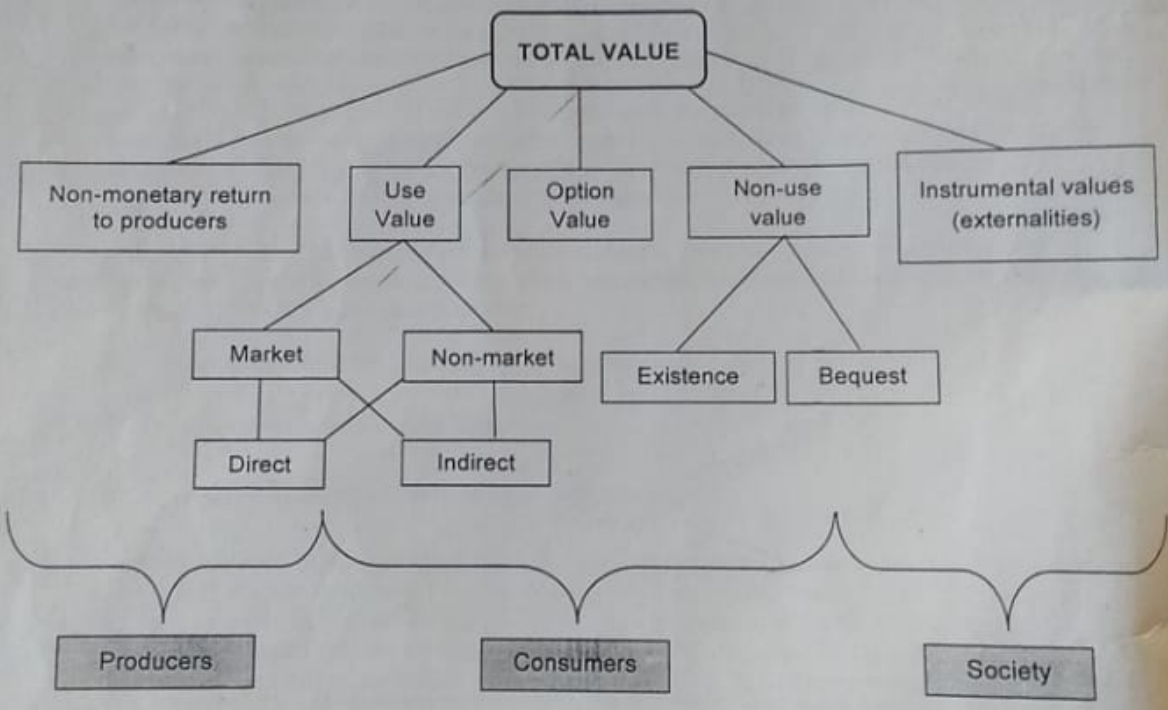
3.2 An economic perspective of value in the cultural context

The concept of total economic value, which is widely used in the valuation of the environment (Tietenberg and Lewis 2009), can be applied to the valuation of culture, albeit with some slight modifications. This concept has been applied to the valuation of cultural heritage sites (e.g.Choi et al. 2010) and also features in a report on the valuation of culture to the Department of Culture, Media and Sport (DCMS) in the United Kingdom (O'Brien 2010). For the purposes of this paper, we have made some modifications to the figure found in O'Brien (2010).

The total economic value of culture captures values that derive both from market transactions and from non-market sources. It captures benefits that accrue directly to an individual user of culture and also captures benefits that accrue to individuals (society) by virtue of others' use (or potential use) of culture (i.e. 'instrumental values' or 'externalities'). Furthermore, it includes value that may accrue to producers (over and above their income) as well as to consumers. Figure 1 summarises the various types of value that may be derived from culture, each of which is discussed in more detail subsequently in this paper. Table 1, provides definitions and examples of the various types of value that cultural goods can provide. Different cultural goods provide these kinds of value to differing degrees.

