

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics(FEM)



Diploma Thesis

**Consumption of Mango and Consumers Preferences
in India**

Jalkit Vadher

© 2019 CULS Prague

**CZECH UNIVERSITY OF LIFE
SCIENCES PRAGUE**
Faculty of Economics and Management
DIPLOMA THESIS ASSIGNMENT
B.Sc Jalkit Vadher
Business Administration

Thesis Title

Consumption of Mango and Consumers Preference in India

Objectives of the thesis

The aim of the diploma thesis is to determine and to evaluate consumption of Mango and consumers preferences in India in the selected period.

The aim will be fulfilled based on the parallel aims. Then, several hypotheses will be defined and verified. Based on the results of an empirical analysis the final conclusions will be introduced.

Methodology

The diploma thesis will cover both theoretical and empirical part. Theoretical part will contain theoretical background of the selected topic as well as the methodological framework. Scientific literature will be used to prepare the literature overview. The empirical analysis will be based mainly on the time series analysis. Other suitable methods will be employed as well. Based on the empirical analysis the results will be presented and some recommendations will be suggested.

The proposed extent of the thesis

60-80 pages

Keywords

Consumption, Consumers, Mango, India

Recommended information sources

GUJARATI, D.N. Essentials of Econometrics. McGraw-Hill/Irwin, USA 1992. ISBN 0-07-025194-0. LIND, D.A. – MARCHAL, W.G. – WATHEN, S.A. Statistical Techniques in Business & Economics. McGraw-Hill/Irwin, USA 2005. ISBN 0-07-286824-4. MULLEN, B. – JOHNSON, C. The Psychology of Consumer Behavior. Lawrence Erlbaum Associates, USA 1990. SAMUELSON, P.A. – NORDHAUS, W.D. Economics. McGraw-Hill, USA 1992. ISBN 0-07-054879-X.

Expected date of thesis defense

2019/20 WS – FEM (February 2020)

The Diploma Thesis Supervisor

Ing. Lenka Rumánková, Ph.D..

Supervising department

Department of Economics

Electronically approved: 5. 11.
2019

prof. Ing. Miroslav Svatoš,
CSc.

Head of department

Electronically approved: 7. 11.
2019

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 19. 11. 2019

Declaration

I declare that I have worked on my diploma thesis titled "Consumption of Mango and Consumers Preference in India" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on date of submission

19/11/2019

Acknowledgement

I would like to say thanks to my supervisor “Ing. Lenka Rumankova” for giving me such topic of research that had helped me in understanding the behaviour of consumers towards a product.

Secondly, I would like to thank my parents and ‘**Ekta Vadher**’ who had been very much supportive for completing this work in a complete manner.

Thirdly, I would like to thank my friends, who help me in collecting responses for my thesis data through the help of a questionnaire.

Consumption of Mango and Consumers Preferences in India

Abstract:

India ranks among the world's leading mango producers and suppliers, with its mangoes known for its sweet taste, savouriness, health and colour. In order to achieve optimum performance for horticultural value chains, understanding consumer value preference is important. This diploma thesis offers insights into mango consumers' tastes in India by way of measures to improve the quality of domestic mango value chains.

The primary data was collected by way of 885 customers and 200 fruit shop owners in ten different cities in India. The mango has been reported to be in demand in the seasons. The product is a speciality and delicacy that is available on special occasions. The choice has been shown to be very broad spread because the labels in the retail store are available. The taste, quality and variety of mango are major factors which affect the purchase decision of consumers.

Diverse considerations are required to be listed in order to affect the decision to purchase a mango. Findings have shown that Consumers gave importance to their food, their medical advantages, their season and their social and cultural interest. Price, taste, freshness and the freedom from damage and defects were the main features of consumers when they purchased mangoes. Consumers expressed their concern about high mango prices, lack of safe mangoes, malpractices in retailers and government ineffective regulations. These results showed that mango value chains businesses did not pay sufficient attention to the demands of the consumers.

