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Challenges in the Way of Sustainable Landscape Design by Selected Design Professionals

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ABSTRACT

Drastic escalation of activities in urbanization and industrialization with every changing day has taken a very serious toll on the human race. Adapting a lifestyle that does not only conserve the environment and its natural resources but also brings no or negligible harm to the planet has become the need of the hour. It becomes essential for individuals to conserve the natural resources. Landscapes that are "environmentally sustainable" have been famously talked about in the current advancements in the field of construction and development. Landscaping goes past just enhancing the view; it actually has numerous benefits that a design professional can bring to life through their expertise and knowledge in the context of environmental sustainability. Sustainable landscapes sequester carbon, clean the air and water, increase energy efficiency, restore habitats, and create value through significant economic, social and, environmental benefits. These professionals are in an exceptionally good place to instigate change, particularly with energy-efficient lighting, eco-friendly materials, materials with recycled content, sustainable wood, and low-energy and water-saving products; but somehow various problems such as lack of technical knowledge, cost, issues with the certification process, resource constraints, clients' perception and other general problems were faced by the design professionals while practicing Sustainable Landscape Design. Hence, the present study was conducted with the objective to find out the extent of problems faced by the Design Professionals with regards to Sustainable Landscape Design. Descriptive research design was adopted for the present study with the sample size of 120 design professionals. The data was collected through questionnaire method which consisted of a scale on Extent of Problems faced by selected design professionals with regards to Sustainable Landscape Design. The content validity and reliability of the scale was established. The major findings revealed that Clients' Perception and Resource Constraints were the major problems faced by the respondents of the study.

Key Words : Landscape Design, Sustainable Landscape Design, Extent of Problems, Principles of Sustainable Landscape Design

INTRODUCTION

The present study aims to find out the challenges faced by selected design professionals with regards to sustainable landscape design.The living organisms of a habitat and their surrounding environment function together as a single unit. This ecological unit is called as an 'ecosystem'. An ecosystem has a physical environment, factors, biological components and interactions between them. The organisms in an ecosystem are usually well balanced with each other and with their environment (Balasubramanian, 2008).Any change in that setting will immediately affect the residents and have a significant impact. With the rapid economic development and urban expansion in recent years, not only are the ecological environment and natural resources being overused, but the waste and pollutants emitted by factories and automobiles have also seriously damaged

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the environmental climate, resulting in ozone layer depletion, greenhouse effect, urban heat islands and acid rain, which have caused serious pollution and damage the environment (Hsu and Ou, 2022).The human species and the environment we live in have suffered greatly as a result of the rapid acceleration of urbanization and industrialization activities with each passing day. With the huge exploitation of natural resources to provide for the so-called "luxuries," the world has transformed into one giant concrete wilderness. This has also led to waste creation without accounting for it, and the depletion of the same has led mankind to where it is today.

Sustainable landscapes are responsive to the environment, re-generative, and can actively contribute to the development of healthy communities. Sustainable landscapes sequester carbon, clean the air and water, increase energy efficiency, restore habitats, and create value through significant economic, social and, environmental benefits[1]. The implementation of a sustainable landscape design and aiding in the healing of the earth are major contributions made by today's design professionals.There are great opportunities to redefine public spaces, as the value of parks and innovative open space design are in the news and have the eyes of the public. This momentum should be used to set the standard for excellent open space design[2]. The world has made significant advancements, so landscape design is no longer just about plants, trees, water, and dirt. Now, the focus is on creating a landscape that requires little upkeep, is affordable to build, and uses a minimal amount of waste-producing and environmentally damaging resources.

The review of literature revealed that much effort has been made in the research area of "Landscape Design" abroad. An overview of the studies carried out reflected that much work has been done in relation to perceptions regarding sustainable outdoors, elements, principles and parameters of environmental sustainability in landscape, sustainable materials for landscaping as well as interiors, guidelines and strategies towards the achievement of Sustainable Landscape Design.

Very few researches were found in India which focused on Sustainable Landscape Design practices. Therefore, the researcher was motivated to adopt the present study which finds out the extent of challenges faced by the selected design professionals.

