# CHAPTER II

# REVIEW OF LITERATURE

# CHAPTER II

## REVIEW OF LITERATURE

An overall review on the research topic is an important part of the study which provides a clear perspective. For the present study, a detailed analytical persual of literature was carried out in order to gain insight into the nature and types of studies conducted in the area of current investigation. The research studies related to various aspects of micro environment and findings that have a direct bearing on the study have been included in this chapter. To provide a clear and better understanding and to make the presentation more comprehensive, the chapter is divided into following broad heads.

2.1 Environment and Determinants of its Degradation

2.1.1 Environment and Quality of Life

2.2 Micro Environment and Women - Their Knowledge and Practices

2.2.1 Womens Knowledge and Practices

2.3 Aspects of Micro Environmental Quality and Related Research Studies

2.3.1 Air Quality

2.3.2 Ventilation

2.3.3 Temperature

2.3.4 Illumination

2.3.5 Sound

2.3.6 Water quality

2.3.7 Sanitation

## 2.1 Environment and Determinants of its Degradation

It has been known from the Vedic times that nature and humankind (that is, Prakriti and Purush) form an inseparable part of life support system. This system has five elements - air, water, land, flora and fauna which are interconnected, interrelated and interdependent. Deterioration in one inevitably affects the other. The crux of the matter is, after all environment for whom ?, the answer is : for the living systems of which humankind is an integral part. Today humankind dominates nature, shapes the environment to suit itself (Khoshoo, 1986).

Environment means surroundings and particularly those surroundings from which human being draws resources in order to develop a better life and in doing so he alters the quality of environment resulting into environmental pollution. Environmental pollution has become a major world wide problem and has badly affected the whole biosphere. The causative factors for the increasing pollution are imbalance growth of population,

mushroom growth of industries, increase of modern technology as a demand for higher living standards, irrational use of natural resources and many more.

The deterioration of human environment through the population explosion, pollution of air and water and other disruptions of the ecological balance pose a major international health hazard and a serious challenge.

In India, we face the duel problem of population and poverty which lead to major environmental problems like the denudation of forests, sewage pollution, malnutrition, communicable diseases and so on Simultaneously, the environmental problems due to industrial pollution and urban congestion are increasing. Moreover United Nations organisation smelled before 1950, India - a developing country having industrial, thickly populated cities like Bombay, Calcutta, Madras are declared polluted. From 1970 onwards scientists, socialists warned for protection of environment (Rawle, 1990).

Recent experiences from all over the world clearly indicate that environmental management is a must. At the Stockholm Conference, our Late Prime Minister Mrs. Indira Gandhi said;

> "In the developing countries poverty is the biggest pollutant and conservation could not be achieved at the cost of people"
>
> (cited in Khoshoo, 1988).

### 2.1.1 Environment and Quality of Life

Today apart from the access to consumer goods and services, the quality of environment is a crucial and vital determinant of quality of life. In words of Wallace (1974) :

> "Quality of life denotes the state of physical, mental and emotional health, civil rights, the performance of educational system,the air, water, land and noise pollution. It also includes other dimensions such as adequate housing, enjoyment of cultural and leisure time activities, healthy family to function according to changing times".

Quality of life of community may be judged by levels of living. Gupta and Ganguli (1976) analysed the levels of living by means of eight components; the primary components viz. level of living, nutrition, housing, medical care and education. The secondary components viz. leisure, security and environment.

Vermayen (1978) and Nair (1988) have reported that some of the measures or indicators of quality of life are healthfulness of life, measurement of learning, time and leisure, employment, housing conditions, quality of natural environment, economic accessibility and so on.

Human kind attempts to attain rapid economic development and there by to improve the standard of living and quality of life, have on many occasions

produced vast and disruptive changes in the environmental quality which leads to the pollution of environment. A lot of effort needs to be taken to control the quality of environment as it provides the human beings with physical substances and opportunity for the all around development of life.

