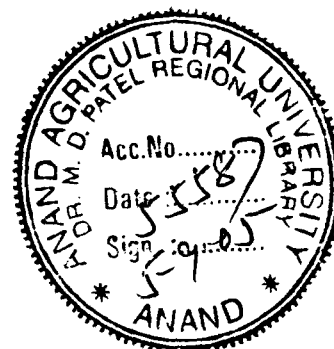


**INDIGENOUS AND SCIENTIFIC KNOWLEDGE OF
THE TRIBAL AND NON-TRIBAL FARMWOMEN
ABOUT NEEM IN MIDDLE GUJARAT**

**A
THESIS
SUBMITTED TO THE
ANAND AGRICULTURAL UNIVERSITY
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**OF
Master of Science
(AGRICULTURE)**

**IN
EXTENSION EDUCATION**

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Abstract

**INDIGENOUS AND SCIENTIFIC KNOWLEDGE OF THE
TRIBAL AND NON-TRIBAL FARMWOMEN
ABOUT NEEM IN MIDDLE GUJARAT**

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ABSTRACT

Neem (*Azadirachta indica*, A. Juss) belongs to the family *Meliaceae*. It is a hardy, quick growing, evergreen tree. Fresh neem leaves and flowers come in March-April. The lifespan of tree is more than two centuries. It is naturally distributed on Shivalik hills of Uttar Pradesh and hillock of Deccan, in Karnataka and adjoining states. Neem is bitter in taste due to the presence of "Triterpenese" or "Limonoids". The most important bioactive substance of neem is "Azadiractin". The neem tree grows on almost all type of soils and wide range of climate. Neem tree is recognized as "Kalpavriksha" because all parts of neem and its products are very useful in agriculture, industries, medicines and in many other fields. The important parts of neem like leaves are used as animal feed, storage of grains, and making of soap and toothpastes. Neem kernel powder is use to protect against weevil, lesser grain borer and khapra beetle. Oilcake is used as a fertilizer and manure. Green twigs are used as toothbrushes and as a prophylactic for mouth and teeth complaints. Neem oil is used as antiseptic, for burning purposes, for making of soap and toothpastes and hydrogenation. Gum is used in medicines and for dyeing silk. Bark is useful in fever, nausea, vomiting and skin diseases. Timber is used for agricultural implement.

Because of versatile usages and availability all around in the fields and near by houses in rural area, neem has taken a place of important tree in the hearts of farmwomen of the tribal and non-tribal region. To motivate rural people to make best uses of this tree in agriculture and other work, farmwomen's role can be aggravated. It is believed that farmwomen can play significant role in popularizing, maintaining and adopting easily available natural material for various economic profit of family. Neem as an important eco and farmers-friendly natural material, farmwomen can be encouraged to popularize usages of this tree. To understand existing status of this tree among farmwomen, it was realized to examine the level of awareness of rural farmwomen regarding this tree to know the existing place of neem tree among them. With this back ground in mind, the present study was undertaken with following objectives;

1. To study profile of the neem tree owner tribal and non-tribal farmwomen.
2. To find out opinion of the neem tree owner tribal and non-tribal farmwomen regarding use of neem.
3. To measure the indigenous and scientific knowledge about neem of the tribal and non-tribal farmwomen located around neem.
4. To find out relationship between profile of the tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.
5. To find out pattern of adoption of various parts of neem by the tribal and non-tribal farmwomen located around neem.
6. To analyze constraints faced by the tribal and non-tribal farmwomen about various uses of neem.
7. To seek the suggestions of the tribal and non-tribal farmwomen to improve their existing status of indigenous and scientific knowledge of neem and improving its uses.

The methodological procedure consisted of dependent and independent variables, setting and selection of the respondents, analysis of data and various

statistical measures used to test the hypothesis. To measure the indigenous and scientific knowledge of the tribal and non-tribal farmwomen about the various uses of various parts of neem was measured in terms of yes and no responses. The adoption behaviour was measured in three parts viz., "Used in past", "Using at present" and "Wish to use in future". To measure the selected independent variables, the scales developed by various researchers were used with slightly modifications. The present investigation was carried out on a randomly selected sample of eighty tribal farmwomen and eighty non-tribal farmwomen of Chhotaudepur and Sankheda talukas of Baroda district of Gujarat. The data were collected with the help of structural schedule by personal interview method. The data so collected were coded, classified, tabulated and analyzed in order to make the findings meaningful.

Major findings

1. Majority of the neem tree owner tribal farmwomen had middle age (75.00 per cent), no any formal education (93.75 per cent), agriculture, animal husbandry and labour as major sources of income (81.25 per cent), up to 2.0 herd size (50.00 per cent), low level of annual income (77.50 per cent), no membership in any organization (92.50 per cent), 5 to 8 members in family (61.25 per cent), joint type of family (66.25 per cent), elderly person in their family from the age of 31 to 50 years (71.33 per cent) and every years migration tendency during last three years (98.75 per cent), low mass media exposure (86.25 per cent), no contact with extension officer (91.25 per cent) and overall high level of scientific orientation (61.25 per cent). While, slightly more than two fifth of them had 2.10 to 4.00 acres of land holding (42.50 per cent) and medium level of cosmopolitaness (42.50 per cent). In case of non-tribal neem tree owner farmwomen, majority of them had middle age (56.25 per cent), primary to secondary level of formal education (62.50 per cent), agriculture, animal husbandry and labour as major sources of income (72.50 per cent), low level of annual income (67.50 per cent), no membership in any organization (95.00 per cent), 5 to 8 members in family (56.25 per cent), joint type of family

(60.00 per cent), elderly person in their family from the age of 31 to 50 years (55.00 per cent), no migration tendency (100.00 per cent), low mass media exposure (66.25 per cent), no any extension contact (98.75 per cent), high level of cosmopolitaness (72.50 per cent) and high level of scientific orientation (85.00 per cent), while half of them had up to 2.00 acres of land holding (50.00 per cent) and slightly more than two fifth had up to 2.0 milch animal (41.25 per cent).

2. The cent per cent of neem tree owner tribal and non-tribal farmwomen had opinion that there is no side effect on human health of neem. The huge majority of tribal (96.25 per cent) and non-tribal (98.25 per cent) had an opinion that neem can be used to cure many diseases of human beings and neem can be used in various ways as plant protection measure, 96.25 per cent of tribal and cent per cent non-tribal farmwomen opined that neem is useful as "Kalpvruksh", 80.00 per cent tribal and 66.25 per cent of non-tribal farmwomen had neutral opinion about the statement that " Consumption of Neem is unpleasant as it is bitter ", 62.50 per cent of tribal and 53.75 per cent of non-tribal farmwomen had again neutral opinion about the statement that "Application of neem is tedious job".
3. Majority of the neem tree owner tribal farm women had knowledge of indigenous and scientific agricultural uses of neem like, tree to make farm implements (100.00 per cent), to prevent soil erosion (96.25 per cent), to make best use of fellow land (93.75 per cent) and as wind breaker (82.50 per cent); Neem leaves for storage of grains (100.00 per cent), as an animal feed (100.00 per cent) and as a fertilizer (73.75 per cent) ; Neem oil to control sucking pests in cotton (51.25 per cent); Neem cake to improve soil fertility (61.25 per cent) and roots to prevent soil erosion (71.25 per cent). In case of non-tribal neem tree owner farmwomen, majority of them had knowledge of indigenous and scientific agricultural uses of neem like, tree to make farm implements (97.50 per cent), to make best use of fellow land (97.50 per cent); to prevent soil

erosion (96.25 per cent) and as wind breaker (83.75 per cent); Neem leaves for storage of grains (100.00 per cent), as an animal feed (100.00 per cent) and as a fertilizer (86.25 per cent); Neem oil to control sucking pests in cotton (66.25 per cent); Neem cake to improve soil fertility (72.50 per cent) and Neem roots to prevent soil erosion (71.25 per cent). At the same time, majority of the neem tree owner tribal farm women did not know the agricultural uses of neem like, branches to know the source of underground water (100.00 per cent); oil to control aphids of mustard (100.00 per cent), to control diamond back moth of cabbage (100.00 per cent), to control white grub (100.00 per cent), to control hairy caterpillar (80.00 per cent), to control fungus (76.25 per cent), to control castor semilooper (75.00 per cent), to control leaf eating caterpillar (72.50 per cent), to control *Helicoverpa* spp. (70.00 per cent), to control larvae of fruits of okra (66.25 per cent); cake for control nematodes (100.00 per cent) and for coating of urea (77.50 per cent). In case of non-tribal neem tree owner farmwomen most of them had no knowledge about agricultural uses of neem like, branches to know the source of underground water (100.00 per cent); oil to control aphids (100.00 per cent), to control diamond back moth of cabbage (100.00 per cent), to control white grub (100.00 per cent), to control fungus (70.00 per cent), to control castor semilooper (68.75 per cent), to control *Helicoverpa* spp. (67.50 per cent), to control hairy caterpillar (66.25 per cent), to control larvae of okra fruits (61.25 per cent) and to control leaf eating caterpillar (51.25 per cent); cake for control nematodes (100.00 per cent) and for coating of urea (58.75 per cent).

4. Majority of the neem tree owner tribal farm women had knowledge of other indigenous and scientific uses of neem like, tree for shadow (100.00 per cent), to create conducive atmosphere for good raining (100.00 per cent) and wood for furniture (100.00 per cent); leaves to prevent mosquito incidence (100.00 per cent), to cure fever (98.75 per cent), to cure dermal diseases (96.50 per cent), for counteracting snake poison (85.00 per cent), for counteracting

scorpion poison (81.25 per cent), as an ingredient of soap (77.25 per cent), as an ingredient of toothpaste (66.25 per cent) and as a medicine for worms (55.00 per cent); twigs as a toothbrush (*datun*) (100.00 per cent) and as fuel (100.00 per cent) and oil as an ingredient of soap (72.50 per cent). In case of non-tribal neem tree owner farmwomen most of them had knowledge of other indigenous and scientific uses of neem like, tree for shadow (100.00 per cent), to create conductive atmosphere for good raining (100.00 per cent) and wood for furniture (100.00 per cent); leaves to cure fever (100.00 per cent), to cure dermal diseases (90.00 per cent), as an ingredient of soap (80.00 per cent), as an ingredient of toothpaste (76.25 per cent) and to prevent mosquito incidence (72.50 per cent); twigs as a toothbrush (*datun*) (100.00 per cent) and as fuel (100.00 per cent); oil as an ingredient of soap (83.75 per cent), to control dandruff (68.75 per cent), to prevent mosquito bite (65.00 per cent) and preparation of medicines (56.25 per cent).

5. The majority of the neem tree owner tribal farmwomen did not know the other uses of neem like, tree for rearing of Gallo (*Tinospora cordifolia*) (65.00 per cent); leaves to cure ill health resulted by opium consumption (100.00 per cent), as a medicine for piles (95.00 per cent), to control diabetes (70.00 per cent) and to relieve cough (63.75 per cent); oil as a contraceptive (100.00 per cent), as nasal drop to cure sinus (100.00 per cent), to cure gumboil of teeth (78.75 per cent), as a fuel in lamp (63.75 per cent), to prevent mosquito biting (57.50 per cent), to control dandruff (55.00 per cent); gum as a medicine against itching (97.50 per cent) and as a tonic (97.50 per cent) and root to prepare paste (*Ghanvati*) (100.00 per cent). In case of non-tribal neem tree owner farmwomen, they did not have know of other uses of neem like, tree for rearing of Gallo (*Tinospora cordifolia*) (53.75 per cent); leaves to cure ill health resulted by opium consumption (100.00 per cent), as a medicine for piles (97.50 per cent), to control diabetes (85.00 per cent), as a medicine for worms (67.50 per cent) and to relieve cough (66.25 per cent) and for

counteracting scorpion poison and snake poison (60.00 per cent); oil as a contraceptive (100.00 per cent), as nasal drop to cure sinus (100.00 per cent), as a fuel in lamp (67.50 per cent) and to cure gumboil of teeth (63.75 per cent); gum as a medicine against itching (93.75 per cent) and as a tonic (88.75 per cent) and root to prepare paste (*Ghanvati*) (100.00 per cent).

6. Non-tribal neem tree owner farmwomen had significantly better knowledge about indigenous and scientific usages of different parts of neem than the tribal farmwomen in terms of other uses of neem tree, industrial uses of neem leaves, agricultural, health related and industrial uses of neem oil and agricultural uses of neem cake. The non-significant difference between the knowledge about indigenous and scientific usages of different parts of neem of tribal and non-tribal farmwomen was observed in case of agricultural uses of neem tree and neem root, health related uses of neem leaves, neem branches and cake and home purposes of neem branches and neem oil.
7. Non-tribal neem tree owner farmwomen had significantly better adoption about indigenous and scientific usages of different parts of neem than the tribal farmwomen in terms of agricultural usages of neem tree and oil, health and home related usages of neem oil at the same time tribal farmwomen had significantly better adoption about indigenous and scientific agricultural usages of neem leaves and cake than non-tribal farmwomen. It was also seen that there was non-significant difference in the adoption about indigenous and scientific values of different parts of neem between tribal and non-tribal farmwomen in case of agricultural usages of neem cake and neem roots, health related usages of neem leaves and neem branches, home related usages of neem branches and other usages of neem tree.
8. Three variables *viz.*, education, mass media exposure and cosmopolitaness of tribal farmwomen were observed positively significant, while land holding was observed negative significant with indigenous and scientific knowledge of the neem tree owner tribal farmwomen about various uses of neem.

9. Four variables *viz.*, education, land holding, annual income and opinion about various uses of neem of non-tribal farmwomen were observed positively significant, while two variables like occupation and mass media exposure were observed negative significant with indigenous and scientific knowledge of the non-tribal neem tree owner farmwomen about various uses of neem.
10. The less exposure of training, unavailability of sufficient literature on usages of neem, less coverage of neem related information in communication media, insufficient knowledge about various uses of neem, unavailability of neem based products in market and unavailability required quantity of neem were major constraints faced by the neem tree owner tribal and non-tribal farmwomen in using neem for agriculture, health and other purposes.
11. The major suggestions given by the neem tree owner tribal and non-tribal farmwomen in this regards were; training programmes on various uses of neem should be organized at village level, the posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village, indigenous knowledge should be tested on scientific grounds and should be extended further, guidance on the uses of neem should be provided right from school level and efforts should be made to use fellow land by neem plantation to create awareness about neem.

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CERTIFICATE

This is to certify that the research problem entitled **"INDIGENOUS AND SCIENTIFIC KNOWLEDGE OF THE TRIBAL AND NON-TRIBAL FARMWOMEN ABOUT NEEM IN MIDDLE GUJARAT"** submitted by **SHRI. ZALA PRAVINSINH KIRTANSINH** in partial fulfillment of the requirement for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in the subject of **EXTENSION EDUCATION** of the Anand Agriculture University is a record of bonafide research work carried out by him under my guidance and supervision and the research problem has not previously formed the basis for the award of any degree, diploma or other similar title.

ANAND
Date : **30/ 8 / 2005**


(**N. B. CHAUHAN**)
MAJOR ADVISOR

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Place: Anand

Date : 22/ 8 / 2005


(P. K. Zala)

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Introduction

I. INTRODUCTION

Neem belongs to the family *Meliaceae* and botanically known as *Azadirachta indica*, *A.Juss.* Its native place is Indian sub-continent. It is a hardy, quick growing, evergreen tree with a height of 15 to 20 meters, semi-straight trunk of 30 to 80 cm in diameter. It spreads its branches as much as 20 meters. Leaves are up to 30 cm long, pinnate, leaflets are 7 cm long, lance acuminate, oblique, more or less serrated 12 to 17 in numbers. Flowers are small and white, bisexual flowers are born in auxiliary clusters and sweet scented, develop in loose clusters from near the base of the leaves. Fresh leaves and flowers come in March- April and then the old leaves fall; new leaves are bronze purple in colors. Fruits are up to 1.7 cm long, rounded and oblong. When it ripens became yellow or greenish yellow and comprises a sweet pulp enclosing a seed. A neem tree normally beings bearing fruits after 3 to 5 years, becomes fully productive in 10 years and there after it can produce up to 50 kg of fruits annually. The lifespan of tree is more than two centuries.

Neem tree is also known as roadside shade tree in the tropics, particular, *A. indica*, which is widely distributed in India, Pakistan, Sri Lanka, South-East Asia and Africa. It had been introduced in to Africa by Indian settlers. Now neem plantations have spread to several countries like Central America, South America, Continental USA, Caribbean, Islands, Southern Africa and Australia. In India, it is naturally distributed on Shivalik hills of Uttar Pradesh and hillock of Deccan, in Karnataka and adjoining states.

Neem is bitter in taste. The bitterness is due to the presence of an array of complex compounds called "*Triterpenese*" or "*Limonoids*" the most important bioactive substance of neem is "*Azadirachtin*", it is considered as most effective source of pest management without disturbing the ecological equilibrium of the surroundings and harming to farmer friendly insects.

Neem has adapted a wide range of climate; it thrives well in hot weather, where the maximum shade temperature is as high as 49 degree centigrade and tolerated cold up to zero degree centigrade, on altitudes up to 1500 meters. The neem tree grows on almost all type of soils including clayey, saline and alkaline soil, with pH up to 8.5, but it does well on black cotton soil and deep well drained soil with good sub-soil water. The tree improves the soil fertility and water-holding capacity as it has unique property of calcium mining, which changes the acidic soil into neutral. Neem is safe to earthworm, honeybee and fish.

Neem tree is recognized as "*Kalpavriksha*" because of its versatile usages. So far agriculture is concerned, the neem and its products used in various way to protect the environment and promote sustainable agriculture. All parts of neem and products derived from them are useful. The important parts of neem like leaves are useful as a good fodder for animals. It is most commonly used as animal feed by the farming community during the dry periods when no other fodder is available. Mixing of dried leaves during storage of grains and keeping between two fold of clothes to protect them from insects are well known. An extract of leaves is used in toothpastes and soaps. All parts of neem tree possess insecticidal properties but seed kernel is the most active. Neem kernel powder when mixed with rice and wheat it protect against weevil, lesser grain borer and khapra beetle for a long period. Oilcake, obtained from seeds, is used as a fertilizer and manure. Green twigs are used as tooth brushes for cleaning teeth and as a prophylactic for mouth and teeth complaints. Oil is said to be effective in treatment of leprosy and skin diseases. Neem oil is useful in soap making and hydrogenation. It is also used as antiseptic and for burning purposes. Gum exudates from the bark are used in medicines as a stimulant and for dyeing silk. Bark is useful in fever, nausea, vomiting and skin diseases. The main component of the oil is "*Nimbidin*", which is very bitter. Nimbidin is used for making several pharmaceutical preparation including emulsion, liquors, ointments, medicinal cosmetics such as lotions, shampoos, creams, hair tonics and gargles. Timber is used for agricultural implements and furniture.

In spite of several benefits of neem, they have remained unused among the farmers and other people. In addition to this, it is not accepted as regular cultivable field crop by the farmers. It can also be cultivated on wasteland. Looking to the extraordinary agricultural and other usages of neem, there is an urgent need to popularize plantation of neem tree and its various usages among Indian farmers.

In accelerating important task of popularizing plantation of neem tree and its various usages among farmers, role of women is most important. Historian believes that it was women who first started cultivation of crop and initiated the art and science of farming. In the recent times also the women play a pivotal role in agricultural occupation as manager, decision maker and skill farm worker. It is believed that every woman has quality of an entrepreneur, as she manages, organizes and assures responsibility for running her house. It has been realized that women possess talent, which can be exploited for the productive purposes. It is estimated that women are responsible for 70 per cent of actual farm work and constitute up to 60 per cent of the farming population. It is, therefore, not an exaggeration, that women in developing countries are the backbone of food security. According to the international statistics women contribute more than 90 per cent of the total work of the world.

Because of versatile usages and availability all around in the fields and near by houses in rural area, neem has taken a place of important tree in the hearts of women of tribal as well as non-tribal region. To motivate rural people to make best uses of this tree in agriculture and other work, women's role can be aggravated. It is said that women can cooperate significant responsibility in popularizing easily available material for various economic profit. Thus, it was realized to examine the level of awareness of rural woman regarding this tree to know the existing place of neem tree among them. With this back ground in mind, the present study on "Indigenous and scientific knowledge of the tribal and non-tribal farmwomen about neem in middle Gujarat" has been designed to undertake.

1.1 CONCEPT OF THE INDIGENOUS KNOWLEDGE

Since time immemorial the tribal farmwomen have been hard working in carrying out experiments with plants, trees, animals and surrounding things. The information thus gained over a period of time has been passing on from generation to generation by words of mouth. This knowledge in today's parlance is called local knowledge, traditional knowledge, traditional wisdom or simply indigenous knowledge. Indigenous knowledge includes both technical and non-technical fields covering various social and religious taboos, beliefs, customs, communication pattern, music, ecology, vegetation, climate and monsoon.

Indigenous knowledge is mainly inherited through the socio-cultural system and it is maintained and developed through the oral traditions, folk talks, proverbs etc. It is sum of knowledge based on people's accumulated experience in dealing with situations and problems in various aspects of life.

Indigenous knowledge is body of understood information on any field acquired by an individual by informal way through the words of mouth from generation to generation.

Indigenous knowledge is stored in memories and activities of people and it is many times expressed in the form of stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language, taxonomy, agricultural practices, equipment, materials, plant species and animal breeds.

1.2 STATEMENT OF THE STUDY

Gujarat state has a population of over fifty million, which is spread across 18,000 villages and 240 cities/towns. Nearly sixty per cent of the population lives in rural area while 40 per cent of the population lives in urban area. Among the rural population, 14.92 per cent consists of tribal population. This tribal population has considerable indigenous and scientific knowledge about various flora and fauna. Neem is one of the most important trees for tribal people, which are widely used by them. Neem is a versatile tree and people use its various parts like twigs, seeds, leaves, roots, etc. for various purposes. Similarly non-tribal people also use neem for various

purposes, but there may be differences in the manner the tribal and non-tribal people use it. Considering this, the problem entitled "Indigenous and scientific knowledge of the tribal and non-tribal farmwomen about neem in middle Gujarat" was undertaken with the following objectives.

1.3 OBJECTIVES OF THE STUDY

The present study was conceived with general objective of measuring the existing indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem in Chhotaudaipur taluka and Sankheda taluka of Baroda district of Gujarat. The specific objectives of the study would be as under.

1. To study profile of the neem tree owner tribal and non-tribal farmwomen.
2. To find out opinion of the neem tree owner tribal and non-tribal farmwomen regarding use of neem.
3. To measure the indigenous and scientific knowledge about neem of the tribal and non-tribal farmwomen located around neem.
4. To find out relationship between profile of the tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.
5. To find out pattern of adoption of various parts of neem by the tribal and non-tribal farmwomen located around neem.
6. To analyze constraints faced by the tribal and non-tribal farmwomen about various uses of neem.
7. To seek the suggestions of the tribal and non-tribal farmwomen to improve their existing status of indigenous and scientific knowledge of neem and improving its uses.

1.4 SCOPE OF THE STUDY

Rural people in India constitute about eighty per cent of total Indian population. Even today, some of the tribal and rural communities have maintained their rich traditions of health care knowledge, indigenous knowledge of various feed of animals, making implements, insect-pest controls, sources of applying soil

nutrients etc. What India needs today is a mass-oriented, eco-friendly, sustainable, decentralized and low cost, need based, culturally acceptable and community based holistic healthcare system for human, plant and agriculture as a whole. The neem can play an important role in this course of action. The uses of such tree can be improved if the tribal and non-tribal farmwomen know medicinal value, agricultural value, industrial value, insecticides value etc. of neem available around them. This is possible only when systematic study is undertaken to know existing indigenous knowledge of the tribal and non-tribal farmwomen about various uses of neem.

Thus, the present study will be of great use to planners, administrators and research workers. The existing level of indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem will provide base to analyze knowledge gap among the tribal and non-tribal farmwomen. The knowledge regarding factors influencing the indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various use of neem will be most useful to restructure and reframe approaches in right direction. The findings of the study will be much helpful to administrators to create awareness among the tribal and non-tribal farmwomen about various medicinal uses, agriculture uses, industrial uses, insecticides uses, etc. of neem.

1.5 LIMITATION OF THE STUDY

1. The study was restricted only to Chhotaudaipur taluka and Sankheda taluka of Baroda district of Gujarat because of limited time and resources.
2. The diagnostic study was confined to only eighty tribal farmwomen and eighty non-tribal farmwomen.
3. The study will be limited to only some of the selected characteristics of the respondents not all the characteristics.
4. The findings will be based on verbal expression and response of the respondents.

Review of literature

II. REVIEW OF LITERATURE

The literature reviewed so far clearly indicates that very few research studies have been conducted on the indigenous and scientific knowledge and adoption of neem. A comprehensive review of literature is an essential part of any scientific investigation. The main purpose of this is to put forth findings of the research study, which are related to the present investigation. It also helps the researcher to conclude and compare findings of his research with past research works to avoid duplication. Moreover, it also aids in clearing some concepts regarding the study. Thus, to develop a conceptual framework and to find out appropriate design for the study, a review of past studies was carried out.

As the literature having direct bearing on different aspects of present study is limited, the references having indirect bearing were also reviewed and presented in this chapter under the following heads:

- 2.1 Importance of the indigenous knowledge**
- 2.2 Scientific studies on usages of neem in agriculture**
- 2.3 Profile of the indigenous and scientific knowledge holder and adopter respondents**
- 2.4 Opinion of the farmers about various uses of neem**
- 2.5 Knowledge of indigenously and scientifically approved values of neem**
- 2.6 Relationship between knowledge and profile of the respondents**
- 2.7 Adoption of indigenously and scientifically approved values of plants**
- 2.8 Constraints faced by farmers for various uses of neem**
- 2.9 Suggestions of the farmers to accelerate rate of neem use among the farmers**

2.1 IMPORTANCE OF THE INDIGENOUS KNOWLEDGE

Rudramoorthy (1964) pointed out that a judicious combination of folk knowledge and scientific knowledge helps to seek the adoption of improved farming by the farmers.

Andrew (1978) noted that in Japan the level of agriculture technology has been raised steadily since the end of the last century by the means of indigenous research on the bases of existing plant resources and system of production.

Anonymous (1978) stated that it is important to overlook the kind and extent of the local knowledge, experience, technology, skills and institutions, which exist in any total community. Such resources can often be very valuable indeed.

Knight (1980) has called for the systematic documentation of traditional farmers' knowledge in to an "information bank" from which extension workers and other farmers can draw enlightens.

Gupta (1983) reported that since ancient time, local people as chief source of medicine use herbages with no side effect for the treatment of various ailments. Even their uses are locality specific due to poor documentation.

Sandoval (1992) argued that there is a pressing need for the systematic documentation or memory banking of local farmers' indigenous knowledge.

Chittiraichelvan (1994) suggested that with the addition of farmers' indigenous or traditional knowledge, the technologies developed get refined, the problems are restated and scientific solutions are evolved.

Rajsekaran and Warren (1994) opined that indigenous knowledge could be used to fulfill socio economic needs and conserve biodiversity at the same time.

Tawade *et al.* (1998) pointed out that knowledge and use of medicinal plants by the respondents were assessed in 47 medical plant species commonly found in Konkan region. Of these, 13 species were seasonal and 34 were perennial. The result revealed that 85 to 100 per cent of the respondents were aware about seasonal as well as perennial medicinal plant species. The observation in respect of the use of the medicinal plants also revealed somewhat similar picture.

Patel (1998) reported that majority (67.67 per cent) of the tribal farmwomen were having medium to high level of knowledge on indigenous resource management activities.

Kanani (1998) reported that majority (65.00 per cent) of the indigenous practices adopter farmers had medium level of knowledge about indigenous practices of groundnut crop, followed by 21.67 per cent with high and 13.33 per cent with low level of knowledge about indigenous practices of groundnut crop.

Singh and Saroj (1999) during their efforts to bring out the inherited knowledge through school going sons/daughters about medicinal uses of different plants and educate them for their conservation observed that students took keen interest on this aspect.

Gupta (2000) propounded that local knowledge has a tremendous potential for restoring the economic and ecological balance.

Parvathi *et al.* (2000) recorded that indigenous knowledge in post-harvest operations is highly valued, since in many cases the new tools and techniques were not available or beyond the means of farmers.

2.2 SCIENTIFIC STUDIES ON USAGES OF NEEM IN AGRICULTURE

Sharma (1993) noted that neem oil extracted from the seeds of *Azadirachta indica* A.Juss (Family-Meliaceae) was tested for its repellent action on mosquitoes and sawflies. Cost analysis revealed that neem oil is the cheapest and most effective and safe method of personal protection.

Hellpap (1993) reported that in 1987 the Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ) and the Instituto Loyola started a joint project to promote and disseminate the use of local homemade insecticides from neem by small scale vegetable farmers in the Dominican republic. The project is co-operating closely with a group of 60 pilot farmers. Who visited once a week and whose experiences with neem are regularly evaluated? They use homemade aqueous neem

extracts prepared in barrels with a specially designed wire mesh fitter. The method is easy and accepted by farmers.

Dimetry (1993) indicated that the use of biologically active substances from neem for the control of agricultural pests has been undertaken in different parts of the world. The studies done in Egypt indicate the possibility of using the neem seed kernel extracts with insecticidal properties for the control of different pests. The repellent, antifeedant and growth regulator properties of the toxic principles from the seeds of *Meliaceae* combined with low cost local availability, safety to the environment and compatibility with the agro ecosystem, enhance their potential in insect pest management system.

Singh and Raheja (1993) noted that insect growth regulatory activity of neem is the most important biological effect. Its effect is, however limited to the developmental stages, the adult generally remain unaffected (except in cases where they get sterilized) and continued to be a potential threat.

Murugan *et al.* (1993) reported that the neem kernel extract may be considered as a chemosterilant agent for the insect and as a highly promising candidate for an integrated pest management strategy.

Mathur and Nigam (1993) pointed out that neem oil does possess insecticidal, antifeedant and juvenomimetic properties against stored product pest, *Coryra caphalonica* and the phytophagous pest, *Epilachna viginitopunctata*. Therefore, it may suitably be well fitted in the integrated management of both these experimental insects.

Rao *et al.* (1993) noted that neem affected *Spodoptera litura* at olfactory, gustatory and physiological levels. Both methanol and hexane extracts of neem seed kernels proved to be larval repellants and oviposition deterrents.

Dhaliwal *et al.* (1993) pointed out that insecticides of botanical origin like neem are environmentally safe and their effectiveness against a wide variety of insects makes them suitable in IPM programmes.

Sachan and Katti (1993) reported that large scale multilocal field trials have revealed that neem seed kernel extract (NSKE) and neem leaf extract (NLE) at 5.00 per cent each provided significant and cost effective control of *Heliothis armigera* compared to conventional insecticides in chickpea.

Gupta (1993) reported that on the basis of 3 year of field trials, it was concluded that application of neem alone or in combination with conventional insecticides failed to check pest complex in cotton under field conditions. However, its combination with synthetic parathyroid proved effective in managing pest complex in cotton and increasing good quality yield.

Dhawan and Simwat (1993) noted that cotton crop in Punjab is attacked mainly by pink bollworm and spotted bollworms. Three botanical insecticides viz. RD-9 Repelin, Neemark and Ind-Ne-20EC were tested alone and in combination with conventional insecticide (quinalphos) and synthetic parathyroid (cypermethrin) for the control of bollworm complex on cotton in three different experiments. Botanical insecticides gave better bollworm control and higher yield when used in combination than quinalphos and cypermethrin alone. Mixing of botanicals with conventional insecticides make them as effective as synthetic pyrethroids. These combinations can be substituted for synthetic pyrethroids for bollworm management.

Shukla *et al.* (1993) pointed out that neem products to be pest effective safer to predators, economically viable and socially acceptable, especially by the poor farmers of the region of eastern MP.

Nanda *et al.* (1993) reported that neem kernel extract and oil were found relatively safer than the insecticides like monocrotophos and ethophenprox to predators like spiders (*Lycosa pseudoannulata* and *Phidippus spp.*) and mirid bugs (*Cyrtorhinus lividipennis*) in field condition.

Rao *et al.* (1993) reported that the utility of neem-based formulations in rice field was well recognized by the farming community and their availability commercially at an affordable price will promote large-scale use. The use of neem-based formulations in rice aquatic system was safer and no adverse effect was

observed on the non-target population. Neem products were also safer to fish and can be used in rice fish culture.

Bandara and Kudagama (1993) pointed out that neem products such as water, methanol and petroleum ether extracts of neem seed kernels can be used effectively and economically for controlling the leaf eating caterpillar complex on cabbage.

Akhauri *et al.* (1993) noted that since the cultivation of early pigeon pea in Bihar is almost impossible without protection against the spotted pod borer (*Maruca testulalis* G.) and because its control with chemical insecticides is ecologically undesirable and unaffordable. Neem oil therefore might be exploited more efficiently as a biorational insecticide in pod borer management in early pigeon pea cultivation, hitherto uneconomical in Bihar.

Sombaisiri (1993) noted that Thai neem seed extracts were tested for the control of insect pests on Chinese kale, namely, *Plutella sylostella*, *Spodoptera litura* and *Hellula undalis*. Methanolic neem extract at 5 per cent concentration probably was the best among the neem formulations in controlling insects and resulted in greater marketable yield.

Srivastava *et al.* (1993) reported that two cheap neem seed enriched extracts, an oil based and a cakes based were identified. Both the extracts proved very effective against mango hoppers, *Amritodus atkinsoni* and *Idioscopus miticulus* serious pests of mango.

Chari *et al.* (1993) pointed out that neem formulation containing *azadiractin* were highly effective at 0.003 per cent and higher concentrations in protecting the tobacco foliage from the *spodoptera* damage.

Gupta *et al.* (1993) reported that all neem cake extracts significantly reduced larval emergence from egg sac of *Heterodera cajani* and increased nematode morality of *Pratilanchus thornei*. It is concluded that neem cake can successfully be used in control of these nematode species.

Tiyagi and Alam (1993) noted that the residual effects of oilseed cakes and ploughing on the population of plant parasitic nematode and frequency of fungi remained below the initial level.

Vaishnav *et al.* (1993) pointed out that neem cake is recommended for root knot nematode in groundnut.

Reddy *et al.* (1993) pointed out that the application of neem cake in combination with *Paecilomyces lilacinus* gave maximum shoot length and weight and was most effective in reducing the citrus nematode (*Tylenchulus semipenetrans* Cobb.) population both in soil and in roots.

Sitaramaiah *et al.* (1993) pointed out that neem cake @ 0.5 t/ha + carbofuran 0.75kg active ingredient/ha + NPK (150: 100: 50) treatment was most effective in increasing the leaf yield and reducing the root galls and soil nematode population in most of the locations.

