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CONCEPTUAL UNDERSTANDING OF SUSTAINABLE DEVELOPMENT

Nasreen Mustaq
Senior Subject Specialist
GCET, Sharaqpur Sharif, Sheikhupura,
PAKISTAN

Muhammad Azeem
Assessment Expert
PEAS, University of Education, Lahore
PAKISTAN.
knowledge_jhumra@yahoo.com

ABSTRACT

The study was carried out to investigate the opinion of prospective teachers regarding aspects of environmental sustainable development and its importance in current and future situation. Sustainable development is an important aspect of society which means meets the needs of the present without compromising the ability of future generations to meet their own needs. For this purpose 247 prospective teachers were selected from three public universities as a sample of the study. Data were collected by using a three point likert type scale. Data was analyzed by using descriptive and inferential statistics. Gender, locality, and, level of education has no effect regarding the diverse aspects of environmental sustainable development and their importance in current and future context.

Keywords: *sustainable development, environmental development, society*

INTRODUCTION

There is consensus on the fact that "sustainable development" does not only focus solely on environmental issues but broadly based on three interdependent and mutually reinforcing pillars: economic development, social development, and environmental protection. Social thinkers have argued that "cultural diversity" is also the fourth pillar of sustainable development. Sustainable development was a key theme of the United Nations Conference on the Human Environment in Stockholm in 1972 by lay claim to explicitly that "it was possible to achieve economic growth and industrialization without environmental damage".

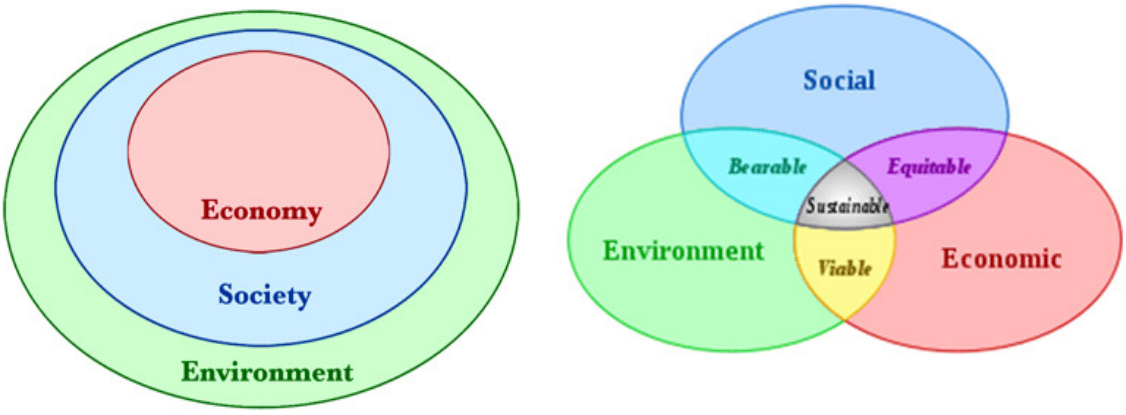

Fig. 1 Based on "Sustainable development" diagram at Cornell Sustainability Campus
Source: http://www.sustainablecampus.cornell.edu/csi.cfm

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Talberth (2006) stated that "Economic domain is populated by personal consumption expenditures, consumer durable service flows, services from public infrastructure, net capital investment, and net foreign borrowing. The environmental domain assigns costs to air, noise, and water pollution, lost farmland, wetlands, and forests, depletion of oil reserves, as well as carbon dioxide and ozone damages. The social domain counts the benefits of volunteer work, higher education, and parenting as well as the costs of crime, inequity, commuting, and auto accidents (p. 4)". According to World Commission on Environment and Development reported by Brundtland (1987) "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. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth. The Commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes. Meeting essential needs requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision making and by greater democracy in international decision making. Sustainable global development requires that those who are more affluent adopt life-styles within the planet's ecological means - in their use of energy, for example. Further, rapidly growing populations can increase the pressure on resources and slow any rise in living standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem. Yet in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. We do not pretend that the process is easy or straightforward. Painful choices have to be made. Thus, in the final analysis, sustainable development must rest on political will" (Brundtland, 1987). On the pillars of sustainable development, France said at Rio+20, governments must take decisions on three pillars of sustainable development, and Spain and Finland called for their integration (CSD-19, 2011).

