

# Sustainable techniques: A study of some contents and financing options in development

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**Abstract**—The concept of development is now the key value of any dynamic society. United Nations development agenda of developing, developed or least developed has been the debate of modern societies and the viewpoints are now extending into post – modernity era.

However, ever since the stockholm declaration in 1972 and subsequent Conferences in Brundtland, and Rio much is now in focus, especially in this decade 2005 – 2014 of sustainable education and development, which is now affecting any development agenda and the challenges are now alive for developing societies.

The aim of this paper was to outline key areas of sustainable techniques in development as well as address various sources of finance. Models of understanding sustainable education and development like community well-being, indicators of sustainable well-being, development compass model and financial intergenerational equity model have been discussed. Various assumptions and recent developments have also been included.

The design of the paper was on content analysis of techniques based on models and assumptions besides relationships with the environment in learning and change required functions, actors and actions in higher education financing and the new community model approach in the education for sustainability and development.

The paper recommends sustainable techniques and models that can address humanity problems as well as financing options based on correcting price, loop holes, environmental concerns and revisiting sustainability indicators in the changing world especially for the developing societies in practice.

Further research should consider in-born financing options in addressing better sustainability indicators for humanity well-being.

**Keywords**—Development, Financing options, Sustainable Techniques.

## I. INTRODUCTION

**T**HE role of community in sustainable development has caused excitement and confusing in almost equal measure amongst practitioners and policy makers over recent years, and particularly since the United Nations conference on Environment and Development (UNCED) in Rio de Janeiro Brazil in 1992, when world leaders signed up to Agenda 21 as the agenda for the twenty – first century, confirming that sustainable development requires community participation in practice as well as principle (Warburton,2000)

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Education for sustainability involves a commitment to a framework of specific, global, ethical goals which speak for justice equality and democracy. Above all, it needs to be designed and celebrated for its ability to embrace eco-sensitive action as its legitimate output. Nothing less is sustainable. Anything else fails to allow local communities to sustain themselves, and if local communities fail, global unsuitable behaviours spiral beyond control.

Therefore, sustainability education must be linked to the reality of its clients; it must marry action to intellect; it cannot and must not allow any one section of education to invade and persuade local people that to think about is a fair exchange for thinking about and tacking action. (Huckle and Sterling, 2008)

Components of sustainable communities relates to health, security, standard of living, education, environment, culture, recreation and leisure, housing, transport, that is, access to goods and services, tranquility and community spirit; as cited in quality of life in cities by Guinness guide to best places in the UK, 1995.

Therefore, sustainable development ought to mean the creation of a society, an economy that can come to terms with the life support limits of the planet in a way that enables the most vulnerable peoples to survive with dignity in a self reliant manner.

Orientations in education for sustainability in the post-modernity era are based on socially critical transformative and change in education paradigm.

Sustainable development was defined in the Brundtland Report of 1987 by World Council for Education and Development as; humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations, to meet their own needs.

Therefore sustainable development in post modernist and ecological world views involves planning the three E's that is, environment, economics and equity. Issues in sustainable planning will therefore involve;

- i) Land use
- ii) Urban design
- iii) Housing
- iv) Transportation
- v) Environmental protection and restoration
- vi) Energy and material use
- vii) Green and architecture building

- viii) Equity and environmental justice
- ix) Economic development
- x) Population concerns, among others (Wheeler, 2004)

In our current society human needs are dynamic and paramount in our lives. Bradshaw, 1972 conceptualized needs as cited by Denney D. 1998 as;

- i) Normative needs, which are defined by professional or expert
- ii) 'Felt' need, corresponds with what the service user wants.
- iii) Expressed need, is need combined with action as in the case of a service user making an application for some form of help.
- iv) 'Comparative' needs, is assumption of need based on the service user being in the same circumstances as other who receive services.