Objective :

To assess the extent of challenges faced by the Design Professionals with regards to sustainable landscape design.

METHODOLOGY

The present study was undertaken to discover answers to questions regarding Sustainable Landscape Design; extent of problems faced and practices adopted by the selected design professionals. In order to achieve the aim of the present study, a detailed plan of work and sequential procedure was followed which is presented in this chapter. The chapter deals with Research Design, Variables and Conceptual Framework under Study, Operational Definitions, Locale of the Study, Unity of Enquiry, Sample and Sampling Technique, Selection, Development and Description of the Tool, Data Collection and Data Analysis.

The research design of the present study will be descriptive in nature. The major purpose of Descriptive Research is describing the state of affairs as it exists. Descriptive Research Design is adopted for the present research because it gathers data on the extent of problems faced and practices adopted by selected design professionals with regards to Sustainable Landscape Design.

The sample for the present study were 120 design professionals who had a minimum work experience of 5 years in the respective field. Purposive sampling technique was used for the collecting the data. For the present study questionnaire was developed. The tool consisted of 38 statements relating to extent of problem faced with regards to Sustainable Landscape Design and it was analyzed in terms of Major Problem, Minor Problem and Not a Problem. High scores revealed high extent of problems experienced with regards to extent of problems faced and *vice versa*.

RESULTS AND DISCUSSION

Background information of the selected design professionals:

This section deals with background information of the selected design professionals which consists of age, educational qualification, duration of time working as a design professional, number and kinds of projects undertaken in which aspects of Sustainable Landscape Design are incorporated and the sources through which they obtained information about Sustainable Landscape Design.

Age of the respondents:

The findings revealed that slightly more than one-half (53.33%) of the respondents were in the age group of 26 to 38 years. It was also revealed that more than one-third (37.5%) of the respondents were in the age group of 39 to 51 years. Very few of the respondents *i.e.,* 9.2 per cent were in the age group of 52 to 65 years. The minimum age of the respondent was found to be 26 years and the maximum was 65 years. The mean age of the respondents was found to be 38.41 years (Table 1 and Fig. 1).

Table 1: Frequency and percentage distribution of the respondents according to their age

Sr. No.	Age (in years)	Respondents (n=120)	
		f	%
1.	26-38	64	53.33
2.	39-51	45	37.5
3.	52-65	11	9.2
	Mean	38.41	
	Standard Deviation	9.087	
	Minimum	26	
	Maximum	65	

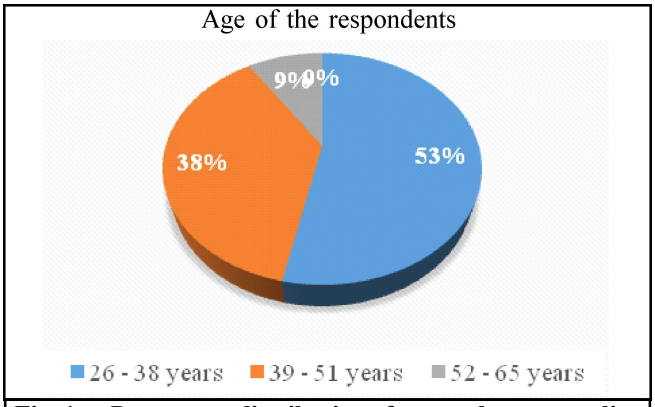

Fig. 1 : Percentage distribution of respondents according to their age

Education qualification of the respondents:

The data pertaining to the educational qualification of the respondents as shown in Table 2, revealed that more than one-half of the respondents (59.17%) were holding a Bachelor's Degree, whereas very few (12.5%) of the respondents had pursued a Master's Degree. Moreover, slightly more than one-tenth (14.2%) of the respondents had pursued their Diploma and remaining (14.2%) were qualified from various other design fields (B.Tech. in Built Environment, Master Diploma in Interior Designing, PG Diploma in Urban Design, MTRP – Town and Regional Planning, B.Sc. in Agriculture, B.Sc. in Horticulture, MA Architecture, Ph.D. in The Water Architecture of Arid India) (Fig. 2).