Figure 1: Sources of Total Value



Measurement of Sustainable Development

The weighting Method

Developing a scale of values and designing and testing quality indicators is the most important task. The **Gross Environmental Sustainable Development Index** (GESDI) is quantitatively describing quality indicators rather than merely measuring different variables. **GESDI** includes all possible aspects, all physical, biological, health, social and cultural components which routinely influences the lives of individuals and communities. If we are to achieve effective evaluation of quality, comprehensive data are needed about the status and changes of the variables. Optimally, these data may be organized in terms of indices that in some fashion aggregate relevant data. These indices are in turn used to predict the impact of public and private actions, assess conditions and trends, and determine the effectiveness of programs in all areas. Knowing what are the important elements of sustainable development allows us to structure indicators into major areas such as demographic data; the economic data of the individual, family, and household; the status of the region's economy; housing, community facilities, and aesthetic quality; social quality. Here also the weights given to the different segments of the evaluation were obtained or guess-estimated from the results of the **Survey on the Scale of Values**.

The impact equation: **GESDI** can be determined by defining an impact or stress equation which itself separates ecological balance and pollution into basic sustainable development impacts. An impact or stress **I** is created by the interactions between four major quality systems: **People**, **Economic Development**, **Environment** and **Availability of Resources**.

The function **I** is a product of four index scales of assessments: U, G, P and C. Each product indicates the relative importance of a given impact, or stress, with respect to the four major quality systems.

$$\mathbf{Ii = Ii,E + Ii,AR + Ii,PA + Ii,ED}$$

where $\mathbf{Ii,E = Ui\ Gi\ Pi\ (WC)i,E}$

$\mathbf{Ii,PA = Ui\ Gi\ Pi\ (WC)i,PA}$

$\mathbf{Ii,AR = Ui\ Gi\ Pi\ (WC)i,AR}$

$\mathbf{Ii,ED = Ui\ Gi\ Pi\ (WC)i,ED}$

and where E, PA, AR and ED represent the components of the four major quality systems.

The components of the **Economic Development** system, **ED**, relate to progress whether it is economically at home, in our community, or in the ways of doings things. New ways of doing things pervade this system. The ideal is to find safe ways of doing things. More and more new consumer products and building materials are brought into the market every year. With less and less government it is getting harder to control all what is brought on the market and therefore

more of the non-safe types of products will appear. How do we protect a population from such products? Competitive forces will not necessarily be helping improving the environment and our health.

The components of the **People** or **Social** system, **PA**, relate to human activities and their actions, interactions and reactions. The social and economic well-being of the people and their health are pivotal points for this system.

The components of the **Environment** system, **E**, refer to the media through which impacts are transmitted. Each component interacts with other components in the system as well as with components in all other systems.

If only the impacts, or stresses related to the **Environment** are considered then $\mathbf{I_i}$ is called the *Environmental Quality Equation* and the results obtained here are an *Environmental Sustainable Developmen*.If only the impacts, or stresses related to the **Economic Development** are considered then the results obtained here are a Sustainable Economic Development. If only the impacts, or stresses related to **People** are considered then the results obtained are a *Sustainable Community Development* and a *Sustainable Home Developmen*. In each case, impacts or stresses must be made to interact with all four major quality systems.

The **Urgency index**, **U**, expresses the importance of the need to find a solution to the stress within a reasonable period of time or else the impact will cause significant damages to components of the four major quality systems.

The **Geographical Extent index**, **G**, expresses the significant detectable geographical extent of the stress or impact, and includes all major media and modes of transportation and communications.

The **Persistence index**, **P**, expresses the period of time during which the effects of the stress or impact will still be felt at a significant level.

The **Number of Interactions index**, **C**, describes the relative complexity of the stress or impact while interacting with each of the four major quality systems. An interaction is counted whether it was documented, or is likely or expected to occur. The weight, **W**, expresses the probability or a judgment value of an interaction and its degree of importance. Results of the **Survey on the Scale of Values** were used to guess-estimate the weights for the impacts.

The four interacting circle

The four interacting circles are quality systems. They are used because together they form a neat geometric expression about a complicated intellectual concept. They represent interactions. These interactions occur between the systems and within each individual system. The four interacting circles are a simplistic expression of our need for one another, our interaction, the thoughtless damage we can cause. We are worlds within worlds orbiting in and through each other's space. This interaction can be planned and executed in a caring, considerate manner so that all may exist and not destroy the other.