## 2.2. Micro Environment and Women - Their Knowledge and Practices.

The social well being of man is influenced by his residential environment. Housing is the locale of most family function, it is the background of family life (Menon, 1980). It is a major responsibility of women to run the family life smoothly. For this she has to perform a number of household work and a considerable time is spent on performing these tasks. As commonly observed, the major share of her time is devoted to the micro environment that is, kitchen, mainly in the tasks related to meal preparation.

A study on demands on the time of urban and rural women (George, 1985) showed that cooking absorbed maximum time of both urban and rural housewives that is, 3.44 hours and 3.65 hours respectively.

Singal (1981) while analysing women's work pattern of kitchen activities showed that drudgery was increased because of lack of elementary knowledge of work simplification technique and cooking done in smokeful environment which adversely affected the health of the homemaker.

From an overview of literature, it is clear that women spend considerable time in performance of multitude of tasks, specially in the kitchen. It has been widely acknowledged that unless quality of work environment is improved, their quality of life could not be achieved (Kamlamma, 1981; Gandhi and Singh, 1987 and Devas, 1988).

### 2.2.1 Women's Knowledge and Practices

Kaur (1984) conducted a study of knowledge, sanitary practices and opinions of the housewives regarding air and water pollution. The survey included 120 housewives from three selected localities. It was found that majority of the respondents had medium level of knowledge regarding air and water pollution. Very few respondents had high level of knowledge. Majority of the respondents followed fair practices related to sanitation. The findings also revealed that demographic factors like socio-economic status affects the knowledge and sanitary practices regarding air and water

pollution. Age did not show any significant effect on knowledge and sanitary practices. High education showed a significant effect on knowledge but not on sanitary practices. Highly significant relationship was found between knowledge and sanitary practices.

A study of assessment of micro environmental quality (Ramdas, 1988) revealed that majority of the respondents had low level of knowledge. Positive relationship was found between the knowledge of the respondents and educational level and also between knowledge and the quality of environment in the kitchen.

In the study by Veerbala (1990), education and knowledge emerged as important determinants of quality of environment in kitchens. Home makers having higher education had better knowledge with regards to quality of environment. Home makers who possessed higher degree of knowledge had better quality of environment in their kitchens. It was also found that young home makers possessed more knowledge than middle and old aged homemakers. It was also found that quality of environment varied with the locality. Quality of environment was best in residential locality and worse in highly populated and commercial area.

Pawar (1993) studied knowledge and practices of slum homemakers with special reference to environmental conditions. The sample included 30 homemakers each from three slums of Baroda. The findings revealed that most of the respondents had medium knowledge regarding causes, effects and prevention of various aspects of environment such as land, air, water and noise. Only 20 per cent had good knowledge. Most of the respondents followed fair practices of maintaining environmental conditions while 22 per cent followed poor practices. Positive correlation was found between practices and extent of knowledge. Significant association was found between the education and knowledge of the respondents. Also the practices significantly differed due to age and type of family but not by exposure to media, income and size of the family.

## 2.3. Aspects of Micro Environmental Quality and Related Research Studies.

The research studies related to various environmental aspects have been presented here.

These aspects include air quality, ventilation, temperature, illumination, sound, water quality and sanitation.

### 2.3.1. Air Quality

The immediate environment of man comprises of air on which depends all forms of life. Unfortunately, there has never been pure air. Foreign substances have been present in the air at all times at all places.

According to Park and Park (1986), air is rendered impure by :

i) respiration of man and animals,

ii) combustion of coal, gas, oil, etc.,

iii) decomposition of organic matter,

iv) volcanic activity leading to dust, gases and increase in temperature,

v) industrial activities lead to complexity of air pollution,

vi) trade, traffic and manufacturing processes which, gives off dust, fumes, vapour, gases and toxic substances.

> "Air pollution is the presence in the outdoor atmosphere of one or more substances put there directly or indirectly by an act of man, in such an amount as to interfere with his health or welfare, or the full use and enjoyment of his property"
>
> (Murdoch, 1975).

Another definition adopted by Air Prevention Control Act (Mehta, 1981) states that :

> "Air pollution is any solid, liquid or gaseous substances present in the atmosphere in such a concentration that may be or tend to be injurious to human beings or other living creatures or plants or property or environment".