Table 2 : Frequency and percentage distribution of the respondents according to their Educational Qualification

Sr. No.	Educational Qualification	Respondents (n=120)	
		f	%
1.	Diploma	17	14.2
2.	Bachelor's Degree	71	59.2
3.	Master's Degree	15	12.5
4.	Other (B.Tech. in Built Environment, Master Diploma in Interior Designing, PG Diploma in Urban Design, MTRP – Town and Regional Planning, B.Sc. in Agriculture, B.Sc. in Horticulture, MA Architecture, Ph.D. in The Water Architecture of Arid India)	17	14.2
	Total	120	100

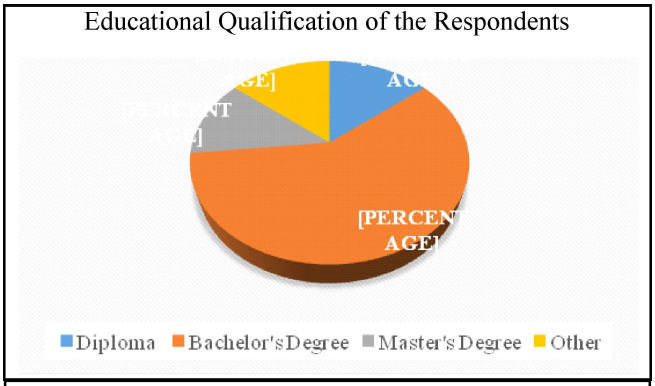

Fig. 2 : Percentage distribution of respondents according to their Educational Qualification

Duration of time working as a Design Professional:

The findings in Table 3, revealed that majority of the respondents (53.3%) of the respondents had a work experience of more than 10 years and the remaining 46.7 per cent of the respondents had a work experience of less than or equal to 10 years (Fig. 3).

Kinds and number of Landscape Design projects undertaken by the respondents:

The findings showcased that few respondents had work experience of more than 30 years, which was reflected through a greater number of residential as well as commercial landscape design projects undertaken by them.

Table 3: Frequency and percentage distribution of respondents according to their duration of time working as a Design Professional

Sr. No.	Duration of time working as a Design Professional (in years)	Respondents (n=120) f	%
1.	≤10 years	56	46.7
2.	> 10 years	64	53.3
	Total	120	100
	Minimum	6	
	Maximum	42	

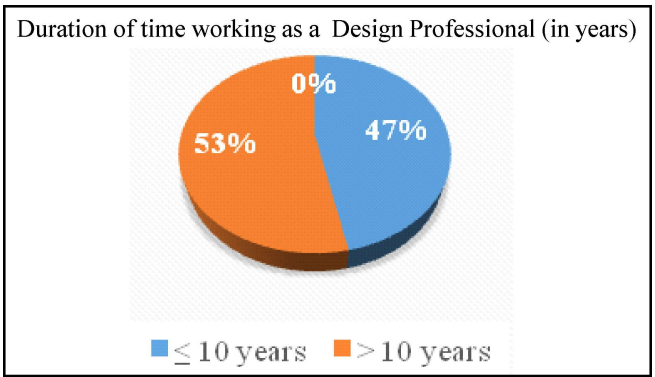

Fig. 3 : Percentage distribution of respondents according to their duration of work experience as a Design Professional

The findings in relation to the number and kinds of sustainable landscape design projects in residential areas revealed that 41.6 per cent of the respondents had undertaken 1 to 10 residential projects and the same proportion of respondents had also undertaken more than 20 residential projects. Furthermore, the data revealed that with regards to the number and kinds of sustainable landscape design projects in commercial areas indicated that one-half of the respondents (50.8%) had undertaken 1 to 10 commercial projects. It was also revealed that 25.9 per cent of the respondents had undertaken more than 20 commercial projects (Table 4 and Fig. 4).