The impact equation defines the four interacting circles.

$$I_i = U_i G_i P_i \left((WC)_{i,E} + (WC)_{i,PA} + (WC)_{i,AR} + (WC)_{i,ED}\right)$$

The following is the design depicting the impact interactions.

The urgency index, U, described in the mathematical model, is one of the four indices of the equation for the evaluation of impacts. It is the index or variable that reflects the level of responsibility we are willing to take to solve the problem, impact or concern. It reflects the importance of the need to find a solution to the stress within a reasonable period of time or else the impact will cause significant damages and will be felt by the next generations to come.

The scale is as follows. The minimum value is 1 and is equivalent to saying that the impact is not important and may be resolved within a century. The maximum value is 10 and is equivalent to saying that the impact is very important, no waiting allowed, so as to ensure a sound future for Earth.

Scoring method for performance

The scoring method for performance is a simple method designed to assess performance in the area of sustainable development. There is a point awarded to each response to a question. The answer to each question produces a score. The scale of the scoring system is shown here.

Answer	Score
Absolutely not	0
Not often	1
Sometimes	2
Habitually	3
Most of the times	4
Definitely yes	5

If a question is not applying to the site, it must be left out and the total number of questions is reduced by one. All points are then added to obtain a percentage in each sub-section therefore assessing performance in all areas. The rating for each sub-section is calculated using the following equation:

$$\text{Sub-section \%} = \frac{\text{Total number of points for the subsection}}{\text{Total number of questions for the sub-section}} \times \frac{100\%}{5}$$

The sub-section rating obtained is entered at the end of each sub-section. By adding the percentage together and dividing by the number of sub-sections will yield the "Section Rating", which is the average percentage performance in this area of sustainable development.

We have assigned weights to each Section Rating value as part of the accounting method. These weights were obtained from the Survey on the Scale of Values and are of the same kind as the Urgency or Importance Index value. We guess-estimated in between the values from the Survey.

Thus the section rating can be obtained.

$$\text{Section Rating} = \frac{\text{Sub-section rating total}}{\text{Total number of sub-sections}} \times \text{I(normanized)}$$

= GESDI for this section.

All percentages were then added to obtain an overall rating for the site.
The GESDI for the home and the community is obtained by adding all GESDI of all the sections together.

Example of impact equation of Sustainable Development

Sustainable Forestry Development

The natural stock of forest yields the end-use or consumption of cut timber. A sustained yield of timber must be reached to satisfy the principles of sustainable development. To maintain the productive capacity of the stock and sustain the income or benefits, people are asked to replenish the stock once used. Consumption levels of the stock must be maintained without depleting the quality and quantity of services the stock brings in creating wealth. Sufficient investments must be made to replenish timber stocks. For instance, an investment in reforestation is necessary.

A forest has both:

1) A market value for the resource of timber harvested for forest products; and
2) Nonmarket values for resources such as: wilderness and protected areas, water quality, vegetation, recreational areas, ecosystem biodiversity, forest soils, peat, watersheds, old-growth trees, air quality, aesthetic, forest soil productivity and carrying capacity, and spiritual values.

Timber resources have monetary values which are derived from the conversion of timber into marketable forest products. The economic value and monetary account of the forest as a resource is determined as follows:

(opening and net closing balance of the physical stock measurement of timber) x ((average price - costs + business profit and risk) for all forest products and production per cubic meter of timber, or per unit of forest land area)

This way the net balance of timber or the value of the net effect of both growth and depletion is accounted for, and is used in the Gross Sustainable Development Product (GSDP) accounts either as a depreciated or appreciated value.

Depletion or depreciation might be due to fire, harvesting, insect and disease damage, and

land use changes. Appreciation might be due to reforestation, land use changes, growth, and productive gains.