Keywords:

Mango, consumer value, consumer concerns, India, consumer value, consumer segmentation, cluster analysis, mango production, perceived quality, consumer preferences, willingness-to-pay

Spotřeba Mango a preferencí spotřebitelů v Indii

Abstrakt

Indie patří mezi přední výrobce a dodavatele manga na světě a její manga jsou známá svou sladkou chutí, příjemností, zdravím a barvou. Abychom dosáhli optimálního výkonu v zahradnických hodnotových řetězcích, je důležité porozumět preferenčním hodnotám pro spotřebitele. Tato diplomová práce nabízí pohled na vkus spotřebitelů manga v Indii prostřednictvím opatření ke zlepšení kvality domácích hodnotových řetězců manga.

Primární údaje byly shromážděny prostřednictvím 885 zákazníků a 200 majitelů ovocných obchodů v deseti různých městech v Indii. Bylo hlášeno, že po sezónách je mango požadováno. Jedná se o specialitu a pochoutku, která je k dispozici při zvláštních příležitostech. Ukázalo se, že výběr je velmi široký, protože štítky v maloobchodě jsou k dispozici. Chuť, kvalita a rozmanitost manga jsou hlavními faktory, které ovlivňují rozhodnutí spotřebitelů o nákupu. Aby bylo možné ovlivnit rozhodnutí o koupi manga, musí být uvedeny různé důvody. Zjištění ukázala, že spotřebitelé přikládali důležitost svému jídlu, jejich lékařským výhodám, sezóně a společenskému a kulturnímu zájmu. Cena, chuť, čerstvost a osvobození od škod a defektů byly hlavními rysy spotřebitelů při nákupu manga. Spotřebitelé vyjádřili znepokojení nad vysokými cenami manga, nedostatkem bezpečných mango, nesprávnými praktikami maloobchodníků a neefektivními vládními předpisy. Tyto výsledky ukázaly, že podniky hodnotových řetězců manga nevěnovaly dostatečnou pozornost požadavkům spotřebitelů.

Klíčová slova:

Mango, spotřebitelská hodnota, obavy spotřebitelů, Indie, spotřebitelská hodnota, segmentace spotřebitelů, shluková analýza, produkce manga, vnímaná kvalita, preference spotřebitelů, ochota zaplatit

Table of content

1.	Introduction	10
1.1	Introduction:	10
1.2	History of mango consumption in India	11
1.3	Positive and negative side effects of mango	13
1.4	Types of mango	17
1.6	Packaging of mangoes	25
1.7	Research Aim and Objectives:	26
1.8	Research Hypothesis:	26
1.9	Purpose of the Diploma thesis:	27
1.10	Structure of the Diploma thesis	27
2.	Objectives and Methodology	30
2.1	Introduction	30
2.2	Research Philosophy	30
2.2.1	Review for selecting the research philosophy	31
2.3	Research Approach:	32
2.3.1	Review for selecting the research approach	32
2.4	Research design	32
2.4.1	Review for selecting the research design	33
2.5	Data collection Procedure	33
2.6	Sample Size	33
2.7	Data Analysis Tools and Techniques	34
2.8	Ethical Considerations	34
2.9	Research Limitations	35
2.10	Time Horizon	36
3.	Literature Review	37
3.1	Types of mangoes grown in India	37
3.2	Visual, Smell and Taste Components	38
3.3	Factors influencing consumer preferences	38
3.5	Origin and nutrient related attributes	42
3.6	Reasons of popularity	43
3.7	The post reaping management of mangoes	44

3.8 Marketing of mango in India	47
3.9 Post-harvest operations	54
3.10 Transportation:	57
3.11 Conceptual Framework	59
4. Practical Part	60
4.1 Introduction	60
4.2 Quantitative Analysis	60
4.2.1 Quantitative Analysis: For Customers of mangos in India.	61
4.2.2 Quantitative Analysis: For Local fruit sellers	64
5. Results and Discussion	67
5.1 Findings and Analysis of data collected from the customers of mango	67
5.2 Findings and Analysis of data collected from the sellers of mango	69
5.3 Analysis of the hypothesis	70
6. Conclusion	72
6.1 Overall conclusion	72
6.2 Recommendations:	73
7. References	75
8. Appendix	77

