CHAPTER 3

RESEARCH METHODOLOGY

3.1 GENERAL

This chapter reviews the existing methods and approaches followed in the landscape perception and preference studies and the methodology adopted in the current study. Component and Characterization Approaches for landscape evaluation have already been discussed in detail in Chapter II (2.11.1 and 2.11.2). So, it is appropriate here to discuss on the data required for landscape studies. Assumptions for landscape evaluation and data analysis which has some relevance to the conceptual framework discussed earlier in Chapter II. The methodology for the current research is described.

3.2 A REVIEW OF METHODOLOGIES

3.2.1 Methods, Tools and Techniques

In the body of literature, there are indications of various methods, tools and techniques, applied to evaluate physical landscapes and cognitive attributes or perceived aesthetic qualities. The tools and techniques are, to a large extent, dependent on the type of evaluation. Focus is on ‘place-centric’ approach (Craik and Zube 1976) whereas some focus is on ‘person-centric’ approach or on the basis of ‘situational context’ (Gobster et al 2007) as discussed earlier in the review chapter. Expert models evaluate physical landscapes on the basis of certain criteria or rules (classical aesthetical design models) or evaluate psychological outcomes in the observers or personality
traits (psychological models). The psychophysical-experiential models attempt to balance the above two.

3.3 SURVEY METHODS

By and large, landscape evaluation studies use primary survey methods to collect data on landscapes or use respondents to collect data on their perceptions and preferences. Data on landscapes (as units of study) collected may be primary (by site reconnaissance, self observations), secondary data (land use maps, photographs, and drawings), or both. Data collected on the respondents also vary to a large extent by way of two survey types, namely, on-site surveys and off-site surveys (laboratory-oriented). Both have their merits and demerits. On-site and off-site surveys are an integral part of landscape studies.

3.3.1 On-site versus Off-site Experiments

A ‘Sense of Landscape’ is evoked by real experience on the field or by representative sample scene. There are two types of experiments in landscape preference studies, namely, indirect off-site (surrogate) experiment and direct, on-site field judgments (Echelberger 1979). Both the experiments have their pros and cons, if applied in isolation. On-site experiments include noting the observation on the field by an investigator and/or the responses from participants, which are taken when landscapes are directly experienced. On-site experiments capture individual perceptions and responses better (Marjanne Sevenant and Marc Antrop 2008). It is considered as uneconomical from the off-site experiments. On the contrary, off-site experiments rely on surrogate representations such as photographs, slides, models, drawings, video clips, and photomontages (Hyman 1981), or digitally simulated scenarios, to represent reality. Indirect, off-site experiments are economical, and nevertheless poses a few instrumental biases by default. However, both
the methods are used in isolation or in combination in landscape preference studies.

### 3.3.2 Online Survey

Present technological advancement in the field of internet communications and the digital media formats encourage scholars to use internet medium for online internet surveys (Jerry 'Joby' Bass 2004; Michael Roth 2006; Wherrett 2000), for data collection and analysis. Online survey is predominantly applied in household surveys off-the field from locals who are mostly familiar with the landscape. Most respondents are surveyed on-site to obtain direct impression about the landscapes they are visiting or have visited. Access to internet to common public is however limited. And this method is beyond the scope of the study.

### 3.3.3 Questionnaire and Interview Method of Survey

Most landscape preference studies involve questionnaire survey (Isik Sezen and Sevgi Yilmaz 2010), or an interview process (Alister Scott and Anna Bullen 2004). In both the methods, responses are in the form of what the participants like or dislike, about the general or specific components of the landscapes or the ‘environment perceived’, written or verbal description of them, absolute rating or relative ranking of preferences of the chosen, representative landscape samples as scenes, slides or video graphs or any other visual or audio representation of the sites.

### 3.3.4 Questionnaire Format

In case of questionnaire formats, there are two types of questionnaires: open-ended format and close-ended format. Close-ended formats are preferred than the open-ended format, for standard responses that
are easy to sum up for statistical analysis and convenient to cover larger samples in relatively shorter periods than the open ended formats. However, both the methods are widely in use.