Sustainable development

Hanley (2000), the term sustainable development has been widely and variously defined but a consensus as to its general implication is that sustainable development requires a non-declining level of well being for future generations. Sustainable development (SD) is a pattern of growth in which resource use aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for generations to come (sometimes taught as ELF-Environment, Local people, Future). The term was used by the Brundtland Commission which coined what has become the most often-quoted definition of sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." (Wiki, 2012)

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Brundtland (1987) defined "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

i. the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and
ii. the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (cited in IISD, 2011)"
iii. This definition was vague but it cleverly captured two fundamental issues, the problem of the environmental degradation that so commonly accompanies economic growth and yet the need for such growth to alleviate poverty (S.M. 1991).

Sustainable development means the system of connection between space and time. The concept of sustainable development is rooted in this sort of systems thinking. It helps us understand ourselves and our world. The problems we face are complex and serious—and we can't address them in the same way we created them. But we can address them. According to Hrea Organization 2011 sustainable development means:

The right to development implies the right to improvement and advancement of economic, social, cultural and political conditions. Improvement of global quality of life means the implementation of change that ensures every person a life of dignity; or life in a society that respects and helps realize all human rights. These changes must include the eradication and alleviation of widespread conditions of poverty, unemployment, and inequitable social conditions. Sustainable development ensures the well-being of the human person by integrating social development, economic development, and environmental conservation and protection. Social development implies that the basic needs of the human being are met through the implementation and realization of human rights. Basic needs include access to education, health services, food, housing, employment, and the fair distribution of income. Social development promotes democracy to bring about the participation of the public in determining policy, as well as creating an environment for accountable governance. Social development works to empower the poor to expand their use of available resources in order meet their own needs, and change their own lives. Special attention is paid to ensure equitable treatment of women, children, people of indigenous cultures, people with disabilities, and all members of populations considered most vulnerable to the conditions of poverty.

Economic development expands the availability of work and the ability of individuals to secure an income to support themselves and their families. Economic development includes industry, sustainable agriculture, as well as integration and full participation in the global economy. Social and economic developments reinforce and are dependent on one another for full realization. It is impossible to separate the well-being of the human person from the well-being of the earth. Therefore truly sustainable development places just as much importance on the protection and of the earth and the earth's resources. International documents that include the environmental aspect of development affirm and reaffirm that "human beings are at the centre of concern for sustainable development. They are entitled to a healthy and productive life in harmony with nature…". As the goal of sustainable development is to permanently improve the living conditions of human beings, social and economic developments must be carried out in a way that is environmentally and ecologically sound; ensuring the continual

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rejuvenation and availability of natural resources for future generations. Active participation in sustainable development ensures that those who are affected by the changes are the ones determining the changes. The result is the enjoyment and sharing of the benefits and products generated by the change. Participation is not exclusive, ensuring equitable input, self-determination and empowerment of both genders and all races and cultural groups (Hrea, 2011)".

Sustainable development is essentially about relationships between people and their environment. The human element is now widely recognized as the key variable in sustainable development, both in terms of reasons for unsustainable development an in terms of the hopes for sustainable development. Human relationships based on naked self interest greed, envy and lust for power, maintain inequitable distribution of wealth, generate conflicts and lead to scant regard for the future availability of natural resources. On the other hand, relationships characterized by justice and negotiated, mutual interests and lead to greater equity, respect and understanding .It is these qualities that will underpin strategies of sustainable development.

The underlying values which education for sustainable development must promote include at least the following:

a. Respect for the dignity and human rights of all people throughout the world and a commitment to social and economic justice for all.
b. Respect for the human rights of future generation and a commitment to intergenerational responsibility.
c. Respect for care for the greater community of life in all its diversity which involves the protection and restoration of the earth ecosystem.
d. Respect for cultural diversity and a commitment to build locally and globally a culture of tolerance, non-violence and peace (UNESCO, 2003)

Indicators of Sustainable Development

Indicators cannot be final and definitive, but may be improved, developed or adjusted over time to fit specific conditions, priorities and capabilities of a country. Countries may take advantage of the useful information and practical experience or other countries to further advance the developing work on sustainable development indicators by adding their own unique perspectives to what already has been learned.