Table 2.1 Comparison of Trace Gas Concentration (ppm*)

| Sr. No. | Gases | Clean air | Polluted air |
|---|---|---|---|
| 1 | $CO_2$ | 320 | 400 |
| 2 | CO | 0.1 | 40.70 |
| 3 | $CH_4$ | 1.5 | 2.5 |
| 4 | $NO_2$ (Nox) | 0.001 | 0.2 |
| 5 | $O_3$ | 0.02 | 0.5 |
| 6 | $SO_2$ | 0.0002 | 0.2 |
| 7 | $NH_3$ | 0.01 | 0.02 |

(Cited in Stern, Vol I, 1976).

* ppm - parts per million

Air pollution is woven throughout the fabric of our modern life. A by-product of the manner in which we build our cities, air pollution is waste remaining from the ways we produce our goods, transport overselves and our goods, generate energy to heat and light the place where we live, play and work and use fuels to cook the food we eat. The major cause of all air pollution is combustion and combustion is essential to man.

Air pollution has reached alarming levels in Indian metros. Delhi, Bombay and Calcutta are three of the ten most polluted cities in the world (Press Trust of India, 1993). The result of this pollution is increasing incidence of respiratory problems in our metros and three in every ten Delhi residents report respiratory problems of some type. Due to multiple sources of pollution spread all over the city, no area is really safe and homes are affected with industrial smoke, vehicle exhaust, dust and gases in the air. Since, families continue to spend 80 per cent of their time indoors (Halpern, 1978) for most people, the risk of health may be greater indoors than outdoors.

Health effects from indoor air pollution are many and varied. Immediate effects include irritation of the eyes, nose, headaches, dizziness, fatigue, cold and coughs. Other problems like asthama, allergies and bronchitis may show up after years of exposure.

Related Research Studies on Air Quality

Research Studies done in the field of indoor air pollution are mostly related to estimation of air pollutants, types of pollutants, and harmful effects of air pollution.

Sofulowe (1968) found excessive CO, $NO_2$ and $SO_2$ concentrations in poorly ventilated kitchens, where cooking fuel used was wood. Concentrations as high as 3000 ppm and an average of 940 ppm of CO were reported.

An intensive study done (Yocum, Clink and Cote, 1976) on indoor / outdoor air pollution involved three pairs of buildings in and around Hartford, Connecticut revealed that the day time concentrations were higher in both indoor and outdoor air as compared to the night time concentrations. Also the organic content of particulate matters was enriched in the indoor samples as compared to the outdoor samples. This finding was attributed to smoking and cooking activities indoors.

Smith, et al. (1981) from the National Institute of Occupational Health (NIOH), Ahmedabad and Jyoti Solar Energy Institute at Vallabh Vidyanagar jointly carried out a pilot study in 36 households of four villages of Gujarat. The results were shocking. The average exposure of women to total suspended particulates (TSP) in their cooking period ranged from 1,110 to as high as 56,600 and averaged about 7,000 micro grams per cubic meter (µg/cum), as compared to 260 µg/cum recommended in the US and 120-150 µg/cum recommended by WHO.

An average of 3,850 nanograms of BaP (benzo (a) pyrene) was found per cubic meter. BaP has been suggested as a carcinogen in cigarette smoke.

A number of factors make the level of exposure to pollutants worse. Dwelling in the villages are small and badly ventilated and lot of discomfort are felt by heavy smoke.

Aggarwal, et al. (1982) measured TSP, particulate BaP, $SO_2$ and $NO_2$ in 16 poorly ventilated urban kitchens in Ahmedabad using biomass fuels. Their results showed substantially greater concentrations of all except $NO_2$ when dung was used in addition to or instead of wood.

A government of India document prepared for the United Nations Conference on the Human Environment (1982) admitted that the present total emission of carbon dioxide, sulphur dioxide, nitrogen dioxide, organic particulates, etc. are much higher (as compared to other sources) from burning of firewood, cattle dung, vegetable waste products and refuse, etc. This is because half of all the energy consumed in India is for cooking purposes and over 90 per cent is from these non-commercial fuel sources.