Ahmad and Alam (1993) reported that neem products besides being directly effective against the nematode have also served as substrate for enhancing the inoculum load of the fungus (*Paecilomyces lilacinus*).

Patel *et al.* (1993) noted that neem cake was observed to be more effective for control of root knot disease in green gram than in tomato nursery.

Zeringue and Bhatnagar (1993) reported that non-volatile, somewhat heat labile neem leaf constituents irreversibly and almost totally inhibit aflatoxin biosynthesis in *Aspergillus flavus* and *Aspergillus paraciticus*, without affecting fungal growth, in both in vitro and in vivo condition.

Shenoi *et al.* (1993) noted that a preliminary trial in sick nursery on neem leaf and neem cake amendments before soil solarization with and without subsequent sprays of Ridomil MZ gave promising indication of the feasibility of evolving an integrated schedule for overall management of tobacco nurseries.

Roychodhury and Jain (1993) pointed that neem oil can be used as substitute for synthetic insecticide and can provide a base for formulation of an

effective plant based insecticide for the control of vector and virus transmission, provided its ability to penetrate the leaf tissue can be improved.

Mariappan and Samuel (1993) noted that neem (*Azadirachta indica* A. Juss) and Mahua (*Madhuca longifolia* koen-Macbr. Var *latifolia* Roxb.cheval) both individually and as mixtures reduced the acquisition and transmission of the virus by the aphid vectors.

Rao (1993) has shown that neem-coated urea has a good potential in the production of citronella oil by reducing nitrogen losses and improving nutrient utilization by the crop.

Bhandari *et al.* (1993) pointed that the application of neem extract coated urea to rice showed its residual effect on the grain yield of succeeding wheat crop.

Singh and Takkar (1993) concluded that ammonia volatilization loss from urea could be reduced by coating urea with neem oil. Ammonia volatilization can be further reduced by building up organic matter content of soil with manure and by manipulating moisture content.

Rao Syamsunder *et al.* (1993) noted that development of non-lethal, environmentally safe botanical formulation, as bird repellents is needed to prevent heavy losses. In view of antifeedant properties and environmental safety, the botanical formulations may prove an alternative to chemical sprays in controlling the birds and warrant further investigations.

Subramanian and Lakshmanan (1993) noted that neem oil was effective in various skin diseases and inhibited the growth of all the three strains of *Mycobacterium tuberculosis* and *Mycobacterium pyrogenes* var. *aureus*. Neem products inhibit the growth of *Mycobacterium leprae* in the mouse foot pact.

Garg *et al.* (1993) concluded that neem oil could be fractionated to yield immunocontrceptive fraction or pure principle, which will definitely have better stability and lesser toxicity and probably have better activity than the total crude oil.

2.3 PROFILE OF THE INDIGENOUS AND SCIENTIFIC KNOWLEDGE HOLDER AND ADOPTER RESPONDENTS

Generally it is found that all farmers residing in the same community do not possess same level of knowledge and adoption about particular aspect. This might be due to difference in their personal, social, communicational, economical or psychological characteristics, which are related to the person's knowledge and adoption. Factors, which affect these phenomena, are discussed here.

2.3.1 Age

Kanani (1998) reported that slightly less than half (48.33 per cent) of the indigenous practices adopter farmers had middle age, followed by 42.50 per cent with old age and 9.17 per cent with young age.

Patel (1998) observed that majority (64.17 per cent) of the tribal farmwomen involved in indigenous resource management activities had middle age, followed by 23.33 per cent with young age and 12.50 per cent with old age.

Joshi (1998) reported that majority (60.67 per cent) of the farmers of Anand district had middle age, followed by 21.33 per cent with old age and 18.00 per cent with young age.

Patel (2003) reported that majority (58.33 per cent) of the respondents located around medicinal floras had middle age.

Ghosh (2004) reported that majority (56.00 per cent) of the tribal farmwomen had old age, followed by 44.00 per cent with middle age and none of them was in young age group.

Zala (2005) observed that majority (66.67 per cent) of the respondents were found in the middle age group, followed by 18.33 per cent in young age group and only 15.00 per cent of the tribal farmwomen in the old age group.

Bhagat (2005) observed that slightly more than half (51.67 per cent) of the farmers having neem tree near by their home or farm had middle age, whereas 46.67 per cent with old age and only 1.66 per cent of them with young age.

2.3.2 Education

Gouda (1995) observed that majority (57.50 per cent) of the farmers of Anand taluka had up to higher secondary or less than that level of education.

Kanani (1998) reported that majority (56.67 per cent) of the indigenous practices adopter farmers had primary level of education, followed by 15.84 per cent with no any formal education and 14.17 per cent and 7.50 per cent with higher secondary and more than that level of education, respectively.

Patel (1998) observed that majority (60.83 per cent) of the tribal farmwomen involved in indigenous resource management activities were illiterate.

Joshi (1998) reported that majority (82.67 per cent) of the farmers of Anand district had up to secondary or less than that level of education.

Kashem and Islam (1999) in their study on indigenous agricultural technologies inferred that a greater proportion of the rural women were illiterate.

Patel (2003) reported that exact three forth (75.00 per cent) of the respondents located around medicinal floras had ability to read and write

Ghosh (2003) revealed that majority (88.33 per cent) of the tribal farmers were illiterate, followed by 6.67 per cent with primary level of education and 5.00 per cent with ability to read and write

Ghosh (2004) reported that great majorities (97.00 per cent) of the respondents were illiterate, while only 2.00 per cent and 1.00 per cent has primary and secondary level of education, respectively.

Zala (2005) reported that a great majority (90.00 per cent) of the respondents were found to be illiterate, while only 6.67 per cent and 3.33 per cent has secondary and higher secondary and primary level of education, respectively.

Bhagat (2005) observed that 38.34 per cent of the respondents had up to secondary standard of education, followed by 34.16 per cent with higher education, 17.50 per cent of them had higher secondary standard of education and 10.00 per cent had primary level of education.

2.3.3 Occupation

Joshi (1998) reported that slightly more than three forth (76.00 per cent) of the farmers of Anand district had agriculture and animal husbandry occupation.

Patel (1998) stated that great majority (95.00 per cent) of the tribal farmwomen involved in indigenous resource management activities had agriculture and labor work as main sources of income.

Patel (2003) concluded that majority (71.76 per cent) of the respondents located around medicinal floras had farming and animal husbandry as major sources of income.

Ghosh (2003) revealed that majority (60.00 per cent) of the tribal farmers located around medicinal plants were engaged in farming and animal husbandry, while 35.00 per cent were engaged in farming and labour, 3.33 per cent and 1.67 per cent had occupation of service and farming, respectively.

Ghosh (2004) reported that slightly more than half (51. 00 per cent) of the tribal farmwomen had agriculture and animal husbandry as their main occupation.

Zala (2005) concluded that more than three forth (80.00 per cent) of the tribal farmwomen were engaged in agriculture, labour and Animal Husbandry, while 10.00 per cent of them were engaged in farming, animal husbandry, labour and business whereas only 6.67 per cent and 3.33 per cent had dependency on Agriculture, Labour, Animal Husbandry and service and Agriculture and labour, respectively

Bhagat (2005) revealed that more than three forth (83.33 per cent) of the farmers having neem tree near by their home or farm were engaged with agriculture and animal husbandry. While 8.33 per cent of them had service, 6.67 per cent had business as an additional occupation along with agriculture and animal husbandry and only 1.67 per cent of them had only agriculture occupation.

2.3.4 Land Holding

Gouda (1995) observed that slightly less than half (49.17 per cent) of the farmers of the Anand taluka had up to three hectares of land holding.

Joshi (1998) reported that majority (58.67 per cent) of the farmers of Anand district had up to two hectares of land holding.

Patel (2003) concluded that exactly half (50.00 per cent) of the respondents located around medicinal floras had up to 2.0 ha of land holding.

Ghosh (2003) revealed that more than three forth (80.00 per cent) of the tribal farmers were having less than five acres of land holding.

Ghosh (2004) reported that majority (69.00 per cent) of the tribal farmwomen had up to 5 acres of land holding.

Zala (2005) observed that slightly less than half (48.33 per cent) of the tribal farmwomen had up to 2.0 acres of land holding, followed by 38.33 per cent and 13.34 per cent with land holding 2.1 acres to 4.0 acres and above 4.0 acres, respectively.

Bhagat (2005) concluded that exactly half (50.00 per cent) of the farmers having neem tree near by their home or farm were big farmers and 34.16 per cent of them were medium farmers, whereas only 15.84 per cent were small farmers.

2.3.5 Herd Size

Patel (1998) reported that great majority (87.08 per cent) of the tribal farmwomen involved in indigenous management activities were having one to two milch animals.

Patel (2003) concluded that more than three forth (78.33 per cent) of the respondents located around medicinal floras had at least one or more than one animals.

Ghosh (2003) revealed that more than half (53.33 per cent) of the tribal farmers had up to 2 animals, followed by 28.33 per cent with no animals, 16.67 per cent with 3 to 4 and only 1.67 per cent with more than 4 animals, respectively.

Zala (2005) reported that slightly less than half (48.33 per cent) of the tribal farmwomen had up to 2 size of herd, followed by 35.00 per cent and 13.34 per cent with 3 to 4 and above 4 size of herd, respectively. While only 3.33 per cent of the tribal farmwomen had no any animal possession.

Bhagat (2005) reported that majority (69.17 per cent) of the respondent farmers having neem tree near by their home or farm had up to two milch animals, whereas 29.16 per cent had three to four milch animals and only 1.67 per cent of them had above four animals.

2.3.6 Income

Patel (1998) reported that majority (52.51 per cent) of the tribal farmwomen involved in indigenous resource management activities had up to Rs. 15000 of annual income.

Kanani (1998) concluded that majority (57.50 per cent) of the indigenous practices adopter farmers had up to Rs. 30,000 of annual income.

Patel (2003) reported that more than three forth (78.33 per cent) of the respondents located around medicinal floras had up to 20,000 rupees of annual income.

Ghosh (2003) revealed that great majority (81.67 per cent) of the tribal farmers located around medicinal plants had up to 15,000 rupees of annual income.

Ghosh (2004) reported that majority (67.00 per cent) of the tribal farmwomen had up to Rs. 15,000 of annual income.

Zala (2005) concluded that slightly more than three forth (76.67 per cent) of the tribal farmwomen were found with low level of (up to Rs. 10,000/-) annual income followed by 13.33 per cent and 10.00 per cent with medium and high level of annual income, respectively.

Bhagat (2005) reported that majority (54.16 per cent) of the respondent farmers having neem tree near by their home or farm had above 50, 000/- but below 1,00,000/- rupees of annual income, whereas 23.34 per cent had above 1,00,000 rupees, while 22.50 per cent had below 50, 000/-rupees of annual income.

2.3.7 Organization Participation

Joshi (1998) reported that majority (53.33 per cent) of the farmers of Anand district had membership in more than one organization.

Kanani (1998) reported that majority (66.67 per cent) of the indigenous practices adopter farmers had medium level of social participation, followed by 21.66 per cent with high and 11.67 per cent with low level of social participation.

Patel (1998) reported that greatly majority (91.67 per cent) of the tribal farmwomen involved in indigenous resource management activities had no membership in any social organization.

Sundaramari and Ranganathan (2003) inferred that a majority of the respondents were found to have medium level of social participation.

Patel (2003) stated that majority (96.67 per cent) of the respondents had low level of social participation.

Ghosh (2003) revealed that none of the tribal farmers located around medicinal plants were having any organizational participation.

Ghosh (2004) reported that greatly majority or nearly cent per cent (98.00 per cent) of the tribal farmwomen had no membership in any social organization.

Zala (2005) reported that a great majority (95.00 per cent) of the respondents had no any membership in any organization, while only 3.33 per cent of them had membership in one social organization.

Bhagat (2005) stated that more than three forth (80.83 per cent) of the farmers having neem tree near by their home or farm had membership in at least one social organization; whereas 15.84 per cent of them had membership in two organizations and 3.33 per cent were the position holders in their organization.

2.3.8 Size of family

Chaudhari (1988) revealed that nearly half (49.00 per cent) of the tribal family consisted more than 6 members, 36.00 per cent had less than 5 members and remaining 25.00 per cent had more than 8 members in their family.

Gouda (1995) concluded that exact three forth (75.00 per cent) of the respondents had up to five members in their family.

Rath Navneeta (1996) observed that slightly less than half (44.32 per cent) of the rural women had 5-8 members in their family.

Joshi (1998) reported that slightly more than three forth (78.67 per cent) of the sugarcane growers belonged to big family (more than four members in the family).

Patel (1998) reported that majority (67.92 per cent) of the tribal farmwomen involved in indigenous resource management activities belonged to big family (more than five members in the family).

Ghosh (2003) inferred that majority (55.00 per cent) of the tribal farmers had up to 5 family members in their family.

Ghosh (2004) concluded that slightly less than half (49.00 per cent) of the respondents had six to ten members in their family.

Zala (2005) revealed that majority (66.67 per cent) of the respondents were having 5 to 8 family members, whereas 23.33 per cent and 10.00 per cent were having above 8 members and up to 4 family members, respectively.

Bhagat (2005) reported that majority (54.16 per cent) of the farmers having neem tree near by their home or farm had up to five members in their family and 45.84 per cent had more than five members in their family.

2.3.9 Type of family

Patel (1995) indicated that majority (58.15 per cent) of the respondents' belonged to joint type of family.

Gouda (1995) concluded that slightly more than three forth (77.50 per cent) of the respondents had nuclear family.

Joshi (1998) reported that majority (68.00 per cent) of the sugarcane growers belonged to joint family.

Patel (1998) reported that majority (55.00 per cent) of the tribal farmwomen involved in indigenous resource management activities belonged to joint family.

Ghosh (2003) inferred that slightly more than half (51.67 per cent) of the tribal farmers had nuclear type of family.

Ghosh (2004) concluded that majority (61.00 per cent) of the tribal farmwomen belonged to joint family.

Zala (2005) revealed that majority (68.33 per cent) of the tribal farmwomen were having nuclear type of family, while 31.67 per cent were having joint type of family.

Bhagat (2005) reported that slightly more than three forth (76.67 per cent) of the farmers having neem tree near by their home or farm were from joint type of family and 23.33 per cent of them were from the nuclear family.

2.3.10 Age of the eldest member in the family

Ghosh (2003) reported that more than three forth (80.00 per cent) of the tribal farmers were having the eldest member of family below 60 years of age.

Ghosh (2004) noted that majority (54.00 per cent) of the tribal farmwomen had the eldest family member up to 50 years of age

Zala (2005) revealed that slightly less than three forth (73.33 per cent) of the tribal farmwomen had elderly person between 31 to 50 years in their family, followed by 25.00 per cent them above 70 years and only 1.67 per cent respondents had up to 30 years.

Bhagat (2005) reported that 33.33 per cent of the respondent farmers having neem tree near by their home or farm had eldest member in their family between the age of 51 to 60 years and 33.67 per cent of them had the eldest member above 60 years of age. Slightly less than one third (30.00 per cent) of the farmers having neem tree near by their home or farm had eldest family member up to 50 years of age.

2.5.11 Migration tendency

Patel (1995) revealed that majorityt (60.00 per cent) of tribal families were observed with migration habit.

Bisht and Tiwari (1997) observed that slightly more than three forth (76.00 per cent) of the educated respondents and 24.00 per cent of uneducated respondents were found with temporary migration tendency.

Shah (1997) concluded that more than half (54.67 per cent) of tribal families were observed with migration habit, whereas 45.33 per cent of them had no migration habit.

Ghosh (2003) revealed that a great majority (83.33 per cent) of tribal farmers were migrating every year during last three years, followed by 15.00 per cent and 1.67 per cent of them did not migrate during last three years and twice during last three years, respectively.

Zala (2005) revealed that majority (70.00 per cent) of the tribal farmwomen had migration tendency every year during last three years, followed by 25.00 per cent, 3.33 per cent and 1.67 per cent of them had migration tendency never during last 3 years, twice during last 3 years and once in last 3 years, respectively.

2.3.12 Mass Media Exposure

Wagle (1996) reported that slightly more than half (54.17 per cent) of the farmers of Anand and Kheda districts had favorable farm television viewing exposure.

Patel (1997) revealed that slightly more than half (55.00 per cent) of the farmers of Anand and Kheda districts had favorable mass media exposure.

Wakle *et.al.* (1998) observed that 20.83 per cent farmers always, 25.00 per cent sometimes and 54.17 per cent of the farmers never use TV as a source of information.

Siddhartha (2001) concluded that majority (58.75 per cent) of the poultry farmers of Anand taluka had medium level of mass media exposure.

2.3.13 Extension Contact

Kanani (1998) reported that majority (64.17 per cent) of the indigenous practices adopter farmers had medium level of the extension participation.

Patel (1998) reported that slightly less than half (45.83 per cent) of the tribal farmwomen involved in indigenous resource management activities had low level of extension contact.

Patel (2003) stated that majority (66.67 per cent) of the respondents located around medicinal floras had medium to high level of extension contact.

Ghosh (2003) revealed that majority (63.33 per cent) of the tribal farmers located around medicinal plants had no extension contact.

Ghosh (2004) noted that majority (69.00 per cent) of the tribal farmwomen had low level of extension contact.

Bhagat(2005) revealed that slightly more than two fifth (42.50 per cent) of the respondent farmers having neem tree near by their home or farm had high level of extension contact, followed by 34.17 per cent and 23.33 per cent with low and medium level of extension contact, respectively.

2.3.14 Cosmopoliteness

Kanani (1998) reported that majority (54.17 per cent) of the indigenous practices adopter farmers had medium level cosmopoliteness, followed by 26.66 per cent with high and 19.17 per cent with low level of cosmopoliteness.

Patel (1998) reported that majority (66.00 per cent) of the tribal farmwomen involved in indigenous resource management activities were having medium level of cosmopoliteness.

Patel (2003) concluded that exact three forth (75.00 per cent) of the respondents located around medicinal floras were found with medium to high level of cosmopoliteness.

Ghosh (2003) concluded that slightly less than half (48.33 per cent) of the tribal farmers located around medicinal plants were having medium level of cosmopoliteness.

Ghosh (2004) reported that majority (52.00 per cent) of the tribal farmwomen were having medium level of cosmopoliteness.

Bhagat (2005) concluded that cent percent (100.00 per cent) of the farmers had high level of cosmopolitaness.

2.3.15 Scientific Orientation

Temkar (2000) found that slightly less than half (48.34 per cent) of the dairy farmers of Anand district had medium level of scientific orientation.

Siddhartha (2001) concluded that majority (51.25 per cent) of the poultry farmers of Anand taluka had medium level of scientific orientation.

Bhagat (2005) revealed that great majority (95.83 per cent) of the respondent farmers having neem tree near by their home or farm had high level of scientific orientation, followed by only 4.17 per cent with medium level of scientific orientation.

2.4 OPINION OF THE FARMERS ABOUT VARIOUS USES OF NEEM

Bhagat (2005) reported that cent per cent farmers had opined that “neem can be used to cure many diseases of human beings” and “there is no side effect of neem on human heath.” They also believed that “neem is as useful as “*Kalpavriksha*” and “neem can be used in various ways as plant protection measures. Slightly more than two third (68.33 per cent) of the farmers had not realized any objection in using neem though it is bitter in test. At the same time, 54.17 per cent of the farmers had neutral opinion bout the statement that “Application of neem is a tedious job”.

2.5 KNOWLEDGE OF INDIGENOUSLY AND SCIENTIFICALLY APPROVED VALUES OF NEEM

Bhagat (2005) reported that of majority the farmers had knowledge about the use of the neem tree as a wind breaker (75.00 per cent), as best utilization of the fallow land (100.00 per cent), to check soil erosion, furniture making and shadow (100.00 per cent), to make farm implements (99.16 per cent), for creating conducive situation to have good rain (98.33 per cent). She further reported that 100.00 per cent farmers had knowledge about the use of neem leaves for storage of grains, as an animal feed, as fertilizer, to avoid mosquito incidence, to cure fever, use

of neem leaves as a medicine for worms (80.83 per cent), to cure dermal diseases (97.50 per cent), to control diabetes (78.33 per cent). She also reported that 98.33 per cent of the respondent farmers aware about use of neem leaves as an ingredient of toothpaste and toilet soap, 100.00 per cent farmers had awareness of the use for datun, 55.00 per cent of the respondent farmers knew about the use of neem oil to control aphids, to control sucking pests (74.16 per cent), to control leaf eating caterpillar (96.66 per cent), to control heliothis (98.33 per cent), to control hairy caterpillar (75.83 per cent), to control fungus problem (64.16 per cent), to prepare pesticides (66.66 per cent), to control dandruff (76.66 per cent), to cure gum boil of teeth (64.16 per cent), neem oil as an ingredient of soap (99.16 per cent) and use of neem oil in preparation of medicines (100.00 per cent). As far as knowledge of neem cake was concerned, she observed that 81.66 per cent of the farmers had awareness about the use of neem cake to control nematodes, to improve soil fertility (100.00 per cent) neem cake to increase efficiency of urea by coating (38.33 per cent). She what's more observed that 98.33 per cent of the farmers had awareness about this use of the neem roots to prevent soil erosion.

2.6 RELATIONSHIP BETWEEN KNOWLEDGE AND PROFILE OF THE RESPONDENTS

2.6.1 Age and knowledge

Manju (1996) observed that there was non-significant relationship between age of the coconut growing farmers and their knowledge of indigenous practices.

Kanani (1998) reported that there was significant relationship between age of the indigenous practices adopter farmers and their indigenous knowledge.

Patel (1998) reported that there was non-significant relationship between age and knowledge regarding indigenous resource management activities of tribal farmwomen.

Tawade *et al.* (1998) pointed out that there was non-significant relationship between age and awareness of the villagers about medicinal plants and their use.

Ghosh (2003) concluded that there was non-significant relationship between the age and indigenous knowledge of the tribal farmers about the use of the medicinal plants.

Ghosh (2004) reported that there was positive significant relationship between age and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that there was non-significant relationship between age and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.2 Education and knowledge

Manju (1996) observed that there was positive significant relationship between education of the coconut farmers and their knowledge of indigenous practice.

Kanani (1998) reported that there was non-significant relationship between education of the farmers and their indigenous knowledge.

Patel (1998) reported that there was non-significant relationship between education and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that level of education of the tribal farmers was observed non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was non-significant relationship between education and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) concluded that there was non-significant relationship between education and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.3 Occupation and knowledge

Singh (1993) did not observe any relationship between occupation and knowledge of the farmers.

Chauhan (1994) observed significant relationship between occupation and knowledge of the farmers.

Verma and Jain (1996) observed negative significant relationship between occupation and knowledge of the farmers.

Patel (1998) reported that there was non-significant relationship between occupation and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that occupation of the tribal farmers was observed positively and significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was non-significant relationship between occupation and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) reported that there was non-significant relationship between occupation and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.4 Land Holding and knowledge

Kulkarni *et al.* (1990) observed that land holding was found positively and significantly correlated with knowledge of the farmers.

Patel (1998) reported that there was non-significant relationship between land holding and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that land holding of the tribal farmers was observed negatively and significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was non-significant relationship between land holding and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that there was non-significant relationship between land holding and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.5 Herd size and knowledge

Patel (1998) reported that there was non-significant relationship between herd size and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that herd size of the tribal farmers was observed positively and non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was non-significant relationship between herd size and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that there was non-significant relationship between herd size and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.6 Income and knowledge

Kanani (1998) reported that there was non-significant relationship between income and indigenous knowledge of the farmers.

Patel (1998) reported that there was non-significant relationship between income and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that income level of the tribal farmers was observed negatively and non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was non-significant relationship between income and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) concluded that there was non-significant relationship between income and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.7 Organization participation and knowledge

Manju (1996) observed that there was no relationship between social participation of the coconut farmers and their knowledge of indigenous practices.

Kanani (1998) reported that there was non-significant relationship between social participation and indigenous knowledge of the farmers.

Patel (1998) reported that there was non-significant relationship between social participation and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) studied that level of education of the tribal farmers was observed non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was negative non-significant relationship between social participation and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that there was non-significant relationship between income and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.8 Size of family and knowledge

Patel *et al.* (1994) studied that level of knowledge was non-significantly correlated with size of family of respondents

Patel (1998) reported that there was positive significant relationship between size of family and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2004) reported that there was positive significant relationship between size of family and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that there was non-significant relationship between size of family and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.9 Type of family and knowledge

Patel (1998) reported that there was positive significant relationship between type of family and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2004) reported that there was positive significant relationship between type of family and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) found that there was non-significant relationship between type of family and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.10 Migration tendency and knowledge

Patel (1995) revealed that migration habit was found negative and significant relationship with overall technological gap.

Shah (1997) found that the level of knowledge regarding mixed farming of tribal farmwomen had negatively and non-significant correlation with their migration habit.

Patel (1998) reported that with regards to knowledge of tribal farmwomen about IRM indicated that they had medium to high-level knowledge.

Ghosh (2003) concluded that migration tendency of the tribal farmers was found non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

2.6.11 Age of the eldest member in the family and knowledge

Ghosh (2004) reported that there was positive significant relationship between age of the eldest member in the family and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) observed that there was non-significant relationship between age of the eldest member in the family and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.12 Mass media exposure and knowledge

Chauhan (1994) observed significant relationship between mass media exposure and knowledge of the farmers.

Wagle (1996) observed significant relationship between farm television exposure and knowledge of the farmers.

Patel (1997) observed significant relationship between mass media exposure and knowledge of the farmers.

2.6.13 Extension contact and knowledge

Kanani (1998) reported that there was non-significant relationship between extension contact and indigenous knowledge of the farmers.

Patel (1998) reported that there was non-significant relationship between extension contact and knowledge regarding indigenous resource management activities of tribal farmwomen.

Ghosh (2003) concluded that level of extension contact of the tribal farmers was observed non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was positive non-significant relationship between extension contact and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) revealed that “there is no association between extension contact and indigenous and scientific knowledge about various uses of neem” was accepted here.

2.6.14 Cosmopoliteness and knowledge

Singh *et al.* (1991) reported that there was negative significant relationship between cosmopoliteness and knowledge gap of the farmers.

Patel (1998) observed non-significant relationship between cosmopoliteness and knowledge regarding indigenous resource management activities of tribal farmwomen.

Kanani (1998) reported that there was non-significant relationship between cosmopoliteness and indigenous knowledge of the farmers.

Ghosh (2003) concluded that level of cosmopoliteness of the tribal farmers was observed negatively and non-significantly correlated with their indigenous knowledge about the use of medicinal plants.

Ghosh (2004) reported that there was negative non-significant relationship between cosmopoliteness and indigenous knowledge of the tribal farmwomen about various medicinal floras.

Bhagat (2005) observed that there was non-significant relationship between cosmopoliteness and indigenous and scientific knowledge of the farmers about various uses of neem.

2.6.15 Scientific orientation and knowledge

Padhi (1993) did not observe significant relationship between scientific orientation and knowledge of the farmers.

Singh (1993) reported that there was non-significant relationship between scientific orientation and knowledge of the farmers.

Patel (1998) observed significant relationship between scientific orientation and knowledge regarding indigenous resource management activities of tribal farmwomen.

Bhagat (2005) revealed that there was non-significant relationship between scientific orientation and indigenous and scientific knowledge of the farmers about various uses of neem.

2.7 ADOPTION OF INDIGENOUSLY AND SCIENTIFICALLY APPROVED VALUES OF PLANTS

Parrish (1994) reported that 11.70 per cent of the farmers were using indigenous practices for rodent control and less than one fourth (23.30 per cent) were using traditional insect control methods.

Parvathi (1995) revealed that majority (56.88 per cent) of the farmwomen had medium level of adoption of both traditional and modern post harvest practices, followed by 25.62 per cent at high level and 17.5 per cent at low level.

Kanagasabapathi (1996) had concluded in his study that more than eighty per cent of the identified indigenous agricultural practices were widely adopted by the tribal respondents, which revealed the worth of the indigenous practices followed by the tribal farmers.

Vijayalayan (2001) in his study on eco-friendly agricultural practices in rice found that 41.66 per cent, 32.50 per cent and 25.84 per cent of the rice growers had low, medium and high level of adoption of eco-friendly agricultural practices of rice cultivation.

Ghosh (2003) concluded that majority (71.67 per cent) of the tribal farmers were having high to medium level of adoption about the use of medicinal plants.

Bhagat (2005) reported that exact one fourth (25.00 per cent) of farmers used neem tree as a wind break, 98.33 per cent for the best utilization of the fellow land, 100.00 per cent to check soil erosion and shadow, 65.00 per cent to make farm implements and 53.33 per cent for furniture making. She also reported that exact three fourth (75.00 per cent) farmers used neem leaves for storage of grains, 51.66 per cent as an animal feed, 98.33 per cent as fertilizer, 91.66 per cent to avoid mosquito incidence, 72.50 per cent as a medicine for worms, 87.50 per cent to cure

dermal diseases, 79.16 per cent to cure fever and 43.33 per cent to control diabetes. Further she reported that nearly cent per cent (98.33 per cent) of the farmers used neem twigs as datun, 55.00 per cent used neem oil to control aphids, 23.33 per cent to control leaf eating caterpillar, 24.16 per cent to control heliothis, 76.66 per cent to control dandruff. As far as cake of neem was concerned 81.66 per cent of the farmers used neem cake to control nematodes, 100.00 per cent to improve soil fertility, 34.16 per cent used it to increase efficiency of urea by coating. In case of root, 98.33 per cent of the farmers used it to prevent soil erosion.

2.8 CONSTRAINS FACED BY FARMERS FOR VARIOUS USES OF NEEM

Bhagat (2005) revealed that less exposure of training, unavailability of sufficient literature on usages of neem, less coverage of such information in communication means, insufficient knowledge about various uses of neem, unavailability of neem based products in market and unavailability required quantity of neem were major constrains faced by the farmers respectively, in using neem for agriculture, health and other purposes.

2.9 SUGGESTIONS OF THE FARMERS TO ACCELERATE RATE OF NEEM USE AMONG THE FARMERS

Bhagat (2005) reported that the major suggestions given by the farmers were training programmes on various uses of neem should be organized at village level, the posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village, indigenous knowledge should be tested on scientific grounds and should be extended further, guidance on the uses of neem should be provided right from school level and efforts should be made to use fellow land by neem plantation to create awareness about neem.

Research Methodology

III. RESEARCH METHODOLOGY

This chapter deals with the research design, tools and techniques of scientific investigation employed in the light of objectives of the study. It describes and clarifies methods for measuring the dependent and independent variables. It includes sampling procedure for data collection and statistical technique for analysis of the data. The methodology adopted for conducting the study is presented as under.

- 3.1 Plan of study**
- 3.2 Area of study**
- 3.3 Sample of the study**
- 3.4 Selection of village**
- 3.5 Selection of respondents**
- 3.6 Research design**
- 3.7 Tool and method of data collection**
- 3.8 Selection of variables**
- 3.9 Operationalization of the concepts**
- 3.10 Measurement of variables**
- 3.11 Statistical framework for analysis of data**
- 3.12 Research hypothesis**

3.1 PLAN OF STUDY

The study was conducted to know the knowledge, adoption and opinion of the farmwomen regarding indigenously and scientifically approved uses of neem. It is considered that women play a key role in preserving and succeeding the indigenous and some of the scientific knowledge. More over the move towards female education made them inquisitive about the new innovations. In this regard both indigenous and scientific knowledge are considered. As we know that neem was so much a part of Indian life that most people were not even conscious of how many ways neem

impacted their lives. But gradually its importance was neglected and it started losing its identity as a “bitter boon”. But it has started getting its identity back since the dramatic interest shown in neem by the people of Europe and the United States. They have realized the value and the significance of neem. Thus, it is high time now to recall and restore the indigenous knowledge and also to make the efforts in a scientific way in order to make the better use of this tree. For that a large no of agencies, government as well as non-governmental organizations including multinational agencies are now taking keen interest in this aspect. Thus, there are bright chances of income generation for rural people with consideration of the existing knowledge, which is available with them and a little bit enhancements in it by various communication means.

A plentiful of neem exists in the Chhotaudaipur taluka and Sankheda taluka have been utilizing by the tribal and non-tribal farmwomen for their own purpose. Some efforts are yet needed to create more awareness and various medicinal and various other agricultural uses of neem available around them, prior to initiate any extension activity, to motivate people towards various uses of neem to have adequate and reliable information of the existing situation. With this consideration, the present study was conducted in Chhotaudaipur taluka and Sankheda taluka of Baroda district of Gujarat. So far, very limited survey works have been carried out by any social research workers in any part of this taluka to know the existing status of the tribal and non-tribal farmwomen in terms of their indigenous and scientific knowledge about the various uses of neem. Hence, the idea of the research problem was discussed with major guide about various aspects of indigenous and scientific knowledge of tribal and non-tribal farm women regarding various uses of neem and finally, it was carried out in Chhotaudaipur and Sankheda taluka of Gujarat.

3.2 AREA OF STUDY

Due to limited resources and time available with the investigator, study was conducted Baroda district of Gujarat. Gujarat accounts 14.92 per cent of the total tribal population in the state. The tribal population is concentrated mainly in

eleven districts of the state, which are situated mainly on the eastern hill belt of the state. The Baroda is one the tribal dominated district of the eastern state, thus, present study was conducted in the tribal dominated areas of Chhotaudaipur taluka and non-tribal area of Sankheda taluka of Baroda district of Gujarat because following reasons :

1. Investigator would be able to cover this area with in time limit.
2. None of the scientific and sustained efforts have been made to study existing indigenous and scientific knowledge and adoption of the farmwomen regarding various uses of neem.
3. The uses of neem in various ways can be improved in this taluka if tribal and non-tribal people know the benefit of neem.
4. Nine to twelve village which are at least 10 Km far from big cities were selected for the study to understand status of neem faraway from the effect of urban area.

3.3 SAMPLE OF THE STUDY

For the present investigation simple random sampling techniques was employed.

3.4 SELECTION OF VILLAGES

The list of villages of selected taluka was obtained from the taluka panchayat office. Further from this list, purposely ten tribal and non-tribal dominated villages having less than 3000 of population and located at least 10 km far from big cities as shown in the map of Chhotaudaipur taluka and Sankheda taluka were identified and selected by using simple random sampling technique for the study.

3.5 SELECTION OF RESPONDENTS

The list of the farm families having existence of neem tree near by their houses or farms was prepared with the help of VLWs of the selected villages, out of such families, one farmwoman and from the each selected village proportionately five to ten random farmwomen as respondents were selected. Thus a random sample of about 160 respondents was selected for the study.