The needs which therefore exist include; nine broad categories given by Braye and Preston- Shout, 1995 cited by Denney, 1998 as;

- i) Personal or social care
- ii) Health care
- iii) Accommodation
- iv) Finance
- v) Education
- vi) Employment
- vii) Leisure
- viii) Transport and
- ix) Access

Sustainable education and development therefore, attempts to answer concerns of social exclusion. Social exclusion is a term which originated in the social policy of the French socialist governments of the 1980s and was used to refer to a disparate group of people living in the margins of society and in particular without access to the system of social insurance. In the United Kingdom, social exclusion unit was set – up in 1997, Wales in 1999, Northern Ireland, 1998 and Scottish office in 1999. The need to set-up arose because of:

- i) The lack of effective national policies to address the structural causes of decline
- ii) A failure to effectively engage local communities
- iii) Too great an emphasis on physical regeneration at the expense of creating opportunities for people
- iv) The failure to develop a joined up approach to the issues.

Dimensions of social exclusion broadly includes: economic, social, political, neighbourhoods, individual, spartial and group concentration. Social exclusion attempts to identify key features of poverty and social exclusion which may include:

- Lack of opportunities to acquire education and skills
- Childhood deprivation
- Disputed families
- Barriers to older people living active fulfilling and healthy lives
- Inequalities in health
- Poor housing

- Poor neighborhoods
- Fear of crime
- Disadvantaged groups(Percy – Smith, 2004)

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## II. MATH

The concept of sustainable development education involves three basic issues, understanding sustainable development, as by the definition of 1987 as our 'common future' or the Bruntland Report.

It means sustainable development is development that meets the needs of the present without compromising the ability to future generations to meet their own needs. In the same way, concerns of sustainable education integrate the learning agenda with that of securing a sustainable future.

The rationale for sustainable development education as per chapter 36 of Agenda 21-40, chapter agreement reached at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992, also known as the Earth Summit is therefore, education of critical for promoting sustainable development and improving the capacity of the people to address environment and development issues; while basic education provides the underpinning of any environmental and development education, the latter needs to be incorporated as an essential part of learning.

Both formal and non-formal education is indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness values and attitudes skills and behavior consistent with sustainable development and for achieving environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development for effective public participation in decision making(Blewitt and Cullingford, 2004), as cited from Blewitt, (2002).

World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, and Millennium development goals in year 2000, and 1990 Jomtien Conference in Thailand on Education for all and United Nations decade on some human rights frameworks for action on education for sustainable development means therefore, education that includes concerns of poverty alleviation, human rights, gender equity, cultural diversity, international understanding and peace is the one which should be sustainable.

### **Objectives of the study were to establish;**

- i) Community well - being model in assessing sustainability.

- ii) To determine key indicators of sustainable well - being.
- iii) Development compass model used in the formal sector in sustainability.
- iv) To determine financial intergenerational equity model for sustainable development.

**Assumptions in sustainable development indicators;**

- They make assumptions about what is important now and what will be important in the future.
- They are unable to account for irreversibilities, such as species loss, or characteristics that cannot be represented in monetary terms.
- They often do a poor job of taking uncertainty into account.
- They emphasize flow variables and do not account for stocks of natural resources.
- They emphasize quantities that enter into commerce.
- They are based on linear relationships that cannot be reconciled with ecological functions.

*Community well - being model*

This is based on business environmental responsibilities otherwise referred as sustainable approach which came up in the 1980s, as a new model for environmentally, responsible business, that is, combining financial opportunities with environmental and ethical responsibilities. The goals involve sustainability or just the pillars of sustainability. (Hartman and Desjardins, 2008)

**Sample indicators of community well-being for Montgomery County ABC**

Domains	Indicators
1. Demographics	Age, race, sex of population Persons per square mile
2. Health	Percentage of children age 6 and under immunized Percentage of people who report currently using tobacco
3. Economy	Number of women-owned businesses Percentage of population with Social Security income
4. Education	Percentage of high school graduates Average daily attendance rate
5 Public Safety	Number of incidents of crimes against residential property Number of alcohol related juvenile offenses

6. Environment	Percentage of participation in recycling program Number of days air pollutants exceed healthful levels
7. Transportation	Number of accidents reported along interstate bypass Number of households with no vehicle available
8. Social Welfare	Percentage of families living below federal poverty line Rate of substantiated reports of child neglect
9. Community Involvement	Number of community events to support local organizations Percentage of registered voters voting in 2000 election
10. Housing and neighborhoods	Number of housing code violations Percentage of owner-occupied housing