Patel (1986) found that air quality in the canteen kitchens was poor due to presence of certain gaseous pollutants. The concentration of methane, oxides of

nitrogen and carbon monoxide were found very high compared to the prescribed limits.

Singh (1986) in the descriptive cum experimental study on environmental conditions of 120 domestic kitchens of Baroda found that there was no general trend obtained for the gaseous pollution with respect to the type of fuels. The value of methane was within the prescribed limit but values of oxides of nitrogen and carbon monoxide were more than the prescribed limit.

Veerbala (1990) conducted a study on assessment of micro environmental conditions of selected household kitchens in three areas of Delhi. It was found that kitchens located in highly populated area had more SPM concentration whereas, in industrial area and railway station area, SPM concentration was within permissible limit in most of the kitchens. In all the areas CO levels were found above the permissible limit in kitchens.

Mohan, et al. (1992) in her study on indoor air quality assessment at selected locations in Pune city found that levels of $NO_x$ and $SO_2$ were well within the permissible limits but the concentration were relatively higher in hotels and kitchens. Suspended particulate matters exceeded the permissible limit in 75 per cent

samples. Heavy traffic, poor ventilation and type of fuels used for cooking seemed to affect the indoor air quality.

### 2.3.2 Ventilation

'Ventilation' may be simply defined as :

> "A process of removing and supplying air by natural or mechanical means to and from an air source or any space".
>
> (Arora and Bindra, 1980).

The modern concept of ventilation implies not only the replacement of vitiated air by a supply of fresh air but also control of the quality of incoming air with regards to its temperature, humidity and purity with a view to provide a thermal environment that is comfortable and free from risk of infection. The location of the doors and windows should be such, as to provide enough natural ventilation. This natural ventilation could be supplemented by a suitable mechanical ventilation system. It is essential that adequate air-change in buildings must be available so as to remove smoke, odour, etc. to an acceptable level.

Good ventilation is necessary due to following objectives given by Arora and Bindra (1980) :

i) To prevent an undue concentration of body odours, fumes, dust, etc.

ii) To prevent an undue concentration of bacteria-carrying particles.

iii) To remove products of combustion.

iv) To remove body heat and heat liberated by the operation of electrical and mechanical equipments.

v) To create air movement so as to remove the vitiated air or its replacement by the fresh air.

vi) To create healthy living conditions by preventing the undue accumulation of carbon dioxide and moisture and depletion of the oxygen content of air.

vii) To maintain conditions suitable to the contents of the space.

viii) To prevent flammable concentration of gas vapour or dust.

Related Research Studies on Ventilation

After going through related research studies it was found that very few studies have been done on ventilation in the kitchen.

Singh (1985) stated that the crowding of persons into the small space promote the rapid extension of infection. Also, if there are different kinds of pollution in and near the houses, it affects the health of the occupants. Further, he stated that a contaminated water supply or defective sewage disposal is closely

associated with infection of the intestinal tract and may lead to serious and wide spread epidemics. Among the adults, respiratory diseases are more frequent and severe when there is air pollution inside the houses and if the ventilation is poor, even when the total space is enough for ordinary use.

Findings of the study conducted by Singh (1986) reported that quality of ventilation was good in majority of the kitchens. Majority of the respondents did not feel cold, humid or suffocated in the kitchen. But most of them felt hot and discomfort due to over crowdedness and high temperature in the kitchen.

Ramdas (1988) found that in residential area kitchens and bedrooms lacked ventilation as there were no windows in most of the cases. They used kerosene and wood as fuel for cooking. Whereas, in commercial and industrial areas, gas was used as main fuel for cooking.

In the study on rural sanitation by Sangwan and Dak (1990), the data showed absence of ventilation, smoke-disposal facilities and seperate kitchen in large number of rural houses.

### 2.3.3 Temperature

Thermal comfort is becoming increasingly important. Until recently people were inclined to accept heat and the associated discomforts as a natural and expected part of work. This attitude has changed and people now expect or even demand working conditions that do not expose them to extremes of heat or cold. Proper control of temperature of the air medium surrounding the body removes a physiological stress, there by making greater comfort and improved physical well-being and health.