Sources of Information obtained by the selected design professionals regarding Sustainable Landscape Design:

Generally, apart from their own experiences, the design professionals made use of various other sources of information to acquire knowledge about Sustainable Landscape Design. Different sources used were print media, audio/visual media, word of mouth and formal education or seminar.

Table 4 : Frequency and percentage distribution of respondents according to the number and kinds of Sustainable Landscape Design Projects undertaken

Sr. No.	Kinds of Projects Undertaken	Respondents (n=120) f	%
1.	Residential Projects		
	1 – 10 Projects	50	41.6
	11 – 20 Projects	20	16.8
	> 20 Projects	50	41.6
	Total	120	100
2.	Commercial Projects		
	1 – 10 Projects	61	50.8
	11 – 20 Projects	28	23.3
	>20 Projects	31	25.9
	Total	120	100

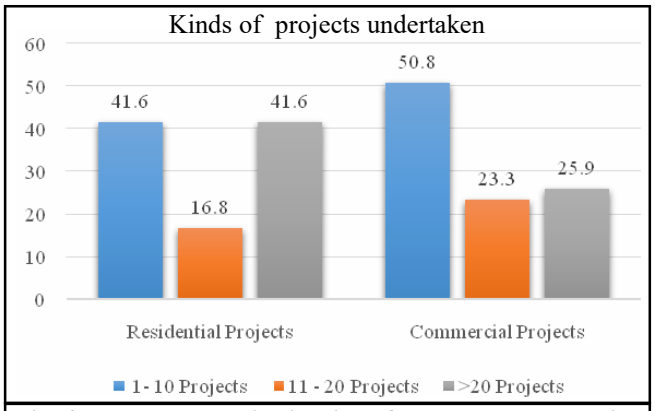

Fig. 4 : Percentage distribution of respondents according to the number of Sustainable Landscape Design projects undertaken

The data with regards to sources of information on Sustainable Landscape Design Practices of the respondents revealed that maximum awareness and information was sourced from audio/visual media (40.83%) by the selected design professionals. Whereas, more than one-third (36.6%) of the respondents also gained information regarding Sustainable Landscape Design from print media such as newspapers and magazines. A very few respondents were informed about the same through word of mouth from the clients, professional associates, or friends (13.33%) and through formal education/seminars (9.16%) also (Table 5 and Fig. 5).

Problems faced by the selected design professionals while practicing Sustainable Landscape Design:

This section covers information regarding the

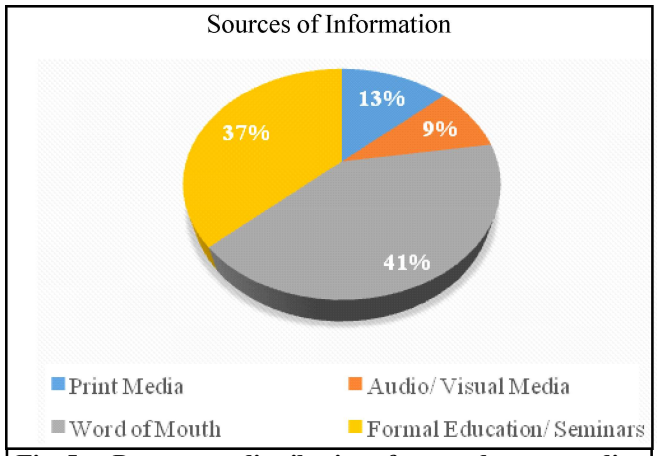

Fig. 5 : Percentage distribution of respondents according to the number of Sustainable Landscape Design projects undertaken

problems faced by the selected design professionals while practicing Sustainable Landscape Design. The problems considered were listed as 'Lack of technical knowledge', 'Cost', 'Issues with the certification process', 'Resource constraints', 'Clients' perception', and 'Other' problems. The responses were sought in terms of 'Major Problem', 'Minor Problem', and 'Not a Problem'. These were ascribed the scores of 3 through 1 respectively. The scores were interpreted in terms of 'To High Extent', 'To Moderate Extent', and 'To Low Extent'. Higher scores revealed high extent of problems and *vice versa*.