List of pictures

Fig 1: Wholesale price of Alphonso in India	20
Fig 2: Per cent contribution of different states in total mango production (2016-17)	23
Fig 3: State-wise Area, Production and Productivity of Mango	26

1. Introduction

1.1 Introduction:

Mango is an important fruit that is cultivated and eaten in India. Due to its high socioeconomic benefits, it holds a prominent role in the economy. India is one of the world's major mango producing and exporting nations and its mangoes are known throughout the world for their sweet taste, juiciness, nutritional values and aroma. A broad variety of inefficiencies in manufacturing, postharvest and advertising are accountable for these inadequate results. In addition to these limitations, there is an increasing realization that value chains working in the mango sector in India lack awareness of customer expectations and mango-related issues.

As a result, these chains manage to produce the required value to buyers, which not only impacts the competitiveness of competitors in the value chain but also effects in the mango industry's general sub-optimal performance (Yadav & Pandey, 2016)

India is one of the world's major mango producers with a range of mango producers in the region with a strong connection of mango varieties from Alphonso as well as Kesar. India has almost 885 mango species. Just approximately 20 types are widely cultivated, though. For optimum development and ripening, most Indian mango variants have unique eco geographic demands.

Mangoes are native to South Asia and are part of the *Mangifera* genus, which includes innumerable tropical fruit trees. It is the national fruit of India, Pakistan, and the Philippines, as well as Bangladesh's national tree. Mango is offered in many different varieties, but Alphonso is the most famous of all. In terms of richness, aroma and creaminess, it is a superior variety. The Alphonso is also the priciest variant in western India, mainly Ratnagiri and Raigad, and the Konkan area in India.

Mangoes have enjoyed the senses of people for ages with their sweet fragrance and aroma. However, the Western world had only enjoyed it over the last 400 years, while Indians have been cultivating this juicy fruit for over 4000 years. Here's the exciting trip of mango to India over the years if you are interested for its roots.

1.2 History of mango consumption in India

The history of this famous apple gives some very exciting details. Since very young days the mango was renowned to Indians. Scientific fossil proof shows that fruit appeared in Northeast India, Myanmar and Bangladesh, from which it travelled to northern India, from 20 to 35 million years ago.

Amra-Phal was the first title provided to the mango. It's also called Rasala and Sahakara in ancient Vedic literature and is mentioned on Upanishad and Puranas in Brihadaranyaka, who reject the drop of fruit groves. The title changed to Aam-Kaay in Tamil upon entering South India. It slowly became Maamkaay because of the spelling changes. It was altered into Maanga by the Malayali people. When they reached Kerala, the Portuguese people were fascinated by the fruit and brought it as Mango to the western world (Yadav & Pandey, 2016)

The rulers in old India used the names of mangoes to bestow awards upon distinguished individuals, such as the honor provided to the renowned courtesan Amra Pali, the Vaishalian. The mangro was also linked to the god of bliss, Manmatha, and its flowers were regarded by the Hindu Nanda Kings as the weapons of the god. Alexander landed in India during the Nanda regime and battled the fateful war with King Porus. He brought with him several kinds of delightful mangoes when it was moment for him to move to Greece. As Buddhism grew the mangoes depicted religion and wealth among the supporters of religion, as several stories of Buddha and mango groves existed. Mangoes were swapped as presents among Buddhist leaders and became a significant diplomatic instrument. During that era, Buddhist priests brought mangoes with them, popularizing the berries wherever they came. The legend says the Buddha had a mango tree to sleep under the shaded woods (KUSUMA & BASAVARAJA, 2013)

Megasthenes and Hsiun-Tsang, oldest writers of ancient India, have written about the mango groves cultivated as a sign of wealth on roadsides and roads by the medieval Indian rulers, especially the Maurya. They also talked of the unbelievable flavor of the fruit that makes individuals outside India aware of the mango. The Munda Tribals and Swamy Chakradhar Dattaraya sect also helped the people from ancient India to produce this decadent fruit.

Alauddín Khilji had been the first mango sponsor in the medieval era and his celebration in Sivama Fort was an extravagance with mangoes in various shapes on a sumptuous list. The Mughal Emperors went next; with iconic love for mango. The only heritage that was intact from one century to the next in the Mughal Dynasty was actually the obsessive passion for mango.