Related Research Studies on Temperature

Not much work is done on temperature level in kitchen and its impact on women.

Findings of the study conducted on environmental conditions of canteen kitchens (Patel, 1986) revealed that even though in most of the kitchens gas was used as fuel for cooking purpose, the kitchens were found to be dusty, sooty and smoky. In most of the kitchens discomfort was felt due to high temperature. Sufficient lighting was found in more than half of the kitchens. The temperature levels were very high as compared to recommended levels.

Temperature levels were above the recommended levels in all three areas in the study done by Ramdas (1988).

A study by Veerbala (1990) revealed that environmental quality was poor in some and satisfactory in some kitchens. Temperature levels and noise levels were beyond the tolerance level.

### 2.3.4 Illumination

Good illumination is essential for visual comfort, convenience, well-being of all members and effectiveness of performance of tasks. Good lighting could be defined as "having the right amount of light at the right place" (Morris, 1959).

It has been proved by the scientists and engineers with professional skill that in the end the cost of good lighting would be less than the cost of the results and out come of poor lighting (Morris, 1959).

Related Research Studies on Illumination

Very few studies are conducted on home lighting especially on kitchen lighting.

According to Katwala (1976), study on Co-operative housing societies in Baroda revealed that most of the respondents had sufficient day light in their kitchens whereas the artificial light was inadequate in most of the cases.

Desai (1977) studied existing artificial lighting system in the residential building of selected families of Baroda city. The findings revealed that the quality of average illumination in the kitchen was far below the recommended standards given by Indian Standard Institution.

A study conducted by Dhar (1981) revealed that the amount of day light in most of the kitchen was inadequate because they were in improper direction. Electricity was provided only in 16 percent of houses and rest were dark because they used kerosene lamps.

A study conducted by Singh (1986) on environmental conditions of domestic kitchens found that majority of the respondents were satisfied with natural and artificial lighting and had proper location of the lighting fixtures in the kitchen.

Ramdas (1988) found that sufficient lighting was available in the kitchens in commercial and industrial areas whereas, lighting conditions were inadequate in residential area.

The colour and finish of the walls are important in planning lighting. It is known that quantity of light available in a room is greatly dependent on the reflective qualities of the colour of floors, walls and ceiling (Tessie, 1965).

It is economical and fairly simple if walls, ceilings and floors are finished in light colours since white colour reflects 85 per cent, light shades 70 to 75 per cent and dark shades reflect 5 to 10 percent of light (Morris, 1959).

### 2.3.5 Sound

Literally sound is that which can be heard. In our daily lives we hear numerous sounds, out of which some do convey some meaning to us and are pleasant to the ear while others are unnecessary and annoying, leading to noise pollution.

According to Anatasi (1964);

> "Noise is any sound that is physiologically arousing and harmful, subjectively annoying or disruptive of performance".

Howel (1970) said;

> "A sound is disturbing only if the subject finds it inappropriate for his activity at the relevant time".

Grandjean (1978) also supports that noise is any disturbing sound.

Noise is defined as :

> "Unwanted sound" but perhaps a better conception is "the wrong sound, in the wrong place, at the wrong time"
> (Park and Park, 1986).

Thus, it is a subjective phenomena, based on personal evaluation.

One of the concomitant effects of the industrialization, mechanization and urbanization of life has been the marked increased in noise.

Western scientists have said that in the 20th century, noise will be greatest killer and number one cause of diseases especially in the developing countries (Kher, 1987).

Constant noise can cause deafness, emotional and mental strain, palpitations, digestive upset, stress and much more. Generally we Indians are noise makers. We can't distinguish between sound or music which is pleasant as against noise which is noisome.

Bombay, Delhi and Calcutta are supposed to be the maximum noise making cities of the world. The average noise range in these cities is 60 to 90 dB when even 45-50 dB are considered irritating and harmful in the long run (Kher, 1987).