According to Boulanger (2008) that usefulness of indicators of sustainable development is dependent on swapping among scientific soundness and rigor, political effectiveness and democratic legitimacy. He argued that "dimensions and indicators making up an index can be represented in the form of a tree diagram, the concept being the trunk of the tree and each branch representing one of the dimensions, with each branch breaking down into sub-branches ending up with the leaves representing the actual indicators. At each branching out, a weighting can be attributed to the branches arising there, with at the end the leaves to which is attached a weight equal to the product of the coefficients of the sub-branches and the branches from which they arise".

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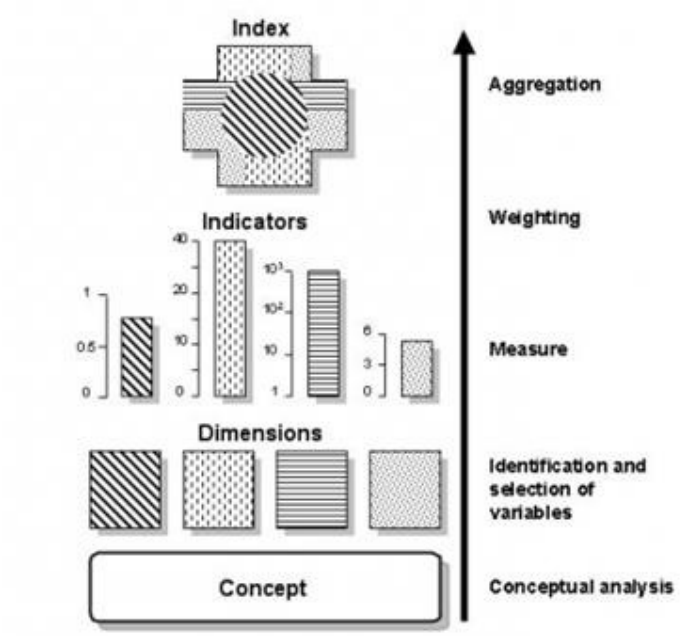

Fig. 2i Construction of indicators identified by Lazarsfeld cited in Boulanger. (2008)

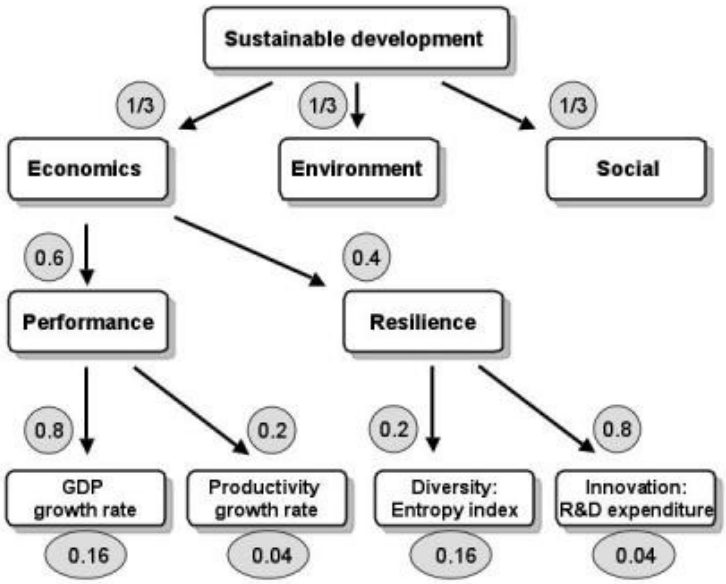

Figure 2ii. Tree diagram of dimensions and indicators

Source: Boulanger. (2008)

According to JoAnne DiSano (1995) Science and technology represent avenues for improving sustainable development decision-making through better understanding of ecological and social processes, enhanced efficiency of resource utilization, and systematic assessments of current conditions and future prospects. To maximize this potential, Agenda 21 advocates

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interdisciplinary research and better communication between scientists, decision makers, and the general public. Despite its significant role, the funding of scientific activity, including investment in research and development, has declined in most countries since 1992.