Lack of technical knowledge:

The data revealed that more than one-third of the respondents (35.8%) were facing problems due to lack of training/education about Sustainable Landscape Design to a high extent, followed by more than one-half (55.8%) of the respondents who stated that not being aware about several codes, materials and standards for Sustainable Landscapes also moderately impeded the adoption of Sustainable Landscape Design (Table 6).

Cost:

The findings analyzed in Table 7, revealed that

Table 5 : Frequency and percentage distribution of respondents according to various sources of information on sustainable landscape design practices

Sr. No.	Sources of Information	Respondents (n=120)	
		f	%
1.	Print Media (Newspaper, Magazine)	16	13.3
2.	Audio/Visual Media (Television Programs)	11	9.2
3.	Word of Mouth (Clients, Professional Associates, Friends)	49	40.8
4.	Formal Education/Seminars (Educational Programs, Workshops, Conferences, Seminars, Professional Organizations, Personal Research)	44	36.7
	Total	120	100

Table 6 : Frequency and percentage distribution of respondents according to Lack of Technical Knowledge as a problem while practicing Sustainable Landscape Design

Sr. No.	Lack of technical knowledge as a problem while practicing Sustainable Landscape Design	Respondents (n=120)						
		Extent of Problem while practicing Sustainable landscape design						Weighted Mean Scores (1-3)
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Lack of training/education about Sustainable Landscape Design.	43	35.8	49	40.8	28	23.3	2.13
2.	Lack of technical understanding.	24	20	53	44.2	43	35.8	1.84
3.	Lack of experience.	20	16.7	49	40.8	51	42.5	1.74
4.	Lack of education and knowledge about the concept among the clients.	35	29.2	47	39.2	38	31.7	1.98
5.	Preconceived notions/stigma amongst the professional as well as the client for the concept to be "tough" to implement.	22	18.3	60	50	38	31.7	1.87
6.	Unaware about several codes, materials, and standard for Sustainable Landscapes.	29	24.2	67	55.8	24	20	2.04
7.	Unaware about concern and immediate importance for Sustainable Landscape Design	36	30	44	36.7	40	33.3	1.97
	Total Weighted Mean							1.90

slightly more than one-third (34.2%) of the respondents found that the high initial cost for implementing Sustainable Landscape Design projects hindered the adoption of Sustainable Landscape Design to a high extent. The data also showed that more than one-half (57.5%) of the respondents experienced uncertainty about the economic benefits from Sustainable Landscapes as a problem which had a moderate effect on their Sustainable Landscape Design practices in the longer run.

Issues with the certification problem :

The data presented in Table 8 shows that, slightly less than one-half of the total number of respondents (45%) found lack of active government participation in endorsing getting certified as a major problem for them to practice Sustainable Landscape Design. Moreover, 55.8 per cent of the respondents found process of certification was not easy to understand to a moderate extent.

Resource constraints :

The findings given in Table 9, it was indicated that lack of availability of the required sustainable materials locally, affected 40.8 per cent of the respondents to a high extent. Whereas, 60 per cent of the respondents were moderately affected due to same.

Clients' Perception:

The findings in the Table 10, revealed that more than two-third (68.3%) of the respondents faced problems to a high extent due to a lack of interest on the part of the client. Moreover, persistence of negative stereotypes among the clients about adopting Sustainable Landscape Design was also a problem experienced by almost one-half of the respondents (49.2%) to a moderate extent.