The World Health Organization has recommended that a level of 45 dB at night and 55 dB by day is safe level for human hearing. Research at the All India Institute of Medical Sciences revealed that the level of dangerous noise begins at 85 dB.

Table 2.2 The Noise Levels due to Various Sources

| Source of Noise | Noise in decibels (dB) |
|---|---|
| Threshold of hearing | 0 |
| Rustle of leaves | 10 |
| Average whisper | 20 |
| Quiet radio at home | 40 |
| Busy office with typewriters | 65 |
| Domestic arguments | 80 |
| Busy street traffic | 70 |
| Industries | 80-120 |
| Three wheelers | 95-100 |
| Motor cycles | 100-106 |
| Loud speakers | 60-122 |
| Rock music | 115 |
| Threshold of pain | around 130 |
| Jet airlines at close range | 160 |

(Cited in Rao, 1987).

Related Research Studies on Sound

In most of the studies conducted on sounds, major concern was to find out various sources of sound and sound level in the house.

A Dutch survey (Berland, 1970) of apartment dwellers found that 25 per cent were annoyed by traffic noise. About 12 per cent were disturbed by noise made by playing children and 10 per cent by slamming doors.

A British Public Opinion Survey (Berland, 1970) found that by itself traffic noise was as annoying as all the combined noises of air craft, trains, industry, construction work, domestic appliances, neighbours, children and pets.

Farr (1970), a noted public health physician in California said that kitchens are the noisiest rooms in homes. The noise levels in kitchen can run from 56 dB to more than 100 dB.

Sharma (1984) conducted a study on sound levels in homes and measured sound levels in 50 houses in quiet and noisy localities of Baroda. In her study, traffic and transport were identified as major source of noise by majority of the respondents. Other loud sources included industries, construction work, music, pets and religious activities with loud speakers.

Measurements of sound levels of various household activities revealed that activity of washing clothes had widest range of sound (58 to 82 dB), water running in bathroom produced mean sound of 72 dB. Call bell produced mean sound level of 70.2 dB. It was also found that

sound levels inside the homes decrease on closing of doors and windows. Fan, Mixie, radio produced sound from 62 to 86 dB and children were nosiest and sound levels ranged from 67-82 dB with mean of 77 dB.

Patel (1986) in the study on environmental conditions of canteen kitchen found that in all the kitchens people were disturbed by noise and main sources were dishwashing activities, talking of people, moving of utensils and operation of electrical appliances. The sound levels in these kitchens were high as compared to recommended levels.

Sound levels in the study by Ramdas (1988) were found below tolerance level in residential and industrial area and high in commercial area.

Veerbala (1990) found that sound levels were beyond tolerance level in homes.

### 2.3.6 Water Quality

Water is elixir of life. Every nation is striving to provide clean drinking water to its citizens. Much of the ill-health in the underdeveloped countries is largely due to lack of safe drinking water. There can be no state of positive community health and well-being without safe water supply. The basic relationship between water

quality and health effects have been studied for many water quality characteristics.

Different definitions are given by different authors to define water pollution.

Charles (1971) pointed out that ;

> "Drinking water is considered as polluted if it contains harmful bacteria or chemicals which may be toxic. There are certain biological and chemical agents which affect the taste of the water and gives an offensive odour. Any of these materials in natural water render that water polluted with respect to its use for drinking".

Major sources of water pollution are domestic waste and sewage, industrial waste, pesticides and biocides, detergents, agricultural and animal waste and micro organisms.

Kudesia (1980) defined water pollution as the addition of any foreign material (inorganic, biological or radiological) or any physical change in the natural water which may harmfully affect the living life (human, agricultural or biological) directly or indirectly, immediately, after sometime or after a long time.

As per the International Reference Center for Community Water Supply Sanitation (1981) the basic requirements for drinking water are that it should be :

i) free from pathogenic (disease causing) organisms,
ii) containing no compounds that have an adverse effect acute or in the long term, on human health,
iii) fairly clear (low turbidity, little colour),
iv) not saline (salty),
v) containing no compounds that cause an offensive taste or smell,
vi) not causing corrosion or encrustration of the water supply system, nor staining clothes washed in it.