Table 1: Proposed Sustainable Development Indicators

Social	Environmental
Education	Freshwater/groundwater
Employment	Agriculture/secure food supply
Health/water supply/sanitation	Urban
Housing	Coastal Zone
Welfare and quality of life	Marine environment/coral reef protection
Cultural heritage	Fisheries
Poverty/Income distribution	Biodiversity/biotechnology
Crime	Sustainable forest management
Population	Air pollution and ozone depletion
Social and ethical values	Global climate change/sea level rise
Role of women	Sustainable use of natural resources
Access to land and resources	Sustainable tourism
Community structure	Restricted carrying capacity
Equity/social exclusion	Land use change
Economic	**Institutional**
Economic dependency/Indebtedness/ODA	Integrated decision-making
Energy	Capacity building
Consumption and production patterns	Science and technology
Waste management	Public awareness and information
Transportation	International conventions and cooperation
Mining	Governance/role of civic society
Economic structure and development	Institutional and legislative frameworks
Trade	Disaster preparedness
Productivity	Public participation

Source: Indicators of Sustainable http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isd-ms2001isd.htm

According to Boulanger (2010) Regardless of the differences among existing conceptions and theories of sustainable development, they all begin by acknowledging vital environmental issues (climate change, loss of biodiversity, water and soil pollution, coming shortages in non-renewable resources, deforestation, overharvesting of natural resources, etc.) caused, notably, by inappropriate production and consumption patterns. In this article we focus on environmental sustainable development.

Teacher and Sustainable Development SD

Nineteenth Session of the UN Commission on Sustainable Development (CSD-19) (2011) has decided to:

i. accelerate convergence among the three pillars of sustainable development;
ii. strengthen human resources and institutional capacities;
iii. collectively commit to raise awareness of the significance of education for sustainable development;
iv. address the social and poverty issues related to informal waste management;
v. strengthen the dissemination and application of the Basel Convention technical guidelines on environmentally sound waste management.

These decisions show world's serious concern with sustainable development including environmental sustainability. We can achieve this through education as education is remarkably considered responsible for sustainability and development. Indeed, education and sustainability are inextricably linked, but the distinction is enigmatic for many. Sustainability is the inherent idea of implementing culturally appropriate programs that are locally relevant. First priority is the promotion of basic education by simply increasing basic literacy. To achieve this, basic education must address sustainability and expanded to include necessary skills and critical-thinking, to organize and interpret data and information, skills to identify important questions, and the ability to analyze issues that tackle society otherwise poor or low-quality education severely limits the options available to society for developing its short- and long-term sustainability plans. Secondly, teachers should encompass a vision that integrates environment, economy, and society that requires teaching and learning knowledge, skills, perspectives, and values. It will guide and motivate people to pursue sustainable livelihoods, to participate in a democratic society, and to live in a sustainable manner. Thirdly, teachers try to people become media literate and able to analyze the messages of corporate advertisers. Fourthly, teachers encouraged to train their young ones in environmental management and to provide training to their workers.

Steps for Sustainable Development in Pakistan

Many countries in the world have grasped the need for education to achieve sustainability but very limited in Pakistan due to lack of progress stems from many sources e.g. a lack of vision or awareness or lack of policy or funding. Pakistan is the sixth largest populous country of the world and according to the State Bank of Pakistan in its 2009 annual report. Poverty and illiteracy are hurdles in the way of sustainable development. There is need to work on this. To bring awareness among the masses, education can also play an important role about the issue. Government is trying its best for the wellbeing of the people and to make Pakistani economy strong. More Efforts are needed to provide better living facilities to the people, to provide them clean drinking water and to provide them better education. By addressing and tackling critical barriers or reduce delays of derailment sustainability development may achieve. Pakistan is also actively participating in sustainable development movement. In Nineteenth Session of the UN Commission on Sustainable Development (CSD-19) (2011), on assistance, Pakistan urged developed country partners to fulfill their commitments in financial resources, technology transfer and capacity building, and said developed countries should bring their consumption to a sustainable level. The following are the most important steps that should be taken for sustainability development in Pakistan.

Media' Role

Electronic and print media can play a vital role in promoting sense of sustainability development regarding all three pillars especially environment.

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Legitimate

Framing and implementation of rule and regulation related to preservation of natural resources, pollution control, establishment of chemical factories etc.

Increasing Awareness of SD is Essential

People's realization of sustainability development SD through education can improve implementing of national policies of sustainability development SD and society then is in a position to be reoriented to help achieve sustainability.