Other problems:

The data in Table 11, revealed that 41.7 per cent of

Table 7 : Frequency and percentage distribution of respondents according to Cost as a problem while practicing Sustainable Landscape Design

Sr. No.	Cost as a problem while practicing Sustainable Landscape Design	Respondents (n=120)						Weighted Mean Scores (1 – 3)
		Extent of Problem while practicing Sustainable landscape design						
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	High initial cost for implementing Sustainable Landscape Design.	41	34.2	68	56.7	11	9.2	2.25
2.	High cost of sustainable landscape design materials	31	25.8	62	51.7	27	22.5	2.03
3.	High cost associated for accreditation/certification	33	27.5	63	52.5	24	20	2.08
4.	Uncertainty about the economic benefits in the longer run from Sustainable Landscape Design.	26	21.7	69	57.5	25	20.8	2.01
	Total Weighted Mean							2.18

Table 8 : Frequency and percentage distribution of respondents according to Issues with the Certification Process as a problem while practicing Sustainable Landscape Design

Sr. No.	Issues with the certification as a problem while practicing Sustainable Landscape Design	Respondents (n=120)						Weighted Mean Scores (1 – 3)
		Extent of Problem while practicing Sustainable landscape design						
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Unable to understand the process of certification.	31	25.8	67	55.8	22	18.3	2.08
2.	Expensive certification process.	23	19.2	56	46.7	41	34.2	1.85
3.	Lengthy certification process.	29	24.2	53	44.2	38	31.7	1.93
4.	Difficulty in obtaining the certification.	23	19.2	60	50.0	37	30.8	1.88
5.	Unaware of the various Certifications and Green Standards that can be acquired	35	29.2	62	51.7	23	19.2	2.10
6.	Lack of active Government participation in endorsing certification.	54	45.0	54	45.0	12	10.0	2.35
	Total Weighted Mean							1.92

the respondents found lack of legislative support to encourage the practices of Sustainable Landscape Design and lack of commitment to protect the environment through adoption of Sustainable Landscape Design practices as a problem to a high extent. Moreover, 52.5 per cent of the respondents were affected due to a lack of legislative support to encourage the practices of Sustainable Landscape Design to a moderate extent

In context of the extent of problems faced by the respondents while practicing Sustainable Landscape Design, clients' perception was found to be the major problem faced by a little more than one-half (50.8%) of the respondents to high extent. The findings also elicited that 71.7 per cent of the respondents faced issues with

Table 9 : Frequency and percentage distribution of respondents according to Resource Constraints as a problem while practicing Sustainable Landscape Design

Sr. No.	Resource constraints as a problem while practicing Sustainable Landscape Design	Respondents (n=120)						
		Extent of Problem while practicing Sustainable landscape design						Weighted Mean Scores (1 – 3)
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Lack of financial assistance from financial institution to practice Sustainable Landscape Design.	42	35	72	60	6	5	2.30
2.	Lack of availability of the required sustainable materials locally.	49	40.8	48	40	23	19.2	2.22
3.	Unaware about the available materials and various resources used for a Sustainable Landscape Design.	40	33.3	45	37.5	35	29.2	2.04
4.	Misleading information by manufacturers regarding company's materials and its effect on the environment.	40	33.3	56	46.7	24	20	2.13
5.	Relatively higher cost of required materials acting as a barrier for adopting Sustainable Landscape Design.	34	28.3	67	55.8	19	15.8	2.13
6.	Lack of availability of landscape space for implementation of sustainable landscape practices.	41	34.2	53	44.2	26	21.7	2.13
	Total Weighted Mean							2.24

Table 10 : Frequency and percentage distribution of respondents according to Clients' Perception as a problem while practicing Sustainable Landscape Design

Sr. No.	Clients' perception as a problem while practicing Sustainable Landscape Design	Respondents (n=120)						
		Extent of Problem while practicing Sustainable landscape design						Weighted Mean Scores (1 – 3)
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Unwillingness of the clients to pursue Sustainable Landscape Design.	81	67.5	32	26.7	7	5.8	2.62
2.	Unable to imbibe proper knowledge and awareness about Sustainable Landscape Design to the clients.	32	26.7	53	44.2	35	29.2	1.98
3.	Persistence of negative stereotypes among the clients about adopting Sustainable Landscape Design.	50	41.7	59	49.2	11	9.2	2.33
4.	Unaware about the positive environmental impact of Sustainable Landscape Design.	51	42.5	51	42.5	18	15	2.28
5.	Resistance to change ones mindset from traditional Landscape Designing practices to Sustainable Landscape Design practices.	71	59.2	39	32.5	10	8.3	2.51
6.	Lack of interest on the part of the client.	82	68.3	32	26.7	6	5	2.63
	Total Weighted Mean							2.48

the certification process to a moderate extent.