Related Research Studies on Water Quality

The research studies in the area of water pollution are mostly related to water supply system, its sanitation and effects of polluted water on human health.

A study was conducted by Pendse (1969) to know the opinions of housewives regarding safety and cleanliness of drinking water. Relevant findings showed that majority of the housewives expressed that the drinking water they got was clean and safe to drink but all the respondents reported that during monsoon occasionally the water was muddy.

A study was undertaken to examine the various sources of water supply in Tarai region as regards to their sanitary quality. All 100 water samples were tested for standard plate, coliform and enterococous counts. Most sources revealed that the counts were higher than that of the permissible limits (Thapliyal, et al., 1972).

Goyal, et al. (1981) found that in the industrial area of Ludhiana town water samples taken from handpump had high concentrations of trace elements. The water sample were found to contain chromium, copper, zinc and iron, etc. Alarming high concentrations of cyanide have been found in ground water which would have highly detrimental effect on the health of the people if the water is used for drinking purpose.

A survey conducted by the Gandhigram Institute in five villages in Madurai (1982) showed that people using street taps had a higher incidences of diarrhoea and shigelosis (a bacillary dysentry which can hit children badly). The study found that there was a high risk of water contamination during transport and storage. Clean water was often collected in dirty containers.

Method of water storage also affects the quality of water. The most commonly used materials are earthenware or metal vessels but today plastic has reached every

sphere of our daily life. Saxena, Srivastava and Seth (1984) stated that rapid increase in use of plastic has attracted the attention of scientists, as it may cause health hazards due to the usage of toxic polymers and chemical additives in there processing.

Singh (1986) found that 25 percent of the samples of stored drinking water were polluted. The respondents used to change the water once a day and stored water in earthernware and metal vessels.

A study on various practices of home makers for water storage was conducted by Taneja (1986) with 100 homemakers of IIT Kanpur campus using tube well water for drinking. It was found that majority of the respondents used earthernware for the storage of water in summer and in monsoon and winter plastic vessels were used. Other materials used were stainless steel, galvanised iron, brass, copper, glass, etc. Water filters were also used by some of them.

She further studied bacteriological quality of drinking water stored in vessels of different materials and found that there was difference in the disinfecting quality of various materials used for storage of drinking water. It was found that copper is the best material compared to brass, earthenware and stainless steel. Plastic is the worst material for the storage of drinking water.

According to a survey carried out in Kutch, as reported by Express News Services (1988), water samples were taken from 24 sources in Kutch, out of which 11 were contaminated and were non-potable. Water of four other sources were declared as "may be considered potable in the absence of a better alternative source". The non-potable water contained a lot of fluorides and magnesium which adversely affect the bones.

Quality of water analysed (Veerbala, 1990) showed that most of the water samples in highly populated area were polluted as the source of water supply was untreated hand pumps water and none of the home makers made effort for purifying water.

Shah (1995) studied quality of drinking water and water practices of 90 homemakers in Padra district. It was evident that the age, education of the respondents, occupation and income of the family were related to the water management and sanitation practices followed by them and as a result it had an effect on their health also. The samples of stored water used for drinking purpose were found polluted due to poor handling of water.

### 2.3.7 Sanitation :

Sanitation practices are also important aspect to determine quality of environment. The dictionary meaning of the word sanitation is "the science of safeguarding health" (Park and Park, 1986).

The WHO defines environmental sanitation as :

> "The control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health and survival"
>
> (Cited in Park and Park, 1988).

Definition of sanitation given by national Sanitation Foundation of the U.S.A. (cited in Park and Park, 1986) is as follows :

> "Sanitation is a way of life. It is the quality of living that is expressed in the clean home, the clean farm, the clean business, the clean neighbourhood and the clean community. Being a way of life it must come from within the people; it is nourished by knowledge and grows as an obligation and an ideal in human relations".

Housing and sanitary conditions of a nation are an index of state of development. Nearly 78 per cent people in India live in villages where housing and sanitary conditions are extremely unsatisfactory (Misra, 1970; WHO, 1981 and Lata, 1986).