Table 1 : Village wise distribution of the tribal and non-tribal farmwomen

Chhotaudaipur taluka (Tribal farmwomen)			Sankheda taluka (Non-tribal farmwomen)		
Selected village	Respondents according to selection criterion	Selected respondents	selected village	Respondents according to selection criterion	Selected respondents
Chilarvat	103	10	Vadeli	104	10
Acchala	98	10	Modasar	102	10
Bhilpur	92	09	Kadila	94	09
Akalbara	91	09	Mankni	89	09
Pipleg	88	09	Ajali	83	08
Malaja	79	08	Pitha	81	08
Vijol	74	07	Alhadpur	78	08
Devliya	68	07	Gojpur	74	07
Zer	63	06	Shekhanpur	62	06
Accheta	49	05	Talakpur	54	05
Total	805	80	Total	821	80

3.6 RESEARCH DESIGN

Ex-post facto research design was applied for this study. Kerlinger (1976) stated that ex-post facto research design is worthy to apply, when the independent variable has already acted upon.

3.7 TOOL AND METHOD OF DATA COLLECTION

The data were collected through the personal interview. Personal interview schedule is considered to be the most important tool and the researcher could get most authentic first hand information. The interview schedule was prepared by keeping in view of the objectives of the study and was common for all the respondents. In formulating the questions and statements for the schedule, the investigator requested the opinion and guidance of the major advisor, used available literature and consulted experts of Extension Education Department of B.A. College of Agriculture, Anand. The detail of questionnaire is presented in Appendix.

3.8 SELECTION OF VARIABLES

A list of variables to be dealt with in the present study was prepared on the basis of review of literature related to the subject of research. Further, experts were consulted and finally the variables that were found most relevant to the present study were selected. The dependent and independent variables selected for the study are given bellow.

3.8.1 DEPENDENT VARIABLES

- I. Indigenous and scientific knowledge of farmwomen about various uses of neem
- II. Adoption pattern of the farmwomen about various uses of neem in past, present and future.

3.8.2 INDEPENDENT VARIABLES

I Personal variables

- 1 Age
- 2 Education

II Economic variables

- 1 Occupation
- 2 Land holding
- 3 Herd size
- 4 Annual income

III Social variables

- 1 Organizational participation
- 2 Size of family
- 3 Type of family
- 4 Age of eldest member of the family
- 5 Migration tendency

IV. Communication variables

- 1 Mass media exposure
- 2 Extension contact

V. Psychological variables

- 1 Opinion of the respondents regarding use of neem
- 2 Cosmopolitaness
- 3 Scientific Orientation

3.9 OPERATIONALIZATION OF THE CONCEPTS

1. **Indigenous knowledge:** It is a body of understood information acquired and possessed by an individual by informal way through the words of mouth from generation to generation.
2. **Adoption:** It is a decision making process on the part of the farmwomen to put into practice the indigenous and scientific uses of neem.
3. **Age:** It refers to chronological years of farmwomen on the date of interview rounded to the nearest years.
4. **Education:** It is the ability to read and write or formal education received by an individual up to certain standard. It is the level of literacy of that individual.
5. **Land holding:** It refers to possession of land by the respondents in terms of acres.
6. **Occupation:** It refers to involvement, connection and attachment of the respondents in various income-generating activities.
7. **Herd size:** It refers to possession of various milch animals by the respondent.
8. **Income:** It refers to total earning in rupees per year of the respondents from the various sources.
9. **Organization participation:** It refers to participation of the respondents in local formal and informal organization(s).
10. **Nuclear family:** A nuclear family consists of a husband, wife and children.

11. **Joint family:** A joint family consists of more than one primary family on the basis of close blood relation and common residence.
12. **Migration tendency:** Migration tendency refers to as movement of the tribal farmwomen to a place other than the place of their residence for searching any type of work and staying there for a time being.
13. **Tribal farmwomen:** This term has been referred as adult female of selected farm family of territorial tribal communities, living in relative isolation on hills and forest area.
14. **Mass media exposure:** It is defined as the nature and the frequency of the respondents in different mass media such as television, radio, newspapers and magazines.
15. **Extension contact:** It refers to degree of contact of respondents with various extension agencies or personals.
16. **Cosmopoliteness:** It is degree to which respondent is oriented to his immediate outside social systems for various kinds of help and guidance.
17. **Scientific orientation:** It is the degree to which respondent is oriented to the use of scientific methods in decision making in relation to adoption behavior.

3.10 MEASUREMENT OF VARIABLES

The measurements of techniques for each of the selected dependent as well as independent variables are presented below.

3.10.1 Dependent variables

3.10.1.1 Indigenous and scientific knowledge of farmwomen about various uses of neem

The indigenous and scientific knowledge of farmwomen about various uses was measured for various parts of neem based on its usefulness in any of the selected areas like agriculture, industries and health or general purpose. The responses were collected in terms of correct or incorrect answers and scores of '1' for correct

and '0' for incorrect answer were given. To know the overall knowledge, scores of correct responses of all the items of all the parts of neem were added up.

3.10.1.2 Adoption pattern of the farmwomen about various uses of neem in past, present and future

Adoption is a mental process in which an individual passes from awareness to continue use of an idea in his or her life. In order to obtain adoption behaviour of the respondents for neem, information regarding pattern of uses of various parts of neem was collected in three parts viz., "Used in past", "Using at present" and "Wish to use in future". The farmwomen who were using any parts of neem before the date of interview was considered as "Used in past", using any part at the time of interview was considered as "Using at present" and their further willingness to use any part of neem while interviewing was considered as "Wish to use in future". The responses about the practical application of various parts of neem were collected in terms of 'Yes' and 'No' and scores of '1' for positive and '0' for negative answers were given. The final score of "Used in past" was received by summing received scores for each part of neem. The same technique was used to get final scores for "Using at present" and "Wish to use in future".

3. 10.2 Independent variables

3. 10.2.1 Personal variables

3. 10.2.1.1 Age

Age of the tribal and non-tribal farmwomen was operationalized as the number of completed years at the time of interview. Age is an important factor, which plays significant role in indigenous and scientific knowledge of farmwomen. The respondents were classified into three categories:

Sr. No.	Categories
1	Young age (up to 30 years)
2	Middle age (31 to 50 years)
3	Old age (Above 50 years)

3. 10.2.1.2 Education

It refers to the number of years of formal education completed by the tribal and non-tribal farmwomen. It was measured with the help of socio-economic status (SES) scale developed by Trivedi (1963) with some modifications. One score was given to each formal level of education of the respondent. The maximum scoring followed for each level of formal education was as under:

Sr. No.	Level of education	Score
1	Illiterate	0
2	Up to Primary Education	8
3	Secondary Education and higher secondary Education	13
4	Above Higher Secondary Education	16

3. 10.2.2 Economic variables

3. 10.2.2.1 Occupation

It refers to involvement, connection and attachment of respondents in various income-generating activities. The respondents were classified as under.

Sr. No.	Occupation	Score
1	Only agriculture	1
2	Agriculture and Labour	2
3	Agriculture, Labour and Animal Husbandry	3
4	Agriculture, Labour, Animal Husbandry and business	4
5	Agriculture, Labour, Animal Husbandry and Service	4

3. 10.2.2.2 Land Holding

It refers to total possessions of land by the respondents in term of acres. On the basis of land holding they were categories viz., Up to 2.00 acres, from 2.10 to 4.00 acres, above 4.00 acres and no land. One score was given for each acre of land holding.

Sr. No.	Categories
1	No land
2	Up to 2.00 acres
3	From 2.10 to 4.00 acres
4	Above 4.00 acres

3. 10.2.2.3 Herd size

The term herd size refers to milch animals possessed by the respondents. One score was given for each milk animal; total scoring was obtained by summing all the scores. The respondents were classified as under.

Sr. No.	Categories
1	Having no animals
2	Up to 2 animals
3	3 to 4 animals
4	5 to 6 animals
5	Above 6 animals

3. 10.2.2.4 Annual Income

It refers to total earning in rupees per year of the respondents from the various sources; one score was assigned for each 1000 Rs. of income. It was measured in terms of range and grouped into following categories.

Sr. No.	Annual income
1	Up to Rs. 10,000/-
2	10,001 Rs. to 20,000 Rs.
3	20,001 Rs. to 30,000 Rs.
4	Above Rs. 30,000/-

3. 10.2.3 Social Variables

3. 10.2.3.1 Organizational Participation

It refers to the degree of involvement of the tribal and non-tribal farmwomen as a member or office bearer. The scoring technique used and classification of tribal and non-tribal farmwomen were as per following criteria.

Sr. No.	Categories	Scores
1	No membership in any organization	0
2	Membership in one organization	1
3	Membership in more than one organization.	2
4	Position holder in any organization.	2

3. 10.2.3.2 Size of Family

It refers to the number of members in the family of tribal and non-tribal farmwomen. The scoring technique and classification of respondents were done as under.

Sr. No.	Size of Family	Score
1	Up to 4 members	1
2	From 5 to 8 members	2
3	Above 8 members	3

3. 10.2.3.3 Type of family

It refers to the type of family including nuclear type consists of husband, wife and children, and joint type consists of more than one primary family on the basis of close blood relation and common residence. The scoring technique and classification were made as under:

Sr. No.	Family type	Score
1	Joint	2
2	Nuclear	1

3.10.2.3.4 Age of eldest member of family

It refers to the age of the eldest member either male or female in the family of the tribal and non-tribal farmwomen. One score was assigned to each year, thus real age of the eldest member in completed year was considered as total score for this variable.

Sr. No.	Categories
1	Up to 30 years
2	31 to 50 years
3	Above 50 years

3. 10.2.3.5 Migration Tendency

It refers to movement of the tribal and non-tribal farmwomen at other than the place of their native residence for searching any type of work and staying there for a time being. This was measured by asking questions to the tribal and

non-tribal farmwomen based on her degree of migration behaviour during last three years in search of work. It was categorized as under:

Sr. No.	Type of migration	Score
1	Every year during last three years	3
2	Twice during last three years	2
3	Once during last three years	1
4	Not any time during last three years	0

3.10.2.4 Communication Variables

3.10.2.4.1 Mass media exposure

This refer to the frequency of reading newspaper, farm magazine and other literature as well as frequency of use of radio and television by the neem owner respondents. This variable was quantified by using following procedure.

Score of five for always exposure, four for once in a week, three for once in fortnight, two for once in a month, one for once in a year and zero for none involvement or exposure were separately assigned for newspaper, farm magazine, agriculture literature, radio, television, exhibition and seminar/symposium. To know the final score of mass media exposure, score obtained by individual for each media was added up. After that entrepreneurs were grouped in to three categories *wiz.*, low ($<\text{mean} - 0.5 \text{ S.D.}$) and high ($>\text{mean} + 0.5 \text{ S.D.}$).

3.10.2.4.2 Extension Contact

It refers to the contacts made by the farmwomen with extension agencies or extension workers whether locally or outside the village. It was measured by considering the frequency of meeting of respondents with different extension personals. The respondents were classified into three levels.

Sr. No.	Extension officer contact
1	No contact
2	Once in month
3	Once in a 6 th month

3.10.2.5 Psychological variables

3. 10.2.5.1 Opinion towards various uses of neem

The level of opinion of the farmwomen towards various uses of neem was measured with the help of constructing six statements. The responses of the farmwomen were obtained against each statement in terms of their agreement or disagreement on a three point continuum viz. agree, neutral and disagree with scores of 2, 1 and 0 for positive statements and reverse for the negative ones. Statement number 3 and 4 were negative while statement number 1, 2, 5 and 6 were positive. The final score of opinion was worked out by summing scores obtained by respondent for all statements. High score reflected positive favourable opinion and reverse in case of low score. The statements related to opinion are given in Appendix. The farmwomen were classified based on arbitrary method into three levels viz. low favourable opinion ($<\text{mean} - 0.5 \text{ S.D.}$), medium favourable opinion ($\text{mean} \pm 0.5 \text{ S.D.}$) and high favourable opinion ($>\text{mean} + 0.5 \text{ S.D.}$).

3. 10.2.5.2 Cosmopoliteness

Cosmopoliteness is the tendency of farmwomen to contact members of other than her own community for any kind of help or advice. Localiteness is the tendency to limit herself within her own community for any kind of help or advice. It was measured with the help of scale developed by Singh (1973). The scale consisted of six statements arranging in a three-point continuum ranging from “agree” at one end and “disagree” to the other end. The scoring procedure was followed as per original scale. Statement number 1, 3 and 6 were negative while statement number 2, 4 and 5 were positive. The Scale is given in Appendix. For positive statements scoring were 2, 1 and 0 for agree, neutral and disagree responses, respectively. For negative statements, the scoring was reverse. The final score was worked out by summing scores obtained by respondent for all statements. The respondents were categorized in three categories by using arbitrary method, viz. low ($<\text{mean} - 0.5 \text{ S.D.}$), medium ($\text{mean} \pm 0.5 \text{ S.D.}$) and high ($>\text{mean} + 0.5 \text{ S.D.}$).

3. 10.2.5.3 Scientific Orientation

The scale used in this study with slight modification was constructed to measure the degree to which the farmwomen were oriented to use the scientific methods in farming and decision making by Supe (1969). It consisted of six statements, except statement number sixth remaining five were positive. The responses of the farmwomen were obtained against each statement in terms of their agreement or disagreement on a three point continuum ranging from agree neutral and disagree. The positive statements were scored 2, 1 and 0 for agree, neutral and disagree responses respectively and for negative statements the scoring was reverse. The final score was worked out by summing scores obtained by respondent for all statements. The respondents were categorized in three categories based on arbitrary method, *viz.* low ($<\text{mean} - 0.5 \text{ S.D.}$), medium ($\text{mean} \pm 0.5 \text{ S.D.}$) and high ($>\text{mean} + 0.5 \text{ S.D.}$).

3. 10.2.6 Problems faced by farmwomen in efficient use of neem and suggestions

The problems were obtained from each respondent. To know their degree of importance, respondents were asked to give their responses in three point continuum i.e. very important, important and not important. The scores assigned were, two, one and zero for very important, important and not important responses, respectively. Finally, the mean score for each problem was calculated for ranking them in terms of its importance. The same procedure was applied to identify and quantify suggestions of the farmwomen to accelerate rate of neem use among the farmers.

3.11 STATISTICAL FRAMEWORK FOR ANALYSIS OF DATA

The data were classified, tabulated and analyzed in order to make the findings meaningful for interpretation and drawing inferences. For this, different statistical methods were used. Some of the data were subjected to analyze in terms of frequency, whenever necessary. At some places, mean score and standard deviation

were calculated. The Pearson's coefficient of correlation was used to measure relationship between independent variables and dependent variables.

3.11.1 Statistical tools used

Following statistical tools were used in the present study.

3.11.1.1 Arithmetic mean and standard deviation

These estimates were used for classification of the respondents into different categories.

3.11.1.1.1 Mean

Mean was obtained by dividing total score by the number of respondents.

3.11.1.1.2 Standard Deviation

It was obtained by the square root of the average of the square deviation from mean.

3.11.1.1.3 Coefficient of correlation (r)

It was computed to find the relationship between each of the independent variables and the dependent variable by employing following formula.

$$r = \frac{\sum(XY) - \frac{\sum X \sum Y}{n}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{n} \right] \left[\sum Y^2 - \frac{(\sum Y)^2}{n} \right]}}$$

Where,

r = Correlation coefficient

X and Y are two variables

n = Number of observations

Σ = Constant (Greek word)

3.12 Research Hypothesis (Stated in null form)

- HO₁: There is no difference between knowledge of tribal and non-tribal farmwomen about various uses of neem.
- HO₂: There is no relationship between selected independent variables of the tribal and non-tribal farmwomen and their scientific and indigenous knowledge regarding various uses of neem.
- HO₃: There is no difference between adoption behaviour of tribal and non-tribal farmwomen about various parts of neem.

Result and Discussion

IV. RESULT AND DISCUSSION

This chapter presents the objective wise findings of the study. Keeping in view of the objectives of the study, information was collected from the respondents and it was classified, tabulated, analyzed and presented in a systematic way as per following heads.

- 4.1 Profile of the farmwomen**
- 4.2 Opinion of the tribal and non-tribal farmwomen regarding the various uses of neem**
- 4.3 Indigenous and scientific knowledge of the tribal and non-tribal farmwomen about the various uses of neem**
- 4.4 Comparison between the indigenous and scientific knowledge of tribal and non-tribal farmwomen regarding various uses of neem**
- 4.5 Relationship between the profile of the farmwomen and their indigenous and scientific knowledge about neem**
- 4.6 Adoption of indigenous and scientific values of neem by tribal and non-tribal farmwomen**
- 4.7 Comparisons between the adoption of indigenous and scientific values of various parts of neem by tribal and non-tribal farmwomen**
- 4.8 Problems faced by the farmwomen in the indigenous and scientific uses of neem**
- 4.9 Suggestions offered by the farmwomen to encourage indigenous and scientific uses of neem**

4.1 PROFILE OF THE FARMWOMEN

4.1.1 Age

Age is the natural phenomena going on in the life of every individual human being. Younger age woman is more active energetic and undergo frequent changes, while middle age woman is nature and stable in ideas and behaviour. An old

age woman is reluctant towards changes and slow in acceptance of new ideas. Thus, age plays a crucial role in the behaviour of every individual. The information collected regarding the age of the respondents were grouped as (i) Young age group (up to 30 years); (ii) Middle age group (31 to 50 years) and (iii) Old age group (above 50 years). The data in respect of age of the respondents are presented in Table 2.

Table 2 : Distribution of the respondents according to their age n=160

Sr. No.	Age group	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Young age group (Up to 30 years)	12	15.00	20	25.00
2	Middle age group (31 to 50 years)	60	75.00	45	56.25
3	Old age group (Above 50 year)	08	10.00	15	18.75
Total		80	100.00	80	100.00

It is evident from the data presented in Table 2 that exact three fourth (75.00 per cent) of the neem tree owner tribal farmwomen were in the middle age group, followed by 15.00 per cent belong to young age group, while only 10.00 per cent were in the category of old age group. Incase of neem tree owner non-tribal farmwomen also, majority (56.25 per cent) of them were found to be in the middle age group, followed by 25.00 per cent belonged to young age group and only 18.75 per cent of the farmwomen were in the old age group.

The results say that majority of the neem tree owner tribal and non-tribal farmwomen were from the middle age group.

This finding is in conformity with those of Patel (1998) and Bhagat (2005).

4.1.2 Education

Education is the process of producing the desired changes in the behaviour of the farmwomen. Thus, education plays an important role in the life of every human being and as such it would be interesting to know the indigenous and

scientific knowledge level of the neem with this view. The respondents were classified into four categories *viz.*, (i) Illiterate; (ii) Up to primary; (iii) Secondary and higher secondary and (iv) Above higher secondary education. The data in this regard are presented in Table 3.

Table 3 : Respondents according to their level of education n=160

Sr. No.	Level of education	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Illiterate	75	93.75	29	36.25
2	Up to primary (Up to 7 th std.)	02	02.50	26	32.50
3	Secondary and higher secondary (8 th to 12 th std.)	03	03.75	24	30.00
4	Above higher secondary education	00	00.00	01	01.25
Total		80	100.00	80	100.00

The data presented in Table 3 indicate that great majority (93.75 per cent) of the neem tree owner tribal farmwomen were illiterate, followed by 3.75 per cent with secondary and higher secondary level of education, 2.50 per cent with primary level of education. In respect of neem tree owner non-tribal farmwomen, 36.25 per cent of non-tribal farmwomen were illiterate, followed by 32.50 per cent with primary level, while 30.00 per cent with secondary and higher secondary level of education and only 1.25 per cent of farmwomen were above higher secondary.

Looking to the data in the Table 3 it can be inferred that great majority (93.75 per cent) of the neem tree owner tribal farmwomen were illiterate at the same time majority (62.50 per cent) of the neem tree owner non-tribal farmwomen had primary to secondary level of formal education. The low annual income, social restriction and lack of awareness about the importance of education for the development of life might be the probable reason for having low level of education among the tribal farmwomen.

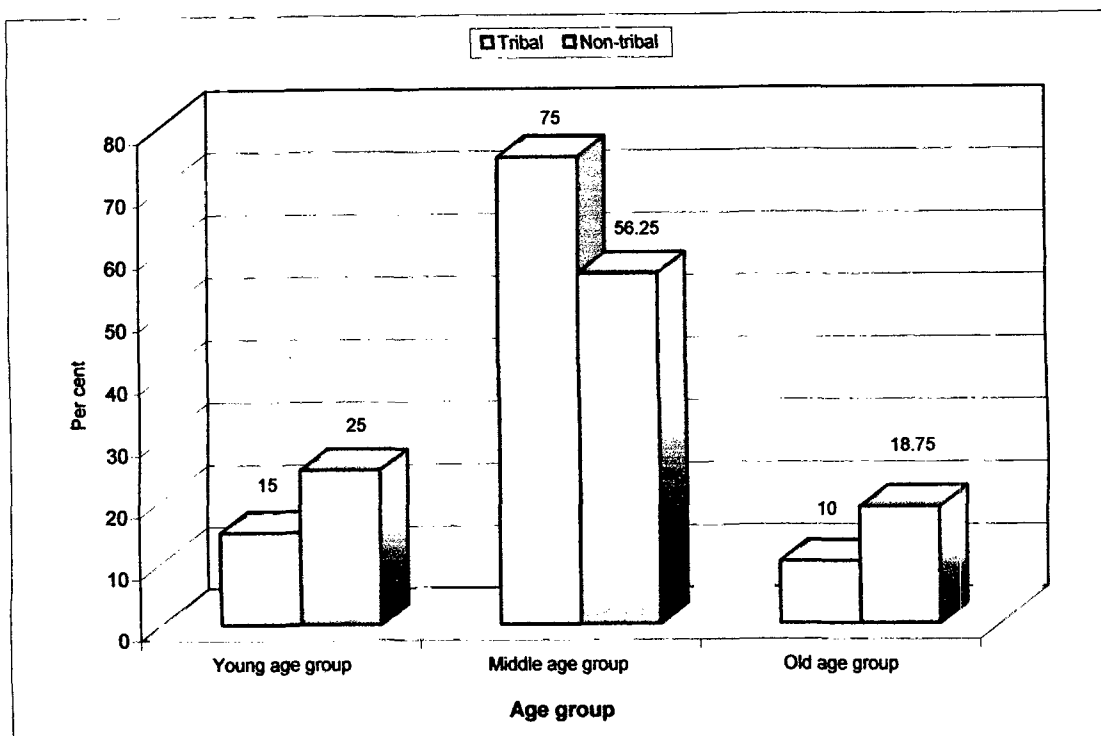


Fig. 1 : Distribution of the respondents according to their age

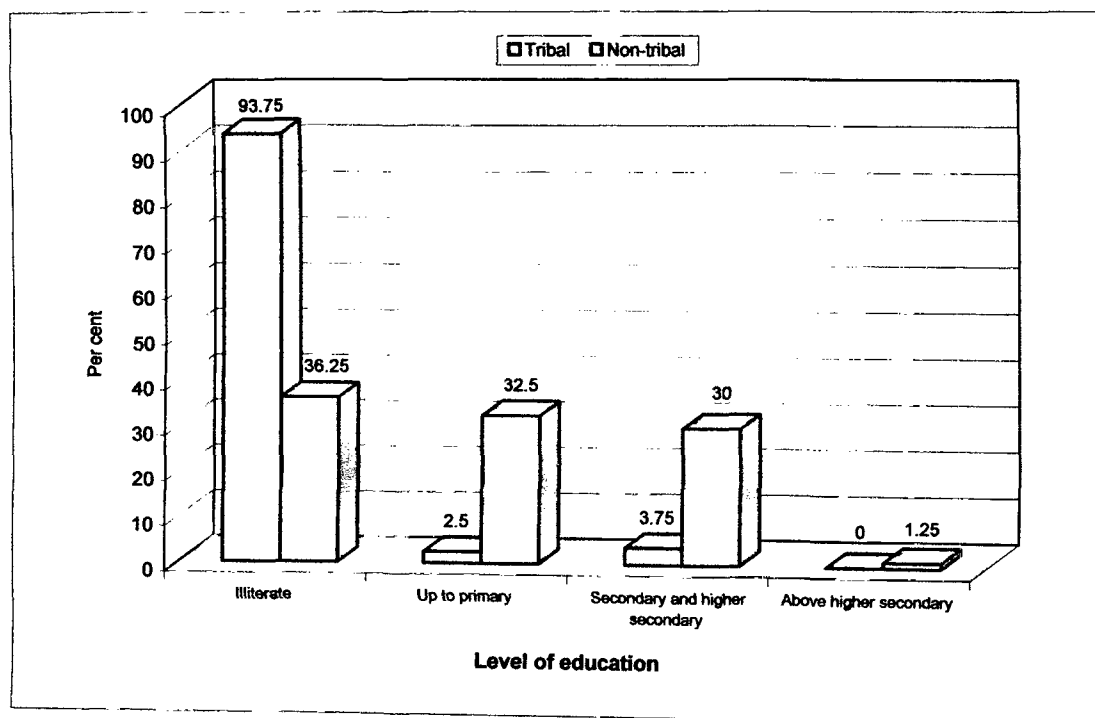


Fig. 2 : Respondents according to their level of education

This finding is more or less in conformity with those reported by Patel (1998).

4.1.3 Occupation

The occupation of the respondents has been considered as one of the important factors contributing to the annual income and cosmopolitaness of the farmwomen. It was assumed that a farmwomen engaged in a type of occupation which would either provide her opportunity to fetch her more income. Occupation may be agriculture, business, service or labour work. In order to study this aspect the information was collected and respondents were classified into five groups *viz.*, (i) Agriculture only; (ii) Agriculture and labour; (iii) Agriculture, labour and animal husbandry; (iv) Agriculture, labour, animal husbandry and business; (v) Agriculture, labour, animal husbandry and service. The data in these regards are presented in Table 4.

Table 4 : Distribution of the respondents according to their occupation n=160

Sr. No.	Occupation	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Only Agriculture	02	02.50	16	20.00
2	Agriculture and labour work	40	50.00	33	41.25
3	Agriculture, labour work and A.H.	25	31.25	25	31.25
4	Agriculture, labour work, A.H. and business	10	12.50	04	05.00
5	Agriculture, labour work, A.H. and service	03	03.75	02	02.50
Total		80	100.00	80	100.00

The data presented in Table 4 indicate that majority (81.25 per cent) of the neem tree owner tribal farmwomen were dependent on agriculture as well as either on labour or animal husbandry, followed by 12.50 per cent on agriculture, labour, animal husbandry and business, 3.75 per cent on agriculture, labour, animal husbandry and service and only 2.50 per cent only on agriculture. Incase of neem tree

owner non-tribal farmwomen, also majority (72.50 per cent) of them were depend on agriculture as well as either on labour or animal husbandry, followed by 20.00 per cent of them dependent only on agriculture, 5.00 per cent dependent on agriculture, labour, animal husbandry and business and 2.50 per cent dependant on agriculture, labour, animal husbandry and service.

Thus, it can be said from the Table 4 that majority of the neem tree owner tribal (81.25 per cent) and non-tribal (72.50 per cent) farmwomen were dependent on agriculture as well as either on labour work or animal husbandry. This means that neem was possessed by those tribal and non-tribal farmwomen who were dependent on agriculture; labour work and animal husbandry.

This finding is more or less inconformity with those reported by Ghosh (2003) and Bhagat (2005).

4.1.4 Size of land holding

Land holding has been considered as one of the important factors that determine the economic status and potentiality of farmwomen to go for new agricultural technology as well as other allied enterprises. In fact, land holding has significant role in maintaining their families and socio-economic development. Therefore, the variable land holding was considered in the present investigation. The respondents were grouped into three categories according to their size of land holding *viz.*, (i) small size (up to 2.00 acres) (ii) medium size (2.10 to 4.00 acres) and (iii) large size (above 4.00 acres). The data in these regards are present in Table 5.

Table 5 : Respondents according to their size of land holding n=160

Sr. No.	Size of land holding	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Small size (Upto 2.00 acres)	30	37.50	40	50.00
2	Medium size (2.1 to 4.00 acres)	34	42.50	15	18.75
3	Large size (Above 4.00 acres)	16	20.00	25	31.25
Total		80	100.00	80	100.00

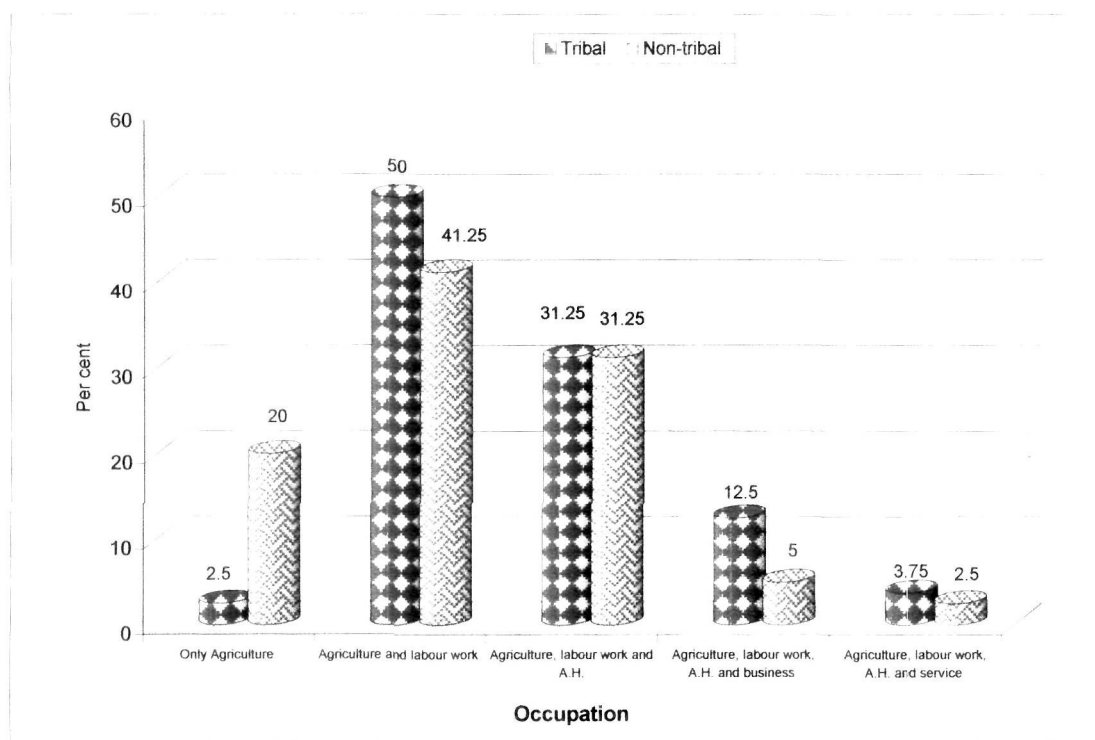


Fig. 3 : Distribution of the respondents according to their occupation

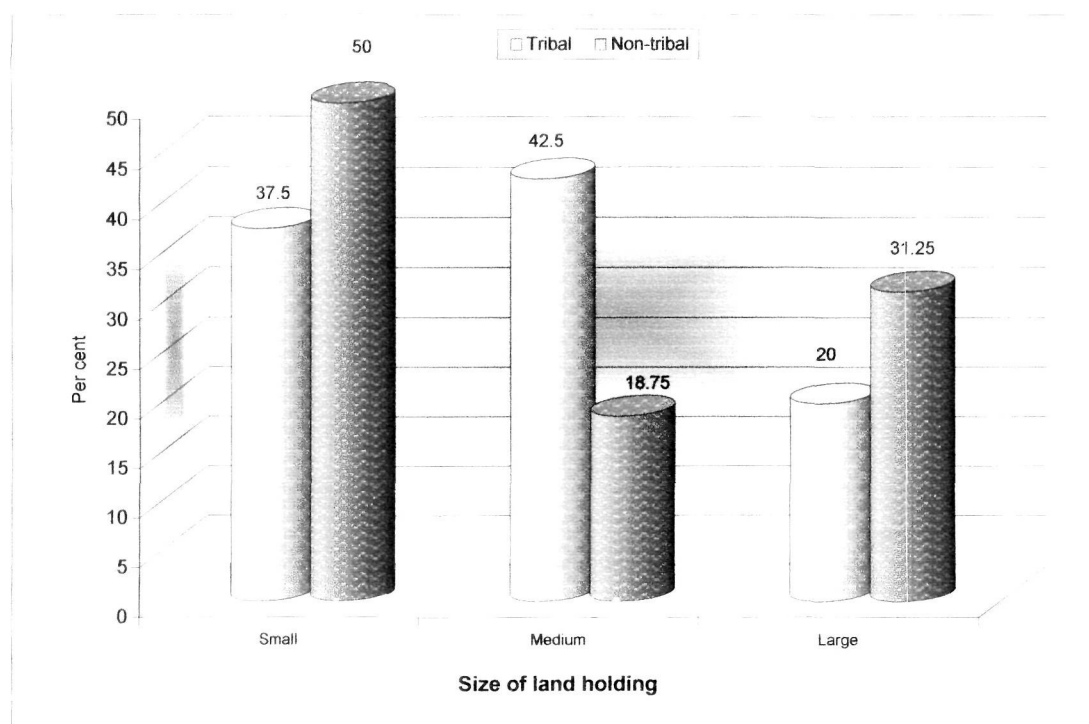


Fig. 4 : Respondents according to their size of land holding

The data presented in Table 5 reveal that 42.50 per cent of the neem tree owner tribal farmwomen had land holding from 2.10 to 4.00 acres, followed by 37.50 per cent and 20.00 per cent of them had land holding up to 2.00 acres and above 4.00 acres, respectively. Incase of non-tribal neem tree owner farmwomen, exactly half (50.00 per cent) of them had land holding up to 2.00 acres, followed by 31.25 percent and 18.75 per cent of them with above 4.00 acres and from 2.10 to 4.00 acres of land holding, respectively.

The analysis of data showed that slightly less than two fifth (37.50 per cent) of the neem tree owner tribal and half of the non-tribal (50.00 per cent) farmwomen had small size (up to 2.00 acres) of land holding. This might be because of the fragmentation of land from one generation to another generation among the family of farmwomen.

This finding is in partial conformity with those reported by Ghosh (2003).

4.1.5 Herd size

The term herd size refers to milch animals possessed by farmwomen. Animal wealth has got a significant role in increasing the income and the indigenous and scientific knowledge of the tribal and non-tribal farmwomen. Animal provides manures for farm, milk and balanced diet for human beings. Moreover the fodder of animal also plays a significant role in increasing the indigenous and scientific knowledge of the tribal and non-tribal farmwomen about neem.