The physical stock, end-use and consumption accounts show the net balance of timber volumes and productive forest land area. The end-use and consumption accounts show both appreciation, depreciation or depletion

Ir oder to evaluate a Sustainable Forestry Development, the market value for the resource of timber must be evaluated as well as the impact on nonmarket values of the other forest resources. All forest quality indicators must be taken into account:

*ecosystem biodiversity * peat * acid rain damage * water quality * recreational areas * per capita consumption of timber and forest products * per capita export of timber volume of forest products * soil productivity * watersheds * forest soil erosion * vegetation * aesthetic * soil carrying capacity * old-growth trees * wilderness and protected areas * air quality * spiritual values

Global Indicator

Gross Sustainable Development Product (GSDP)

An other indicator was developed to measure the costs of development: the Gross Sustainable Development Product (GSDP).

The GSDP is defined as the total value of production within a region over a specified period of time. It is measured using market prices for goods and services transactions in the economy.

The GSDP is designed to replace the Gross Development Product (GDP) as the primary indicator of the economic performance of a nation.

The GSDP takes into accounts:

- the economic impacts of environmental and health degradation or improvement, resource depletion or findings of new stocks, and depreciation or appreciation of stocks;
- the impact of people activity on the environment, the availability of resources, and economic development;
- the "quality" of the four major quality systems and the impacts of changes in these systems on national income and wealth;
- global concerns and their impacts on the economy;
- the welfare, economic development and quality of life of future generations;
- expenditures on pollution abatement and clean-ups, people health, floods, vehicle accidents, and on any negative impact costs;
- the status of each resource and the stocks and productive capacities of exploited populations and ecosystems, and make sure that those capacities are sustained and replenished after use; and
- the depreciation or appreciation of natural assets, the depletion and degradation of natural resources and the environment, ecological processes and biological diversity, the costs of rectifying unmitigated environmental damage, the values of natural resources, capital stocks, the impacts of degradation or improvement, social costs, health costs, environmental clean-up costs, and the costs of the environment, economic growth, and resources uses to current and future generations and to a nation's income.

The measurement of GSDP shows that consumption levels can be maintained without depleting and depreciating the quality and quantity of services. It indicates the solutions to the problems as well as the directions to take, such as:· invest in technology, R & D, to increase the end-use efficiency;· increase productivity;· modify social, educational programs and services;
· slow down or increase economic growth;· remediate components of the four major quality systems; and· rectify present shortcomings of income and wealth accounts.

The measurement of GSDP also gives a proper and sound signal to the public, government and industry about the rate and direction of economic growth; it identifies environmental, health, and social quality; it identifies sustainable and unsustainable levels of resource and environmental uses; it measures the success or failure of sustainable development policies and practices; and it identifies resource scarcity. Values obtained enable us to make meaningful comparisons of sustainable development between cities, provinces, nations over the entire planet.

Status reports of all physical accounts show the physical state and availability of resources and the state of the environment. Examples of the physical stock accounts are:

• minerals • oil, gas and coal • forests
• wildlife • agricultural • soils • fish
• protected wilderness areas • flow rate of water
Valuation in terms of money accounts is difficult for some non-market values such as:

* aesthetic satisfaction * air quality * water quality
* soil carrying capacity and productivity * acid rain deposition
* biodiversity * wilderness and protected areas * land productivity
GESDI can be obtained for these quality indicators that are difficult to give a money value to. Both the GESDI and GSDP are measured together and tell us about the quality and cost of development, locally and globally.

Measurements of GESDI and GSDP provide insights for the discussion of issues such as:

* Is the actual rate of development too slow or too fast?

* Are People aspects being stressed too far?

* Are resources and the environment managed in a sustainable manner?

* What forms of community and home designs promote sustainability?

* In what ways should social, educational, and health programs and services be modified?

* Is this generation leaving to the future generation a world that is at least as diverse and productive as the one it inherited?

* What improvements can be brought up to the quality of development?

Some of the important measures for sustainable development are as follows:

(i) Technology:

Using appropriate technology is one which is locally adaptable, eco-friendly, resource efficient and culturally suitable. It mostly involves local resources and local labour. Indigenous technologies are more useful, cost-effective and sustainable. Nature is often taken as a model, using the natural conditions of that region as its components. This concept is known as "design with nature". The technology should use less of resources and should produce minimum waste.

(ii) Reduce, Reuse, and Recycle Approach:

The 3-R approach advocating minimization of resource use, using them again and again instead of passing it on to the waste stream and recycling the materials goes a long way in achieving the goals of sustainability. It reduces pressure on our resources as well as reduces waste generation and pollution.