3.3.5 Photo-Questionnaires

Photographs with questionnaires (Photo-questionnaires) are highly prevalent in landscape preference studies (Scott 2002; Kaplan 1979; Kaplan and Austin 2004; Simonic 2003; Julio Hernandez et al 2004; Anne Kearneya 2008; Sullivan and Lovell 2005) for the reason that “Meaningful public participation is enhanced through a photo questionnaire and people also adept positive visual information, even though picture is not a substitute of real landscape experience” (Kaplan 1979). In some cases, visitor/subject-employed photography (Rajinder Jutla 2000; Jacobsen 2007; Hammitt 1987) or sorting of pre sampled photographs by respondents (Simonic 2003) are also applied in surveys. Extensive comparison is done by Jacobsen (2007) on the above method.

3.4 SURVEY TOOLS AND TECHNIQUES

Various tools and techniques are applied during a survey to measure landscapes, namely, absolute or relative rating, ranking of the selected landscape samples, verbal descriptions, semantic differentials, and adjective checklists. Further, it is observed that ranking (Morgan and Williams 1999; Jacobsen 2007; Gary Hampe and Noe 1979; David Pitt and Ervin Sube 1979; Manuel Arriaza1 et al (2005); Isik Sezen and Sevgi Yilmaz 2010) and rating scale (Morgan and Williams 1999; Williams and Lavalle 1990) techniques are predominantly applied in the landscape preferences surveys. Further, chosen landscape samples are also applied in off-site survey experiments by photographic techniques, video graphics, simulated images, and GIS maps.
3.4.1 Rating Scale

Most frequently quoted example of rating systems is by Fines (1968) and Leopold (1970; cited in Whyte 1977). Fines selected 17 factors grouped under 3 landscape types, namely, lowland, highland and townscape and assigned ratings of 0-1 Unsightly, 1-2 Undistinguished, 2-4 Pleasant, 4-8 Distinguished, 8-16 Superb and 16-32 Spectacular. In case of Leopold (1970), 46 landscape factors grouped under 3 main descriptive categories of physical, biological and water quality, human use and interest have been used. Both methods have revealed a subjective appraisal of landscapes and strong local landscape contexts and nomenclatures and a lack of external validity.

Rating scales vary from five-, seven-, twenty-points and in some experiments to infinity (continuous scale). Most of the experiments have applied a five-point scale (Julio Hernandez, Lorenzo Garcia and Francisco Ayuga 2004; Heft and Nasar 2000; Arjen Buijs et al 2009; Sullivan and Lovell 2005; Simonic 2003; Thomas Herzog et al 2000; Echelberger 1979; Zube et al 1975). For example, Zube David Pitt and Thomas Anderson (1975) have applied a five-point scale (like – dislike) to measure preferences to reside, recreate, travel and enjoy scenic on the nine views / stations, and found modest correlation between the nine views / stations, of value ranging from 0.56 to 0.62. On the contrary, Williams and Lavalle (1990) have used open ended scales (continuous scale) keeping zero in the middle, representing a neutral position and scales extending positively and negatively, on both sides of the scale representing strength of agreements and disagreements, respectively. A few methods pre-rate on the basis of amount of expected attributes or components present in the selected unit of landscape (Fines 1968; Leopold 1970, cited in Whyte 1977).

Morgan and Williams (1999) have used rating scales ranging from 0-20 to measure seventy beaches in Wales in UK, against five parameters. In
all, 220 landscape samples have been ranked by independent panels ranging from 0 to 5, on the basis of predictive variables such as complexity, coherence, legibility, mystery and water. So, the ratings method are common in landscape preference studies.

### 3.4.2 Semantic Differential Techniques

This technique uses bipolar adjectives to gain responses of chosen landscape types, which are further categorized as evaluative, potency-based and activity factors. Echelberger (1979) has used a series of bi-polar adjectives, 7 evaluation factor pairs with 5 potencies factor and 2 activity factor. Potency factors include unique to commonplace, delegate to rugged, smooth to rough, humorous to serious, and gentle to violent. Activity factors are represented by varied to repetitive, active to passive, hot – cold, and vibrant – still pairs. Three locations - Comdan, Cuyler, and Northbille – have been measured on-site with a five-point scale. Zube and others (1975) have on the other used 18 bipolar semantics evaluated on a seven-point scale.

Recent work of Jūratė Kamičaitytė-Virbašienė, Rolandas Janušaitis (2004) has used semantic differential techniques where 8 factors such as vitality, variety, complexity, harmony, expressivity, uniqueness, functionality, and meaningfulness have been chosen and measured on ten-point scales with ten landscape samples.