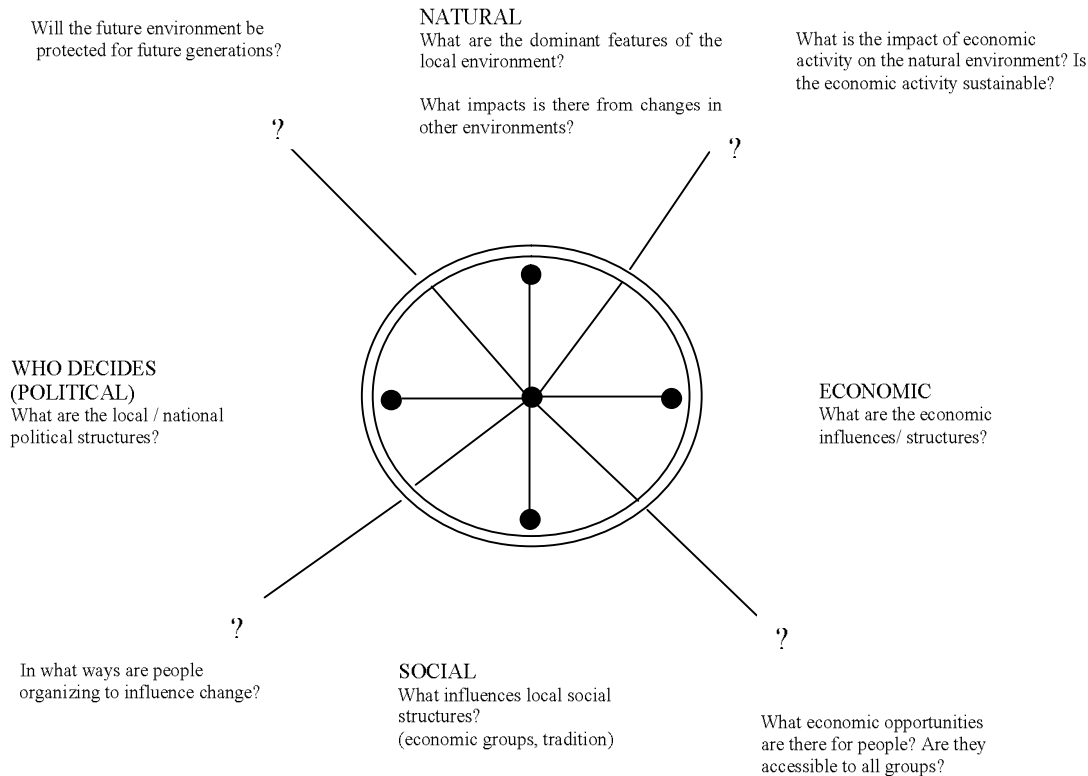
*Montgomery model for Asset – based approach for community well being in a rural county (cited in Scales and Streets, 2004)*

**Key indicators of sustainable well – being (Guy and Kibert’s model)**

Criteria	Questions
Community involvement	Were they developed and acceptable by the stakeholders?
Linkage	Do they link social, economic and environmental issues?
Valid	Do they measure something that is relevant?
Available and timely	Are the data available on a regular basis?
Stable and reliable	Are they compiled using a systematic method?
Understandable	Are they simple enough to be understood by lay persons?
Responsive	Do they respond quickly and measurably to change?
Policy relevance	Are they relevant to policy?
Representative	Do they cover the important dimensions of the area?
Flexible	Will data be available in the future?
Proactive	Do they act as a warning rather than measure an existing state?

Source: Guy and Kibert, 1998 cited in Morse and Bell, 2003

### Development compass model used in the formal sector in sustainability



- Natural capital ( $K_n$ ) - the stock of natural assets or environmental assets, for example, soil fertility, forests, fisheries, biodiversity, waste assimilation capacity, oil, gas, coal, the ozone layer, biogeochemical cycles.
- Financial capital ( $K_f$ ) - equity and debt that represent claims on physical or working assets.
- Social capital ( $K_i$ ) - formal and informal institutions that consist of laws, economic policies, property rights, and codes of conduct.
- Cultural and spiritual capital ( $K_c$ ) - behavioral influences, sometimes defined as informal institutions,

Source: Belk et al (1992) as cited by Huckle and Sterling, 2008

### Financial intergenerational equity model for sustainable development

An intergenerational equity model is normally adapted by World Bank as a way to hold capital stocks constant from generation to generation of capital constant in addressing policy implications for sustainable development. One way to do this is to hold capital stocks constant from generation to generation. Capital consists of several types:

- Man-made or physical capital ( $K_m$ ) - machines, factories, and roads
- Human capital ( $K_h$ ) - the stock of knowledge, skills, and health

that affect human decisions and actions (while this type of capital is particularly difficult to identify, it has a significant impact on how people make decisions).