Table 6 : Distribution of respondents according to their herd size n=160

Sr. No.	Herd size	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	No animals	02	02.50	16	20.00
2	Up to 2 animals	40	50.00	33	41.25
3	3 to 4 animals	25	31.25	25	31.25
4	5 to 6 animals	10	12.50	04	05.00
5	Above 6 animals	03	03.75	02	02.50
Total		80	100.00	80	100.00

The data presented in Table 6 postulate that half (50.00 per cent) of the neem tree owner tribal farmwomen had up to 2 milch animals, followed by 31.25 per cent of them were with 3 to 4 milch animals, 12.50 per cent with 5 to 6 milch animals, 3.75 per cent of them were having above 6 milch animals and only 2.50 per cent of them were with no any milch animals. While, in case of non-tribal neem tree owner farmwomen, 41.25 per cent of them were having up to 2 milch animals, followed by 31.25 per cent with 3 to 4 milch animals, 20.00 percent with no any milch animals, 5.00 per cent of them having 5 to 6 milch animals and only 2.50 per cent of them were having above 6 milch animals.

From the above result it can be inferred that majority of the tribal the neem tree owner farmwomen (81.25 per cent) and non-tribal the neem tree owner farmwomen (72.50 per cent) had at least one or more than one animals. Agriculture with animal husbandry is helpful in getting additional income might be the reason to have at least one animal with majority of the neem tree owner tribal and non-tribal farmwomen.

This finding is similar to the findings reported by Patel (1998), Ghosh (2003) and Bhagat (2005).

4.1.6 Annual income

Annual income includes quantum of money obtained or earned during a year from farm and non-farm sources. It also indicates that socio-economic position of an individual affects the behaviour of farmwomen. Generally the sound and multipurpose activities can only be possible when the money is available on hand. Knowledge can be closely related with annual income of human being. According to the level of annual income the respondents were grouped in to four categories and are presented in Table 7.

Table 7 : The respondents according to their annual income

n=160

Sr. No.	Annual income	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Up to Rs. 10,000	62	77.50	54	67.50
2	Rs. 10,001 to Rs. 20,000	10	12.50	11	13.75
3	Rs. 20,001 to Rs. 30,000	01	01.25	04	05.00
4	Above Rs. 30,000	07	08.75	11	13.75
Total		80	100.00	80	100.00

It may be observed from the Table 7 that more than majority (77.50 per cent) of the neem tree owner tribal farmwomen had annual up to Rs. 10,000/- of annual income followed by 12.50 per cent of them with Rs. 10,001/- to Rs. 20,000/-, 8.75 per cent of them with above Rs. 30,000 and only 1.25 per cent of them had Rs. 20,001 to Rs. 30,000/- of annual income. In case of non-tribal farmwomen, majority (67.50 per cent) of them had up to Rs. 10,000/- of annual income, followed by 13.75 per cent with either Rs. 10,001/- to Rs. 20,000/- or above Rs. 30,000/- and only 5.00 per cent of them were with Rs. 20,001/- to Rs. 30,000/- of annual income.

From the data it can be concluded that majority of the neem tree owner tribal (77.50 per cent) and non-tribal (67.50 per cent) farmwomen had low level (up to Rs. 10,000/-) of annual income. It means that looking to the various uses of neem; it was preferred by those farm women who had low level of annual income.

This finding is in conformity with the findings of Patel (1998) and Ghosh (2003).

4.1.7 Organizational participation

Organizational participation refers to participation of the neem tree owner tribal and non-tribal farmwomen in local formal and informal organizations. Organizational participation helps the individual to broaden their vision and insight for self-development in right direction. It denotes the extent to which an individual is actively involved in the affairs of the community. It also plays an important role in influencing adoption behaviour of farmwomen. Those who have wider social

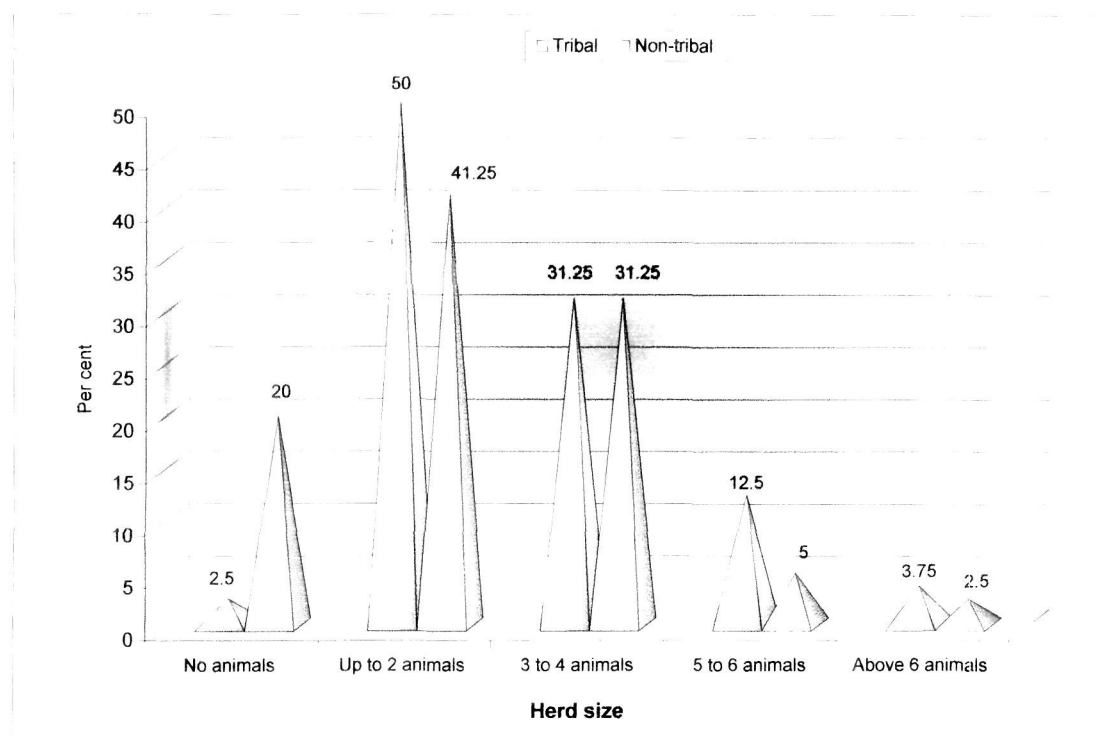


Fig. 5 : Distribution of respondents according to their herd size

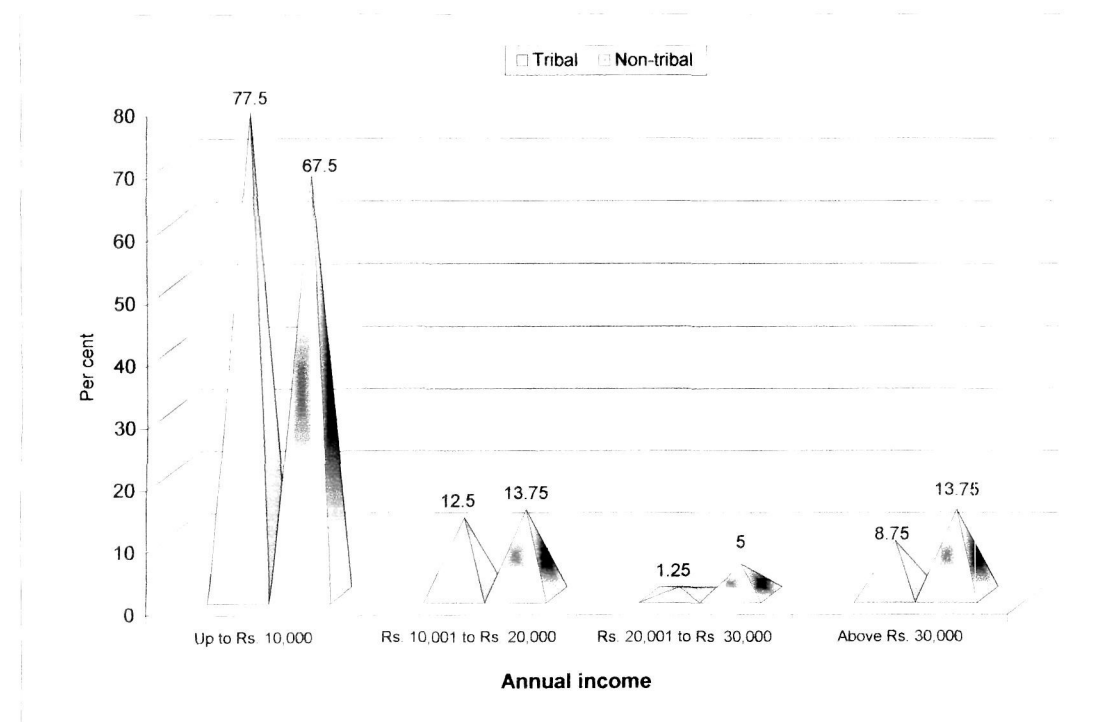


Fig. 6 : The respondents according to their annual income

contacts are probably more knowledgeable, resourceful and hence they may help in diffusion of innovations and adoption process of new practices, new ideas and method earlier than others. Keeping this in view organizational participation of the tribal and non-tribal farmwomen was studied and data of which were presented in table 8.

A perusal of data present in Table 8 reflects that great majority (92.50 per cent) of the neem tree owner tribal farmwomen had no participation in any organization, followed by 5.00 per cent of them were having participation in one

Table 8 : Distribution of respondents according to their organizational participation n=160

Sr. No.	Organizational participation	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	No participation	74	92.50	76	95.00
2	Participation in one organization	04	05.00	03	03.75
3	Participation in more than one organization	02	02.50	01	01.25
Total		80	100.00	80	100.00

organization and only 2.50 per cent were having participation in more than one organization. In case of non-tribal neem tree owner farmwomen also great majority (95.00 per cent) of them had no participation in any organization followed by 3.75 per cent of them were having participation in one organization and only 1.25 per cent of the respondents were participation in more than one organization.

Thus, it can be inferred that great majority of the neem tree owner tribal (92.50 per cent) and non-tribal (95.00 per cent) farmwomen had no participation in any organization. This finding reflected the general impression that yet the tribal and non-tribal farmwomen have not become an important part of social organization in rural. The strong rituals, customs, tradition might not have permitted women in this regards.

This finding is further strengthened by the result reported by Patel (1998) and Ghosh (2003).

4.1.8 Size of family

The size of family is also an important variable, which can play role on the behaviour of an individual. The family as a single entity influences thoughts and actions of the individual members in the agriculture in a large measure. Hence, the family size of the respondents was studied and data are presented in the Table 9.

The data presented in Table 9 reveal that majority (61.25 per cent) of the neem tree owner tribal farmwomen had 5 to 8 members in their family, while 23.75 per cent of them had above 8 members in their family and only 15.00 per cent had up

Table 9 : Distribution of respondents according to their size of family n=160

Sr. No.	Size of family	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Up to 4 members	12	15.00	18	22.50
2	5 to 8 members	49	61.25	45	56.25
3	Above 8 members	19	23.75	17	21.25
Total		80	100.00	80	100.00

to 4 members in their family. Incase of the non tribal neem tree owner farmwomen, majority (56.25 per cent) of them had 5 to 8 members in their family, while 22.50 per cent of them had up to 4 members and 21.25 per cent of them had above 8 members in their family.

From the above result it may be inferred that majority of the tribal and non-tribal neem tree owner farmwomen had 5 to 8 members in their family. This might be due to the fact that farmwomen of Baroda district are still believer of traditional way of joint family system.

This finding is in conformity with the finding of Gouda (1995) and Bhagat (2005).

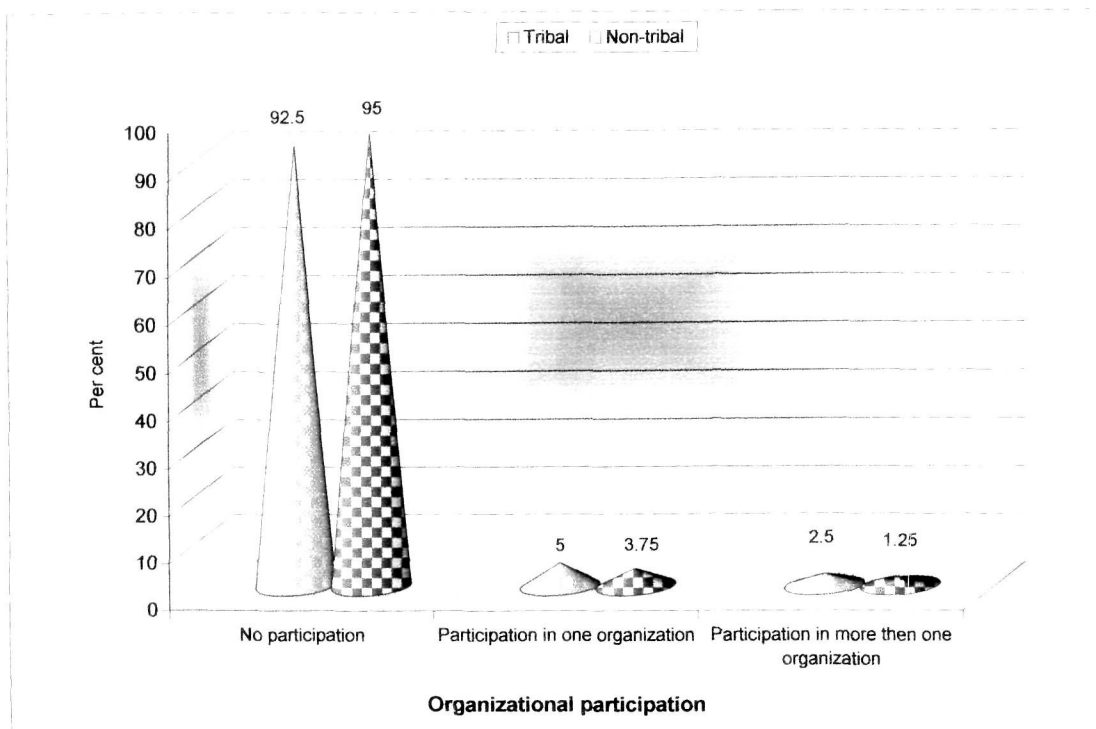


Fig. 7 : Distribution of respondents according to their organizational participation

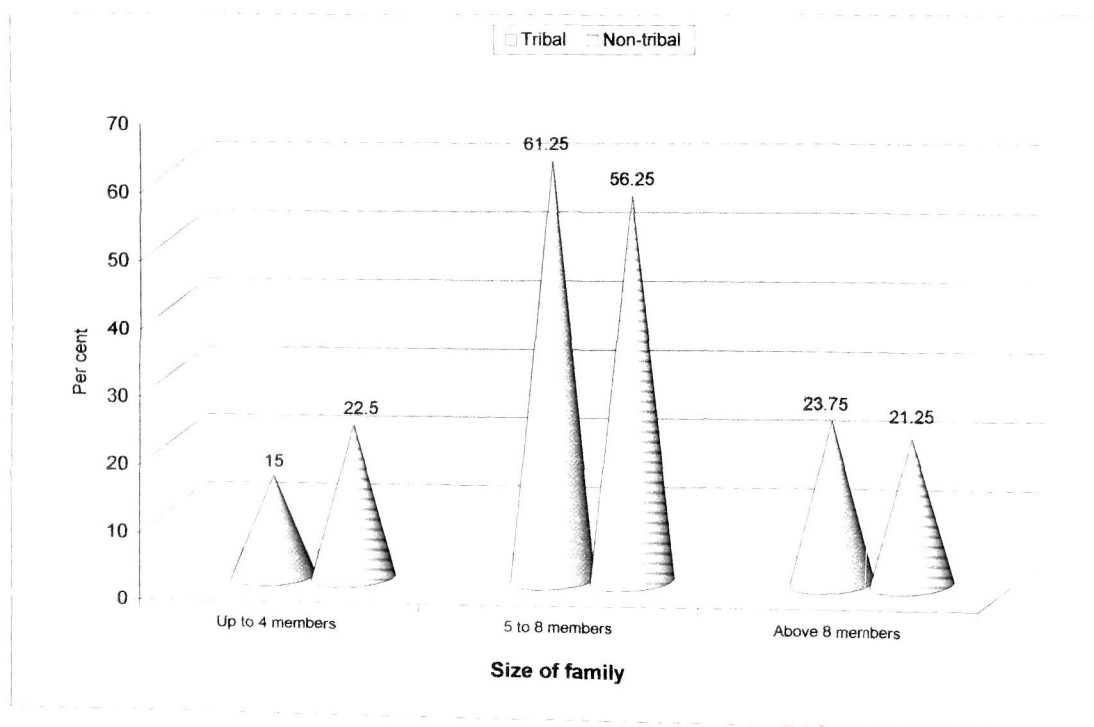


Fig. 8 : Distribution of respondents according to their size of family

4.1.9 Type of family

Joint family system is known since old civilization. In our country still joint family system is prevailing at the same time nuclear families are increasing day by day. As regards the family type, the respondents were classified into two categories and are presented in Table 10.

Table 10 : The respondents according to their type of family n=160

Sr. No.	Type of family	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Nuclear family	27	33.75	32	40.00
2	Joint family	53	66.25	48	60.00
Total		80	100.00	80	100.00

The data presented in Table 10 indicate that majority (66.25 per cent) of the neem tree owner tribal farmwomen had joint type of family, while only 33.75 per cent of them had nuclear type of family. In case of non-tribal neem tree owner farmwomen, also majority (60.00 per cent) of them had joint type of family, while only 40.00 per cent of them had nuclear type family.

It may be inferred from the above results that majority of the neem tree owner tribal (66.25 per cent) and non-tribal (60.00 per cent) farmwomen had joint type family because of their tendency to remain together under the same roof and their main occupation is agriculture.

This finding is in conformity with those findings reported by Patel (1998), Joshi (1998), Ghosh (2003) and Bhagat (2005), respectively.

4.1.10 Age of elder person in family

Elder person in family has a significant role to play to transfer indigenous and scientific knowledge from generation to generation. Thus data regarding this were collected and presented in Table 11.

Table 11 : Respondents according to the eldest person in the family n =160

Sr. No.	Eldest person in the family	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Up to 30 years	3	3.75	15	18.75
2	31 to 50 years	57	71.25	44	55.00
3	Above 50 years	20	25.00	21	26.25
Total		80	100.00	80	100.00

A perusal of data presented in Table 11 reflect that majority (71.25 per cent) of the neem tree owner tribal farmwomen were between 31 to 50 years, followed by 25.00 per cent of them were above 50 years and only 3.75 per cent of them were up to 30 years. Incase of nor-tribal neem tree owner farmwomen, majority (55.00 per cent) of them were between 31 to 50 years, followed by 26.25 per cent of them were above 50 years and only 18.75 per cent of them were up to 30 years.

Thus, it can be inferred that majority of the neem tree owner tribal (71.25 per cent) and non-tribal (55.00 per cent) farmwomen had elderly person in their family between 31 to 50 years of age.

This finding is line with the finding of Zala (2005).

4.1.11 Migration tendency

Migration tendency of tribal farmwomen has relation with the total annual income of their family.

Table 12 : Respondents according to their migration tendency n=160

Sr. No.	Migration Tendency	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Never in last 3 years	15	18.75	80	100.00
2	Every years during last 3 years	57	71.25	00	00.00
3	Twice in a 3 years	05	06.25	00	00.00
4	Once in a 3 years	03	03.75	00	00.00
Total		80	100.00	80	100.00

A searching look into the Table 12 reveals that majority (71.25 per cent) of the neem tree owner tribal farmwomen had migration tendency every year during last three years, 6.25 per cent and 3.75 per cent of them had migration tendency twice during last 3 years and once in last 3 years, respectively. It was also seen that 18.75 per cent had no such migration habit. In case of non-tribal neem tree owner farmwomen, cent per cent of them had no any migration tendency during last 3 years.

It can be concluded from the Table 12 that majority (71.25 per cent) of the neem tree owner tribal farmwomen were migrating every year during last three years. It was because of scattered and small size of land holding and non-availability of irrigation facility with majority of tribal farmwomen. They use to do agriculture during nonsoon season only, after that they migrate to other place in search of work and again return back before the onset of monsoon.

This finding is further strengthened by the result reported by Patel (1995), Bist and Tiwari (1997) and Ghosh (2003), respectively.

4.1.12 Mass media expose

The nature and frequency of the involvement of respondents in different media such as television, radio, newspaper and magazines are varying from person to person. Keeping this in view, mass media exposure of the respondents was studied and data are presented in Table 13.

Table 13: Respondents according to their mass media exposure n=160

Sr. No.	Mass media exposure	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Low (< 2.3 Score)	69	86.25	53	66.25
2	High (> 2.3 Score)	11	13.75	27	33.75
Total		80	100.00	80	100.00

It is evident from the data presented in Table 13 that majority (86.25 per cent) of the neem tree owner tribal farmwomen had low mass media exposure and 13.75 per cent of them had high mass media exposure. In case of the non-tribal neem

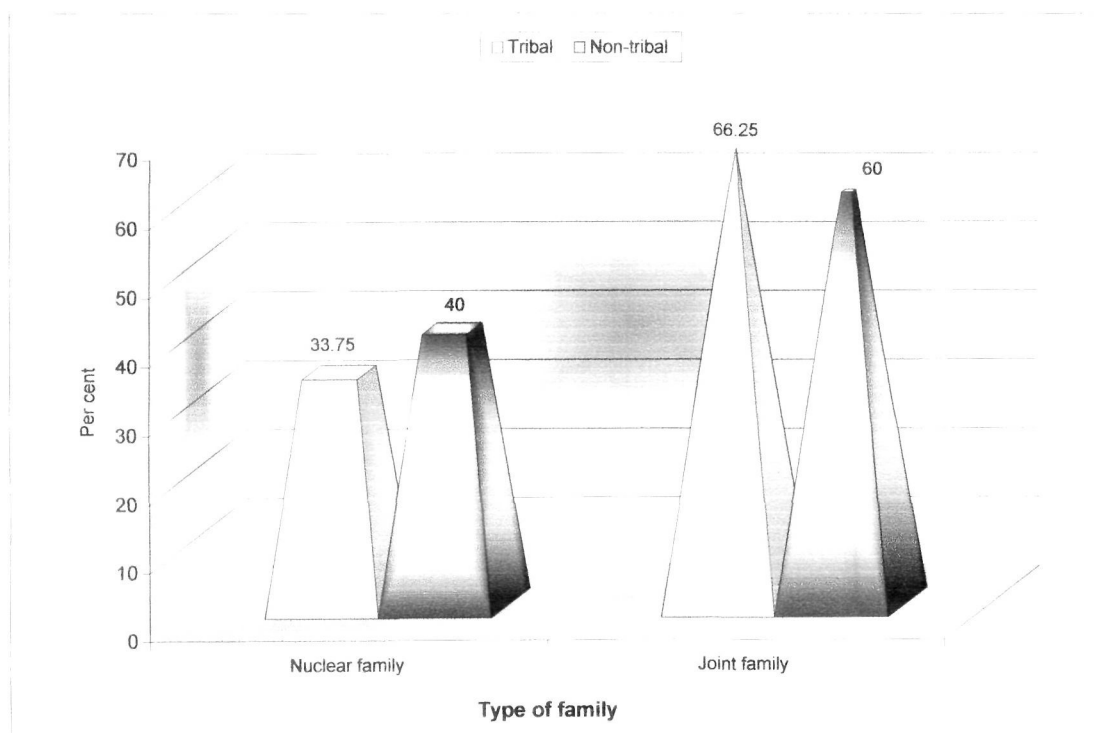


Fig. 9 : The respondents according to their type of family

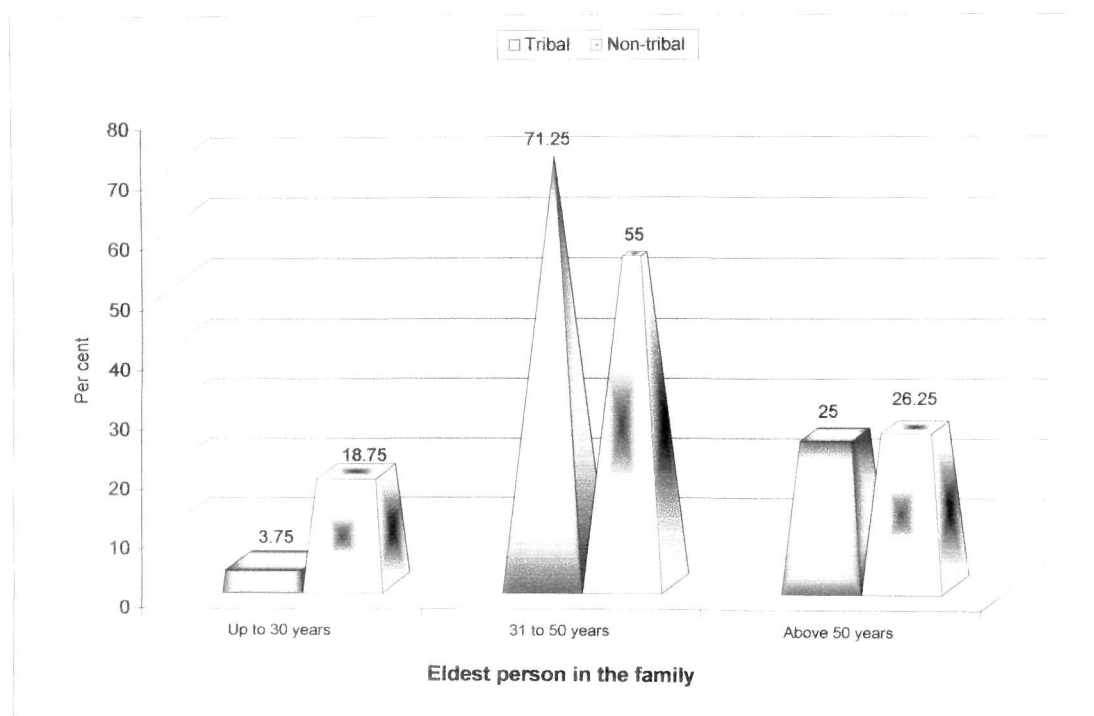


Fig. 10 : Respondents according to the eldest person in the family

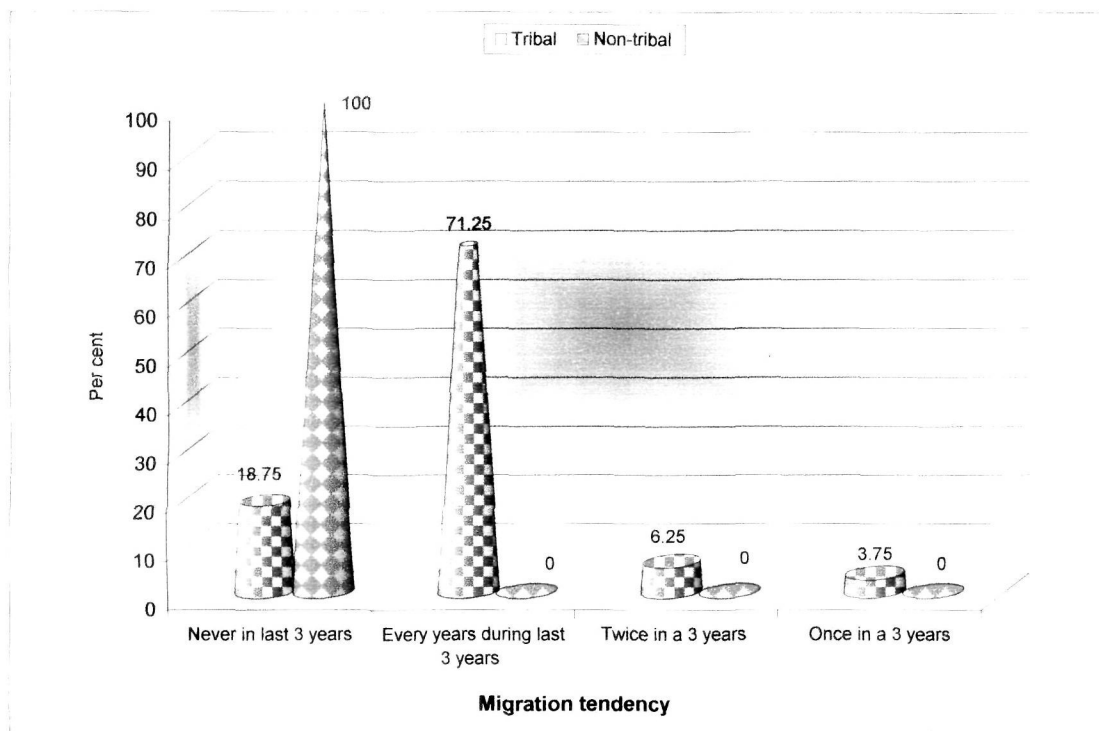


Fig. 11 : Respondents according to their migration tendency

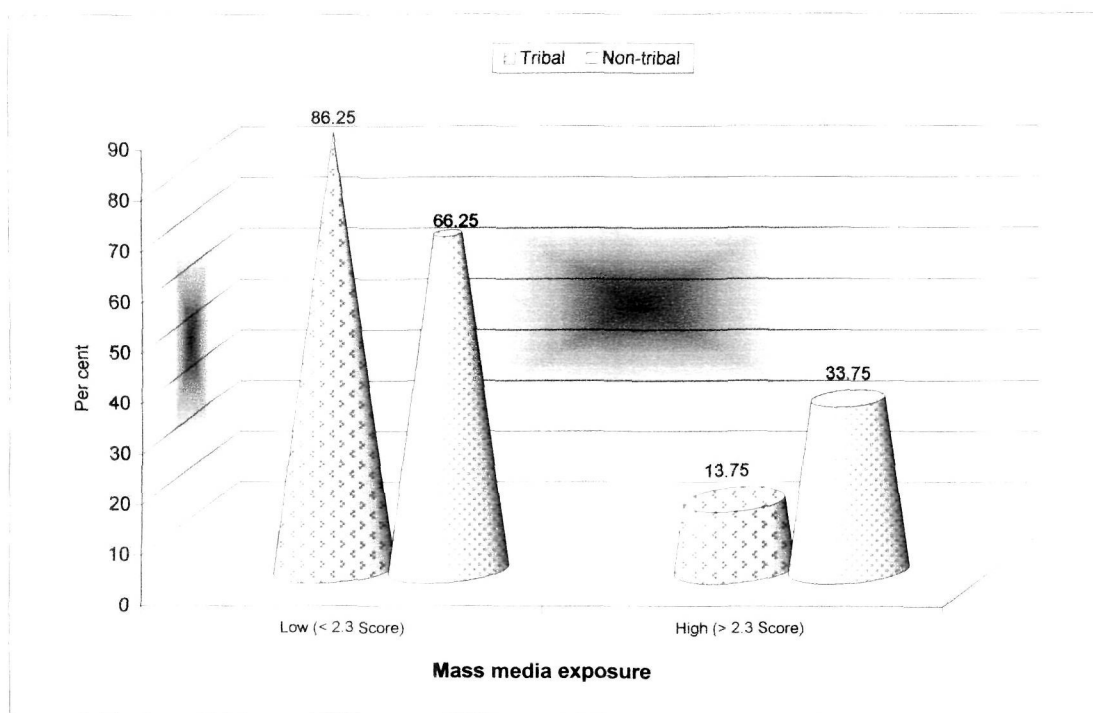


Fig. 12 : Respondents according to their mass media exposure

tree owner farmwomen, also majority (66.25 per cent) of them had low mass media exposure and 33.75 per cent of them had high mass media exposure.

The analysis of data showed that majority of the neem tree owner tribal (86.25 per cent) and non-tribal (66.25 per cent) farmwomen had low mass media exposure.

4.1.13 Extension contact

The communication characteristic like contact with extension officer of the neem tree owner tribal and non-tribal farmwomen were also studied and results are presented in Table 14.

Table 14 : Respondents according to their extension contact n=160

Sr. No.	Extension contact	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	No contact	64	80.00	62	77.50
2	Once in month	05	6.25	10	16.25
3	Once in a 6 th month	11	13.75	05	06.25
Total		80	100.00	80	100.00

The data in the table 14 disclose that majority (80.00 per cent) of the neem tree owner tribal farmwomen had no contact with the extension officer, followed by 13.75 per cent of them had once in 6th month contact and only 6.25 per cent of the respondents had contact one in a month with extension officer. In case of non-tribal farmwomen also majority (77.50 per cent) of them has no such contact, followed by 16.25 per cent of them had once in a month contact and only 6.25 per cent of them had once in a 6th month contact with extension officer. This might be due to less interactive nature, lack of confidence and social system of the rural India.

This finding is further strengthened by the result reported by Ghosh (2003).

4.1.14 Cosmopolitaness

Table 15 : Respondents according to their cosmopolitaness n=160

Sr. No.	Cosmopolitaness	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Low level (< 8.125 score)	21	26.25	07	08.75
2	Medium level (8.125 to 9.925 score)	34	42.50	15	18.75
3	High level (>9.925 score)	25	31.25	58	72.50
Total		80	100.00	80	100.00

It can be inferred that 42.50 per cent of the neem tree owner tribal farmwomen had medium level of cosmopolitaness, while 31.25 per cent and 25.25 per cent of them had high and low level of cosmopolitaness, respectively. Whereas, in case of neem tree owner non-tribal farmwomen majority (72.50 per cent) of the respondents were having high level of cosmopolitaness followed by 18.75 per cent and 8.75 per cent of them had medium and low level of cosmopolitaness, respectably.

This finding is line by the result reported by Kanani (1998), Patel (1998), Patel (2003), Ghosh (2003) and Ghosh (2004), respectively.

4.1.15 Scientific orientation

A perusal of data presented in Table 16 reflected that majority (61.25 per cent) of the neem tree owner tribal farmwomen were having high level of scientific orientation, while 30.00 per cent and 8.75 per cent of them had medium and low level of scientific orientation. Whereas, in case of non-tribal neem tree owner farmwomen, majority (85.00 per cent) of them were having high level of scientific orientation, followed by 12.50 per cent and 2.50 per cent of them had medium and low level of scientific orientation, respectively.