### 3.4.3 Q-Sort Technique

This technique is employed commonly in psychometric studies to assess personality, and later also in social studies field (Jacobsen 2007; Zube et al 1975). It is a rigorous means of objectifying the human subjectivity. In case of landscape preferences studies, Q-sort technique has been applied for visual responses to the landscape scene samples (Zube 1974;
Pitt and Zube 1979). This technique engages participants in ranking the landscape scene samples, especially through photographs, according to precise directions. As a consequence, it reveals subjective viewpoints. In this technique, the resultant data are often analysed by Principal Component Analysis (PCA). As pre-selected landscape scene sample piles are sorted according to scenic quality of the landscapes in the photos (Jacobsen 2007) in order of 1 to 7 in the first part, placing a set of photographs in a pile, one representing the lowest and the pile seven representing the highest scenic quality. For instance, Zube (1974) has applied the following pre-pile distribution, as cited by David Pitt and Ervin Sube2 1979):

<table>
<thead>
<tr>
<th>Pile</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Photographs</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>14</td>
<td>11</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

Respondents have been asked to place 56 photographs into seven piles, according to the perceived scenic quality of the landscapes in photos. In pile number 7, the respondents have placed three landscapes that they thought having the highest scenic quality. In pile number 1, they have also placed three landscapes that they thought having the lowest scenic quality. From the remaining fifty landscapes, they have placed seven in the pile 6 with the high scenic quality and seven in the pile number 2 with the low scenic quality. There are now thirty six landscapes, placed eleven with the high scenic quality in pile number 5 and another eleven with the low scenic quality in pile number 3. They have placed the remaining fourteen landscapes in pile number 4, meaning they have the middle level scenic quality. The number of photographs to be placed in each pile has also appeared on the pile identification cards on the table in front of them. Respondents have been asked to rearrange the photographs till they are satisfied of the piling. This technique is basically applied as an off-site survey method where the
landscape scene samples are small in number, for, if not; it may turn into a laborious task.

### 3.4.4 Rank Order Technique

This is an extensively applied technique, albeit a simple one, for quick responses from participants in surveys. Several landscape research and planning scholars have applied this rank order technique in landscape assessment studies (Morgan and Williams 1999; Jacobsen 2007; Gary Hampe and Noe 1979; David Pitt and Ervin Zube 1979; Manuel Arriaza1et al 2005; Isik Sezen and Sevgi Yilmaz 2010; Zube et al 1975; Kevin Marsh 2004).

Zube et al (1975), have identified very high correlations between Q-sort, semantic differentials and rank ordering techniques of rating of panoramic views of the eight landscape samples. It may therefore be assumed that all landscape measurement techniques, to a large extent, produce similar results, more or less.

### 3.5 LANDSCAPE SAMPLING TECHNIQUES AND TOOLS

Landscape assessment studies engage a few techniques and tools to identify or select landscape scene samples for landscape components, landscape types or features based on scenic quality and their psychological impacts. These landscape scene samples are representative surrogates of the real – the static representatives of photographs, slides, 2 1/3 D sketches, or dynamic representations like the video graphs - or on the simulated landscape samples like the simulated scenes, photomontages and landscape animations. These techniques are applied to explore or test hypotheses with certain criteria / factors or presence of components. In other cases, character landscape types are identified to obtain and to compare landscape values (Turner 1975).
3.5.1 Photographic Tools and Techniques


3.5.2 Video-Graphic Technique

Video clips are also applied in few cases, especially in off-site conditions (Michael Roth 2006; Susan Konica 1979: 87 (comparison), 119 (+simulated drives) (4), Heft and Nasar 2000; Hetherington et al 1993). For example, Susan Konica (1979) has extensively used video tapes as landscape samples where 12 video tapes of 72-75 seconds each have been used to get the responses in off-site conditions. Hetherington et al (1993) have on the other hand explored the possibility of adding motion and sound to dynamic landscape elements like the moving water and vegetation of the landscapes. Roth (2005) has used digital video and still photographs for online internet landscape preference surveys, on the other.