We can therefore look upon the total stock of capital,  $K$ , as  $K = K_m + K_h + K_n + K_f + K_i + K_x + K^*$

Where  $K^*$  denotes capital of a critical nature for which a substitute is difficult or impossible to find. Some types of capital can be substituted for other types, such as coal for oil. Other types of capital may be more difficult, or even impossible, to substitute, such as the ozone layer. Whether or not capital is substitutable helps in ascribing a market value to it; however, the problem here is that markets do not exist for some types of capital.

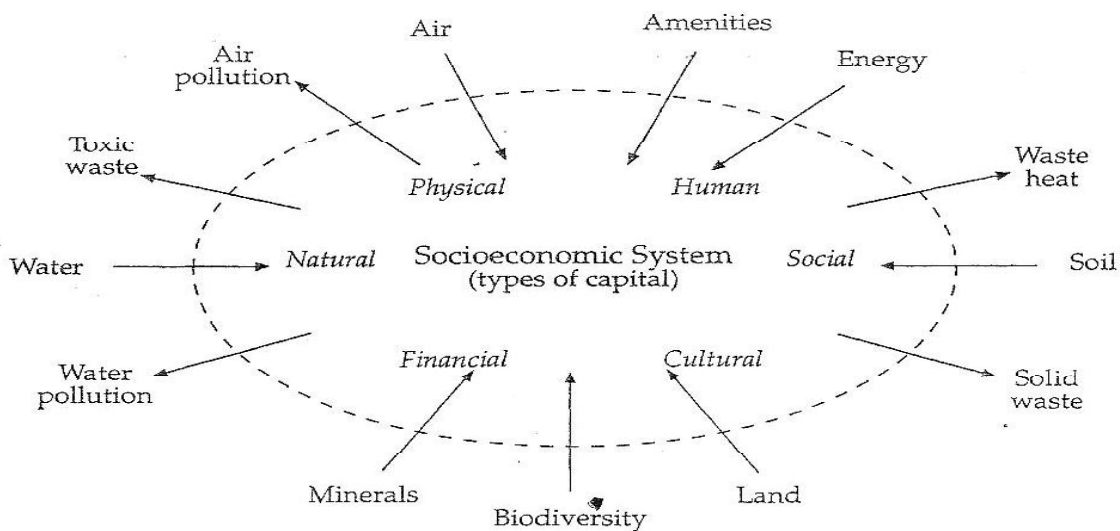
### III. DISCUSSION OF MAIN FINDINGS

Sustainable development and social economic environment can also be interrelated through the interaction of human

society and the environment. This can be understood as follows;

*(Scott and Gough, 2003)*

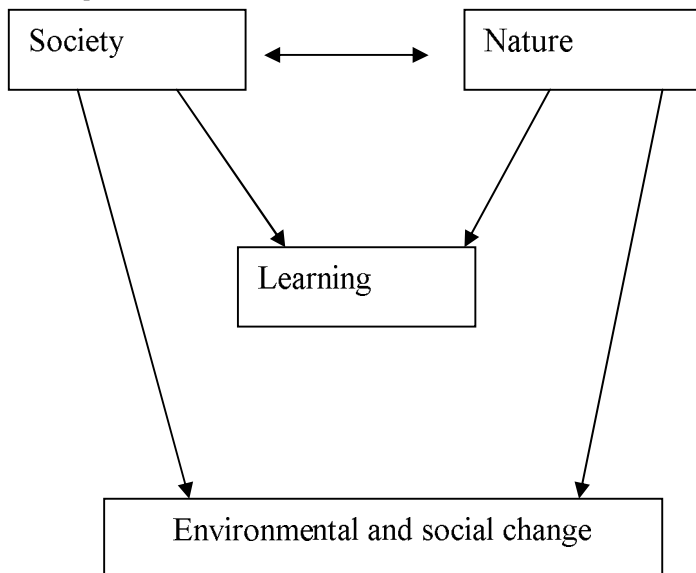
Examples of some the contents of sustainable development learning initiatives are shown in the table below;