(iii) Promoting Environmental Education and Awareness:

Making environmental education the centre of all learning process will greatly help in changing the thinking pattern and attitude of people towards our earth and the environment. Introducing subject right from the school stage will inculcate a feeling of belongingness to earth in small children. 'Earth thinking' will gradually get incorporated in our thinking and action which will greatly help in transforming our lifestyles to sustainable ones.

(iv) Resource Utilization as Per Carrying Capacity:

Any system can sustain a limited number of organisms on a long-term basis which is known as its carrying capacity. In case of human beings, the carrying capacity concept becomes all the more complex. It is because unlike other animals, human beings, not only need food to live, but need so many other things to maintain the quality of life. Sustainability of a system depends largely upon the carrying capacity of the system. If the carrying capacity of a system is crossed (say, by over exploitation of a resource), environmental degradation starts and continues till it reaches a point of no return.

Carrying capacity has two basic components:

i. Supporting capacity i.e. the capacity to regenerate

ii. Assimilative capacity i.e. the capacity to tolerate different stresses.

In order to attain sustainability it is very important to utilize the resources based upon the above two properties of the system. Consumption should not exceed regeneration and changes should not be allowed to occur beyond the tolerance capacity of the system.

(v) Improving Quality of Life Including Social, Cultural and Economic Dimensions:

Development should not focus just on one-section of already affluent people. Rather it should include sharing of benefits between the rich and the poor. The tribal, ethnic people and their cultural heritage should also be conserved. Strong community participation should be there in policy and practice. Population growth should be stabilized.

Measure of sustainable development:

Green accounting: It is a type of **accounting** that attempts to factor environmental costs into the financial results of operations. It has been argued that **gross domestic product** ignores the environment and therefore decision-makers need a revised model that incorporates green accounting

Maintaining constant potential for wealth creation means maintaining a constant (not reducing) means of production, which includes man-made capital, human capital, technology and level of learning. What we need to know at each moment of time how much of this productive base we can use. This is given by environmentally adjusted net national product.

Environmentally adjusted net national product (ENP) can be a good measure when (i) all elements of NNP are correctly valued in terms of current economic situation; (ii) this is true in a forward-looking sense too (prices reflect future scarcity) and (iii) all depreciation of natural capital is similarly allowed for.

ENP is the annual 'pay-off' from our total (natural + man made) capital stock. ENP can rise through time if this total capital stock rises, and / or as technology improves. Falling ENP means fall in society's sustainable income. Hartwick's optimal adjustments to NNP can be summarized as follows.

Non-renewable resources: In each period the Hotelling's rents from non-renewable resource extraction should be deducted from NNP (assuming all inputs / outputs are valued at their shadow prices).

Then, by definition, ENP= NNP – [{MP – MC} $\dot{X}$]
Here, [ ]is the Hotelling's rent.
If published average cost (AC) are used instead of marginal costs (MC) as MCs are typically not recorded, then, given that mining companies are expected to be operating where MC > AC. This overstates the correct deduction and understate ENP. Also new discoveries overstates the actual loss of the non-renewable resources, so this should be netted out before the conversion to the ENP is made.
Renewable resources: Here positive growth can occur subject to population size and rate of harvesting. The positive growth of renewable resources will be an addition to NNP.

Pollution / environmental amenity effects: Here, part of pollution dissipates at a natural rate and remaining part is added to production by a constant proportion.
Pollution can be reduced by reduction in production, but this is not a social optimal decision. If in addition direct pollution abatement activities are allowed, stock of pollution declines.
Examples:
Secondary Lead Smelting Industry in Kolkata (Recycling industry)
The selected study area covered two municipal wards in the city of Kolkata. In the pre-regulation period about 50 secondary lead smelting units had been operating within that area being sparsely populated at that time. With the influx of population the area was gradually converted into residential-cum-factory area. For the stringent regulation imposed by the regulatory authority WBPCB, combined with objections by local people, all units were forced to shut down operations for not having pollution abatement devices. Ultimately after the provision of control technology by WBPCB only 12 units were able to install the pollution control devices successfully.