The problem of sanitation has taken a more complex turn in modern times. High population densities, industrialization, rising living standards and exodus from rural to urban areas have not only increased the volume of domestic and trade wastes but also have greatly changed its character and have given rise to new problems regarding its collection and disposal.

Related Research Studies on Sanitation

The studies conducted in the field of sanitation are mostly on personal hygiene. Efforts are made to study household and environmental sanitation and effects of certain determinants on sanitation.

A study conducted by Bhatnagar (1968) revealed that knowledge and practices in the area of cleanliness of drinking water was not significantly different due to the variables such as age and educational level of the housewife; caste and income of the family. It was found that knowledge and practices regarding handling food and garbage disposal were signinficantly related with educational level and income of the family.

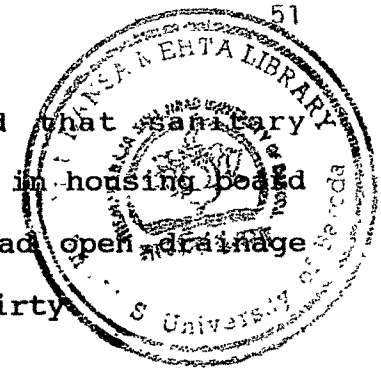
Pendse (1969) studied the knowledge and practices of urban housewives in household sanitation. The sample consisted of forty housewives of Baroda city. The findings showed that housewives had knowledge regarding

sanitation. They knew the reasons for getting sick, uncleanliness, etc. Most of the housewives took preventive measures while handling the food.

Patel (1971) studied the community life in slums of Baroda with reference to conditions of housing; pilot survey was done on 520 respondents. The findings showed that most of the slum houses were found congested, having insufficient space. There was absence of ventilation, light, independent latrines and bathrooms. There was low standard of living of the people.

Research done by Karla (1972) found that the problem of cleaning the kitchen was faced by majority of the respondents because of its kachcha floor.

An evaluation of cooperative Housing in Baroda was carried out by Ogale (1981). It was found out from the survey of 100 homemakers of families living in co-operative ownership housing colonies that about one-fourth were not satisfied with the sanitation facilities within and surrounding the house. The kitchens in many house plans had poor orientation. Most of the kitchens were neglected in terms of facilities such as adequate storage space, proper lighting arrangements and ventilation.



Kaul (1981) in her study found that sanitary conditions around the houses were better in housing board colony than in slums. The slum area had open drainage system which made the surrounding very dirty.

Desai (1985) studied the environmental perception and the degree of resident's concern of maintaining and conserving environment as resource. The major findings of the survey of 200 residents of Ahmedabad city showed that housing conditions were poor in case of city. Residents were aware of environmental problems of physical type but tend to undermine these problems. They were least sensitive to cleanliness and lacked interest in participating in environmental programmes.

Singh (1986) revealed that majority of the respondents did not use dust bin in the kitchen and those who used dust bin, cleaned it once a day and faced problems of bad smell and presence of flies and cockroaches around the bin.

Gamit (1987) carried out study on urban poor with reference to housing and environmental conditions of Baroda city. Out of 700 families surveyed, it was found that majority lived in inadequate area and had no bathroom facility. Ventilation and lighting facilities were inadequate. There was absence of proper drainage; health and hygiene were neglected and majority had polluted surroundings.

Sardana, et al. (1990) observed that majority did not have any drainage, waste water led to the street, accumulated near by and served as breeding place for mosquitoes.

The findings of the study on rural sanitation (Sangwan and Dak, 1990) revealed significant influence of socio -economic factors like caste, education, occupation and income on the poor state of rural sanitation.

Going through various National and International journals and research studies on environmental pollution, it was found that considerable work has been done in the field of air, water and noise pollution due to industrial growth; air and noise pollution due to automobiles; industrial waste disposal problems, effects of pollution on health of the human beings, etc. But it is surprising that very limited work has been done in the field of indoor pollution which enters or originates inside the house.

This indicated a need to take up in depth study taking into consideration various aspects of micro environment and assessment of quality of micro environment of household kitchens.