3.5.3 Digital Simulation Visualization Tools and Technique

In the past, 2-D planar orthographic projections have served as the conventional means of communication among the planners, designers and others. They are mostly a series of lines, symbols, signs and graphic
connotations as in the case of plans, elevations, and sections. They are virtually reconstructed in mind by the experts with professional training, and in some cases substantiated with illustrative sketches and rendered perspectives. For an ordinary lay person, it is virtually incomprehensible and sometimes, in complex representations of large scale areas, it is even strenuous to professionals. In the advent of affordable complex, computer hardware and sophisticated software (like word processing, picture editing, vector graphics, GIS applications, 3-D visualizations, landscape modelling and other interactive applications) have brought about the possibility of photo realistic images, 3-D visualizations of virtual models, precise GIS mapping, walk through animations to a credible representation, understandable and comprehensible even to an ordinary lay person. Rudiger Mach and Peter Petschek (2006) have extensively described the potential of visualization techniques and digital tools that can be applied to visualization of digital terrain with the available landscape data. In this study, some of the image processing (Adobe Photoshop), Vector graphics (Google Sketchup 7), GIS applications (Arc GIS 7.1) have been applied to a necessary extent, though there are possibilities for future use. However, presently, it is beyond the scope of this study.

3.5.4 GIS Technique

In some of the reviewed research works, GIS has been used extensively for mapping applications (Morgan and Williams 1999; Jerry 'Joby' Bass 2004). Land use and land cover maps (scale: 1:50,000) have also been utilised in them to identify and preselect the components or landscape types in a regional level landscape assessment study (for example, Hernandez et al 2004; Scott 2002; Brown 2005; Otero et al 2007). Precision of the GIS land use mapping and satellite image data also help with classifying and characterizing landscapes as landscape types in any selected region. This is
further put to test on-field to evolve landscape preference values from the public or from selected respondents of a case study.

3.6 DATA REQUISITE FOR LANDSCAPE STUDIES

Regional level landscape studies demand as much data information, both primary and secondary, as possible. Four landscape data types are necessary for preference studies: they are photographic data (in the form of photographs, slides, video clips), land cover data (in the form of maps), orthophotos (in the form of aerial photographs, Google images) and on-field observations (primary data collected to corroborate and update at human level visual entities) (see Ode Åsa et al 2008). However, there are studies restricted to primary data like the direct field observations with strong conceptual or theoretical underpinnings such as the naturalness, legibility, complexity, and mystery and to indicators observed on-site for the same (Kaplan et al 1989).

3.7 LANDSCAPE EVALUATION STUDIES: ASSUMPTIONS

All of the methods used here for landscape evaluation, in the study, involve three main assumptions:

1) Visual landscape elements in some way influence how people respond to an area.

2) The significant visual elements can be isolated and scaled either in the field or from photographs.

3) The relationship between selected landscape elements and their perceived values is sufficiently culturally influenced for an observer’s perceptions to be shared to some degree by a relevant larger group (“residents”, “users”, or “general public”).
The first assumption is concerned with the validity of the measure and the last with its reliability. In other words, would people other than the researcher select the same features of the landscape as being diagnostic for determining landscape “value” and would other people make the same evaluations of particular landscape scenes even if they agreed on the salient diagnostic features?

Whether or not these assumptions are reasonable can be determined by comparing two methods of landscape evaluation, both of which use direct observation of the environment. The first is a technique developed by Leopold (1970) to compare the aesthetic appeal of different river valleys in the United States to aid the environmentalist to quantify his judgements. The second is a method to develop a map of landscape quality to use as a regional planning tool in the Southeast of England (Fines 1968).

3.8 DATA ANALYTICAL TOOLS AND TECHNIQUES

In pursuit of assessing landscapes, there are several tools and techniques in use in the landscape preference studies. A majority of the scholars applies statistical tools to analyze the response data and a few apply mathematical models to procure the landscape values. To deal with a large number of data points and data sets, computer-aided statistical analysis programs like the SPSS and MS Excel are generally applied by many landscape preference studies. Two types of statistical analysis - descriptive (mean, range, frequency, Chi-square test, ANOVA, MANOVA, PCA) and inferential - are presently applied by the scholars. A few studies have also analyzed the components and their characters, within scenes using scene analysis software (Stravroula et al 2005) that is beyond the scope this study.

Weighted mean method, mean rank correlation (Spearman), content analysis, factor analysis, principal component analysis (PCA), regression,
Multidimensional Scaling (MDS) are also prevalent statistical methods applied.