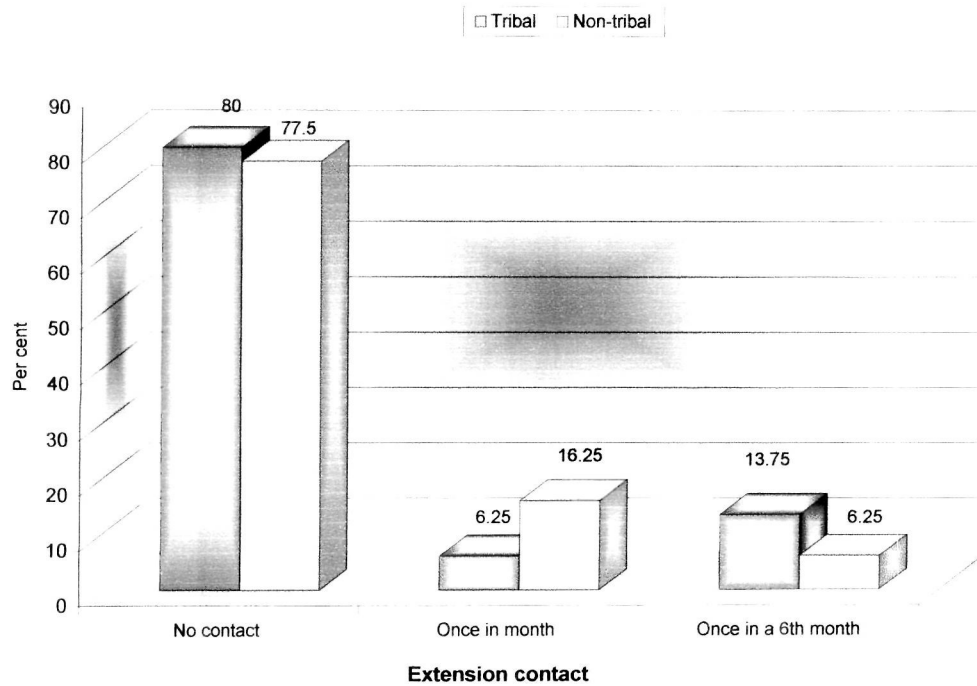


Fig. 13 : Respondents according to their extension contact

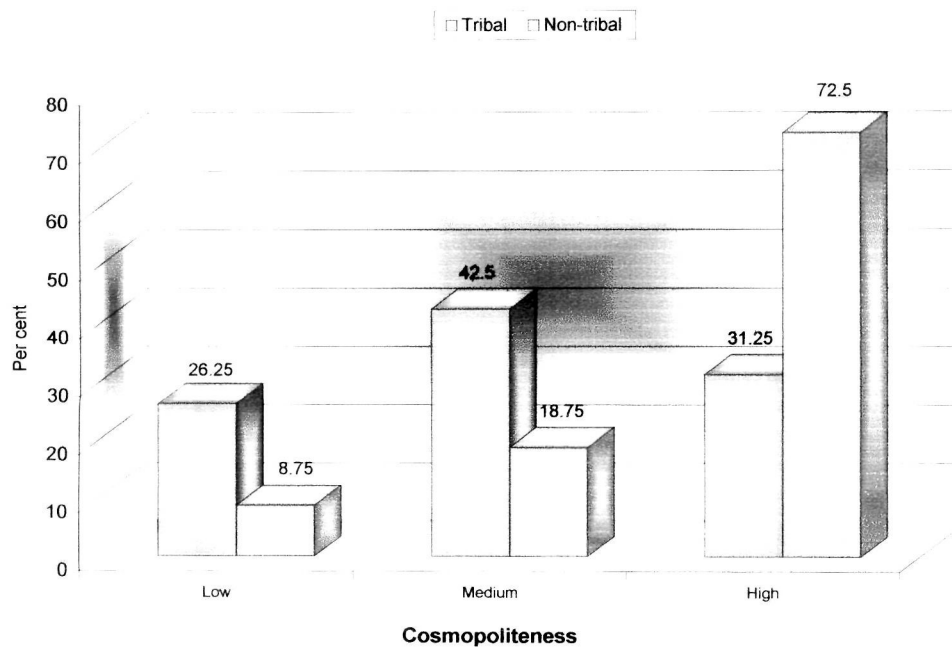


Fig. 14 : Respondents according to their cosmopolitaness

Table 16: Respondents according to their overall scientific orientation n=160

Sr. No.	Opinion	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Low level (< 10.86 score)	7	8.75	2	2.50
2	Medium level (10.86 to 11.96 score)	24	30.00	10	12.50
3	High level (>11.96 score)	49	61.25	68	85.00
Total		80	100.00	80	100.00

This finding is line with the result reported by Bhagat (2005).

4.2 OPINION OF THE INDIVIDUALS REGARDING THE VARIOUS USES OF NEEM

Table 17 : Distribution of respondents according to their opinion for various uses of neem n=160

Opinion	Tribal farmwomen (n=80)			Non-tribal farmwomen (n=80)		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree
	No. (Per cent)	No. (Per cent)	No. (Per cent)	No. (Per cent)	No. (Per cent)	No. (Per cent)
Neem can be used to cure many diseases of human beings	77 (96.25)	00 (00.00)	03 (3.75)	79 (98.25)	01 (1.25)	00 (00.00)
Neem can be used in various ways as plant protection measure	77 (96.25)	00 (00.00)	03 (3.75)	79 (98.25)	01 (1.25)	00 (00.00)
Consumption of neem is unpleasant as it is bitter in test so it is not preferred to use	07 (8.75)	64 (80.00)	09 (11.25)	07 (08.75)	53 (66.25)	20 (25.00)
The preparatory practices for the use of neem is a tedious job	21 (26.25)	50 (62.50)	09 (11.25)	05 (06.25)	43 (53.75)	32 (40.00)
Neem is a "Kalpvruksh" / "Bitter boon"	77 (96.25)	03 (3.75)	00 (00.00)	80 (100.00)	00 (00.00)	00 (00.00)
There is no side effect of using neem	80 (100.00)	00 (00.00)	00 (00.00)	80 (100.00)	00 (00.00)	00 (00.00)

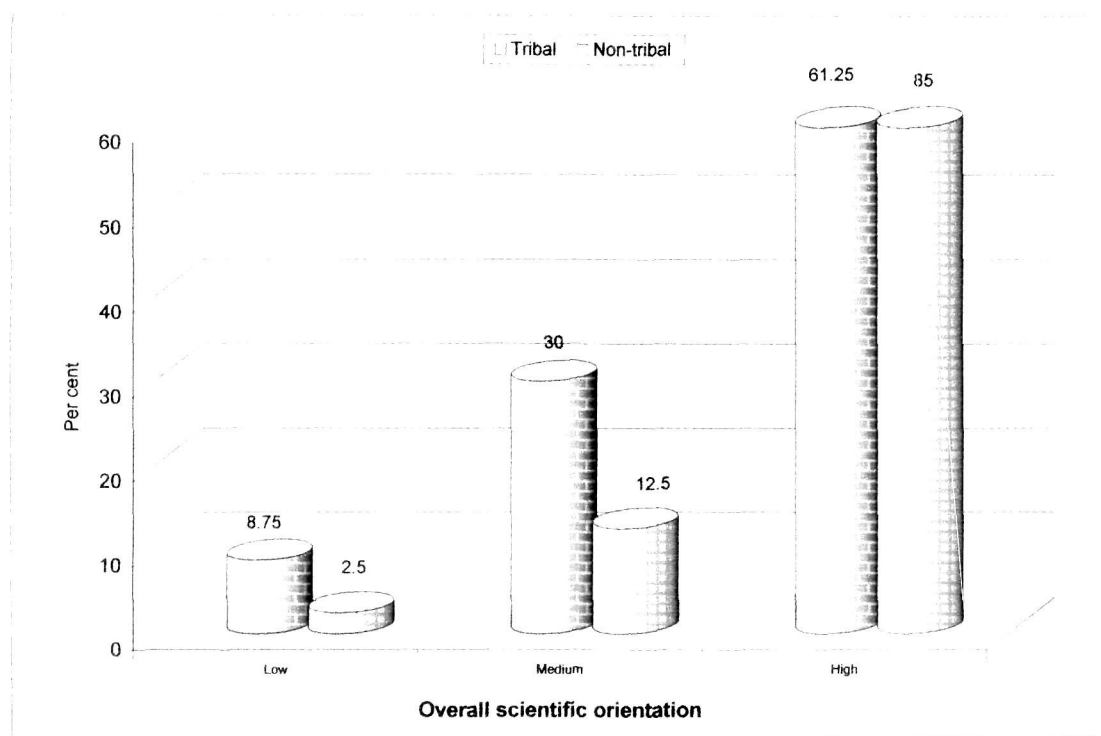


Fig. 15 : Respondents according to their overall scientific orientation

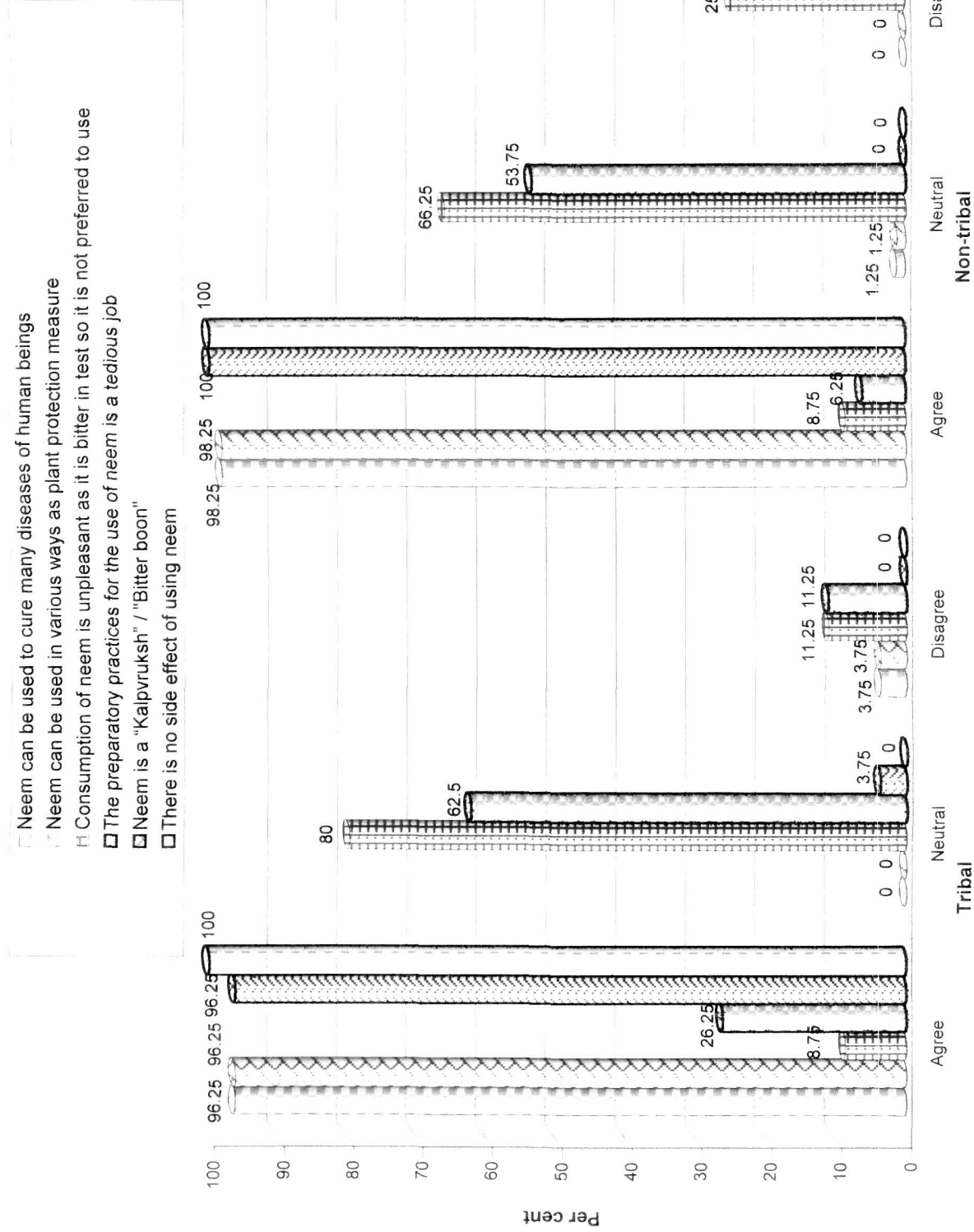


Fig. 16 : Distribution of respondents according to their opinion for various uses of neem

It can be inferred that nearly cent percent of the neem tree owner farmwomen (96.25 per cent) and non-tribal farmwomen (98.25 per cent) had opinion that neem tree is useful for curing many human diseases and opinioned that neem is useful for crop protection in agriculture.

The Table 17 shows that majority of the neem tree owner tribal (80.00 per cent) and non-tribal farmwomen (66.25 per cent) had natural opinion for the statement; Consumption of neem is unpleasant as it is bitter in test so it is not preferred to use.

The data presented in Table 17 postulate that majority of the neem tree owner tribal (62.50 per cent) and non-tribal farmwomen (53.75 per cent) had neutral opinion that the preparatory practices for the use of neem is a tedious job.

From the above result in Table 17 indicate that nearly cent per cent neem tree owner tribal farmwomen (96.25 per cent) and cent percent (100.00 per cent) non-tribal farmwomen had opinioned that neem is as good as Kalpvruksh at the same time it was also observed that cent percent of the neem tree owner tribal and non-tribal farmwomen optioned that there is no side effect in using neem.

This finding is line with the result reported by Bhagat (2005).

Table 18 : Distribution of the respondents according to the overall opinion for various uses of neem n=160

Sr. No.	Overall Opinion	Category of farmwomen			
		Tribal (n=80)		Non-tribal (n=80)	
		Number	Per cent	Number	Per cent
1	Low favourable (< 9.66 score)	28	35.00	09	11.25
2	Medium favourable (9.66 to 10.52 score)	49	61.25	64	80.00
3	High favourable (> 10.32 score)	03	03.75	07	08.75
Total		80	100.00	80	100.00

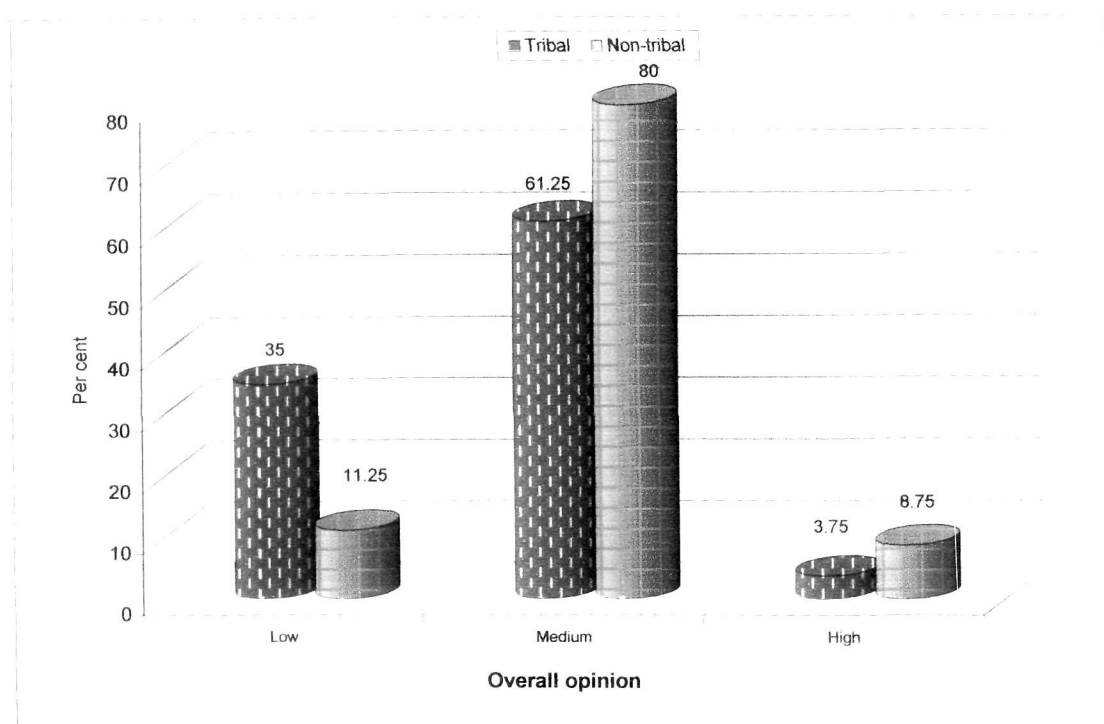


Fig. 17 : Distribution of the respondents according to the overall opinion for various uses of neem

The data presented in Table 18 indicate that majority (61.25 per cent) of the neem tree owner tribal farmwomen were with medium favourable opinion for the various uses of neem followed by 35.00 per cent of them had low favourable and only 3.75 per cent of the respondents had high favourable overall opinion for various uses of neem. In case of non-tribal neem tree owner farmwomen, majority (80.00 per cent) of them belonged to medium favourable, while 11.25 per cent and 8.75 per cent of them belonged to medium and high favourable opinion about the various uses of neem, respectively.

4.3 INDIGENOUS AND SCIENTIFIC KNOWLEDGE ABOUT VARIOUS USES OF NEEM

4.3.1 Knowledge about indigenuous and scientific usages of neem tree

It is evident from the data presented in Table 19 that, as far as knowledge of uses of neem tree for agricultural aspects were concerned, cent percent of the neem tree owner tribal farmwomen knew its use to make farm implements, followed by 96.25 per cent and 93.75 per cent of them had knowledge to use it for the prevention soil erosion and for best use of the fallow land, respectively. While 82.50 per cent of them had knowledge to use it as a windbreaker. Incase of non-tribal neem tree owner farmwomen, great majority of them had knowledge to use it for making farm implements (97.50 per cent), for best use of the fallow land (97.50 per cent), for the prevention soil erosion (96.25 per cent) and as a windbreaker (83.75 per cent). It can be concluded that there was a high level of knowledge among the tribal and non-tribal farmwomen about neem tree for agricultural uses. It may be due to the availability of this tree around their houses, fields and villages.

Table 19 : Distribution of the respondents according their indigenous and scientific knowledge about various uses of neem

n=160

Sr. No.	Particulars	Knowledge	
		Tribal farmwomen (n=80) No. (Percent)	Non-tribal farmwomen (n=80) No. (Percent)
I	Knowledge related to usages of tree		
A	Agricultural usages of tree		
1.	As a wind break	66 (82.50)	67 (83.75)
2.	To make best use of the fellow land	75 (93.75)	78 (97.50)
3.	To prevent soil erosion	77 (96.25)	77 (96.25)
4.	To make farm implements	80 (100.00)	78 (97.50)
B	General usages of tree		
1.	For shade	66 (82.50)	67 (83.75)
2.	For bringing rain	75 (93.75)	78 (97.50)
3.	Wood or furniture	77 (96.25)	77 (96.25)
4.	For rearing of GALG	80 (100.00)	78 (97.50)
II	Knowledge related to usages of neem leaves		
A	Agricultural usages of neem leaves		
1.	For storage of grains	80 (100.00)	80 (100.00)
2.	As an animal feed	80 (100.00)	80 (100.00)
3.	As a fertilizer	59 (73.75)	69 (86.25)
B	Health related usages of neem leaves		
1	To prevent from mosquitoes	80 (100.00)	58 (72.50)
2	Anti venom for bite of scorpion	65 (81.25)	32 (40.00)
3	Anti venom for snakebite	68 (85.00)	32 (40.00)
4	As a medicine for worms	44 (55.00)	26 (32.50)
5	Used in bathing water for prevention of dermal diseases.	77 (96.25)	72 (90.00)
6	As a cure of fever	79 (98.75)	80 (100.00)
7	As an anti-coughing agent	29 (36.25)	27 (33.75)
8	As a medicine for piles	04 (5.00)	02 (2.50)
9	To control diabetes	24 (30.00)	12 (15.00)
10	For curing of ill health due to opium	00 (00.00)	00 (00.00)
C	Industrial usages of neem leaves		
1	As an ingredient of toothpaste	53 (66.25)	61 (76.25)
2	As an ingredient of soap	57 (71.25)	64 (80.00)

III	Knowledge related to usages of neem twigs/branches		
A	Agricultural usages of neem twigs/branches		
1	To know the source of underground water	00 (00.00)	00 (00.00)
B	Health related usages of neem twigs/branches		
1	As a toothbrush (Dahun)	80 (100.00)	80 (100.00)
C	Usages of neem twigs/branches for home purpose		
1	As a fuel	80 (100.00)	80 (100.00)
IV	Knowledge related to usages of neem oil		
A	Agricultural usages of neem oil		
1.	For control of sucking pests		
i	For control of aphids (mustard)	00 (00.00)	00 (00.00)
ii	For control of sucking pests in cotton	41 (51.25)	53 (66.25)
2.	For control of biting pests		
i	For control of leaf eating caterpillar	22 (27.50)	39 (48.75)
ii	For control of Helicoverpa	24 (30.00)	26 (32.50)
iii	For control of castor semilooper	20 (25.00)	25 (31.25)
iv	For control of diamond back moth (cabbage)	00 (00.00)	00 (00.00)
v	For control of fruit borer (Okra)	27 (33.75)	31 (38.75)
vi	For control of white grub	00 (00.00)	00 (00.00)
vii	For control of hairy caterpillar	16 (20.00)	27 (33.75)
3	As a fungicide	19 (23.75)	24 (30.00)
B	Health related usages of neem oil		
1	For control of dandruff	35 (43.75)	55 (68.75)
2	For the cure of gum boil	17 (21.25)	29 (36.25)
3	As a contraceptive	00 (00.00)	00 (00.00)
4	To prevent from mosquitoes (apply on body)	34 (42.50)	52 (65.00)
5	As nasal drop for cure of sinus	00 (00.00)	00 (00.00)
C	Industrial usages of neem oil		
1	As an ingredient of soap	58 (72.50)	67 (83.75)
2	In preparation of medicines	36 (45.00)	45 (56.25)
D	Usages of neem oil for home purpose		
1	As a fuel in lamp	29 (36.25)	26 (32.50)

V	Knowledge related to usages of neem cake		
A	Agricultural usages of neem cake		
1	For control of nematodes	00 (00.00)	00 (00.00)
2	To make the soil fertile	49 (61.25)	58 (72.50)
3	For coating of urea	18 (22.50)	33 (41.25)
VI	Knowledge related to usages of neem gum		
A	Health related usages of neem gum		
1	As a medicine against itching	02 (2.50)	05 (6.25)
2	As a tonic	02 (2.50)	09 (11.25)
VII	Knowledge related to usages of neem root		
A	Agricultural usages of neem root		
1	To prevent soil erosion	57 (71.25)	57 (71.25)
B	Health related usages of neem root		
1	For making of the paste (Ghanvati) from bark	00 (00.00)	00 (00.00)
VIII	Method of preparing a solution of neem seed kernel and neem oil		
1	How to separate kernel from neem seed	00 (00.00)	02 (2.50)
2	Procedure to prepare solution from kernel	00 (00.00)	02 (2.50)
3	How to prepare 5 % of solution of extracted kernel	00 (00.00)	03 (3.75)
4	Preparation of neem oil solution for spraying	00 (00.00)	04 (5.00)

The data shown in the Table 19 indicate that cent percent (100.00 per cent) of tribal neem tree owner farmwomen had knowledge to use neem tree for rearing of Gallo, followed by 96.25 per cent, 93.75 per cent and 82.50 per cent of them had knowledge of neem tree for furniture or wood, for creating conducive atmosphere for raining and for shading, respective. While, incase of non-tribal farmwomen, great majority (97.50 per cent) of them had knowledge to use neem tree for rearing of Gallo and for creating conducive atmosphere for raining, followed by 96.25 per cent and 83.75 per cent of them had knowledge to use it for wood or furniture and for shading, respective.

4.3.2 Knowledge about indigenous and scientific usages of neem leaves

A searching look in to the Table 19 reveal that cent percent of tribal and non-tribal neem tree owner farmwomen had knowledge of neem leaves related to agriculture usages for storage of grains and as an animal feed, while 73.75 per cent of the tribal farmwomen and 86.25 per cent of non-tribal had knowledge to use neem leaves for fertilizer. It can be concluded that there was a high level of knowledge among the tribal and non-tribal neem tree owner farmwomen about various agricultural usages of neem leaves.

The data presented in Table 19 postulate that cent percent (100.00 per cent) of neem tree owner tribal farmwomen had knowledge of neem leaves usages for the health to prevent mosquito and slightly less than cent percent of them had knowledge of neem leaves to cure fever (98.75 per cent) and dermal diseases (96.25 per cent). It can be seen that 85.00 per cent, 81.25 per cent, 55.00 per cent, 36.25 per cent and 30.00 per cent of them had knowledge of usages of neem leaves as an antidote for snakebite and scorpion biting, a medicine for worms, anti coughing agent and a medicine for diabetes, respectively. While only 5.00 per cent knew its usage for piles. Incase of non-tribal neem tree owner farmwomen, cent percent (100.00 per cent) of them had knowledge of neem leaves usages for the health to cure fever. It can be seen that 90.00 per cent, 72.50 per cent, 40.00 per cent, 33.75 per cent, 32.50 per cent and 15.00 per cent of them had knowledge of usages of neem leaves to cure dermal diseases, to prevent mosquito, as an antidote for snakebite and scorpion biting, anti coughing agent, a medicine for worms and a medicine for diabetes, respectively. While only 2.50 per cent knew its usage for piles. None of the neem tree owner tribal and non-tribal farmwomen knew usefulness of neem leaves for curing ill health caused by opium consumption. It can be concluded that high level of knowledge among tribal and non-tribal neem tree owner farmwomen about some of the usages of neem leaves to cure fever, for prevention of mosquito and dermal diseases was observed.

As seen Table 19 that majority (71.25 per cent) of neem tree owner tribal farmwomen had knowledge of industrial usages of neem leaves as an ingredient of soap and 66.25 per cent of them knew that it can be used as ingredient of tooth paste. Incase of non-tribal neem tree owner farmwomen, more than three forth of them had knowledge of industrial usages of neem leaves as an ingredient of soap (80.00 per cent) and as ingredient of toothpaste (76.25 per cent). It can be conclude that majority of the tribal and non-tribal neem tree owner farmwomen had knowledge about various industrial usages of neem leaves for the production of soap and toothpaste.

4.3.3 Knowledge about indigenous and scientific usages of neem twigs/branches

It could be understood from Table 19 that cent percent (100.00 per cent) of tribal and non-tribal neem tree owner farmwomen had knowledge about various usages of neem branches as a toothbrush (Datun) and fuel, while none of the tribal and non-tribal neem tree owner farmwomen had knowledge about agricultural related usage of neem branches to know the source of underground water.

Thus, it can be conclude that majority of the neem tree owner tribal and non-tribal farmwomen had knowledge of health and home related usages of neem branches.

4.3.4 Knowledge about indigenous and scientific usages of neem oil

The data in Table 19 reveal that slightly more than half (51.25 per cent) of the tribal neem tree owner farmwomen had knowledge of agriculture related usages of neem oil for the control of sucking pest in cotton, followed by 33.75 per cent, 30.00 per cent, 27.50 per cent, 25.00 per cent, 23.75 per cent and 20.00 per cent of them had knowledge of usefulness of neem oil for the control of fruit borer of okra, *Helicoverpa* spp., leaf eating caterpillar, castor semilooper, fungus and hairy caterpillar, respectively. Incase of non-tribal neem tree owner farmwomen, majority (66.25 per cent) of them had knowledge of agriculture related usages of neem oil for

the control of sucking pest in cotton, followed by 48.75 per cent, 38.75 per cent, 33.75 per cent, 32.50 per cent, 31.25 per cent and 30.00 per cent of them had knowledge of usefulness of neem oil for the control of leaf eating caterpillar, fruit borer of okra, hairy caterpillar, *Helicoverpa* spp., castor semilooper and fungus, respectively.

Some agricultural usages of neem oil for the control of aphids of mustard, diamond back moth of cabbage and white grub were not known by any of the tribal and non-tribal neem tree owner farmwomen.

The information in Table 19 says that slightly less than half of neem tree owner tribal farmwomen had knowledge of health related usages of neem oil for the control of dandruff (43.75 per cent), to apply on human body to prevent mosquito biting (42.50 per cent) and for the cure of gum boil (21.25 per cent). In case of non-tribal neem tree owner farmwomen majority (68.75 per cent) of them had knowledge of health related usages of neem oil use for the control of dandruff, followed by 65.00 per cent and 36.25 per cent of them had knowledge of its application on human body to prevent mosquito biting and for the cure of gum boil, respectively. While none of neem tree owner tribal and non-tribal farmwomen had knowledge of usages of neem oil a contraceptive and as nasal drop to cure of sinus

A searching looking into the Table 19 reveal that majority (72.50 per cent) of neem tree owner tribal farmwomen had knowledge of industrial usages of neem oil as an ingredient of soap; followed 45.00 per cent of them had knowledge to use it in the preparation of medicines. Incase of non-tribal neem tree owner farmwomen, majority (83.75 per cent) of them had knowledge of industrial usages of neem oil as an ingredient of soap and 56.25 per cent of them had knowledge to use it in the preparation of medicines.

It is evident from data presented in Table 19 that 36.25 per cent of neem tree owner tribal farmwomen and 32.50 per cent of non-tribal neem tree owner farmwomen knew usage of neem oil as fuel in lamp.

4.3.5 Knowledge about indigenous and scientific usages of neem cake

The information in Table 19 says that majority (61.25 per cent) of neem tree owner tribal neem tree owner farmwomen had knowledge of agriculture related usages of neem cake to improve soil fertility, followed by 22.50 per cent of them had knowledge to use neem cake for urea coating. Incase of non-tribal neem tree owner farmwomen, majority (72.50 per cent) of them had knowledge of agriculture related usages of neem cake to improve soil fertility, followed by 41.25 per cent of them had knowledge to use neem cake for urea coating. While other usage of neem cake to control nematodes was not known by any of the tribal and non-tribal farmwomen.

4.3.6 Knowledge about indigenous and scientific usages of neem gum

The data presented in Table 19 postulate that only 2.50 per cent of tribal neem tree owner farmwomen had knowledge of health related usages of neem gum as a medicine against itching and as a tonic. Incase of non-tribal neem tree owner farmwomen, followed by 11.25 per cent and 6.25 per cent of them had knowledge of health related usages of neem gum as a tonic and as a medicine against itching, respectively.

4.3.7 Knowledge about indigenous and scientific usages of neem root

The data shown in Table 19 indicate that majority (71.25 per cent) of neem tree owner tribal farmwomen and non-tribal neem tree owner farmwomen had knowledge of agricultural usage of neem root to prevent soil erosion, while none of the tribal and non-tribal neem tree owner farmwomen had knowledge of health related usage of neem root for making of the paste (Ghanvati) from bark.

4.3.8 Knowledge about method of preparing a solution of neem seed kernel and neem oil

The Table 19 clearly indicates that none of neem tree owner tribal farmwomen having neem tree by the their house or farm knew the procedure to

separate kernel from neem seed, procedure of preparing solution from the neem seed kernel for spraying, the exact measurement of preparing 5 % solution of extracted kernel and procedure for preparing neem oil solution for spraying.

Incase of non-tribal neem tree owner farmwomen, 5.00 per cent of them having neem tree nearby their house or farm knew the procedure for preparing the neem oil solution for spraying, followed by 3.75 per cent of them had known the exact 5 % of solution of extracted neem kernel. While only 2.50 per cent of them knew the procedure to separate kernel from neem seed and preparing solution from the neem kernel for spraying.

4.3.9 General awareness about neem among the tribal and non-tribal farmwomen

Table : 20 Respondents about general awareness about neem among the tribal and non-tribal farmwomen n=160

Sr. No.	General awareness	Tribal (n=80)	Non-tribal (n=80)
		No. (Per cent)	No. (Per cent)
1	Knowledge about functions of neem for plant protection		
I	It curtails the growth of egg, larvae and pupae	04 (5.00)	13 (16.25)
II	It prevents the female insects from egg lying.	02 (2.50)	05 (6.25)
III	It makes the male insects sterile.	00 (00.00)	00 (00.00)
IV	It kills the insects by its poisonous effect.	73 (91.25)	72 (90.00)
V	It affects the biting/chewing habit of the insects	30 (37.50)	73 (91.25)
2	Knowledge about life cycle of neem		
I	Time of leaf falling.	77 (96.25)	79 (98.75)
II	Time of setting of new leaves.	77 (96.25)	79 (98.75)
III	Quantity of fruits given by mature tree per year.	56 (70.00)	34 (42.50)
IV	Average age of neem tree	50 (62.50)	77 (96.25)

The searching look in Table 20 reveal that majority (91.25 per cent) of neem tree owner tribal farmwomen had awareness that neem is used in plant protection to kill the insects by its poisonous effect, followed by 37.50 per cent, 5.00 per cent and 2.50 per cent of them had awareness that it affects the biting/chewing habit of the insects, it curtails the growth of egg, larvae and pupae and it prevents the female insects from egg laying, respectively. Incase of non-tribal neem tree owner farmwomen, majority (91.25 per cent) of them had awareness that neem affects the biting/chewing habit of the insects, followed by 90.00 per cent, 16.25 per cent and 6.25 per cent of them had awareness that it is used in plant protection to kill the insects by its poisonous effect, it curtails the growth of egg and it prevents the female insects from egg laying, respectively, while none of the tribal and non-tribal farmwomen had awareness that neem makes the male insects sterile.

The information shown in Table 20 reflects that time of leaf falling in neem and time of setting of new leaves in neem tree were known by majority of neem tree owner tribal (96.25 per cent) and non tribal farmwomen (98.75 per cent), quantity of fruits given by mature tree per year was known by majority of tribal (70.00 per cent) and 42.50 per cent of the non tribal farmwomen, while awareness of average age of neem tree was observed among majority of tribal (62.50 per cent) and non tribal farmwomen (96.25 per cent).

4.4 COMPARISON BETWEEN THE INDIGENOUS AND SCIENTIFIC KNOWLEDGE OF TRIBAL AND NON-TRIBAL FARMWOMEN REGARDING VARIOUS USES OF NEEM

4.4.1 The knowledge of various uses of neem tree of the tribal and non-tribal farmwomen

Date shown in Table 21 indicate that there was non-significant difference in the indigenous and scientific knowledge about the agricultural uses of neem tree between the tribal and non-tribal farmwomen. Hence, the null hypothesis

Table 21 : Comparison between the indigenous and scientific knowledge of tribal and non-tribal farmwomen regarding various uses of neem

n=160

Sr. No.	Item	Mean		't' value
		Tribal (n=80)	Non-tribal ((n=80)	
1	Knowledge related to usages of tree			
A	Agricultural usages of tree	3.488	3.525	0.373 NS
B	General usages of tree	3.088	3.363	4.383 *
2	Knowledge related to usages of neem leaves			
A	Agricultural usages of neem leaves	2.325	2.588	3.262 *
B	Health related usages of neem leaves	2.038	1.388	1.519 NS
C	Industrial usages of neem leaves	1.075	1.650	5.554 *
3	Knowledge related to usages of neem twigs/branches			
A	Health related usages of neem twigs/branches	1.000	1.000	--
B	Usages of neem twigs/branches for home purpose	1.000	1.000	--
4	Knowledge related to usages of neem oil			
A	Agricultural usages of neem oil	4.175	5.488	5.731 *
B	Health related usages of neem oil	0.550	1.113	3.678 *
C	Industrial usages of neem oil	1.338	1.588	2.423 *
D	Usages of neem oil for home purpose	1.313	1.238	0.497 NS
5	Knowledge related to usages of neem cake			
A	Agricultural usages of neem cake	1.065	1.750	5.654 *
6	Knowledge related to usages of neem gum			
A	Health related usages of neem gum	1.313	1.563	1.302 NS
7	Knowledge related to usages of neem root			
A	Agricultural usages of neem root	1.000	1.000	-

Note: *=Significant at .05 level.