Structuring and Placing SD in the Curriculum

It is the need of time that our educators teach about sustainable development and change the goals and methods of education to achieve sustainable development. Some others important steps are:

a. Complete curricular reorientation of education at all levels will probably be necessary.
b. Linking to Existing Issues: Educational Reform and Economic Viability
c. Facing the Complexity of Sustainable Development Concept
d. Developing an ESD Program with Community Participation
e. Engaging Traditional Disciplines in a Transdisciplinary Framework
f. Sharing the Responsibility
g. Building Human Capacity
h. Developing Financial and Material Resources
i. Developing Policy
j. Developing a Creative, Innovative, and Risk-Taking Climate
k. Promoting Sustainability in Popular Culture

PURPOSE OF STUDY

The study was carried out to identify the opinions of prospective teachers about the different aspects of sustainable development and their importance in current and future situations. This paper focuses on "How much male and female prospective teachers have different opinions regarding the different aspects of sustainable development?"

HYPOTHESIS

Ho1: There is significant difference betweenmale and female teachers onopinion regarding environmental issues

Ho2: There is significant difference betweenurban background and rural background teachers onopinion regarding environmental issues

Ho3: Age of prospective teachers' has no effect onopinion regarding environmental issues

Ho4: Prospective teachers' level of education did not effect onopinion regarding environmental issues

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RESEARCH METHDOLODY

Instrumentation

A three-point (agree, uncertain, disagree) likert scale was developed. Following aspects of sustainable development, i.e, environment, and protection of nature, recycling, protection of biodiversity, conservation of energy and water, preservation of cultural heritage, rural development and noise reduction were included in the scale.

Validity and Reliability

Initially hundred statements were developed. Different statements were developed on diverse components of sustainable development. Two experts reviewed precisely about the statements of this scale for its validity. Scale was spot tested. Responses of fifteen prospective teachers were analyzed. Five experts rated each statement and seventy four statements were finalized for piloting. The scale was piloted and statements were reviewed in the light of pilot data.Finally sixty six statements were selected for this scale. The internal consistency of the scale was .86

Sampling and Data Collection

The study was conducted through a survey of three randomly selected intact classes of graduate students who are becoming teachers. Data was collected through a self administered questionnaire approach from prospective teachers enrolled in different disciplines of three Public universities in Sargodha, Lahore, and Multan. The participants were given a choice not to complete the survey if they did not wish to do so. Two hundred and seventy three questionnaires were distributed to prospective teachers for data collection. Two hundred and forty seven questionnaires were collected from students, 68 of MSc mathematics, 64 of MSc chemistry, 66 of MSc physics and 49 of MA students. The researchers distributed the questionnaires to the students through three data collectors during the last semester of their degree programs.Students were given a full class period, approximately 60 min, to complete the task. Close ended questions were supplemented with items requesting demographic information such as, gender, age and discipline. There were total of 150 male and 97 female students in this study. The students represented different educational backgrounds. The majority of the students fell between age group of 20 to 24 years with a few students slightly older than 25.

Data analysis

Collected data organized using Mirosoft Excel 2007. Data were analyzed by using descriptive statistics. Percentages were used to interpret the data. Male and female prospective teachers reflected their opinion on diverse aspects of environmental sustainable development and their importance in current or in a future situation.

Descriptive Analyses

Every participant of study was asked to respond for present and futuristic opinion regarding aspects of sustainable development. The following table shows the percentages of present and futuristic agreed opinions of participants.

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Table 2: Prospective Teacher's on Environmental Sustainable Development Aspects