*Adapted from Furtado et al, 2000*

However, the need to understand the society, its nature, learning and change is to frame the relevant issues in sustainable development, that is;

**Relationships between society, nature, learning and change**



In the same manner, commitments for sustainable development and education recently from Johannesburg Summit of year 2002 led to long term commitments in the following;

- Water and sanitation. For example, there is a new commitment to halve the number of people in the world who do not have access to basic sanitation by 2015
- Sustainable production and consumption. A ten-year framework to promote this is to be developed
- Energy. For example: Improve access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources
- Chemicals. For example, by 2020 these are to be used and produced in ways that do not lead to significant adverse effects on human health and the environment

- Natural resource management. For example, on an urgent basis and where possible by 2015, maintain or restore depleted fish stocks to levels that can produce the maximum sustainable yield
- Corporate responsibility. Plans to enhance this are strongly linked to the Summit's emphasis on the development of partnerships
- Health. Health education is to be 'enhanced'
- Small-island states. Of particular interest, community-based initiatives on sustainable tourism are to be developed by 2004
- Africa. For example, there is to be support for the development and implementation of food security strategies by 2005.

Environmental pollution and its management is also a key factor in addressing sustainability. This may include human actions, ecological principles, air, noise, thermal, soil, radioactive and the vehicular pollution besides wastes and renewable sources of energy. (Khitoliya, 2007)

(Ibid: 14)

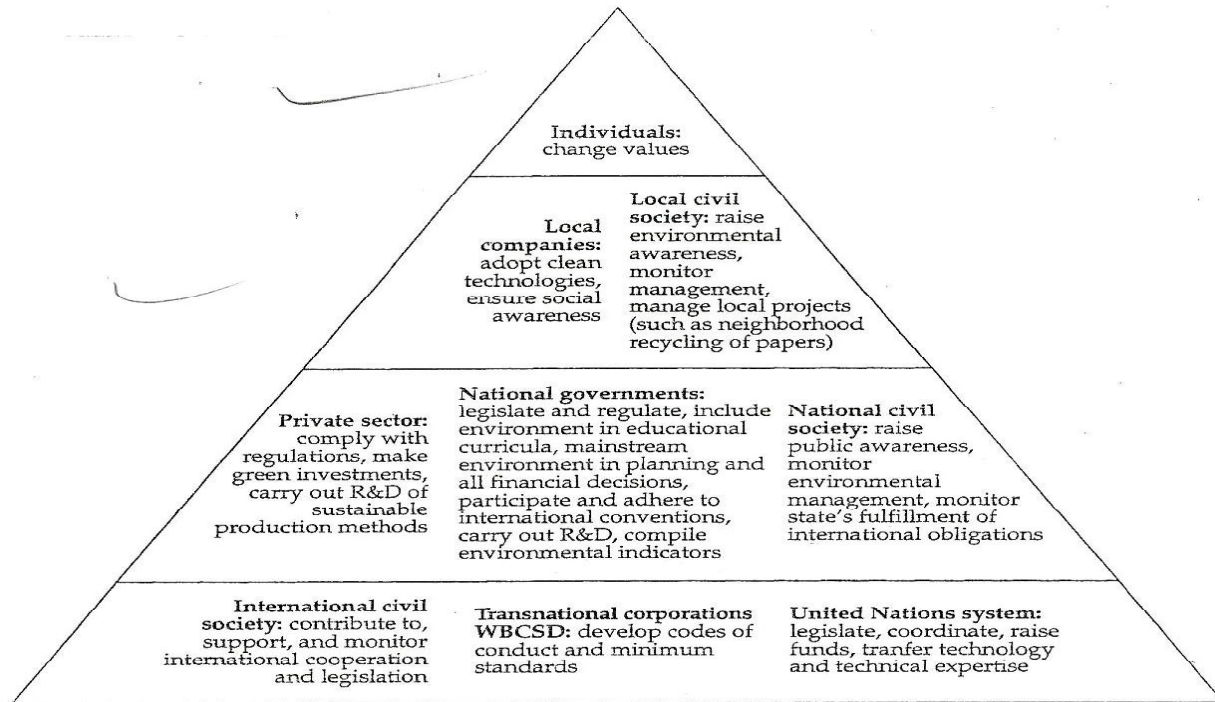
Sustainable development approach has also been based on functions and services provided by the environment according to World Commission on Environment and Development 1987 which have included; regulation functions, production functions, carrier functions and information functions, that is;