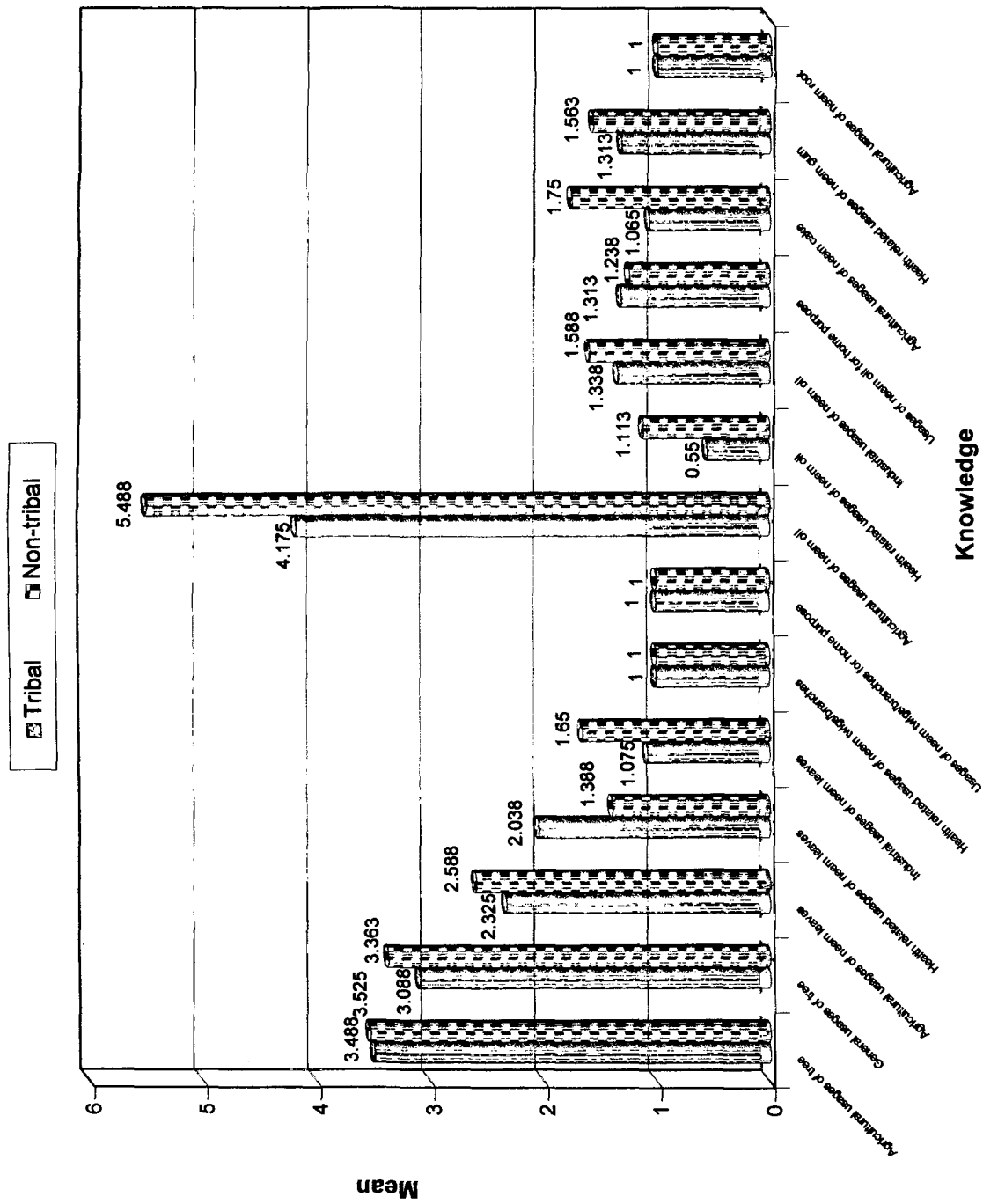


Fig. 18 : Comparison between the indigenous and scientific knowledge of tribal and non-tribal farmwomen regarding various uses of neem

(H₀₁) was accepted. Data disclose that irrespective group of farmwomen had all most similar types of indigenous and scientific knowledge about the agricultural uses of neem tree.

Information shown in Table 21 indicates that there was significant difference in the indigenous and scientific knowledge about various uses of neem tree between neem tree owner tribal and non-tribal farmwomen. Thus, the null hypothesis (H₀₁) was rejected. The 't' value discloses that non-tribal farmwomen had better knowledge than the tribal farmwomen in this aspect.

4.4.2 The knowledge of various uses of neem leaves of the tribal and non-tribal farmwomen

The Table 21 shows that there was significant different in the indigenous and scientific knowledge about agriculture uses of neem leaves between neem tree owner tribal and non-tribal farmwomen. Thus, the null hypothesis (H₀₁) was rejected. The 't' value indicates that the non-tribal neem tree owner farmwomen had better knowledge than neem tree owner tribal farmwomen in agricultural uses of neem leaves.

The Table 21 disclose that there was non-significant difference between the indigenous and scientific knowledge about health related uses of neem leaves of neem tree owner tribal and non-tribal farmwomen. Hence, the null hypothesis (H₀₁) was accepted. The 't' value shows that neem tree owner tribal farmwomen had better knowledge than non-tribal neem tree owner farmwomen in the health related uses of neem leaves.

A searching looks into the Table 21 reveals that there was significant different in the indigenous and scientific knowledge about industry uses of neem leaves between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H₀₁) was rejected. The 't' value indicates that non-tribal neem tree owner farmwomen had better knowledge than neem tree owner tribal farmwomen in this aspect.

4.4.3 The knowledge of various uses of neem branch of the tribal and non-tribal farmwomen

It can be concluded from Table 21 that there was significant difference in the indigenous and scientific knowledge about the health related uses of neem branch between the tribal and non-tribal farmwomen. Thus, the null hypothesis (H_{01}) was rejected. The 't' value discloses that the tribal and non-tribal neem tree owner farmwomen had equal knowledge of uses of neem branch in the health improving matters.

As seen from Table 21 that there was no any difference in the indigenous and scientific knowledge about home related uses of neem branch between the tribal and non-tribal farmwomen. The mean values indicate that the tribal and non-tribal neem tree owner farmwomen had equal knowledge about of neem branch about its home purposes.

4.4.4 The knowledge of various uses of neem oil of the tribal and non-tribal farmwomen

A look into the Table 21 shows that there was significant difference in the indigenous and scientific knowledge about the agricultural uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H_{01}) was rejected. The 't' value indicates that non-tribal neem tree owner farmwomen have better knowledge than the tribal farmwomen in this aspect.

The information in the Table 21 indicate that there was significant difference in the indigenous and scientific knowledge about health related uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H_{01}) was rejected. The 't' value discloses that non-tribal neem tree owner farmwomen had better knowledge than neem tree owner tribal farmwomen in this aspect.

The Table 21 discloses that there was significant difference in the indigenous and scientific knowledge about industry uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H_{01})

was rejected. The 't' value shows that neem tree owner non-tribal farmwomen had better knowledge than the tribal farmwomen in industry uses of neem oil.

As seen from Table 21 that there was non-significant difference in the indigenous and scientific knowledge about home uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H_{01}) was accepted. The 't' value shows that neem tree owner tribal farmwomen had better knowledge than non-tribal farmwomen of neem oil use in home purpose.

4.4.5 The knowledge of various uses of neem cake of the tribal and non-tribal farmwomen

The data presented in the Table 21 disclose that there was significant different in the indigenous and scientific knowledge about the agriculture uses of neem cake between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H_{01}) was rejected. The 't' value shows that non-tribal farmwomen had better knowledge than the tribal farmwomen about the agricultural uses of neem cake.

4.4.6 The knowledge of various uses of neem gum of the tribal and non-tribal farmwomen

A searching look into the Table 21 reveals that there was non-significant difference in the indigenous and scientific knowledge about health related uses of neem gum between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H_{01}) was accepted. The 't' value indicates that non-tribal neem tree owner farmwomen had better knowledge than neem tree owner tribal farmwomen in this aspect.

4.4.7 The knowledge of various uses of neem root of the tribal and non-tribal farmwomen

The Table 21 discloses that there was no any difference in the indigenous and scientific knowledge about agriculture uses of neem root between the tribal and non-tribal neem tree owner farmwomen. The mean values indicate that neem tree

owner tribal and non-tribal farmwomen had equal knowledge about uses of neem gum in agriculture.

4.4 RELATIONSHIP BETWEEN THE PROFILE OF THE FARMWOMEN AND THEIR INDIGENOUS AND SCIENTIFIC KNOWLEDGE REGARDING VARIOUS USES OF NEEM

In order to find out the relationship between indigenous and scientific knowledge of the tribal and non-tribal farmwomen and their independent variables, correlation was worked out. the finding are presented in Table 22.

Table 22 : Relationship between the profile of the farmwomen and their indigenous and scientific knowledge regarding various uses of neem n=160

Sr. No.	Variable	Correlation-coefficient (r-Value)	
		Tribal Farmwomen	Non-tribal Farmwomen
1	Age	-0.0814	-0.0621
2	Education	0.2934 *	0.6260 *
3	Occupation	0.0611	-0.2737 *
4	Land holding	-0.2782 *	0.4018 *
5	Herd size	0.1608	0.0187
6	Annual Income	0.0907	0.3119 *
7	Organization participation	-0.1140	-0.1137
8	Size of family	0.0139	-0.1099
9	Type of family	0.1059	0.1106
10	Age of oldest person	0.0193	0.0617
11	Migration habit	0.0291	-----
12	Mass media exposure	0.3097 *	0.34010 *
13	Extension contact	0.1652	0.0364
14	Cosmopoliteness	0.3409 *	0.0879
15	Scientific orientation	0.1338	0.1316
16	Opinion about various uses of neem	0.0323	0.3216 *

Note: *=Significant at .05 level

4.5.1 Age and knowledge of the farmwomen about various uses of neem

Age of neem tree owner tribal and non-tribal farmwomen had negative and non-significant relationship with the knowledge about various uses of neem. This indicates that comparatively younger farmwomen knew more about neem and its various uses. High degree of inquisitiveness among the younger persons to know more from the surrounding might have played role for their more knowledge. Yet, the non-significant relationship shows that age did not play much role in gaining knowledge.

Hence, the null hypothesis (H_{02}) in this case of age was accepted and it was concluded that there was non-significant relationship between age and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

This finding is in conformity with Manju (1996), Patel (1998), Tawade et al. (1998) and Bhagat (2005).

4.5.2 Education and knowledge of the farmwomen about various uses of neem

A perusal of data presented in Table 22 indicates that the knowledge of neem tree owner tribal and non-tribal farmwomen had positive and significant relationship with their education. It means that level of scientific and indigenous knowledge about various uses of neem was observed better among educated farmwomen. The reason for this might be that educated farmwomen might have greater reception power which resulting in to more knowledge acquisition. In addition to this educated farmwomen might have utilised their reading and writing ability to acquire information about various uses of neem.

Hence, the null hypothesis (H_{02}) is not accepted and it can be concluded that education of tribal and non-tribal farmwomen was significantly related with their knowledge about various uses of neem.

This finding is in conformity with Manju (1996).

4.5.3 Occupation and knowledge of the farmwomen about various uses of neem

The data presented in Table 22 reflect that occupation of neem tree owner tribal farmwomen has positive relationship with indigenous and scientific knowledge about various uses of neem. It means that tribal farmwomen who were dependent on more than one occupation had better knowledge about various uses of neem. However, non-significant relation indicates that occupation of the tribal farmwomen did not affect much to the knowledge gaining process.

Thus, there was an acceptance of the null hypothesis (H_{02}) and it was concluded that there was non-significant relationship between occupation and indigenous and scientific knowledge of the tribal farmwomen about various uses of neem.

In case of non-tribal neem tree owner farmwomen, occupation of non-tribal farmwomen has negative and significant relationship with indigenous and scientific knowledge about various uses of neem. The result indicates that non-tribal farmwomen who were dependent only on agriculture had better knowledge about various uses of neem.

Thus, there was rejected of the null hypothesis (H_{02}) and it was concluded that there was significant relationship between occupation and indigenous and scientific knowledge of the non- farmwomen about various uses of neem.

The result is buttressed by the findings of Kanani (1998), Patel (1998), Ghosh (2004) and Bhagat (2005).

4.5.4 Land holding and knowledge of the farmwomen about various uses of neem

The 'r' value presented in Table 22 reflected that land holding of neem tree owner tribal farmwomen was observed negatively and significantly correlated with their knowledge about neem. The negative value indicates that indigenous and scientific knowledge about various uses of neem was observed better among those farmwomen who had small size of land holding. The free availability of neem might

have motivated to the economically deprived small and marginal tribal farmwomen to make better use of neem in agriculture and in their daily life.

Thus, the null hypothesis (H_{02}) in case of land holding of the tribal farmwomen was rejected and concluded that there was negative significant relationship between land holding of the tribal farmwomen and their knowledge about various uses of neem. The result is supported by the finding of Ghosh (2003).

In case of non-tribal neem tree owner farmwomen, land holding of them had observed positively and significantly correlated with their knowledge about neem. The positive value indicates that knowledge was observed better among those non-tribal farmwomen who had big size of land holding. The result shows that nowadays health conscious rich and big farmwomen have realized to make higher use of natural material in their day-to-day life. Here the null hypothesis (H_{02}) in case of land holding of the non-tribal farmwomen was rejected and concluded that there was positive significant relationship between land holding of the non-tribal farmwomen and their knowledge about various uses of neem.

The result is buttressed by the finding of Kulkarni *et al.* (1990) and Ghosh (2003).

4.5.5 Herd size and knowledge of the farmwomen about various uses of neem

It can be easily inferred from the Table 22 that herd size of neem tree owner tribal and non-tribal farmwomen had positive and non-significant correlation with indigenous and scientific knowledge about various uses of neem. Positive correlation was the indication of more knowledge of the farmwomen with big size of herd. However this trend was not up to the considerable level.

Thus, in this case, the null hypothesis (H_{02}) was accepted and it was concluded that there was non-significant relationship between herd size and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

The result is propped up by the findings of Patel (1998), Ghosh (2003), Ghosh (2004) and Bhagat (2005).

4.5.6 Annual income and knowledge of the farmwomen about various uses of neem

The data presented in Table 22 clearly indicated that annual income of neem tree owner tribal farmwomen had positive and non-significant relationship with their knowledge about neem. This designates that income did not affect to the indigenous and scientific knowledge graining process of the tribal farmwomen.

Thus, the null hypothesis (H_{02}) in case of annual income of tribal farmwomen was accepted and it was concluded that there was non-significant relationship between annual income of tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The result is strengthened by the findings of Kanani (1998), Patel (1998), Ghosh (2004) and Bhagat (2005).

In case of non-tribal neem tree owner farmwomen, annual income of them had positive and significant relationship with their knowledge about neem. This indicates that indigenous and scientific knowledge about various uses of neem was better among rich non-tribal farmwomen as compared to the poor farmwomen. As discussed earlier, high level of health consciousness among rich farmwomen might have motivated them to know more about uses of eco friendly neem products.

Thus, the null hypothesis (H_{02}) in case of annual income of non-tribal farmwomen was rejected and it can be concluded that there was significant relationship between annual income of non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

This result was not in the line with the results of Kanani (1998), Patel (1998), and Ghosh (2004).

4.5.7 Organization participation and knowledge of the farmwomen about various uses of neem

Organization participation of neem tree owner tribal and non-tribal farmwomen had negative and non-significant relationship with indigenous and scientific knowledge about various uses of neem. This shows that organization participation of farmwomen did not affect the knowledge gaining process. However, the negative relationship was eye sighting, indicating that indigenous and scientific knowledge was better among those tribal and non-tribal farmwomen who had deprived organization participation. It is observed that generally rural organization are more engaged in agricultural input supply and financial activities and have limited activities about the encouragement of indigenous knowledge. Thus, poor encouragement by rural organization for such activity might be the reason for above findings.

Thus, there was an acceptance of the null hypothesis (H_{02}) and it was concluded that there was non-significant relationship between organization participation and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

The result is not line with the findings of Manju (1996), Kanani (1998), Patel (1998), Ghosh (2004) and Bhagat (2005).

4.5.8 Size of family and knowledge of the farmwomen about various uses of neem

The number of members in the family did not play a vital role in improving indigenous and scientific knowledge gaining process. Thus, a non-significant relationship was inferred between the size of family and indigenous and scientific knowledge about various uses of neem. However, the positive relationship was an indication to have more indigenous and scientific knowledge about neem among neem tree owner tribal farmwomen who had more family members in the family. In case of non-tribal neem tree owner farmwomen, they had negative and

non-significant relationship the size of family and indigenous and scientific knowledge about various uses of neem.

Thus, the null hypothesis (H_{02}) was accepted and it was concluded that there was non-significant relationship between size of family and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

The result is reinforced by the finding of Bhagat (2005).

4.5.9 Type of family and knowledge of the farmwomen about various uses of neem

The 'r' value in the Table 22 indicates positive and non-significant relationship between the type of family and indigenous and scientific knowledge about various uses of neem. This was an indication of the fact that family system had least role on the indigenous and scientific knowledge of neem tree owner tribal and non-tribal farmwomen about various uses of neem. However, the positive relationship was indication of slightly more indigenous and scientific knowledge about uses of neem in joint families.

Thus, the null hypothesis (H_{02}) was accepted and it was concluded that there was non-significant relationship between type of family and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

The result is propped up by the finding of Bhagat (2005).

4.5.10 Age of the eldest member in the family and knowledge of the farmwomen about various uses of neem

The data presented in Table 22 clearly indicated positive relationship between age of the eldest member in the family and indigenous and scientific knowledge about various uses of neem. It shows that the eldest person in the family did play a role in increasing the knowledge of neem tree owner tribal and non-tribal farmwomen in terms of indigenous and scientific uses of neem in agriculture and

other fields. However non-significant results disclose that this trend was not up to the considerable level.

Thus, the null hypothesis (H_0) was accepted and it was concluded that there was non-significant relationship between age of the eldest member in the family and indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem.

This finding is in conformity with the finding of Bhagat (2005)

4.5.11 Migration habit and knowledge of the farmwomen about various uses of neem

Migration tendency of neem tree owner tribal farmwomen was observed positively and non-significant with their knowledge about neem. The positive 'r' value indicates that knowledge the tribal farmwomen was observed better among those the tribal farmwomen who had high level of migration tendency but this affiliation was not up to the level of significant so it can be said that migration tendency of the tribal farmwomen did not play a significant role in increasing their knowledge about various uses of neem. As far as relationship between the knowledge the non-tribal farmwomen and their knowledge about neem was concerned, cent percent of the non-tribal farmwomen had no any habit of migration so such relationship was not worked out.

Thus, the null hypothesis (H_0) in case of migration tendency of the tribal farmwomen was accepted and it can be said that there was non-significant relationship between migration tendency of the tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The result is line with the finding Ghosh (2003).

4.5.12 Mass media exposure and knowledge of the farmwomen about various uses of neem

The data presented in Table 22 indicate that mass media exposure of neem tree owner tribal and non-tribal farmwomen had positive and significant relationship with their knowledge about neem. It shows that level of scientific and

indigenous knowledge about neem was observed better among those farmwomen who had high level of mass media exposure. High level of mass media exposure might have given them opportunity to get latest information about neem. This might be the reason for about findings.

Thus, the null hypothesis (H_{02}) in case of mass media exposure of the tribal and non-tribal farmwomen was rejected and it was concluded that there was significant relationship between mass media exposure of neem tree owner tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The result is supported by with the findings of Chauhan (1994), Wagle (1996) and Patel (1997).

4.5.13 Extension contact and knowledge of the farmwomen about various uses of neem

The positive non-significant relationship shown in above table states that extension contact did not affect on the indigenous and scientific knowledge about neem gaining process of neem tree owner tribal and non-tribal farmwomen. This result indicates that extension workers have to do more to improve indigenous and scientific knowledge of the farmwomen about usages of neem. It is observed that in general, extension personal are more conscious and competent in guiding about modern agricultural information than indigenes technology. In addition to this, because of social system revealing in rural area, farmwomen might have prevented themselves to contact male extension workers. Thus role of extension contact was not seen up to the level of significant in improving indigenes knowledge of the farmwomen

Thus, the null hypothesis (H_{02}) was accepted here and it was concluded that there was non-significant relationship between extension contact of neem tree owner tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The conclusion is supported by the conclusions of Kanani (1998), Patel (1998), Ghosh (2003), Ghosh (2004) and Bhagat (2005).

4.5.14 Cosmopoliteness and knowledge of the farmwomen about various uses of neem

Perusal of data presented in Table 22 indicates that cosmopoliteness of neem tree owner tribal farmwomen had positive and significant relationship with their knowledge about various uses of neem. It means that the knowledge about neem was observed better among those tribal farmwomen, who had high level of cosmopoliteness or say tendency to contact members of other than their own social system for guidance.

Thus, the null hypothesis (H_{02}) in case of cosmopoliteness of the tribal farmwomen was rejected and it can be concluded that there was significant relationship between cosmopoliteness of the tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

In case of non-tribal neem tree owner farmwomen, cosmopoliteness of them had positive and non-significant relationship with their knowledge about various uses of neem. It means that the cosmopoliteness did not affect on the indigenous and scientific knowledge about gaining process among non-tribal farmwomen.

Thus, the null hypothesis (H_{02}), in case of cosmopoliteness of non-tribal farmwomen was accepted and concluded that there was non-significant relationship between cosmopoliteness of non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The result is supported by with the findings of Kanani (1998), Patel (1998) and Bhagat (2005).

4.5.15 Scientific orientation and knowledge of the farmwomen about various uses of neem

It could be seen from Table 22 that scientific orientation of neem tree owner tribal and non-tribal farmwomen had positive relationship with their

knowledge about various uses of neem. It means that farmwomen who were highly oriented to the use of scientific methods in decision making in relation to adoption behavior had higher level of scientific and indigenous knowledge about neem. However, non-significant relationship indicates that this trend was not that important.

Thus, the null hypothesis (H_0) in case of scientific orientation of the tribal and non-tribal farmwomen was accepted and concluded that there was non-significant relationship between scientific orientation of the tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.

The result is supported by with the findings of Singh (1993) and Bhagat (2005).

4.5.16 Opinion about various uses of neem and knowledge of the farmwomen about various uses of neem

The data presented in Table 22 indicate that opinion about various uses of neem of neem tree owner tribal farmwomen had positive and non-significant relationship with their knowledge about various uses of neem. It means that opinion about various uses of neem did not affect tribal farmwomen's indigenous and scientific knowledge about neem usages.

Thus, the null hypothesis (H_0) in case of opinion about various uses of neem of the tribal farmwomen was accepted and concluded that there was non-significant relationship between opinion about various uses of neem of the tribal farmwomen and indigenous and scientific knowledge about neem usages.

In case of non-tribal neem tree owner farmwomen, opinion about various uses of neem had positive and significant relationship with their knowledge about various uses of neem. It means that indigenous and scientific knowledge about neem usages was observed better among those non-tribal farmwomen who had positive opinion about neem. The positive opinion towards any thing leads person to collect more information about it, this might be observed here also so farmwomen

with positive opinion might have tried more to know about various usages of neem. This might be the reason of above findings.

Thus, the null hypothesis (H_0) in case of opinion about various uses of neem of non-tribal farmwomen was rejected and it could be concluded that there was significant relationship between opinion about various uses of neem of non-tribal farmwomen and their indigenous and scientific knowledge about neem usages.

4.6 ADOPTION OF INDIGENOUS AND SCIENTIFIC VALUES OF NEEM BY TRIBAL AND NON-TRIBAL FARMWOMEN

Information regarding adoption pattern of neem tree was collected in three parts viz., "Used in past", "Using at present" and "Wish to use in future". The farmwomen were asked to give their responses about use of any parts of neem in the past from the time of interview which was considered as "Used in past", using any part at the time of interview was considered as "Using at present" and their wish was asked to use any parts of neem in future was considered as "Wish to use in future".

4.6.1 Adoption of indigenous and scientific values of tree

As far as adoption patterns of neem tree owner tribal farmwomen about neem tree in agriculture was concerned, it could be seen that 6.25 per cent of them used neem trees in past as wind breaker, while 7.50 per cent of them were using neem trees in past as wind breaker at the time of interview and 45.00 per cent of them shown interest to use in future. It can be seen that neem trees were used by 8.75 per cent of tribal farmwomen in past and 50.00 per cent at the time of interview, while 86.25 per cent shown their wish to use it in future to make farm implements. It can be seen that neem tree were not adopting in past and present for best uses of fallow land and to prevent soil erosion. At the same time it can be seen that 30.00 per cent and 38.75 per cent of the tribal shown interest to use neem tree for best uses of fallow land and to prevent soil erosion, respectively.

Table 23 : Distribution of the respondents according their adoption pattern of indigenous and scientific values^{of} neem n=160

Sr. No.	Particulars	Tribal farmwomen (n=80)			Non-tribal farmwomen (n=80)		
		Past No. (Per cent)	Present No. (Per cent)	Future No. (Per cent)	Past No. (Per cent)	Present No. (Per cent)	Future No. (Per cent)
I	Tree						
A	Adoption of neem tree in agriculture						
1	As a wind breaker	05 (6.25)	06 (7.50)	36 (45.00)	01 (1.25)	04 (5.00)	39 (48.75)
2	To use the fellow land	00 (00.00)	00 (00.00)	24 (30.00)	00 (00.00)	02 (2.50)	60 (75.00)
3	To prevent soil erosion	00 (00.00)	00 (00.00)	31 (38.75)	00 (00.00)	14 (17.50)	78 (97.50)
4	To make farm implements	07 (08.75)	40 (50.00)	69 (86.25)	22 (27.50)	67 (83.75)	78 (97.50)
B	Adoption of neem tree for general purposes						
1	For shade	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)
2	For furniture	55 (68.75)	68 (85.00)	80 (100.00)	35 (43.75)	66 (82.50)	80 (100.00)
3	For rearing of GALO	03 (3.75)	08 (10.00)	43 (53.75)	01 (1.25)	11 (13.75)	51 (63.75)
II	Leaves						
A	Adoption of neem leaves in agriculture						
1	For storage of grains	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)
2	As an animal feed	70 (87.50)	73 (91.25)	80 (100.00)	69 (86.25)	77 (96.25)	80 (100.00)
3	As a fertilizer	17 (21.25)	20 (25.00)	57 (71.25)	28 (35.00)	33 (41.25)	62 (77.25)

B Adoption of neem leaves for health care							
1	To prevent mosquito biting	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)
2	Anti venom against scorpion biting	23 (28.75)	00 (00.00)	52 (65.00)	21 (26.25)	00 (00.00)	49 (61.25)
3	Anti venom against snake biting	20 (25.00)	00 (00.00)	48 (60.00)	19 (23.75)	00 (00.00)	38 (47.50)
4	As a medicine for worms	09 (11.25)	09 (11.25)	33 (41.25)	05 (6.25)	12 (15.00)	37 (46.25)
5	Used in bathing water for prevention of dermal diseases.	51 (63.75)	64 (80.00)	76 (95.00)	57 (71.25)	51 (63.75)	63 (78.75)
6	To cure fever	66 (82.50)	60 (75.00)	73 (91.25)	52 (65.00)	55 (68.75)	74 (92.50)
7	As an anti-coughing agent	04 (5.00)	06 (7.50)	36 (45.00)	03 (3.75)	07 (8.75)	42 (52.50)
8	To cure piles	01 (1.25)	01 (1.25)	12 (15.00)	00 (00.00)	00 (00.00)	10 (12.50)
9	To control diabetes	09 (11.25)	00 (00.00)	20 (25.00)	02 (2.50)	00 (00.00)	15 (18.75)
10	For curing of ill health due to opium	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
C Adoption of neem leaves in industries							
1	As an ingredient of toothpaste	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
2	As an ingredient of soap	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)

III	Twigs/Branches						
A	Adoption of neem twigs/branches in agriculture						
1	To know the source of underground water	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
B	Adoption of neem twigs/branches in health						
1	As a toothbrush (Dahun)	80 (100.00)	80 (100.00)	80 (100.00)	76 (95.00)	59 (73.75)	75 (93.75)
C	Adoption of neem twigs/branches in home purpose						
1	As a fuel	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)	80 (100.00)
IV	Oil						
A	Adoption of neem oil in agriculture						
1.	To control of sucking pests						
i	To control of aphids (mustard)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
ii	To control of sucking pests in cotton	25 (31.25)	28 (35.00)	64 (80.00)	28 (35.00)	37 (46.25)	72 (90.00)
2.	To control of biting pests						
i	To control of leaf eating caterpillar	03 (3.75)	07 (8.75)	43 (53.75)	07 (8.75)	08 (10.00)	47 (58.75)
ii	To control Helicoverpa spp.	06 (7.50)	11 (13.75)	45 (56.25)	08 (10.00)	09 (11.25)	52 (65.00)
iii	To control cater semilooper	04 (5.00)	11 (13.75)	40 (50.00)	08 (10.00)	10 (12.50)	46 (57.50)
iv	To control of diamond back moth (cabbage)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
v	To control fruit borer (Okra)	04 (5.00)	14 (17.50)	41 (51.25)	13 (16.25)	27 (33.75)	55 (68.75)

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vi	To control white grub	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
vii	To control hairy caterpillar	00 (00.00)	03 (3.75)	21 (26.25)	03 (3.75)	12 (15.00)	33 (41.25)
3	As a fungicide	00 (00.00)	02 (2.50)	22 (27.50)	02 (2.50)	07 (8.75)	26 (32.50)
B	Adoption of neem oil for health care						
1	To control dandruff	04 (5.00)	13 (16.25)	27 (33.75)	20 (25.00)	24 (30.00)	43 (53.75)
2	To cure gum boil	02 (2.50)	04 (5.00)	18 (22.50)	03 (3.75)	05 (6.25)	22 (27.50)
3	As a contraceptive	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
4	To prevent mosquito biting	05 (6.25)	07 (8.75)	38 (47.50)	12 (15.00)	09 (11.25)	49 (61.25)
5	As nasal drop to cure sinus	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
C	Adoption of neem oil in Industries						
1	As an ingredient of soap	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
2	In preparation of medicines	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
D	Adoption of neem oil in home						
1	As a fuel in lamp	23 (31.25)	13 (16.25)	20 (25.00)	15 (18.75)	00 (00.00)	00 (00.00)
V	Cake						
A	Adoption of neem cake in agriculture						
1	To control nematodes	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)
2	To make the soil fertile	38 (47.50)	37 (46.25)	67 (83.75)	46 (57.50)	47 (58.75)	74 (92.50)
3	For urea coating	12 (15.00)	12 (15.00)	41 (51.25)	18 (22.50)	19 (23.75)	66 (82.50)

VI	Gum						
A	Adoption of neem gum for health care						
1	As medicine against itching ^a	01 (1.25)	00 (00.00)	40 (50.00)	00 (00.00)	00 (00.00)	44 (55.00)
2	As a tonic	01 (1.25)	00 (00.00)	37 (46.25)	00 (00.00)	00 (00.00)	49 (61.25)
VII	Root						
A	Adoption of neem root in agriculture						
1	To prevent soil erosion	10 (12.50)	14 (17.50)	35 (43.75)	15 (18.75)	17 (21.25)	37 (46.25)
B	Adoption of neem root for health care						
1	For making of the paste (Ghanvati) from bark	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)	00 (00.00)

As far as adoption patterns non-tribal neem tree owner farmwomen of neem tree in agriculture was concerned, it can be seen that 1.25 per cent of them used neem trees in past as wind breaker, while 5.00 per cent of them were using at the time of interview and 48.75 per cent of them shown interest to use in future. The data in table say that neem trees were not adopting in past by non of them for best use of fellow land, 2.50 per cent of them were using at the time of interview and 75.00 per cent them shown interest to use it in future. None of them used neem tree in past to prevent soil erosion, 17.50 per cent of them were using at the time of interview and 97.50 per cent them shown interest to use it in future. It can also be seen that neem trees were used by 27.50 per cent of non-tribal farmwomen in past and 83.75 per cent at the time of interview while 97.50 per cent shown their wish to use it in future to make farm implements.

As far as the adoption patterns of neem tree owner tribal and non-tribal farmwomen about other usages of neem tree were concerned, it can be seen that cent percent of them adopted neem trees for shading in past, present and wished to use it for the same in future.

The information given in table says that 68.75 per cent of neem tree owner tribal farmwomen had used neem tree for furniture in past, presently by 85.00 per cent and 100.00 per cent of them were willing to use it for the same in future. Incase of non-tribal neem tree owner farmwomen, 43.75 per cent of them had used neem tree for furniture in past, presently by 82.50 per cent and 100.00 per cent of them were willing to use it for the same in future. The cause behind favorable adoption was might be due to the higher costs of other wood like Teak wood, which are generally used for furniture.

Use of neem tree for rearing of Gallo was adopted by 3.75 per cent in past, 10.00 per cent during time of interview and 53.75 per cent expressed their interest to use it for the same in future by tribal farmwomen. Incase of non-tribal neem tree owner farmwomen, 1.25 per cent of them used of neem tree for rearing of Gallo in past, present by 13.75 per cent and 63.75 per cent of them were willing to use it for the same in future.

4.6.2 Adoption of indigenous and scientific values of neem leaves

As far as the agriculture uses of leaves of neem were concerned cent percent (100.00 per cent) of neem tree owner tribal farmwomen used neem leaves in storage of grains in past, present and shown their wish to use it in future. It can also be seen that 87.50 per cent of the tribal farmwomen had been using neem leaves to feed animals, which has been increased to 91.25 per cent during the time of interview and 100.00 per cent were likely to adopt the same practice in future. Incase of non-tribal neem tree owner farmwomen, as far as the agriculture uses of leaves of neem tree were concerned cent percent of them used neem leaves in storage of grains in past, present and shown their wish to use it in future. It can be also observed that 86.25 per cent of the non-tribal farmwomen had been using neem leaves to feed animals, which has been increased to 96.25 per cent during the time of interview and 100.00 per cent were likely to adopt the same practice in future.

Thus, it can be concluded that high level of adoption of neem leaves for storage grains and as an animal feed was observed by neem tree owner tribal and non-tribal farmwomen. The easy availability and habit to use this for the same from one generation to other generation might be the reason for above findings.