3.9 RESEARCH METHODOLOGY ADOPTED IN THE STUDY

3.9.1 Current Research

Visual landscape assessments are a subject of discussion on global and local platforms in the past years and at the present as well. They are also a subject of interest to experts of diverse fields such as geography, environmental psychology, sociology, ecology, urban and regional planning, tourism, architecture, landscape studies and the like. Thus, this is a subset of the study as to readdress the existing methods and models exploring the issue, which comes across during this study.

The present research attempts at examining the issue of traversed landscapes as part of the travellers’ experiences and identifying their preferences and perceptions of landscape types and components. Thus, it is important to identify the significant visual landscape components involved in framing the perception of the traversing traveller though a particular landscape.

Travellers are important stakeholders of visual consumption of the landscapes, between the tourist destinations, as attractions. Thus, the extent of their preferences, on the observed landscape components and composite landscape character type, of the travellers, form the essential basis for exploration of the current study.

Landscape character type for several reasons is observed (Zube 1975). In this study, adopting a few of Zube’s observations, four distinct reasons on likings for a landscape character type are noticed: 1) Liking to have a ‘permanent residence’ that points towards preference for a
long time association with a particular landscape character type; 2) Likings for an ‘outdoor recreation’ indicating preferences for moderate time association; 3) Likings for a ‘just pass through’ indicating that the landscape character type is either fit for quick traversing or nothing special at all for a long or short time association. The further reason pointing directly to scenic quality (scenic evaluative decision) and distinction to preferences due to first three reasons of liking such as to reside, recreate, or ‘pass through’ can be considered as practical value for landscape planning and management strategies for decision making.

That part of the data acquired from the primary survey on landscape component preferences as ranks by order for the landscape components (primary and secondary) and rating on a 5-point scaling of the six landscape vistas are descriptive and are for analysis. The observed landscape compositions and the travellers as observers are also analysed statistically with cross tabulation correlation method and ANOVA methods. The study consists of identification of two predictor or perceptual components of preferences (like civic and spatial) from the earlier studies as well. So in total six landscape components are examined.

Procedure for the study includes the following

- Visual inventory of the selected links between destinations, with video and photography.

- Dividing the links into vistas of different character types (with the 5km buffer both sides) on the basis composition of specific landuse and land cover composition of the selected physical landscape components.
• Prepare Photo-Questionnaire on the basis of selected components and characterised vistas and make pilot survey and improve the question format.

• Collect response data from the road travellers by Landscape preference Survey with the help of Photo-Questionnaire at en-route and at important nodes within the selected vistas.

• Analyze the data on the basis of research questions and derive inferences and suggestion for improving the satisfaction level of the travellers.

The procedure for the landscape preference studies involves few sequences after literature collection. Further it involves interaction with the administrative officials for secondary data (data like landuse maps and reports, technical documents relevant to site,) and permissions for survey and so on.

Both primary and secondary data have been utilized for the present study. Secondary data was acquired from various sources like, Institute of Remote Sensing (IRS); Anna University, Tamil Nadu Tourism Development Corporation (TNTDC); Ministry of Tourism, Tamil Nadu, Town and Country Planning Department, (DTCP) Chennai. In addition to literature in the form of research papers, news paper articles, reports and documents are referred to construct the theoretical and base for the study. Three types of data are collected and analyzed for this landscape preference study in particular; study vistas that can be categorized as landscape data, response data and respondents’ data.

The primary data consist of responses from the respondents in the form of rank order of landscape components, and likings anddisliking of
landscape character type of vistas on a five point Likert scale, and socio-demographic data and its association like (a) familiarity of the site, (b) environmental attitude, (c) prior landscape knowledge, (d) place associated for a long time (city, town and village) etc are also collected.

3.9.2 Landscape: Components and Landscape Vistas

Generally most of the preference studies suggest for division of case study area as a ‘landscape unit’ with homogeneous character from visual point of view (Arriaza et al 2005) in a larger scale. In some cases it is also divided into generic ‘landscape components’ that are either physically present such as vegetation, landform water and builtforms or perceived components such as fear, legibility, coherence, civilities, cue for care, naturalness etc. So splitting a study area into physical or perceptual components or as landscape units in a larger scale is a well agreed trend.