<i>International</i>	<i>National</i>	<i>Local/regional</i>
1 Mainstreaming environmental education into programmes (Department for International Development)	4 Developing environmental/ development skills: the empowerment of women in Pakistan (World Wildlife Fund)	7 Local Biodiversity Action Planning (Department for Environment, Food and Rural Affairs)
2 Ecoregion Conservation (World Wildlife Fund)	5 A Greener School and Village: livelihood and conservation. The production of vegetable charcoal in Tanzania (Tanzania Environmental Education Programme)	8 Solid waste management and education on the Caribbean island of St Lucia
3 Teaching and Learning for a Sustainable Future	6 Learning to Last (Learning and Skills Development Agency)	9 Environmental learning* at Kaunong Ave, Brunei

<i>Regulation functions</i>	<i>Production functions</i>	<i>Carrier functions</i>	<i>Information functions</i>
Providing support for economic activity and human welfare through <ul style="list-style-type: none"> <li>• Protection against harmful cosmic influences</li> <li>• Climate regulation</li> <li>• Watershed protection and catchment</li> <li>• Erosion prevention and soil protection</li> <li>• Storage and recycling of industrial and human waste</li> <li>• Maintenance of biological and genetic diversity</li> <li>• Biological control</li> <li>• Provisions of migratory, nursery, and feeding habitats</li> </ul>	Providing basic resources such as <ul style="list-style-type: none"> <li>• Oxygen</li> <li>• Food and drinking water</li> <li>• Water for industrial use, households, and so forth</li> <li>• Materials for making clothing and fabrics</li> <li>• Building, construction, and manufacturing materials</li> <li>• Energy and fuels</li> <li>• Minerals</li> <li>• Medicinal, biochemical, genetic, and ornamental resources</li> </ul>	Providing space and a suitable substrate for, among other things, <ul style="list-style-type: none"> <li>• Habitation</li> <li>• Agriculture, forestry, fisheries, aquaculture</li> <li>• Industry</li> <li>• Engineering projects, such as dams and roads</li> <li>• Recreation</li> <li>• Nature conservation</li> </ul>	Providing aesthetic, cultural, and scientific benefits through <ul style="list-style-type: none"> <li>• Aesthetic information</li> <li>• Spiritual and religious information</li> <li>• Cultural and artistic inspiration</li> <li>• Educational and scientific information</li> <li>• Potential information</li> </ul>

Recently, World Business Council for Sustainable

Development (WBCSD) has developed actors and actions dealing on various aspects that include;



*Furtado et al, 2000*

Moreover, other actors and actions in sustainable development have included the following;

- i) Sustainable Agriculture through farmer participation in Latin America and Caribbean otherwise referred as (LAC) region, mainly north eastern Brazil, Southern Mexico and Hillside areas of Andes in Central America and the Caribbean.
- ii) NGOs as mediators of sustainability especially in Andes and Chile.
- iii) Financing options by creating an emergency fund for instance social emergency fund in Bolivia 1986 to 1989.
- iv) Measurement as a major factor factors for instance in early 1990s, the inter-American Foundation (IAF) which was an idea of the US congress in the late 1960s as an experimental alternative to massive government –to-government development programmes that tended to transfer technological modes for implementation in the field. The criterion used performance of the grantee organization, impact of the grant, and cost effective.
- v) Joining the international and National Companies unions or movements for instance, international and National Banana Companies as actively in European Union

market in the mid 1990s for fairer trade practices and related benefits.

(Adopted from (Blaneurt and Zadek, 1998)

- Income information
- Information about volume of activity or workload to establish unit costs
- Organizational arrangements
- Process descriptions

Benchmarks will be both internal and external

b) Overall financial modeling, this will involve:

- Costing models
- Option appraisal models
- resource allocation models
- Financing models

c) Capital investment appraisal, this involves:

- Large scale expenditure
- Longer term implications
- Irreversibility
- Incremental revenue costs

Financial aspects of investment appraisal can also include: economic viability, affordability and funding viability. (Prowle, 2005)

#### **Accountability concepts in sustainable living**

Users have a greater say in service planning and delivery; besides the determination of service professionally as well as the accountability of local decision-makers to democratic control through election. Multiple structures exist in accountability while considering the relationship between sustainability and community.