The use of neem leaves as fertilizers had been done by 21.25 per cent in past, 25.00 per cent during the time of interview and 71.25 per cent of neem tree owner tribal farmwomen shown their interest to adopt it for the same in future. Incase of non-tribal neem tree owner farmwomen, the use of neem leaves as fertilizers had been done by 35.00 per cent in past, 41.25 per cent during the time of interview and 77.25 per cent of them shown their interest to adopt it for the same in future.

As far as the health related usages of neem leaves were concerned, neem leaves were used to prevent mosquito biting in past and present by 100.00 per cent (100.00 per cent) of neem tree owner tribal and non-tribal farmwomen and each was ready to use it for the same in future.

The neem leaves as anti-venom against scorpion bite were used by 28.75 per cent of neem tree owner tribal farmwomen in past, while 65.00 per cent were interested to use it for the same in future. Incase of non-tribal neem tree owner farmwomen, 26.25 per cent them used it as anti-venom against scorpion biting in past, while 61.25 per cent were interested to use it for the same in future.

In case of snakebites, the uses of neem leaves as anti-venom in past and interest to use in future were found in 25.00 per cent and 60.00 per cent of neem tree owner tribal farmwomen, respectively. Incase of non-tribal neem tree owner farmwomen, the uses of neem leaves as anti-venom in past and interest to use in future were found in 23.75 per cent respondents in past, while 47.50 per cent were interested to use it for the same in future.

The neem leaves as medicine for worms had been adopted by 11.25 per cent of neem tree owner tribal farmwomen in past and at the time of interview, while 41.25 per cent of them were interested to adopt it in future. Incase of non-tribal

neem tree owner farmwomen, the neem leaves as medicine for worms had been adopted by 6.25 per cent of them in past and at the time of interview it was adopted by 15.00 per cent, while 46.25 per cent of them were interested to adopt it in future.

63.75 per cent of neem tree owner tribal farmwomen had used neem leaves in bath to prevent dermal diseases, 80.00 per cent in present, while 95.00 per cent were interested in adoption in future. Incase of non-tribal neem tree owner farmwomen, 71.25 per cent of them had used neem leaves in bath to prevent dermal diseases, 63.75 per cent in present, while 78.75 per cent were interested in adoption in future.

To cure fever, 82.50 per cent of neem tree owner tribal farmwomen used the neem leaves in past, 75.00 per cent in present and 91.25 per cent were ready to adopt it for the same in future. Incase of non-tribal neem tree owner farmwomen, to cure fever, 65.00 per cent of them used the neem leaves in past, 68.75 per cent in present and 92.50 per cent were ready to adopt it in future.

In past, 5.00 per cent of neem tree owner tribal farmwomen had used neem leaves as anti coughing agent, presently by 7.50 per cent and 45.00 per cent showed their interest to use it in future. Incase of non-tribal neem tree owner farmwomen, 3.75 per cent of them had used neem leaves as anti coughing agent in past, 8.75 per cent in present and 52.50 per cent of them showed interest to use it in future.

Neem leaves to cure piles have been used by 1.25 per cent of neem tree owner tribal farmwomen in past and present too, while 15.00 per cent of them were interested to use it in future. Incase of non-tribal neem tree owner farmwomen, none of them used neem leaves o cure piles in past and present, while 12.50 per cent of them were interested to use it in future.

To control diabetes, 11.25 per cent of neem tree owner tribal farmwomen used neem leaves in past, but nobody was using at the time of interview and 25.00 per cent were interested to use it in future. Incase of non-tribal neem tree owner farmwomen, 2.5 per cent of them used neem leaves to control diabetes in past,

but nobody was using at the time of interview in present and 18.75 per cent were interested to use it in future

For curing ill health due to opium consumption, nobody of neem tree owner the tribal and non-tribal farmwomen used neem leaves in past and present. In addition to this, nobody of them agreed to use it in future because they did not have habit and had no wish to consume opium.

As far as industrial uses of neem leaves in making toothpaste and soap were concerned, none of the tribal and non-tribal neem tree owner farmwomen adopted it in past and present and nobody of them were interested to use it in future. It can be seen that they did not adopt neem leaves in industrial because tribal farmwomen have poor economic condition and were not in position to have their own industries.

4.6.3 Adoption of indigenous and scientific values of neem branches

As far as agriculture uses of branches of neem tree was concerned, none of the tribal and non-tribal neem tree owner farmwomen used in past, in present and ready to use in future to detect the sources of underground water.

As far as other uses of neem branches were concerned, cent percent (100.00 per cent) of neem tree owner tribal farmwomen had adopted it as datun and fuel in past and present and all of them were ready to continue such uses in future. Incase of non-tribal neem tree owner farmwomen, 95.00 per cent of them had adopted it as datun in past, 73.75 per cent in present and 93.75 per cent of them were ready to use it in future. Cent percent of the non-tribal neem tree owner farmwomen had adopted it as fuel in past and pre sent and all of them were ready to continue these uses in future.

4.6.4 Adoption of indigenous and scientific values of neem oil

As far as the uses of neem oil in agriculture were concerned, none of neem tree owner tribal and non-tribal farmwomen were using neem oil to control

aphid in past and present, at the same time none of them had interest to use it in future.

To control sucking pest in cotton, neem oil had been used by 31.25 per cent of neem tree owner tribal farmwomen in past, 35.00 per cent in present and 80.00 per cent were interested to use it in future. Incase of non-tribal neem tree owner farmwomen, to control sucking pest in cotton, neem oil had been used by 35.00 per cent them in past, 46.25 per cent in present and 90.00 per cent were interested to use it in future.

The neem oil had been used to control leaf-eating caterpillar by 3.75 per cent of neem tree owner tribal farmwomen in past, 8.75 per cent in present, while 53.75 per cent showed their interest to use it in future. The neem oil was used to control *Helicoverpa* spp. by 7.50 per cent of neem tree owner tribal farmwomen in past, 13.75 per cent were using in present and 56.25 per cent were interested to use it in future. To control castor semilooper, 5.00 per cent of them used neem oil in past, 13.75 per cent were using presently and 50.00 per cent were ready to use in future.

Incase of non-tribal neem tree owner farmwomen, to control leaf-eating caterpillar 8.75 per cent them used neem oil in past, 10.00 per cent in present, while 58.75 per cent showed their interest toward its future use. To control *Helicoverpa* spp., 10.00 per cent used in past, 11.25 per cent in present and 65.00 per cent were interested to use it in future. To control castor semilooper, 10.00 per cent used neem oil in past, 12.50 per cent were using presently and 57.50 per cent were ready to use in future.

No adoption by tribal and non-tribal neem tree owner farmwomen in past, present and future was observed for controlling diamond back moth in cabbage because cabbage was not grown by any of them.

To control fruit borer of okra, 5.00 per cent of neem tree owner tribal farmwomen had adopted neem oil in past, 17.50 per cent in present and 51.25 per cent were interested to adopt it in future. Incase of non-tribal neem tree owner farmwomen, 16.25 per cent of them had adopted neem oil to control fruit borer of

okra in past, 33.75 per cent in present and 68.75 per cent were interested to adopt it in future.

No adoption by tribal and non-tribal neem tree owner farmwomen in past, present and future of neem oil to control white grub was found because groundnut was not grown in the area of study.

To control hairy caterpillar no adoption was found in past, but it was adopted by 3.75 per cent of neem tree owner tribal farmwomen in present and 26.25 per cent were interested to adopt it in future. Incase of non-tribal neem tree owner farmwomen, 3.75 per cent of them adopted it to control hairy caterpillar in past, 15.00 per cent in present and 41.25 per cent were interested to adopt it in future.

Neem oil as fungicide had not been adopted in past, but it was adopted by 2.50 per cent of neem tree owner tribal farmwomen currently and 27.50 per cent were interested to adopt it in future. Incase of non-tribal neem tree owner farmwomen, 2.50 per cent of them had adopted neem oil as fungicide in past, 8.75 per cent were using it at the moment and 32.50 per cent were interested to adopt it in future.

As far as the health related usage of neem oil was concerned, 5.00 per cent of neem tree owner tribal farmwomen used it to control dandruff in past, 16.25 per cent were using it currently and 33.75 per cent showed their interest in future use. Incase of non-tribal neem tree owner farmwomen, as far as health related usage of neem oil was concerned, 25.00 per cent of them used it to control dandruff in past, 30.00 per cent were using it presently and 53.75 per cent showed their interest in future use.

To cure gumboil of teeth, 2.50 per cent of neem tree owner tribal farmwomen used neem oil in past, 5.00 per cent were using in present and 22.50 per cent were prepared to use it in future. Incase of non-tribal neem tree owner farmwomen, 3.75 per cent of them used neem oil in past to cure gumboil of teeth, 6.25 per cent were using in present and 27.50 per cent were prepared to use it in future.

No adoption by the tribal and non-tribal neem tree owner farmwomen regarding usages of neem oil as contraceptive in past, present and future was seen.

Application of neem oil on body to prevent mosquito biting was made by 6.25 per cent of neem tree owner tribal farmwomen in past, 8.75 per cent in present and 47.50 per cent were prepared to use it in future. Incase of non-tribal neem tree owner farmwomen, application of neem oil on body to prevent mosquito biting was made by 15.00 per cent in past, 11.25 per cent in present and 61.25 per cent were prepared to use it in future.

None of neem tree owner tribal and non-tribal farmwomen adopted neem oil as nasal drop to cure sinus in past and in present, at the same time nobody was interested to adopt it in future for the same due to lack of knowledge.

As far as industrial usages of neem oil were concerned, none of neem tree owner tribal and non-tribal farmwomen used it in making soap and medicine in past, present and at the same time nobody was interested to use it in future use.

Use of neem oil as a fuel in lamp had been adopted by 31.25 per cent of the tribal farmwomen in past, 16.25 per cent in present, while 25.00 per cent were interested to adopt it in future. Incase of non-tribal neem tree owner farmwomen, 18.75 per cent of them used of neem oil as a fuel in lamp in past, while none of them adopted neem oil as a fuel in lamp in present and in future because of availability of electricity.

4.6.5 Adoption of indigenous and scientific values of neem cake

As far as agricultural usages of neem cake were concerned, none of neem tree owner tribal and non-tribal farmwomen adopted it to control nematodes in past and at the time of interview. At the same time none of them was interested to use it in future due to lack of knowledge.

To improve soil fertility, 47.50 per cent of neem tree owner tribal farmwomen had used neem cake formally, 46.25 per cent were using presently and 83.75 per cent were ready to use in future. Incase of non-tribal neem tree owner

farmwomen, 57.50 per cent of them had used neem cake to make soil fertile in past, 58.75 per cent were using presently and 92.50 per cent were ready to use in future.

The neem cake for coating urea was used by 15.00 per cent of neem tree owner tribal farmwomen in past and in present and 51.25 per cent of them shown their interest to use it in future. Incase of non-tribal farmwomen, 22.50 per cent of them used neem cake for coating urea in past, 23.75 per cent were using in presently and 82.50 per cent of them shown interest to use it in future.

4.6.6 Adoption of indigenous and scientific values of neem gum

As far as the health related uses of neem gum were concerned, 1.25 per cent of neem tree owner tribal farmwomen adopted neem gum as itching medicine and as a tonic in past, none of them were using presently and 50.00 per cent and 46.25 per cent of them were interested to use it as itching medicine and as a tonic in future, respectively. Incase of non-tribal neem tree owner farmwomen, no past and present adoption of neem gum as itching medicine and as a tonic was found but 55.00 per cent and 61.25 per cent of them were interested to use it as itching medicine and as a tonic in future, respectively.

4.6.7 Adoption of indigenous and scientific values of neem root

As far as agricultural usage of neem root was concerned, 12.50 per cent of neem tree owner tribal farmwomen adopted it to prevent soil erosion in past, 17.50 per cent of them were using at the time of interview and 43.75 per cent were interested to use it in future. Incase of non-tribal farmwomen, 18.75 per cent of them adopted it to prevent soil erosion in past, 21.25 per cent of them were using at the time of interview and 46.25 per cent were interested to use it in future.

As far as health related usage of neem root was concerned, none of the tribal and non-tribal neem tree owner farmwomen adopted it for making of the paste (Ghanvati) from bark in past, present and at the same time none of them was prepared to use it for the same in future due to lack of knowledge.

4.8 COMPARISON BETWEEN THE ADOPTION OF INDIGENOUS AND SCIENTIFIC VALUES OF VARIOUS PARTS OF NEEM BY TRIBAL AND NON-TRIBAL FARMWOMEN

4.8.1 Adoption of neem tree by tribal and non-tribal farmwomen

Information shows in the Table 24 that there was significant difference of adoption about the agricultural uses of neem tree between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H03) was rejected. The data shows that adoption behaviors of non-tribal farmwomen were comparatively more positive than the tribal farmwomen.

A searching look into the Table 26 that there was non-significant difference of adoption about the various uses of neem tree between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H03) was accepted. The data shows that adoption behaviors of the tribal farmwomen were comparatively more positive than non-tribal farmwomen about the various uses of neem.

4.8.2 Adoption of neem leaves by tribal and non-tribal farmwomen

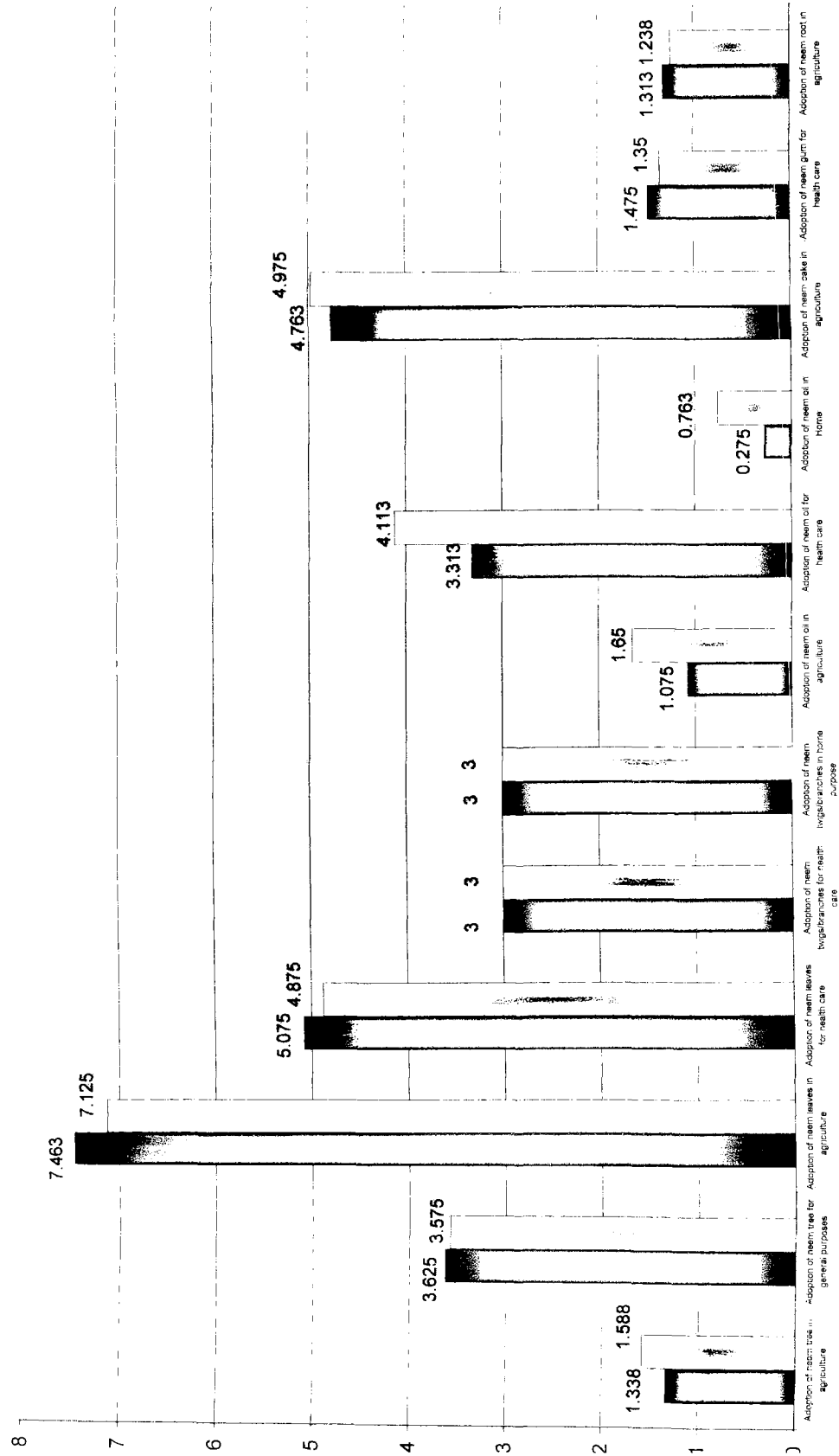
Information shows in Table 24 that there was significant difference of adoption about the agricultural uses of neem leaves between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H03) was rejected. The data shows that incase of agricultural related the indigenous and scientific uses of neem leaves non-tribal farmwomen had better adoption behaviour than the tribal farmwomen.

It can be concluded from that Table 26 that there was non-significant difference of adoption about the health related uses of neem leaves between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H03) was accepted. But here adoption behaviour of the tribal farmwomen was comparatively more than non- tribal farmwomen about the health related uses of neem.

Table 24 : Comparison between the adoption of indigenous and scientific values of various parts of neem by tribal and non-tribal farmwomen n=160

Sr. No.	Item	Mean		't' value
		Tribal (n=80)	Non-tribal (n=80)	
1	Tree			
A	Adoption of neem tree in agriculture	1.338	1.588	2.423 *
B	Adoption of neem tree for general purposes	3.625	3.575	0.326 NS
2	Leaves			
A	Adoption of neem leaves in agriculture	7.463	7.125	2.066 *
B	Adoption of neem leaves for health care	5.075	4.875	0.346 NS
3	Branch			
A	Adoption of neem twigs/branches for health care	3.000	3.000	--
B	Adoption of neem twigs/branches in home purpose	3.000	3.000	--
4	Oil			
A	Adoption of neem oil in agriculture	1.075	1.650	5.554 *
B	Adoption of neem oil for health care	3.313	4.113	4.356 *
C	Adoption of neem oil in Home	0.275	0.763	6.805 *
5	Cake			
A	Adoption of neem cake in agriculture	4.763	4.975	0.609 NS
6	Gum			
A	Adoption of neem gum for health care	1.475	1.350	3.942 *
7	Root			
A	Adoption of neem root in agriculture	1.313	1.238	0.497 NS

Note: *=Significant at .05 levels



Adoption

Fig. 19 : Comparison between the adoption of indigenous and scientific values of various parts of neem by tribal and non-tribal farmwomen

4.8.3 Adoption of neem braches by tribal and non-tribal farmwomen

Information indicates in the Table 24 that there was no any difference of adoption about the heath related uses of neem branch between the tribal and non-tribal neem tree owner farmwomen. Here mean score of adoption behaviour of the tribal and non-tribal farmwomen is same incase of the heath related uses of neem branch.

Information shows in Table 26 that there was no any difference of adoption about the home purpose uses of neem branch between the tribal and non-tribal neem tree owner farmwomen. Here mean score of adoption behaviour of the tribal and non-tribal farmwomen is same incase of the home uses of neem branch.

4.8.4 Adoption of neem oil by tribal and non-tribal farmwomen

Information shows in the Table 24 that there was significant difference of adoption about the agricultural uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H03) was rejected. The data shows that adoption behaviors of the tribal farmwomen were comparatively more positive than non-tribal farmwomen about the agricultural uses of neem oil.

As seen from the Table 26 that there was significant difference of adoption about health related uses of neem oil between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H03) was rejected. The data shoes that health related uses of neem oil non-tribal farmwomen were better in adoption behaviour than the tribal farmwomen.

Information in the Table 26 discloses that there was significant difference of adoption about home purpose uses of neem oil between tribal and non-tribal farmwomen. Hence, the null hypothesis (H03) was rejected. The data shows that adoption behaviors of the tribal farmwomen were comparatively more positive than non-tribal farmwomen about home uses of neem oil.

4.8.5 Adoption of neem cake by tribal and non-tribal farmwomen

The data presented in the Table 24 disclose that there was non-significant difference of adoption about the agricultural uses of neem cake between

the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H03) was accepted. But here adoption behaviour of non-tribal farmwomen was comparatively more than the tribal farmwomen.

4.8.6 Adoption of neem gum by tribal and non-tribal farmwomen

Information shows in Table 24 that there was significant difference of adoption about the agricultural uses of neem gum between the tribal and non-tribal neem tree owner farmwomen. Hence, the null hypothesis (H03) was rejected. The data shows that in case of agricultural related the indigenous and scientific uses of neem gum non-tribal farmwomen had better adoption behaviour than the tribal farmwomen.

4.8.7 Adoption of neem root by tribal and non-tribal farmwomen

A searching look into the Table 24 reveals that there was non-significant difference of adoption about agriculture uses of neem root between the tribal and non-tribal neem tree owner farmwomen. Thus, the null hypothesis (H03) was accepted. But here adoption behaviour of the tribal farmwomen was comparatively more positive than non-tribal farmwomen.

4.9 PROBLEMS FACED BY FARMWOMEN FOR VARIOUS USES OF NEEM

In the present study, some constraints faced by the farmwomen were also studied. The information regarding this is given in Table 25.

A glance of the table 25 shows that less exposure of training, insufficient knowledge about various uses of neem, unavailability of neem based products in market, unavailability required quantity of neem and unavailability of sufficient literature on usages of neem were major problems and less coverage of such information in communication means were minor problems faced by neem tree owner tribal farmwomen in using neem for agriculture, health and other purposes.

In case of non-tribal neem tree owner farmwomen, unavailability of sufficient literature on usages of neem, less exposure of training, less coverage of neem related information in communication media, insufficient knowledge about

various uses of neem, unavailability of neem based products in market and unavailability of required quantity of neem trees were major problems faced by non-tribal farmwomen in using neem for agriculture, health and other purposes.

Table 25 : Constrains faced by farmwomen for various uses of neem n=160

No.	Problems	Tribal (n=80)		Non-tribal (n=80)	
		Mean Score	Rank	Mean Score	Rank
1	Less exposure of training	1.96	I	1.87	II
2	Unavailability of sufficient literature on usages of neem	0.83	V	1.94	I
3	Less coverage of neem related information in communication media.	0.43	VI	1.84	III
4	Insufficient knowledge about various uses of neem	1.93	II	1.22	IV
5	Unavailability of neem based products in market	1.92	III	1.33	V
6	Unavailability required quantity of neem trees	1.43	IV	0.93	VI

4.11 SUGGESTIONS OF THE FARMWOMEN TO ACCELERATE RATE OF NEEM USE AMONG THE FARMWOMEN

A look at the Table 26 data presented the information on suggestions made by the farmwomen to accelerate the rate of neem use among them.

The Table 26 reveals that major suggestions given by neem tree owner tribal and non-tribal farmwomen in this regards were; training programmes on various uses of neem should be organized at village level, the posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village, indigenous knowledge should be tested on scientific grounds and should be extended further, guidance on the uses of neem should be provided right from school level and efforts should be made to use fellow land by neem plantation to create awareness about neem.

Table 26 : Suggestions of the farmwomen to accelerate rate of neem use among the farmwomen n =160

No.	Suggestions	Tribal (n=80)		Non-tribal (n=80)	
		Mean Score	Rank	Mean Score	Rank
1	Training programmes on various uses of neem should be organized at village level	1.98	I	1.96	I
2	The posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village	1.92	II	1.90	II
3	Indigenous knowledge should be tested on scientific grounds and should be extended further	1.85	III	1.83	III
4	Guidance on the uses of neem should be provided right from school level	1.78	IV	1.76	IV
5	Efforts should be made to use fellow land by neem plantation to create awareness about neem	1.58	V	1.62	V

Summary and Conclusion

V. SUMMARY AND CONCLUSION

This chapter deals with the brief account of present investigation for future research.

SUMMARY

Neem (*Azadirachta indica*, *A. Juss*) belongs to the family *Meliaceae*. It is a hardy, quick growing, evergreen tree. Fresh neem leaves and flowers come in March-April. The lifespan of tree is more than two centuries. It is naturally distributed on Shivalik hills of Uttar Pradesh and hillock of Deccan, in Karnataka and adjoining states. Neem is bitter in taste due to the presence of "*Triterpenese*" or "*Limonoids*". The most important bioactive substance of neem is "*Azadirachtin*". The neem tree grows on almost all type of soils and wide range of climate. Neem tree is recognized as "*Kalpavriksha*" because all parts of neem and its products are very useful in agriculture, in industries in medicines and in other fields. The important parts of neem like leaves are used as animal feed, storage of grains, and making of soap and toothpastes. Neem kernel powder is use to protect against weevil, lesser grain borer and Khapra beetle. Oilcake is used as a fertilizer and manure. Green twigs are used as toothbrushes and as a prophylactic for mouth and teeth complaints. Neem oil is used as antiseptic, for burning purposes for making of soaps and toothpastes and hydrogenation. Gum is used in medicines and for dyeing silk. Bark is useful in fever, nausea, vomiting and skin diseases. Timber is used for agricultural implement.

Because of versatile usages and availability all around in the fields and near by houses in rural area, neem has taken a place of important tree in the hearts of farmwomen of the tribal and non-tribal region. To motivate rural people to make best uses of this tree in agriculture and other work, farmwomen's role can be aggravated. It is believed that farmwomen can play significant role in popularizing, maintaining and adopting easily available natural material for various economic profit of family. Neem as an important eco and farmers-friendly natural material,

farmwomen can be encouraged to popularize usages of this tree. To understand existing status of this tree among farmwomen, it was realized to examine the level of awareness of rural farmwomen regarding this tree to know the existing place of neem tree among them. With this back ground in mind, the present study was undertaken with following objectives;

5.1 OBJECTIVES OF THE STUDY

1. To study profile of the neem tree owner tribal and non-tribal farmwomen.
2. To find out opinion of the neem tree owner tribal and non-tribal farmwomen regarding use of neem.
3. To measure the indigenous and scientific knowledge about neem of the tribal and non-tribal farmwomen located around neem.
4. To find out relationship between profile of the tribal and non-tribal farmwomen and their indigenous and scientific knowledge about various uses of neem.
5. To find out pattern of adoption of various parts of neem by the tribal and non-tribal farmwomen located around neem.
6. To analyze constraints faced by the tribal and non-tribal farmwomen about various uses of neem.
7. To seek the suggestions of the tribal and non-tribal farmwomen to improve their existing status of indigenous and scientific knowledge of neem and improving its uses.

5.2 REVIEW OF LITERATURE

A brief account of literature reviewed were presented under nine heads *viz.*, Importance of the indigenous knowledge, scientific studies on usages of neem in agriculture, adoption of indigenously and scientifically approved values of plants, profile of the indigenous and scientific knowledge holder and adopter respondents, opinion of the farmers about various uses of neem, relationship between knowledge

and profile of the respondents, constraints faced by farmers for various uses of neem and suggestions of the farmers to accelerate rate of neem use among the farmers. On the basis of the review of literature dependent and independent variables were selected.

5.3 METHODOLOGY

The methodological procedure consisted of dependent and independent variables, setting and selection of the respondents, analysis of data and various statistical measures used to test the hypothesis. To measure the indigenous and scientific knowledge of the neem tree owner tribal and non-tribal farmwomen about the various uses of various parts of neem was measured in terms of yes and no responses. The adoption behaviour of was measured in three parts *viz.*, "Used in past", "Using at present" and "Wish to use in future". To measure the selected independent variables, the scales developed by various researchers were used with slightly modifications. The present investigation was carried out on a randomly selected sample of eighty tribal farmwomen and eighty non-tribal farmwomen of Chhotaudaipur and Sankheda taluka of Baroda district of Gujarat. The data were collected with the help of structural schedule by personal interview method. The data so collected were coded, classified, tabulated and analyzed in order to make the findings meaningful.

5.4 Hypothesis of the study

H₀₁: There is no difference between knowledge of tribal and non-tribal farmwomen about various uses of neem.

H₀₂: There is no relationship between selected independent variables of the tribal and non-tribal farmwomen and their scientific and indigenous knowledge regarding various uses of neem.

H₀₃: There is no difference between adoption behaviour of tribal and non-tribal farmwomen about various parts of neem.

5.5 MAJOR FINDINGS

The important findings of the study are summarized as below:

5.5.1 Profile of the indigenous practices users:

5.5.1.1 Age

Majority of the neem tree owner tribal farmwomen (75.00 per cent) and non-tribal farmwomen (56.25 per cent) had middle age.

5.5.1.2 Education

Great majority (93.75 per cent) of the neem tree owner tribal farmwomen were illiterates at the same time majority (62.50 per cent) of the neem tree owner non-tribal farmwomen had primary to secondary level of formal education.

5.5.1.3 Occupation

Majority of the neem tree owner tribal farmwomen (81.25 per cent) and non-tribal farmwomen (72.50 per cent) were dependent on agriculture, animal husbandry and labour work.

5.5.1.4 Land holding

Slightly less than two fifth (37.50 per cent) of the neem tree owner tribal and half of the non-tribal (50.00 per cent) farmwomen had small size (up to 2.0 acres) of land holding.

5.5.1.5 Herd size

Majority of the tribal the neem tree owner farmwomen (81.25 per cent) and non-tribal neem tree owner farmwomen (72.50 per cent) had at least one or more than one animals.

5.5.1.6 Annual income

Majority of the neem tree owner tribal (77.50 per cent) and non-tribal (67.50 per cent) farmwomen had low level (up to Rs. 10,000/-) of annual income.

5.5.1.7 Organization participation

Great majority of the neem tree owner tribal (92.50 percent) and non-tribal (95.00 per cent) farmwomen had no participation in any organization.

5.5.1.8 Size of family

Majority of the tribal (61.25 per cent) and non-tribal (56.25 per cent) neem tree owner farmwomen had 5 to 8 members in their family.

5.5.1.9 Type of family

Majority of the neem tree owner tribal (66.25 per cent) and non-tribal (60.00 per cent) farmwomen had joint type family.

5.5.1.10 Age of elder person in family

Majority of the neem tree owner tribal (71.25 per cent) and non-tribal (55.00 per cent) farmwomen had elderly person in their family between 31 to 50 years of age.

5.5.1.11 Migration tendency:

Majority (71.25 per cent) of the neem tree owner tribal farmwomen had every year migration tendency during last three years. In case of non-tribal farmwomen, cent per cent of them had no any migration tendency during last 3 years.

5.5.1.12 Mass media expose

Majority of the neem tree owner tribal (86.25 per cent) and non-tribal (66.25 per cent) farmwomen had low mass media exposure.

5.5.1.13 Extension contact

Majority of the neem tree owner tribal farmwomen (80.00 per cent) and non-tribal farmwomen (77.50 per cent) located around neem had no contact with extension officer.

5.5.1.14 Compositeness

Slightly more than two fifth (42.50 per cent) of the neem tree owner tribal farmwomen had medium level of cosmopoliteness while majority (72.50 per cent) of the neem tree owner non-tribal farmwomen had high level of cosmopoliteness.

5.5.1.15 Scientific orientation

Majority of the neem tree owner tribal farmwomen (61.25 per cent) and non-tribal farmwomen (85.00 per cent) had high level of scientific orientation.

5.5.2 Opinion of the farmers about various uses of neem

Nearly cent percent of the neem tree owner farmwomen (96.25 per cent) and non-tribal farmwomen (98.25 per cent) had opinion that neem tree is useful for curing many human diseases and opinioned that neem is useful for crop protection in agriculture.

Majority of the neem tree owner tribal (80.00 per cent) and non-tribal farmwomen (66.25 per cent) had natural opinion for the statement; "consumption of neem is unpleasant as it is bitter in test so it is not preferred to use".

Majority of the neem tree owner tribal (62.50 per cent) and non-tribal farmwomen (53.75 per cent) had neutral opinion that the preparatory practices for the use of neem is a tedious job.

Nearly cent percent neem tree owner tribal farmwomen (96.25 per cent) and cent percent (100.00 per cent) non-tribal farmwomen had opinioned that neem is as good as *Kalpavriksha* at the same time it was also observed that cent percent of the

neem tree owner tribal and non-tribal farmwomen optioned that there is no side effect in using neem.

5.5.3 Indigenous and scientific knowledge of the tribal and non-tribal farmwomen about various uses of neem

5.5.3.1 Knowledge about indigenous and scientific usages of neem tree

Cent per cent of the neem tree owner tribal farmwomen knew use of neem tree to make farm implements, followed by 96.25 per cent and 93.75 per cent of them had knowledge to use it for the prevention soil erosion and for best use of the fallow land, respectively. While 82.50 per cent of them had knowledge to use it as a windbreaker. Incase of non tribal neem tree owner farmwomen, more than three forth of them had knowledge to use it for making farm implements (97.50 per cent), for best use of the fallow land (97.50 per cent), for the prevention soil erosion (96.25 per cent) and as a windbreaker (83.75 per cent).

Cent percent (100.00 per cent) of tribal neem tree owner farmwomen had knowledge to use neem tree for rearing of Gallo, followed by 96.25 per cent, 93.75 per cent and 82.50 per cent of them had knowledge of neem tree for furniture or wood, for creating conducive atmosphere for raining and for shading, respective. While, incase of non-tribal farmwomen, great majority (97.50 per cent) of them had knowledge to use neem tree for rearing of Gallo and for creating conducive atmosphere for raining, followed by 96.25 per cent and 83.75 per cent of them had knowledge to use it for wood or furniture and for shading, respective.

5.5.3.2 Knowledge about indigenous and scientific usages of neem leaves

Cent percent (1000.00 per cent) of tribal and non-tribal neem tree owner farmwomen had knowledge of agriculture related usages of neem leaves for storage of grains and as an animal feed, while 73.75 per cent of the tribal farmwomen and 86.25 per cent of non-tribal had knowledge to use neem leaves for fertilizer.

Cent percent of neem tree owner tribal farmwomen had knowledge of health related usages of neem leaves to prevent mosquito and slightly less than cent per cent of them had knowledge of neem leaves to cure fever (98.75 per cent) and dermal diseases (96.25 per cent). It was seen that 85.00 per cent, 81.25 per cent, 55.00 per cent, 36.25 per cent and 30.00 per cent of them had knowledge of usages of neem leaves as an antidote for snakebite and scorpion biting, a medicine for worms, anti coughing agent and a medicine for diabetes, respectively. While only 5.00 per cent knew its usage for piles. Incase of non-tribal farmwomen, cent percent of them had knowledge of health related usages of neem leaves to cure fever. It can be seen that 90.00 per cent, 72.50 per cent, 40.00 per cent, 33.75 per cent, 32.50 per cent and 15.00 per cent of them had knowledge of usages of neem leaves to cure dermal diseases, to prevent mosquito, as an antidote for snakebite and scorpion biting, anti coughing agent, a medicine for worms and a medicine for diabetes, respectively. While only 2.50 per cent knew its usage for piles. None of the neem tree owner tribal and non-tribal farmwomen knew usefulness of neem leaves for curing ill health caused by opium consumption.