In this study, set of six landscape Vistas are identified, within a tourist circuit, with distinct character types as per composition of physical landscape components (vegetation, landform, water and builtform present) between six urban centers that are popular tourist destinations as well (Figure 4.20a, 4.20b, 4.20c and 4.20d). The six identified urban center are such: Chennai city centre, Porur, Sriperumbudur, Kancheepuram, Chengalpattu and Mamallapuram (Figure 3.1). Where Chennai, is the fourth largest city in India, an urban center with the tourism importance, Porur and Sriperumbudur are the centers of historical and religious significance, Kancheepuram: a popular temple town and an important urban center as well, Chengalpattu town is significant for trade activities, and Mamallapuram is one of the 28 Indian world heritage site listed under UNESCO. So, the roads linking these six centers forms the six vistas (Figure 4.10), that are in Chennai region of Tamil Nadu, a southern state of India located at 13.04°N 80.17°E.
This research also examines the six case study vistas under four generic physical components as explained earlier and two perceptual components such as Civic and Spatial as well.

![Figure 3.1 Landscape Vistas](image)

### 3.9.3 Selection of Sample

The respondents are road travelers identified by employing simple random sampling technique, an on-site questionnaire survey, while directly experiencing the landscape. Road travelers are various types of tourists or day-to-day commuters. Majority of tourists are drawn randomly, while travelling during one-day roundtrip organized by Tamil Nadu Tourism Development Corporation (TTDC). The round trip traversed through the all vistas selected for this study. More than 60 one-day trips are undertaken for
this landscape preference survey and 40 tourists travelled on each trip and on an average 4-8 respondents participated in each trip.

Off-site respondents are those who live or work in the urban centers like Chennai, Kancheepuram and Mamallapuram and have travelled the vista before and are familiar with the landscapes. They are selected by snowball sampling survey technique conducted with the help of photo-questionnaires.

Table 3.1 Road Travellers’ Typology

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Travellers type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;Travellers' within TN Region&quot; (T1)</td>
<td>104</td>
<td>31.5</td>
</tr>
<tr>
<td>2</td>
<td>Travellers' from other Regions’/State (T2)</td>
<td>173</td>
<td>52.4</td>
</tr>
<tr>
<td>3</td>
<td>Foreign Travellers (T3)</td>
<td>23</td>
<td>7.0</td>
</tr>
<tr>
<td>4</td>
<td>Local Professionals’ (T4)</td>
<td>9</td>
<td>2.7</td>
</tr>
<tr>
<td>5</td>
<td>Day-to-day travellers (Commuters) (T5)</td>
<td>21</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td><strong>Total Travellers (TOT)</strong></td>
<td><strong>330</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: Primary survey by the author

They are predominantly local residents and local commuters. Locals are selected from three major destinations like Chennai, Kancheepuram and Mamallapuram, whereas the local commuters were selected at different location along the vistas and other smaller urban centers like Porur, Sriperumbudur, Chengalpattu, kovalam, and Muttukadu as well.

They are predominantly local residents and local commuters. Locals are selected from three major destinations like Chennai, Kancheepuram and Mamallapuram, whereas the local commuters were selected at different location along the vistas and other smaller urban centers like Porur, Sriperumbudur, Chengalpattu, kovalam, and Muttukadu as well.
3.9.4 Respondents

The number of respondents who participated in this landscape preference study is 330 in total (Table 3.1), where, more than two-third are males (230) and one-third females (99). All are literate (above or completed schooling), where majority of them (80%) are at Graduation level and beyond (HSC and below = 67, UG = 150, PG = 65, Professional = 47). Age group of the respondents ranges from 16 to above 55 years. One third of the total are students (30.4%) and one-fourth Government Employees (25%); little less than one third belong to various types of professional (13.4%) and self-employed small business group (14.9%). Little more than nine-tenth of the respondents are Indians (93%) and few foreigners (7%) and meager number of NRI (1.5%) merged and clubbed as Indian nationals in nationality category participated in the survey.

Associated socio-demographic categories like ‘prior knowledge/interest about the landscape’, Place associated (lived)’ and ‘Familiarity with the study area’ are also examined. Almost four-fifth of the total respondents are not familiar (79%) with site, and rest are moderately familiar, with meager few who are strongly familiar with the site due to association with regional development activities, who are employees of Chennai Metropolitan Development Authority (CMDA), TNDTCP, Housing and Urban Development Corporation Ltd. (HUDCO) and Central Public Works Department (CPWD). It was noted that the above mentioned employees are strongly familiar with the site. (through unstructured personal queries during photo-questionnaire survey by the scholar in-person).

