose not relate the conditions of an individual with the length of life lived by him. The present study tries to examine the relationship between these conditions, particularly income, with the length of life.

3.6 Subjective Well-being - Happiness

Some thinkers consider happiness as an ultimate goal of life. For example, Ng (1996) asserted that happiness is the ultimate objective of most, if not of all. More money is desired because it is supposed to contribute to happiness. If having money does not substantially improve our happiness, then money is not important but happiness is.

The two components of well-being viz. life expectancy and happiness depend on several other factors. The range of these factors
varies from person to person and region to region. In addition, the same set of factors contributes to the well-being differentially for different persons. The differential contribution of various factors has been explained in Sen’s (1985) capability approach to well-being. The role of social and geographical factors to influence the impact of various factors is strong enough to generate a different perception among the individuals about their needs.

Ghabbour (1982) drew a comparison between the needs felt by a farmer and practitioner of traditional medicines in Sri Lanka on the one hand and an American adult on the other. The farmer and practitioner of traditional medicines gave a list of his basic needs in the following priority:

- A clear and beautiful environment both in physical and mental sense,
- An adequate supply of clean water firstly for personal use and secondly for agriculture,
- Clothing, especially to cover the *pudenda*, as an imperative of being civilised,
- Food,
- Housing,
- Health care,
- Roads and communication,
- Fuel,
- Education, and
- Spiritual and cultural needs.
The list of needs as reported by an American adult in the order of priorities is given below:

- Good health,
- Food,
- Sleep,
- Money,
- A life after death,
- Sexual satisfaction,
- Decent living for children, and
- To be something notable,

In both the lists, some needs are material and some are non-material. The balance is, however, different in the two. The second list contains more of non-material needs. The difference in the importance of needs felt by individuals indicates a tendency towards a particular pattern of consumption. An individual indicating more of material needs as urgent needs is likely to make more consumption of material goods. Given the same level of all other things, the individual having preference for more material needs will put more efforts to earn more income. This will give him command over larger amount of goods and services. The level of satisfaction from a given level of goods and services will, however, be different for the two individuals. The person indicating preference for more non-material needs is likely to derive more satisfaction and happiness from non-economic resources. In this situation, the factors determining the level of satisfaction happen to be different for different persons. The difference in the feelings for various needs is the result of prevailing culture and the degree to which need is
satisfied within it. Once the need is satisfied, it is no longer felt as a need. In the above example, the cultural and social differences in the American and Sri Lankan society are quite obvious. Also the level of needs which have been fulfilled in these societies differs to a great extent. These factors are reflected in the difference in intensities of various needs.

To sum up, it has been argued that well-being could be measured through life expectancy (LE) and happiness (H). In the present study, these two indicators are analysed separately. The attempt to get a combined indicator to be called well-being is avoided in acknowledgement of the difficulties involved therein. The functional forms of the two indicators can be defined in the following way.

\[
\text{LE} = f(\text{biological needs, culture, social factors, etc.})
\]
\[
\text{H} = f(\text{economic factors, social factors, demographic factors, political factors, religion, etc.})
\]

The main purpose of the present study is to analyse the micro foundation of the factors, which determine the level of well-being. It was not possible to ascertain all the relevant information to analyse life expectancy, hence, analysis is limited to examining the importance of income in determining the length of life lived by the individuals covered in the survey. In case of happiness, however, as much exhaustive information as possible was ascertained. The information for both the indicators is gathered through a questionnaire based survey. The issues related to methodology and data collection are discussed in the next chapter.