Despite Daulat Khan Lodi's commitments of a nice portion of his Empire and war booty, the first Mughal, Babur, was unwilling to confront the fearful warrior Rana Sanga of Mewars. Lodi then brought Babur into mango, a crop he loved so much, that he persuaded him not only to deal with Rana Sanga but to set the groundwork for his kingdom in India as well (Gopalakrishnan, 2013)

During his trip from India to Kabul, Humayun provided a well-established mail scheme for excellent production of mangoes. Aquarius has constructed the vast Lakhi Bagh close Darbhanga, which grows over 100,000 mango groves. This was one of the oldest instances of mango grafting, including totapuri, rattle and costly kesar.

The affection for mangoes of Shah Jahan was so strong that Aurangzebo, his own child, was jailed and put under detention since Shah Jahan held for himself all the mangoes in the palace. Mangoes were also sent by Aurangzeb to Shah Abbas of Persia to help him in his reign campaign. The renowned Persian poet Amir Khusrau called mango Naghza Tarin Mewa Hindustan, Hindustan's fairest fruit. The Mughals loved their favorite dependency and Jahangir and Shah Jahan were awarded their khansamahs for their exceptional work, such as Aam Panna, Aam ka Lauz, and Aam Ka Meetha Pulao. Nur Jahan made her iconic vintage with a mixture of mangoes and flowers. To honor Sher Shah Suri's success over Humayun, the yellow-golden Chausa Aam was launched, while the exuberant Dussehri Aam owes its creation to the Rohilla heads (Mitra, 2014)

As a mark of Maratha sovereignty, the Marathas Peshwa in Raghunath Peshwa cultivated 10 million fruit groves. It is folklore that it was a crop of these fruits which ultimately became ruler of mangoes, the renowned Alphonso. Finally, the coming of Europeans influenced the orange which came to merely bear fruit from its place as an imperial maker; the British were unable to do this in diplomatic

issues. While its supremacy of flavor has maintained, many variations have vanished as many fresh types emerge.

Mulgoa mango is the result of the studies in Portugal with fresh mango variants, which we value today. Throughout the centuries, the mango had been made a family fruit. Rabindranath Tagore loved mangoes very much and wrote several stories about the fragrant blooms of the mangoes, including the well-known aamer monjori. Mirza Asadullah Ghalib, the legendary Urdu poet, has also been a lover of mangoes. He has despised individuals who do not acknowledge his addiction to fruit (Sekar, Subramanian, Subramanian, & Prakash, 2014)

Now, the curvy mangoes, soon fascinated by weavers and painters, have become a legendary Indian motif. The mango symbolizes success and well-being, and mango leaves are stretched across the front gates of households such as Toran, in many areas of India. For many Indians, childhood experiences include precarious efforts at pickling solitary mangoes that haunt the fruit-laden limbs. Every winter there are numerous Indian houses with the heavy aroma of mangoes maturing on plants and a smooth taste of baked amrass. So it's no surprise that the mango is rightly known as the fruit prince.

1.3 Positive and negative side effects of mango

The mature fruit of the mango varies in color and size. The leaves of mango are 20 to 30 cm long and always green. The young leaves are orange-pink but when they ripen, the transformation to shining red turns dark green. The fruit of mango has one seed containing the plant's embryo. The seed is stubborn, so the cold or dry environments will be harmful to the fruit. It was because the fruits furnish us with good energy, there is another real excuse to devote mangos.

An Australian study linked very healthy mangos because they contain several bioactive unions. The mango contains around 20 minerals and vitamins, making it one of the most magnificent nutrient fruits available. Accommodating the danger of age-related macular degeneration in Japanese seniors was discovered, according to a Boston research. Zeaxanthin in mangoes also enables to avoid macular

degeneration according to the University of Utah Health Care (Kamle & Pradeep, 2013)

Promotes healthy gut Mango meat contains prebiotic dietary fibre according to the book ' Healing foods' that contributes to the feeding of good bacteria in the gut. Leaky bowel causes body diseases, such as IBS, arthritis, slow ageing, and other wellness issues, in relation to bad digestion.