Sustainable Development Aspects	Gender	n	Opinion on Environmental Issues	
			% of Present importance	% of future Important
Land use/Forestry	Male	150	150%	97%
	Female	97	62%	66%
Hygienically Care	Male	150	47%	78%
	Female	97	52%	76%
Freshwater/Drinking water	Male	150	61%	67%
	Female	97	55%	73%
Air pollution	Male	150	79%	59%
	Female	97	87%	41%
ozone depletion	Male	150	60%	86%
	Female	97	43%	88%
Noise reduction	Male	150	58%	70%
	Female	97	68%	60%
Cultural heritage	Male	150	77%	68%
	Female	97	70%	78%
Urbanization	Male	150	86%	32%
	Female	97	64%	84%
Agriculture/secure food supply	Male	150	48%	87%
	Female	97	33%	89%
Sustainable use of natural resources	Male	150	65%	65%
	Female	97	45%	83%
Paper /Glass	Male	150	70%	69%
	Female	97	70%	58%
Preservation of Nature	Male	150	63%	65%
	Female	97	38%	90%
Biotechnology /Biodiversity	Male	150	45%	83%
	Female	97	71%	69%
Cultural Diversity	Male	150	75%	58%
	Female	97	70%	78%
Recycling	Male	150	86%	42%
	Female	97	64%	64%
Chemicals	Male	150	41%	87%
	Female	97	39%	89%
Sustainable tourism	Male	150	65%	63%
	Female	97	45%	83%
groundwater	Male	150	97%	50%
	Female	97	64%	68%
Preservation of Environment	Male	150	78%	50%
	Female	97	87%	44%
Conservation of energy	Male	150	69%	88%
	Female	97	83%	50%

Inferential Analyses

For inferential analyses, following coding was used. Agree =3, Uncertain= 2, Not agree= 1. The responses were added to get the total score of each participant on Likert scale. Independent sample t-test was used to check the significance difference between opinions of different groups.

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Table 3: Hypotheses Testing

Sr. No.	Statement	Strata	Number N	Means	Sig. value	Result
Ho 1	There is significant difference betweenmale and female teachers onopinion regarding environmental issues	Male	150	144.60	0.121	**Accepted**
		Female	97	140.33		
Ho 2	There is significant difference betweenurban background and rural background teachers environmental issues onopinion regarding	Urban	113	148.23	0.654	**Accepted**
		Rural	134	139.67		
Ho 3	Age of prospective teachers' has no effect on opinion regarding environmental issues	>20 years	141	165.14	0.427	**Accepted**
		≤ 20 years	106	159.22		
Ho 4	Prospective teachers' level of education did not effect onopinion regarding environmental issues	MSc	100	146.64	0.498	**Accepted**
		MA	147	137.01		

DISCUSSION

The descriptive analyses showed that prospective teachers think seriously about the different aspects of sustainable development. Inferential analyses show that all the students of under study from three Universities have the almost same opinion regarding environmental issues and their solution irrespective of gender, age and level of education. Male students are slightly strong opinion than female students regarding environmental issues related to Pakistan. Younger students (< 20 years) have better opinion regarding sustainable development issues than adult (>20 years) students. Teachers having urban background are better motivated towards sustainable development than teachers have rural background. As the time going on, awareness about these issues is very important. A healthy society depends on sustainable development. For sustainable survival of future generation, it is much important to conserve the natural resources for their usage. The present study has explored the prospective teachers' opinions regarding the various aspects of sustainable development. They have demonstrated their opinions on different aspects of sustainable development according to their knowledge and showed keen interest for the conservation of different aspects of sustainable development. Researcher think a change should bring be about in their attitude and actions towards the protection of environment and preservation of natural resources as well. They are the responsible citizens of the society and the future of society is in the hands of them.

RECOMMENDATIONS

a. Panel discussions, dialogs, and programs through electronic media is necessary to promote sustainable development vision.

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b. Institutional capacity is a significant means for facilitating movement towards sustainable development
c. Resilient to the effects of natural, technological and environmental hazards, and to proceed from protection against hazards to the management of risk, by integrating disaster prevention strategies with sustainable development.
d. Different awareness raising programs should be arranged for promotion of sustainable development and its different aspects.
e. Educational institutions should conduct seminars and conferences on the different aspects of sustainable development for enhancing the knowledge of prospective teachers and students.
f. Sustainable development programmers must be locally relevant and culturally appropriate, reflecting the environmental, economic, and social conditions of our society and country
g. Sustainable development should be created through a process of public participation in which stakeholders from across the community
h. Each teacher and administrator can contribute to sustainable development programmers according to the strengths and mandate.
i. Society and school should work together to achieve sustainability goals.
j. Community awareness programs should be held by NGO's.
k. Intervention strategies should be designed for bring about a change in their attitude and actions for the different aspects environment, and protection of nature, recycling, protection of biodiversity, conservation of energy and water, preservation of cultural heritage, rural development and noise reduction. i.e. of sustainable development.
l. Some of the tangible sustainable development benefits that can be derived from up-to-date electronic and telecommunications systems.

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