The computed weighted mean scores for each problem faced while practicing sustainable landscape designing revealed that 'Clients' Perception' and 'Resource Constraints' were the aspects in which major problems were faced while practicing sustainable landscape design. The overall weighted means score of all problems faced was 2.12 (Table 13 and Fig. 7).

Conclusion:

The present research was undertaken with objectives to collect information on selected aspects like age of the design professionals, duration of working experience, number and kinds of projects undertaken and the extent of challenges faced with regards to Sustainable Landscape Design. The findings elicited that 78.3 per cent of the respondents faced lack of technical knowledge as a challenge while practicing Sustainable Landscape Design to a moderate extent. The weighted mean computed for each challenge faced revealed that score for "Clients' Perception" was found to be highest among all challenges. The overall weighted mean on the

Table 11 : Frequency and percentage distribution of respondents according to Other Problems while practicing Sustainable Landscape Design practices

Sr. No.	Other problems while practicing Sustainable Landscape Design	Respondents (n=120)						
		Extent of Problem while practicing Sustainable landscape design						Weighted Mean Score (1 – 3)
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Lack of legislative support to encourage the practices of Sustainable Landscape Design.	50	41.7	63	52.5	7	5.8	2.36
2.	Demotivation arises due to not getting the recognition for the projects on Sustainable Landscape Design.	42	35	56	46.7	22	18.3	2.17
3.	Difficult to practice Sustainable Landscape Design when deadlines of project completion are supposed to be met.	31	25.8	58	48.3	31	25.8	2.00
4.	Last minute changes by clients leads to errors in the design.	43	35.8	60	50	17	14.2	2.22
5.	Last minute changes by clients leads to waste of time.	44	36.7	58	48.3	18	15	2.22
6.	Lack of commitment to protect the environment through adoption of Sustainable Landscape Design practices.	50	41.7	55	45.8	15	12.5	2.29
7.	Unsure about the methods of repurposing the not useful resources in the actual landscape design instead of discarding it.	18	15	63	52.5	39	32.5	1.83
8.	Unaware about the competitive advantage of practicing Sustainable Landscape Design as compared to Landscape Design.	37	30.8	50	41.7	33	27.5	2.03
9.	Inability to execute the planned Sustainable Landscape Design.	21	17.5	52	43.3	47	39.2	1.78
	Total Weighted Mean							2.19

Table 12 : Frequency and percentage distribution of respondents according to the extent of problems faced by them while practicing Sustainable Landscape Design practices

Sr. No.	Problems faced while practicing Sustainable Landscape Design	Respondents (n=120)						
		Extent of Problem while practicing Sustainable landscape design						Weighted Mean Scores (1 – 3)
		To High Extent		To Moderate Extent		To Low Extent		
		f	%	f	%	f	%	
1.	Lack of technical knowledge	7	5.8	94	78.3	19	15.8	1.90
2.	Cost	36	30	70	58.3	14	11.7	2.18
3.	Issues with the certification process	12	10	86	71.7	22	18.3	1.92
4.	Resource constraints	40	33.3	69	57.5	11	9.2	2.24
5.	Clients' perception	61	50.8	56	46.7	3	2.5	2.48
6.	Other problems	32	26.7	79	65.8	9	7.5	2.19
	Overall	15	12.5	104	86.7	1	0.8	2.12