3.9.5 Photographs as Scene Samples for Landscape Preference Survey

Questionnaires with photographs (sample of landscape scenes) are the prevalently employed tools for both offsite and onsite landscape
preference surveys. In this study, the questionnaire consisted of both structured closed-ended question and few open-ended question formats and responses are facilitated by two set of panels; one consisting of sample scenes highlighting the six selected ‘universal’ landscape components (vegetation, landform, water builtform, civic and spatial) and ‘localized’ site specific landuse components. The other consisting of information about the six identified vistas as landscape character types referred as ‘routes’. Substantiating with few views, landuse maps with route and important places denoted. Further the scene samples are used for photo-panels for the survey (Figure 3.2).

3.9.6 Questionnaire and Field Survey Administration

The questionnaire was designed in such a manner that the first section dealt with the Environmental Attitude Assessment, consists of 12 questions directly adopted from New Environmental Paradigm and Human Environmental Paradigm (NEP-HEP) paradigm of agreement to assess the environmental attitude. The second section consists of site specific purpose of travel along the route, such as to visit monuments in Mamallapuram, visit temples in Kancheepuram, to visit beaches in Mamallapuram and Kovalam, to just glance around rural Tamil Nadu, for school/college/business or work related commutation or any other. Familiarity of the site categorized on the basis of responses to travelled many times, occasionally and never, that would decide the degree of familiarity. Similarly prior landscape knowledge is examined from this section. Third section is an imperative part where ‘universal’ and ‘locally’ derived landscape components were organized and listed to be rank as per their order of preference such as: order the landscape components you would wish to see and enjoy, frequently while on travel. Firstly, the ‘universal’ landscape components, the one on the top row are asked to be ordered.
Figure 3.2  Typical Photo Panels applied in Landscape Preferences Survey

Secondly, the site specific local components under a particular universal component were asked to be placed in an order as per their choice.

Wherever necessary, the guiding panels as two booklets (one for components and other for character types observed in each of the six vistas) are provided as a ready-reference, in onsite surveys. In the case of off-site
surveys two booklets of guiding boards are critical and offered for good response. Few questions are left optional for response (E.g. Environmental Attitude questions (section 1), open ended Likes and Dislikes about the six selected vistas (section 4).

The forth section consists of open ended Likes and Dislikes about the six vistas for open descriptive response to get some idea of personal views about the vistas. The fifth section consisted of few general questions and vital four questions specific to six vistas. First three questions deals with degree of preference by the respondents (strongly disagree to strongly agree, on five point scale) to ‘favors’ a particular use (residence, recreation, traversing) of the six vistas landscape types, and the fourth question addressed directly on the scenic beauty of the same six vistas. These questions are specific to respondents who are familiar to the site and left optional to unfamiliar respondents. The last and the sixth section consists of demographic profile of the respondents like gender, marital status, age group, education and occupation status, income category and nationality. Additional information of long time association of the respondent in an urban, semi-urban and rural were also sought, to identify their preferences for different types of landscape character types observed.

3.9.7 Landscape Map

Landuse map is required as baseline information for identifying the urban centers and vistas of the study region and characterization of each vista on the basis of landscape component compositions in concordance with the on-site condition.

It is a secondary data pertain to the case study vistas of existing landuse map of the selected region, which further derived and modified to the buffer selected (existing landuse classes data (1:50000) from LISS - III
merged PAN data, with buffer of 5kms on both side of the road) for the vistas. Further the landuse classes are sorted within the four physical landscape components such as vegetation, landform, water and builtform components (Figure 3.3) as stated earlier. Its area occupied, its compositions are derived from the landuse (Figure 3.4) for each of the six vistas by using GIS software and technique. The same is illustrated and explained in the latter chapters (Chapter 6 Results and findings, sub topic two: the observed landscape).

Computer Aided image processing software Adobe Photoshop Elements is used for map representation pertain to the unit of study, to highlight information’s collected from various sources.