Majority (71.25 per cent) of neem tree owner tribal farm women had knowledge of industrial usages of neem leaves as an ingredient of soap and 66.25 per cent of them knew that it can be used as ingredient of tooth paste. Incase of non-tribal neem tree owner farmwomen, more than three forth of them had knowledge of industrial usages of neem leaves as an ingredient of soap (80.00 per cent) and as ingredient of toothpaste (76.25 per cent).

5.5.3.3 Knowledge about indigenous and scientific usages of neem twigs/branches

Cent percent (100.00 per cent) of neem tree owner tribal and non-tribal farmwomen had knowledge of various usages of neem branches as a toothbrush (Daton) and fuel, while none of the neem tree owner tribal and non-tribal

farmwomen had knowledge about agricultural related usage of neem branches to know the source of underground water.

5.5.3.4 Knowledge about indigenous and scientific usages of neem oil

Slightly more than half (51.25 per cent) of the neem tree owner tribal farmwomen had knowledge of agriculture related usages of neem oil for the control of sucking pest in cotton, followed by 33.75 per cent, 30.00 per cent, 27.50 per cent, 25.00 per cent, 23.75 per cent and 20.00 per cent of them had knowledge of usefulness of neem oil for the control of fruit borer of okra, *Helicoverpa* spp., leaf eating caterpillar, castor semilooper, fungus and hairy caterpillar, respectively. Incase of non-tribal neem tree owner farmwomen, majority (66.25 per cent) of them had knowledge of agriculture related usages of neem oil for the control of sucking pest in cotton, followed by 48.75 per cent, 38.75 per cent, 33.75 per cent, 32.50 per cent, 31.25 per cent and 30.00 per cent of them had knowledge of usefulness of neem oil for the control of leaf eating caterpillar, fruit borer of okra, hairy caterpillar, *Helicoverpa* spp., castor semilooper and fungus, respectively.

Some agricultural usages of neem oil for the control of aphids of mustard, diamond back moth of cabbage and white grub were not known by any of the neem tree owner tribal and non-tribal farmwomen.

Slightly less than half of the tribal farmwomen had knowledge of health related usages of neem oil for the control of dandruff (43.75 per cent), to apply on human body to prevent mosquito biting (42.50 per cent) and for the cure of gum boil (21.25 per cent). In case of non-tribal neem tree owner farmwomen majority (68.75 per cent) of them had knowledge of health related usages of neem oil for the control of dandruff, followed by 65.00 per cent and 36.25 per cent of them had knowledge of its apply on human body to prevent mosquito biting and for the cure of gum boil, respectively. While none of neem tree owner tribal and non-tribal farmwomen had knowledge of usages of neem oil as contraceptive and as nasal drop to cure of sinus.

Majority (72.50 per cent) of neem tree owner tribal farmwomen had knowledge of industrial usages of neem oil as an ingredient of soap, followed by 45.00 per cent of them had knowledge to use it in the preparation of medicines. Incase of non-tribal farmwomen, majority (83.75 per cent) of them had knowledge of industrial usages of neem oil as an ingredient of soap, followed by 56.25 per cent of them had knowledge to use it in the preparation of medicines.

36.25 per cent of tribal farmwomen and 32.50 per cent of non-tribal farmwomen knew usage of neem oil as fuel in lamp.

5.5.3.5 Knowledge about indigenous and scientific usages of neem cake

Majority (61.25 per cent) of neem tree owner tribal farmwomen had knowledge of agriculture related usages of neem cake to improve soil fertility, followed by 22.50 per cent of them had knowledge to use neem cake for urea coating. Incase of non-tribal neem tree owner farmwomen, majority (72.50 per cent) of them had knowledge of agriculture related usages of neem cake to improve soil fertility, followed by 41.25 per cent of them had knowledge to use neem cake for urea coating. While other usage of neem cake to control nematodes was not known by any of the neem tree owner tribal and non-tribal farmwomen.

5.5.3.6 Knowledge about indigenous and scientific usages of neem gum

Only 2.50 per cent of neem tree owner tribal farmwomen had knowledge of health related usages of neem gum as a medicine against itching and as a tonic. Incase of non-tribal farmwomen, followed by 11.25 per cent and 6.25 per cent of them had knowledge of health related usages of neem gum as a tonic and as a medicine against itching, respectively.

5.5.3.7 Knowledge about indigenous and scientific usages of neem root

Majority (71.25 per cent) of neem tree owner tribal farmwomen and non-tribal farmwomen had knowledge of agricultural usage of neem root to prevent soil

erosion, while none of the tribal and non-tribal farmwomen had knowledge of health related usage of neem root for making of the paste (Ghanvati) from bark.

5.5.3.8 Knowledge about method of preparing a solution of neem seed kernel and neem oil

None of the neem tree owner of tribal farmwomen knew the procedure to separate kernel from neem seed, procedure of preparing solution from the neem seed kernel for spraying, the exact measurement of preparing 5 % solution of extracted kernel and procedure for preparing neem oil solution for spraying.

Incase of the neem tree owner non-tribal farmwomen, 5.00 per cent knew the procedure for preparing the neem oil solution for spraying, followed by 3.75 per cent of them had knowledge to prepare solution of 5 % of extracted neem kernel. While only 2.5 per cent of them knew the procedure to separate kernel from neem seed and preparing solution from the neem kernel for spraying.

5.5.3.9 General awareness about neem

The majority (91.25 per cent) of neem tree owner tribal farmwomen had awareness that neem is used in plant protection to kill the insects by its poisonous effect, while other awareness like affects of neem on the biting/chewing habit, growth of egg of the insects and its effect and to prevent the female insects from egg laying were not known by majority of them. Incase of non-tribal neem tree owner farmwomen, majority (91.25 per cent) of them had awareness that neem affects the biting/chewing habit of the insects, followed by 90.00 per cent, 16.25 per cent and 6.25 per cent of them had awareness that it is used in plant protection to kill the insects by its poisonous effect, it curtails the growth of egg and it prevents the female insects from egg laying, respectively, while none of the neem tree owner tribal and non-tribal farmwomen had awareness that neem makes the male insects sterile.

The time of leaf falling in neem and time of setting of new leaves in neem tree were known by majority of neem tree owner tribal (96.25 per cent) and

non tribal farmwomen (98.75 per cent), quantity of fruits given by mature tree per year was known by majority of tribal (70.00 per cent) and 42.50 per cent of the non-tribal farmwomen, while awareness of average age of neem tree was observed among majority of neem tree owner tribal (62.50 per cent) and non tribal farmwomen (96.25per cent).

5.5.4 Comparison between the indigenous and scientific knowledge regarding various uses of neem of tribal and non-tribal farmwomen

Non-tribal neem tree owner farmwomen had significantly better knowledge about indigenous and scientific usages of different parts of neem than the tribal farmwomen in terms of other uses of neem tree, industrial uses of neem leaves, agricultural, health related and industrial uses of neem oil and agricultural uses of neem cake. The non-significant difference between the knowledge about indigenous and scientific usages of different parts of neem of tribal and non-tribal farmwomen was observed in case of agricultural uses of neem tree and neem root, health related uses of neem leaves, neem branches and cake and home purposes of neem branches and neem oil.

5.5.5 Relationship between the profile of the tribal and non-tribal farmwomen and their indigenous and scientific knowledge regarding various uses of neem

Three variables *viz.*, education, mass media exposure and cosmopoliteness of neem tree owner tribal farmwomen were observed positively significant, while land holding was observed negative significant with indigenous and scientific knowledge of the tribal farmwomen about various uses of neem.

Twelve variables like age, occupation, herd size, annual income, organization participation, size of family, type of family, age of oldest person, migration habit, extension contact, scientific orientation and opinion about various uses of neem were observed non-significant with indigenous and scientific knowledge of the neem tree owner tribal farmwomen about various uses of neem.

Four variables *viz.*, education, land holding, annual income and opinion about various uses of neem of non tribal farmwomen were observed positively significant, while two variables like occupation and mass media exposure were observed negative significant with indigenous and scientific knowledge of the non-tribal neem tree owner farmwomen about various uses of neem.

Nine variables like age, herd size, organization participation, size of family, type of family, age of oldest person, extension contact, cosmopoliteness and scientific orientation were observed non-significant with indigenous and scientific knowledge of the non-tribal neem tree owner farmwomen about various uses of neem.

5.5.6 Adoption of indigenous and scientific values of neem

5.5.6.1 Adoption of indigenous and scientific values of tree

As far as adoption pattern of neem tree owner tribal farmwomen about neem tree in agriculture was concerned, neem trees were used by 50.00 per cent of them at the time of interview to make farm implements and 86.25 per cent shown their interest to use in future. In case of adoption pattern of non-tribal neem tree owner farmwomen of neem tree in agriculture was used by 83.75 per cent at the time of interview to make farm implements, while 75.00 per cent, 97.50 per cent and 97.50 per cent of them shown their interest to use neem tree in future for better use of fellow land, to prevent soil erosion and to make farm implements, respectively.

Neem tree for shadow and furniture was used by 100.00 and 68.75 per cent of the neem tree owner tribal farmwomen in past; it was used during the time of interview by 100.00 per cent and 85.00 per cent for shadow and furniture, while cent per cent of them expected to use neem tree for shadow and furniture and 53.75 per cent of them expected to use it to rear GALO in future.

Neem tree for shadow was used by 100.00 per cent of the non-tribal farmwomen in past; it was used during the time of interview by 100.00 per cent and 82.50 per cent for shadow and furniture, while cent per cent of them expected to use

neem tree for shadow and furniture and 63.75 per cent of them expected to use it to rear GALO in future.

5.5.6.2 Adoption of indigenous and scientific values of neem leaves

The cent percent, (100.00 per cent) of the neem tree owner tribal farmwomen used neem leaves in storage of grains in past, present and shown their wish to use it in future, 87.50 per cent of them were using neem leaves to feed animals in past, which was increased to 91.25 per cent during the time of interview and 100.00 per cent were likely to adopt the same practice in future.

In case of non-tribal neem tree owner farmwomen, cent percent of them used neem leaves in storage of grains in past, present and shown their wish to use it in future. 86.25 per cent of them had been using neem leaves to feed animals, which has been increased to 96.25 per cent during the time of interview and 100.00 per cent were likely to adopt the same practice in future. The neem leaves as a fertilizer was expected to use in future by 71.25 per cent of the tribal farmwomen and 77.25 per cent non-tribal farmwomen in future.

As far as health related usages of neem leaves were concerned, neem leaves were used to prevent mosquito biting in past and preset by cent per cent (100.00 per cent) of the neem tree owner tribal and non-tribal farmwomen and each was ready to use it for the same in future. The majority of the neem tree owner tribal farmwomen (65.00 per cent) and non-tribal farmwomen (61.25 per cent) were interested to use neem leaves as anti-venom against scorpion bite in future, at the same time 60.00 per cent of the tribal farmwomen and 47.50 per cent of the non-tribal farmwomen were interested to use it in future as anti-venom against the snake biting. Slightly more than two fifth of the neem tree owner tribal farmwomen (41.25 per cent) and non-tribal farmwomen (46.25 per cent) were interested to use neem leaves medicine for worms. Majority (63.75 per cent) of the neem tree owner tribal farmwomen used neem leaves in bath to prevent dermal diseases, 80.00 per cent in present, while 95.00 per cent were interested to adopt it in future. Incase of non-tribal

neem tree owner farmwomen, 71.25 per cent of them had used neem leaves in bath to prevent dermal diseases, 63.75 per cent in present, while 78.75 per cent were interested in adoption in future. To cure fever, 82.50 per cent tribal farmwomen used neem leaves in past, 75.00 per cent in present and 91.25 per cent ready to adopt it in future. Incase of non-tribal neem tree owner farmwomen, 65.00 per cent used the neem leaves to cure fever in past, 68.75 per cent in present and 92.50 per cent ready to adopt in future. 45.00 per cent of the tribal farmwomen and 52.50 per cent of non-tribal neem tree owner farmwomen showed interest to use neem leaves as anti coughing agent in future. Neem leaves to cure piles and diabetes were not found in practice in past and present by majority of the neem tree owner tribal and non-tribal farmwomen.

Neem leaves in industries in making toothpaste and soap were also not found in practice in past and present by any of the neem tree owner tribal and non-tribal farmwomen.

5.5.6.3 Adoption of indigenous and scientific values of neem branches

The cent percent of the neem tree owner tribal farmwomen had adopted neem branches as Datun and fuel in past and present and all of them were ready to continue these uses in future. Incase of non-tribal neem tree owner farmwomen, 95.00 per cent of them adopted it as Datun in past, 73.75 per cent in present and 93.75 per cent of them were ready to interested in future uses. Cent percent of the neem tree owner non-tribal farmwomen adopted it as fuel in past and present and all of them were ready to continue these uses in future.

5.5.6.4 Adoption of indigenous and scientific values of neem oil

The interest to use neem oil in future to control sucking pest in cotton was observed by 80.00 per cent tribal and 90.00 per cent non-tribal farmwomen, to control leaf-eating caterpillar by 53.75 per cent tribal and 58.75 per cent non-tribal farmwomen, to control *Helicoverpa* spp. 56.25 per cent tribal and 65.00 per cent non-

tribal farmwomen, to control castor semilooper 50.00 per cent tribal and 57.50 per cent non-tribal farmwomen, to control fruit borer of okra, 51.25 per cent tribal and 68.75 per cent non-tribal farmwomen. Use of neem oil was observed meager to control diamond back moth in cabbage, white grub and hairy caterpillar among neem tree owner tribal and non-tribal farmwomen.

As far as health related usage of neem oil was concerned, 33.75 per cent tribal and 53.75 per cent non-tribal farmwomen showed their interest to control dandruff in future. The interest to apply neem oil on human body to prevent mosquito biting was shown among 47.50 per cent tribal and 61.25 per cent non-tribal farmwomen. The use of neem oil in other health problems was observed inadequate to control gumboil, as contraceptive, as nasal drop to cure sinus between neem tree owner tribal and non-tribal farmwomen. In addition to this, the use of neem oil in industries and in home activities was observed very poor among neem tree owner tribal and non-tribal farmwomen.

5.5.6.5 Adoption of indigenous and scientific values of neem cake

In case of agricultural usages of neem cake were concerned, none of the neem tree owner tribal and non-tribal farmwomen adopted it to control nematodes in past and at the time of interview. At the same time none of them was interested to use it in future due to lack of knowledge. Neem cake, to improve soil fertility was observed by 47.50 per cent of the tribal farmwomen in past, 46.25 per cent in present and 83.75 per cent were ready to use in future. Incase of non-tribal farmwomen, 57.50 per cent of them used neem cake to make soil fertile in past, 58.75 per cent were using presently and 92.00 per cent were ready to use in future. The interest to use neem cake for coating urea was observed among 51.25 per cent tribal and 82.50 per cent non-tribal farmwomen.

5.5.6.6 Adoption of indigenous and scientific values of neem gum

Amongst the health related uses of neem gum, 50.00 per cent tribal and 55.00 per cent non-tribal farmwomen interested to use neem gum as itching medicine, while 46.25 per cent tribal and 61.25 per cent non-tribal farmwomen interested to use neem gum as a tonic.

5.5.6.7 Adoption of indigenous and scientific values of neem root

As far as agricultural usage of neem root was concerned, 43.75 per cent tribal and 46.25 per cent non-tribal farmwomen had interest to use neem root to prevent soil erosion. It was seen that there was no any health related usage of neem root amongst neem tree owner tribal and non-tribal farmwomen.

5.5.7 Comparison between the adoption of indigenous and scientific values of various parts of neem by tribal and non-tribal farmwomen

Non-tribal neem tree owner farmwomen had significantly better adoption about indigenous and scientific usages of different parts of neem than the neem tree owner tribal farmwomen in terms of agricultural usages of neem tree and oil, health and home related usages of neem oil at the same time tribal farmwomen had significantly better adoption about indigenous and scientific agricultural usages of neem leaves and cake than non tribal farmwomen.

The non-significant difference in case of the adoption about indigenous and scientific values of different parts of neem between neem tree owner tribal and non-tribal farmwomen was observed in agricultural usages of neem cake and neem roots, health related usages of neem leaves and neem branches, home related usages of neem branches and other usages of neem tree.

5.5.8 Problems faced by farmwomen for various uses of neem

Less exposure of training, insufficient knowledge about various uses of neem, unavailability of neem based products in market, unavailability required quantity of neem and unavailability of sufficient literature on usages of neem were

major problems and less coverage of such information in communication means were minor problems faced by the neem tree owner tribal farmwomen in using neem for agriculture, health and other purposes.

Incase of non-tribal neem tree owner farmwomen, unavailability of sufficient literature on usages of neem, less exposure of training, less coverage of such information in communication means, insufficient knowledge about various uses of neem, unavailability of neem based products in market and unavailability required quantity of neem were major problems faced by non-tribal farmwomen in using neem for agriculture, health and other purposes.

5.5.9 Suggestions of the farmwomen to accelerate rate of adoption of neem among the farmwomen

Major suggestions given by the neem tree owner tribal and non-tribal farmwomen to improve rate of adoption of neem were; training programmes on various usages of neem should be organized at village level, the posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village, indigenous knowledge should be tested on scientific grounds and should be extended further, guidance on the uses of neem should be provided right from school level and efforts should be made to use fellow land by neem plantation to create awareness about neem.

5.5.10 Implications

The present study was highlighted direction on the interesting areas in which research work was needed to be carried out. The following implications emerge from this study.

1. The findings of this study revealed that majority of neem tree owner farmwomen were from the middle age group, so middle aged farmwomen should be contacted and their knowledge should be increased about various indigenous and scientific uses of neem. They should be encouraged to

- participate in different training programme to improve their adoption behaviour.
2. There are many advantageous usefulness of neem in agriculture, health, industries and other purposes. It was observed that many areas are yet to be known by the farmwomen about neem. At the same time it was also observed that many known areas of neem were not properly utilised by the farmwomen, such areas need to be popularized among the farmers. During the study it was observed that many values of neem were expected to adopt in future by majority of the farmwomen so they should be encouraged to do so. For this, efforts should me made to motivate farmwomen to implement them by arranging proper training and encouragement.
 3. During the study it was observed that majority of the farmwomen had poor knowledge about how to prepare solution of neem for plant protection measures, thus method demonstrations should be organized to make them aware about this aspect.
 4. Many eco-friendly plant protections related agricultural usages of neem were harvested by the farmwomen, for sustainable agricultural development, such usages should be encouraged among the farming community by involving farmwomen in this process.
 5. VLWs are the direct and easily available source for farmwomen to collect information, thus all the VLWs should be advised to collect knowledge of indigenous and scientific usefulness of neem and they should be informed to popularize it among farming community. A training to improve knowledge regarding various uses of neem should be organized for the VLWs so that farmwomen and other rural people can be benefited by them.
 6. Neem is known as versatile tree, thus each farmwomen should be motivated to grow neem tree near by their home and farm to make best uses of various parts of neem for eco-friendly agriculture and family health care.

7. Proper marketing facility should be developed for the various neem based products so that it can reach to the ultimate user.
8. Effort should be made to increase their education level and to make them understood about the importance of the scientific and indigenous uses of neem and make optimum use of this natural gift.
9. Integrated efforts should be made by the village level worker, agriculture extension officer, medicinal department and NGOs by organizing training camp, exhibitions, video film shows and publication of literature to encourage farmwomen to know and use values of neem not only for human health care but also for agriculture and industries.
10. A large number of women co-operative education instructors should be appointed to educate farmwomen in respect to indigenous as well as scientific usages of neem and other pants.

5.5.11 Suggestion for further research

In the light of findings of the study, the following studies can be undertaken to explore more in the area of indigenous and scientific uses of neem.

1. The study was carried out under certain limitations of time and resources available with researcher, covering only Chhotaudaipur taluka and Sankheda taluka of Gujarat. It is true that a finding of single study is not adequate to make any generalized conclusion. Therefore, it is necessary to replicate the same study in other talukas of the state.
2. The area of research could be extended further and significantly large number of farmwomen could be studied to draw valid conclusions.
3. Some other characteristics of the farmwomen other than those considered in this study might be affecting their knowledge and adoption process. They should be identified and their correlation be ascertained.
4. Such studies should be repeated after some laps of time.
5. Similar investigation may be conducted on other trees, which have usefulness in agriculture and other aspects.

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Appendices

INDIGENOUS AND SCIENTIFIC KNOWLEDGE OF THE TRIBAL AND NON-TRIBAL FARMWOMEN ABOUT NEEM IN MIDDLE GUJARAT

APPENDIX

Name of farmwomen : _____

Name of village : _____

1. Personal characteristics

a) Age : _____ years

b) Education:

Sr.No.	Educational status	Score
1	Illiterate	0
2	Can read and write	1
3	Primary education (Up to 7 th std.)	8
4	Secondary education (Up to 10 th std.)	11
5	Higher education (11 th std. and above)	16

2. Economic characteristics

a) Land holding (in acres)

Sr.No.	Particulars	Score
1.	Irrigated land (in acres)	1
2	Unirrigated land (in acres)	1

b) Occupation

Sr.No.	Particulars	Score
1	Agriculture (Farming)	1
2	Animal husbandry	1
3	Business	1
4	Service	1
5	Labor	1

c) Herd size

Sr.No.	Animal	Number
1	Cow	
2	Buffalo	

d) Annual income: Rs. _____

3. Social characteristics

a) Organizational participation

Please indicate the name of organization(s) in which you hold position/membership

Sr.No.	Name of the organization	Membership (Score)
1	Gram panchayat	1
2	Co-operative organization	1
3	Milk co-operative organization	1
4	Irrigation co-operative organization	1
5	Any other	1

b) Type of family: Joint/ Nuclear

c) Number of members in the family: _____

d) Age of the eldest member in the family: _____ years

4. Communication characteristics:

a) Mass media exposure

Sr.No.	Type of exposure	Score
I	Magazine exposure	
1	Frequency of reading magazine	
A	Do not read	0
B	Once in a while	1
C	Every month	2
2	Source of acquiring magazine	
A	Own	2
B	From others	1
3	Number of magazines read	1/magazine
II	News paper reading exposure	
1	Frequency of reading	
A	Do not read	0
B	Once in a fortnight	1
C	Once in a week	2
D	Twice in a week	3
E	Everyday	4
2	Source of acquiring news paper	
A	Own	2
B	From others	1
3	Number of news papers read	1/News paper
III	Television viewing exposure	
1	Frequency of viewing television	
A	Do not watch	0
B	Once in a fortnight	1
C	Once in a week	2
D	Twice in a week	3
E	Everyday	4

b) Extension contact

Sr. No.	Source	Once in fortnight	Once in month	Once in 6 months	Once in a year	Never
1	VLWs	4	3	2	1	0
2	AEOs	4	3	2	1	0
3	SMS	4	3	2	1	0

5. Psychological characteristics:**a) Cosmopoliteness**

Sr.No.	Particulars	Agree	Neutral	Disagree
1	A farmer can learn everything at the village level itself.			
2	A farmer can escape from number of troubles and barriers if he consults friends and neighbors.			
3	A farmer can fulfill all his needs at the village level itself.			
4	Many things that a farmer ought to know are not confined in his village, but are like in other villages.			
5	These days when communication is so much advanced, a farmer must be known to outside life.			
6	He who does not consult/contact others can act better.			

b) Scientific Orientation

Sr.No.	Particulars	Agree	Neutral	Disagree
1	New methods of farming give better results to a farmer than the old methods.			
2	Even a farmer with lots of experience should use new methods of farming.			
3	Though it takes time for a farmer to learn new methods in farming, it is worth the efforts.			
4	A good farmer experiments with new ideas with farming.			
5	Traditional methods of farming have to be change in order to raise the living standard of a farmer.			
6	The way in which farmers' forefathers farmed it still the better way of farming.			

c) Give your opinion about various uses of neem

Sr.No.	Particulars	Agree	Neutral	Disagree
1	Neem can be used to cure many diseases of human beings			
2	Neem can be used in various ways as plant protection measure			
3	Consumption of neem is unpleasant as it is bitter in test so it is not preferred to use			
4	The preparatory practices for the use of neem is a tedious job			
5	Neem is a "Kalpvruksh" / "Bitter boon"			
6	There is no side effect of using neem			

6 Indigenous and scientific knowledge and level of adoption of various uses of neem

Sr. No.	Particulars	Do you know? (Y/N)	Used in past (Y/N)	Using at present (Y/N)	Will use (Y/N)
I	Tree				
A	Related to agriculture				
1	As a wind break				
2	To make best use of the fellow land				
3	To prevent soil erosion				
4	To make farm implements				
B	Others				
1	For shade				
2	For bringing rain				
3	Wood or furniture				
4	For rearing of GALO				
II	Leaves				
A	Related to agriculture				
1	For storage of grains				
2	As an animal food				
3	As a fertilizer				
B	Related to health				
1	To prevent from mosquitoes				
2	Anti venom for the bite of scorpion				
3	Anti venom for snakebite				
4	As a medicine for worms				
5	Used in bathing water for prevention of dermal diseases.				
6	As a cure of fever				
7	As an anti-coughing agent				
8	As a medicine for piles				
9	To control diabetes				
10	For curing of ill health due to opium				
C	Industrial uses				
1	As an ingredient of toothpaste				
2	As an ingredient of soap				
III	Twigs/Branches				
A	Related to agriculture				
1	To know the source of underground water				
B	Related to health				
1	As a toothbrush (Datun)				
C	Home purpose				
1	As a fuel				
IV	Oil				

A	Related to agriculture				
1.	For control of sucking pests				
I	For control of aphids (mustard)				
II	For control of sucking pests in cotton				
2.	For control of biting pests				
I	For control of leaf eating caterpillar				
II	For control of <i>Helicoverpa</i> spp.				
III	For the control of castor semilooper (caster)				
IV	For control of diamond back moth (cabbage)				
V	For control of fruits borer (Okra)				
VI	For control of white grub				
VII	For control of hairy caterpillar				
3	As a fungicide				
B	Related to health				
1	For control of dandruff				
2	For the cure of gum boil				
3	As a contraceptive				
4	To prevent from mosquitoes (apply on body)				
5	As nasal drop for the cure of sinus				
C	Industrial uses				
1	As an ingredient of soap				
2	In preparation of medicines				
D	Home purpose				
1	As a fuel in lamp (diya)				
V	Cake				
A	Related to agriculture				
1	For control of nematodes				
2	To make the soil fertile				
3	For coating of urea				
VI	Gum				
A	Related to health				
1	As a medicine against itching				
2	As a tonic				
VII	Root				
A	Related to agriculture				
1	To prevent soil erosion				
B	Related to health				
1	For making of the paste (Ghanvati) from bark				

Sr.No.	Do you know?	
1	How various parts of neem are used in plant protection?	
I	It curtails the growth of eggs, larvae and pupae.	Yes/No
II	It prevents the female insects from egg laying.	Yes/No
III	It makes the male insects sterile	Yes/No
IV	It kills the insects by its poisonous effect	Yes/No
V	It affects the biting/chewing habit of the insects	Yes/No
2	About neem	
I	When it shades its leaves?	Right/Wrong
II	When the new growth starts?	Right/Wrong
III	How much fruits a mature tree gives?	Right/Wrong
IV	Average age	Right/Wrong

7 Constrains in efficient use of neem

Sr.No.	Particulars	Very Important	Important	Not Important
1	Less exposure of training			
2	Unavailability of sufficient literature on usages of neem			
3	Less coverage of neem related information in communication media.			
4	Insufficient knowledge about various uses of neem			
5	Unavailability of neem based products in market			
6	Unavailability required quantity of neem trees			

8. Suggestions for extension of various uses of neem

Sr.No.	Suggestions	Very Important	Important	Not Important
1	Training programmes on various uses of neem should be organized at village level			
2	The posters showing various uses of neem should be displayed at gram panchayat, co-operative organizations and other public places in village			
3	Indigenous knowledge should be tested on scientific grounds and should be extended further			
4	Guidance on the uses of neem should be provided right from school level			
5	Efforts should be made to use fellow land by neem plantation to create awareness about neem			

I. Inter co-relation between the independents and dependents variables of tribal farmwomen

	X1	X2	X3	X4	X5	X6	X7	X8	X9
X1	1.0000								
X2	-0.2918	1.0000							
X3	0.2462	-0.0540	1.0000						
X4	0.1914	-0.3167	-0.0547	1.0000					
X5	0.1540	-0.0366	0.0978	0.0903	1.0000				
X6	0.1642	-0.0352	0.0289	0.3627	0.4915	1.0000			
X7	0.1683	-0.0599	0.1050	0.2044	0.3886	0.3241	1.0000		
X8	0.2410	0.0735	0.2661	0.0231	0.2018	0.1207	0.1170	1.0000	
X9	0.2970	0.0250	0.1923	-0.0209	0.2312	0.2297	0.1020	0.6491	1.0000
X10	0.5664	0.0451	0.1871	0.2115	0.2108	0.1984	0.1417	0.3780	0.3171
X11	0.0037	-0.0317	0.0934	-0.0328	0.26678	-0.0436	-0.0239	0.0803	0.1535
X12	0.1634	0.1101	0.0419	0.1169	0.1013	0.0664	0.3752	0.2319	0.0760
X13	0.1217	0.1493	0.0956	0.0797	0.0793	0.0365	0.5160	0.1606	0.1137
X14	-0.3335	0.4343	-0.0396	-0.2869	-0.0386	-0.0319	0.0740	-0.0565	-0.0131
X15	-0.1426	0.3670	-0.0198	0.0964	-0.0773	0.0108	-0.0981	0.0721	-0.0915
X16	-0.2925	0.0774	0.0576	0.0823	0.0019	-0.1128	0.0186	-0.0005	-0.1826
Y1	-0.0814	0.2934	-0.2782	0.0611	0.1608	0.0907	-0.1140	0.1059	0.0135
Y2	-0.0273	0.1054	-0.1667	0.2554	0.0225	0.0890	-0.1733	0.0534	0.0337

	X10	X11	X12	X13	X14	X15	X16	Y1	Y2
X1									
X2									
X3									
X4									
X5									
X6									
X7									
X8									
X9									
X10	1.0000								
X11	-0.0062	1.0000							
X12	0.1305	-0.0417	1.0000						
X13	0.1452	0.1128	0.7248	1.0000					
X14	-0.2431	-0.0972	-0.0627	-0.0180	1.0000				
X15	-0.0740	-0.0325	0.0735	0.0374	0.0409	1.000			
X16	-0.2411	0.0059	-0.1428	-0.2203	0.1847	0.1937	1.0000		
Y1	0.0193	0.0291	0.3097	0.1652	0.0323	0.3409	0.1338	1.0000	
Y2	0.0796	-0.0276	0.1443	0.1549	0.0097	0.3344	0.0370	0.6210	1.0000

Critical value (1-tail., .05) = +/- .18532, Critical value (2-tail., .05) = +/- .21976

Where,

X1=Age

X2=Education

X3=Land holding

X4=Occupation

X5= Herd size

X6=Annual income

X7=Organization participation

X8=Type of family

X9=Size of family

X10=Age of eldest person

X11=Migration habit

X12=Mass media

X13=Extension contact

X14=Cosmopoliteness

X15=Scientific orientation

X16=Opinion

Y1=Knowledge

Y2=Adoption

II. Inter co-relation between the independents and dependents variables of non-tribal farmwomen

	X1	X2	X3	X4	X5	X6	X7	X8	X9
X1	1.0000								
X2	-0.2291	1.0000							
X3	0.1470	0.2646	1.0000						
X4	-0.0526	-0.1454	-0.3206	1.0000					
X5	0.0769	0.0564	0.3730	0.2039	1.0000				
X6	0.1277	0.3324	0.7255	-0.2376	0.3357	1.0000			
X7	0.1521	-0.0778	-0.0821	0.0975	0.0328	-0.0020	1.0000		
X8	-0.0507	0.0534	0.0297	0.1933	0.1743	0.0830	0.0699	1.0000	
X9	-0.0135	-0.1279	0.0659	0.2134	0.2137	0.1531	0.1773	0.4933	1.0000
X10	0.6640	-0.1835	0.2820	-0.1556	0.1683	0.1998	0.1407	0.08640	0.2659
X11	-----	-----	-----	-----	-----	-----	-----	-----	-----
X12	0.1778	0.3384	0.3551	-0.3197	-0.0430	0.4051	-0.0760	0.1463	0.1731
X13	0.0113	0.0516	0.1705	-0.1358	-0.0378	0.2078	0.4612	0.0821	0.1337
X14	-0.1231	0.3422	0.2880	-0.2285	0.1131	-0.2949	0.1135	-0.0626	0.0162
X15	0.0898	0.1244	-0.1190	0.0225	-0.0114	-0.0415	0.0542	0.0887	0.0162
X16	-0.0093	0.0982	-0.1064	0.1159	-0.0240	-0.0475	0.0715	0.0473	-0.0075
Y1	-0.0621	0.6260	0.4018	-0.2737	0.0187	0.3119	-0.1137	0.1106	-0.1099
Y2	-0.2803	0.6845	0.3803	-0.1683	-0.0301	0.3427	-0.1113	0.2589	0.0085

	X10	X11	X12	X13	X14	X15	X16	Y1	Y2
X1									
X2									
X3									
X4									
X5									
X6									
X7									
X8									
X9									
X10	1.0000								
X11	-----	1.0000							
X12	0.1731	-----	1.0000						
X13	0.0517	-----	0.2347	1.0000					
X14	0.0540	-----	0.1282	-0.0141	1.0000				
X15	0.1051	-----	0.0844	0.0415	-0.0547	1.000			
X16	-0.0643	-----	0.0340	0.0278	-0.1409	0.5423	1.0000		
Y1	0.0617	-----	0.3401	0.0364	0.3216	0.0879	0.1316	1.0000	
Y2	-0.0997	-----	0.3539	0.0429	0.2302	-0.0797	0.0214	0.7440	1.0000

Critical value (1-tail., .05) = +/- .18532, Critical value (2-tail., .05) = +/- .21976

Where,

X1=Age

X4=Occupation

X7=Organization participation

X10=Age of eldest person

X13=Extension contact

X16=Opinion

X2=Education

X5= Herd size

X8=Type of family

X11=Migration habit

X14=Cosmopoliteness

Y1=Knowledge

X3=Land holding

X6=Annual income

X9=Size of family

X12=Mass media

X15=Scientific orientation

Y2=Adoption