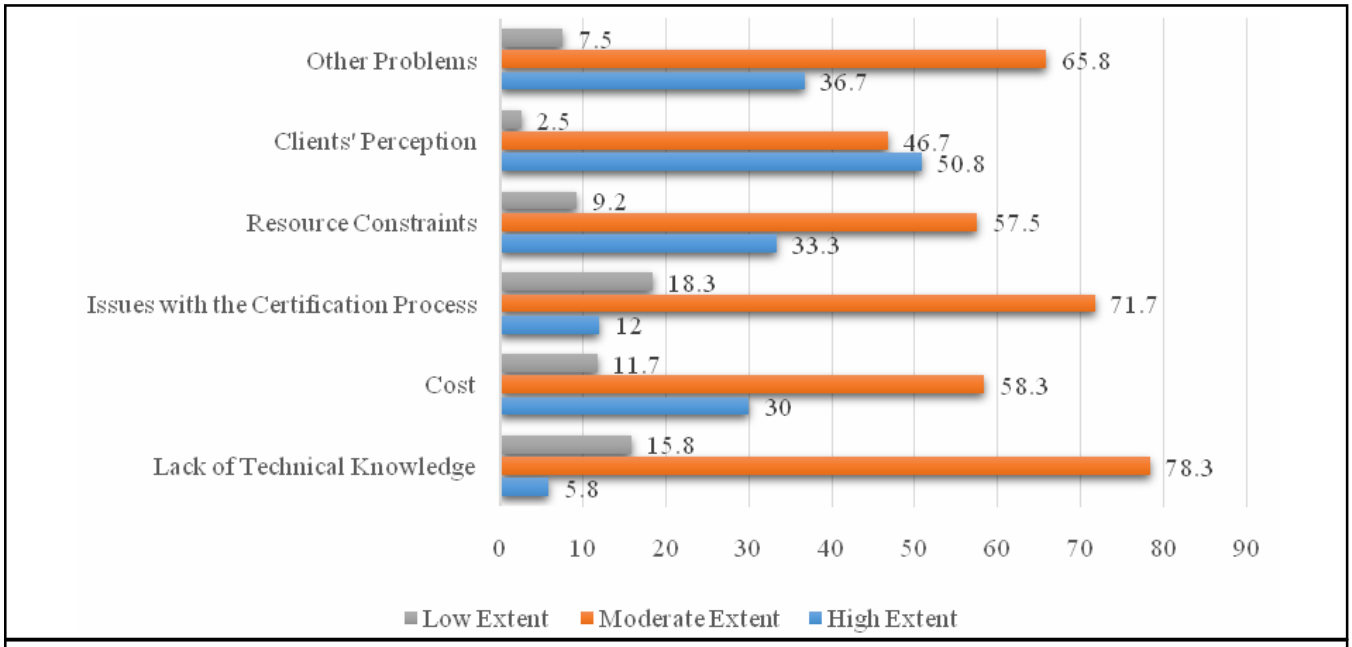

Fig. 6 : Percentage Distribution of respondents according to the Extent of Problems Faced while practicing Sustainable Landscape Design

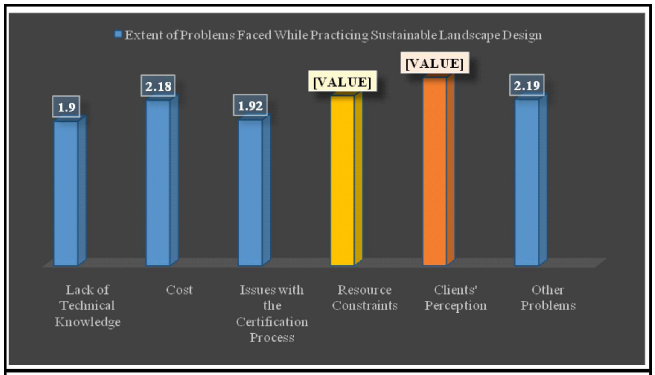

Fig. 7 : Weighted Mean Scores for the Extent of Problems Faced while practicing Sustainable Landscape Design

Table 13 : Weighted mean scores for extent of problems faced while practicing Sustainable Landscape Design

Sr. No.	Extent of Problems Faced While Practicing Sustainable Landscape Design	Total Weighted Mean Scores
1.	Lack of technical knowledge	1.90
2.	Cost	2.18
3.	Issues with the certification process	1.92
4.	Resource Constraints	2.24
5.	Clients' perception	2.48
6.	Other problems	2.19
7.	Overall Weighted Mean	2.12

entire scale was 2.12.

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