In summary therefore, sustainable education and development should be accountable to the following;

i) Professional accountability which is inculcated through professional education and experience, reinforced by restricted entry to employment, policed by the profession itself and or by professional inspectors and enforced by peer group codes of conduct.

ii) Financial accountability is determined by accounting and audit practice (also a professional activity) exercised through checking financial behavior or by reference to proper use of funds. Financial probity is usually subject to external investigation, in the case of public bodies through audit commission.

iii) Legal accountability embodies the obligation to behave within the law and to be brought to account in the courts if the law is broken.

iv) Procedural and or administrative

Accountability is evident in the extent to which organizational process conform to statute or the rules and prudent of natural justice.

v) Managerial accountability, that is in terms of performance of those who allocate resources or manage services in terms of the achievement of targets and conformance with the internal managerial objectives of the organization.

However, accountability can also be characterized as being more closely oriented to non-provider interests, and were four main forms of accountability are:

In higher education therefore, financing of education should consider costing in curriculum, structure, student population, teachers, physical facilities, support services, support staff and affirmative action costs.

Some sources currently supplementing government funding for education in Kenya have been:

a) Communities through harambee or joint fund-raising for the development of educational facilities,

b) NGOs, that is through sponsorship of students and informal schools especially at the pre-school and primary level.

c) Donors, through grants and government borrowing

d) Private sector – through establishment of private schools and training institutions

e) Educational institutions; through income generating activities such as farming, production units, consultancy and hire of facilities. (GOK, 1999)

Generally, higher education institutions funding strategies may also involve; borrowing, grants, internal funds, partnership arrangements with a third party and leasing.

The models to manage these funds effectively normally include;

a) Cost and income benchmarking, that is:

- Cost information



a) Market accountability; that is, deriving from the centrality of the market as the arbiter of allocation of resources, operationalised through price, competition and freedom of information.

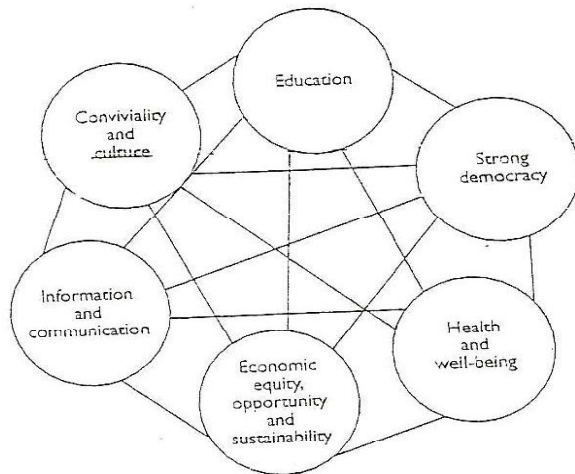
b) User accountability, exercised through the ability of users of services (increasingly termed clients or customers) to demand provision of services and or to determine the volume and nature of such services through the increased obligation on service providers to provide information about service standards, and through the right to complain and / or seek redress.

c) Political accountability; that is exercised through the democratic electoral processes which underpin representative democracy as well as by the political structures which seek to ensure adherence to political position and loyalty to party and through the enforcement and disciplinary procedures of whipping and party groups.

d) Temporal accountability of generation to generation; that is non-specific and non-enforceable ways the present generation is accountable both retrospectively to past generations and prospectively to the future.

(Warburton, 2000)

A new community model in addressing sustainable education and development may there be as follows;



Source: Schuler (1996) as cited by Ledwith M. 2005

### Policy Recommendations for Sustainable Development

Achieving sustainable development, the World Bank institute has three broad economy policy recommendations which should be embraced as:

- Correcting prices, which is the responsibility of markets and governments
- Mainstreaming environmental considerations into economy wide policies, sector work, and cost-benefit analysis of projects
- Devising sustainability indicators in an attempt to modify systems of national accounts,

Further research should therefore include individual country or nation on identifying best sustainable well-being and available homegrown financing options.

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