3.9.8 Landscape Scene Sample

Group of Scene samples (photographs) are collected for each landscape component on-site, to administer in the photo-questionnaire survey (Annexure B-i). Scene samples are sorted out with respect to landscape character type vistas as well. Adobe Primer pro used for video processing and assortment of scene samples from the video footages shot on-site with mini DV camera. Further some scene sample are recollected with HD format with Sony (HDR CX7 series) handy cam and Nikon D90 still camera for the latter stage updates, as well.
Figure 3.3  Landscape Components Along the Vistas (Primary)

Source: Based on Field Survey and IRS Maps, Anna University, Chennai

Figure 3.4  Comprehensive Area Composition of all Vistas in Percentage
3.9.9 Analytical Tool

To address the research questions of this study, computer aided statistical analysis tool SPSS is used. The analysis consists of descriptive statistics of the demographic profile of the respondents i.e. travelers in this study (demographic variable/group variable) and their responses over the landscape components as ranked and landscape types rated (landscape variables: components and vistas) as the mean preference score of the total respondents and mean preference score of various sub-groups such as gender, age, education status, occupation etc. to address the first part of the research question, the mean preference scores of the total respondents are taken as bench mark and co-related with the mean preference scores of the rest of the sub-groups using Correlation Method. Further, the landscape character types are determined by the amount and frequency of landscape components present (Figure 3.4) in the existing landuse map of the selected vistas with the help of GIS software and excel sheet (explained in landscape character type’s chapter and Case study area profile chapter) the preference ranking/rating score for the 6 universal landscape components (4 physical + 2 perceptual)that are often addressed as dominant landscape attributes in landscape preference studies are analyzed.

3.10 LANDSCAPE CHARACTER TYPES (VISTAS) USE PREFERENCE AND SCENIC EVALUATION

The on-field responses and off-field responses (respondents who are familiar with the site are considered) on the landscape character type (Figure 3.1) are examined on the basis of preferences of scenic quality (scenic evaluative decision) and distinction to preferences for various activities such as to live, recreate, or travel (preferential decision) use that can be considered as practical value for landscape planning and management strategies/decision. Further such ‘distinctions could also be of importance in dealing with EIA for
which preferential appraisals could be a major factor in one’s perception of proposed changes (Zube et al 1975) Further to note the appraisal of scenic quality and appraisal as a place to live, recreate and travel would bring in variations in agreements and disagreements for the same landscape type.

To address the second part of the research questions (in Chapter 1: RQ iii to RQ v) the respondents were asked to rate their agreements in 5-point scale (very low-low-moderate-high-very high) three questions on the agreement of three type of uses (Zube 1975) and fourth in particular for the scenic quality the vistas.

3.11 PREFERENCE AGREEMENTS ON LANDSCAPE TYPES

Landscape character typologies derived from land-use classes and quantity of landscape components evokes some likes or dislikes from the respondents on-field. On the other hand their preferences to associate themselves to a particular landscape type for a purpose, where preferences for longtime association ‘to have a permanent house’ or short time association as ‘to recreate’ or to commute bring in some variety in their responses to the same typology of landscape. The degree utilitarian preferences of liking and disliking tend to distinguish from the preferences driven by its scenic beauty of the same landscape type. The method of data collection through four questions and analysis for the same with respect to the typologies identified is explained in the chapter No. 5.1.2 in detail. Respondents who are familiar with the site/vistas of the region are taken into account and analyzed by two way ANOVA method.

3.12 SUMMARY

This chapter has reviewed the methods applied for previous landscape preferences studies and methodology adopted in the current study.
It is noted methodological constrains are inherent in all landscape evaluation studies (Penning-Rowsell 1975), further it is reported by Zube (2003) that methodology for the landscape preferences studies are an iterate process in spite these are intended to be a linear process. Nonetheless, landscape evaluation by preferences is well agreed method in the planning and design fields.

In synthesis the current methodology consists of two broad, one: analysis landscape by component and characterization method (explained in second Section 3.9) and two: analysis of response from the road travellers, where responses are obtained from photo questionnaire (Annexure B and C) method as closed questions (Annexure D.1, D.2 and D.4) and open-ended questions (Annexure D.3) on the observed landscape components and the characterised landscape types. The response are obtained either as ranks in order of preferences or by scaling method.

The landscape components and character types are computed in relation to the chosen case study vistas in the Chennai region, which is explained in the following Fourth Chapter in detail.