The mango fruit pulp includes the characteristics of carotenoids, ascorbic acid, terpenoids and polyphenols that avoid cancer. In other plants and plants, there are also distinctive antioxidants present. A 2010 Texas research also promotes the impacts of mangoes on anti-cancer. Mangiferin and a compound discovered mostly in fruit also are the anti-cancer characteristics of mango. Another 2015 research indicates that polyphenols of fruit prevent breast cancer. Furthermore, the development of colon and liver cancer and other tumour cells have been inhibited by mango. Polyphenolic compounds in mangoes have anti-oxidative characteristics to decrease oxidative pressure according to the study released by the University of Texas (Singh, Singh, & Priyadarshi, 2010)

Nutrients supporting a good core are in mango. It provides magnesium and sodium, for instance, that enables keep your heart safe and soothe blood vessels. Mango includes also a distinctive mango antioxidant. An animal study discovered mango to be able to safeguard cardiac cells from inflammation, oxidative stress and apoptosis. Furthermore, blood cholesterol, triglycerides and free fatty acids may be lowered. Although these results are encouraging, heart health studies are presently inadequate. More trials are therefore necessary before therapy can be suggested.

Vitamin C-rich Mango supports good skin and hair. The protein that the skin and hair texture are provided to this vitamin is crucial for the production of collagen. Collagen rebounds and battles flaccidity and wrinkles on the skin. Mango is a useful vitamin A source which stimulates skin development and sebum manufacturing, which hydrates the scalp to maintain the skin safe.

Vitamin A and additional retinoids move to and safeguard against sunlight into your body. Mango is wealthy in polyphenols that act as antioxidants, apart from vitamins

A and C. These antioxidants assist to prevent oxidative pressure harm in the skin follicle.

Research in 20 obese adolescents shows a 12-week reduced blood glucose intake of new quarter mango. According to scientists, this impact was due to the existence of phytochemical fibre and mango. Another research carried out in Mysore revealed the anti-diabetic effects of the cream of orange husk (Kodali & Rawat, 2013)

Mangoes can be excellent aphrodisiacs as well. The apple is wealthy in vitamin E; the emotional urge is understood to grow. The mixture of vitamin E and beta-carotene increases sexual safety in males was discovered in Australian research. The best defense against sperm damages was also discovered in this mixture. In a study from the US National Health Institutes, vitamin E has been detected to guard against oxidation harm to the sperm membrane. In masculine and female fertility, zinc is another significant mineral, and it has a wealthy in mangoes.

The mango is tasty to contribute to your diet, flexible and simple. Due to its hard peel and big pit, however, it can be tough to trim. One good intention is to trim the content from the well by 1/4 inch wide, vertical spots from the centre. Then chop the content into a model of a lattice and take it out of the shell (Schulze, Nagle, Spreer, Mahayothee, & Müller, 2015)

The fat and vitamins A, C, and B6 are affluent in mango and are all helpful to females who are married. Vitamin A helps combat diseases and avoids newborn sight issues. Yeah, you've been listening well. Some trials concentrated not only on the significance of citrus berries but also on the significance of its peel. The key is photochemical which are used only on the external part of the fruit as stoppers of artificial fats.

The mangoes have fiber that can contribute greatly to weight loss. Research by the University of Minnesota has shown that nutritional fiber, particularly from fruit and vegetable intake, can assist to lose weight. This is due to the capacity of a fiber to generally reduce the consumption of meat, thus favoring weight gain.

Mangoes, which are wealthy in vitamin C, perform a significant part in enhancing protection. Mangoes are a useful supplier of zinc as well as vitamin C and they are essential for keeping the immune system healthy generally. Vitamin C mainly prevents the bodies of the body against artificial air organisms produced by the immune scheme for killing pathogens, according to a paper released by Oregon State University. Vitamin B6 is wealthy in mangos and could decrease urinary oxalate as per research in the USA. Potassium is also discovered to decrease the danger of kidney stones in mangos (Akoy, 2014)

Mangoes are useful to people and young females suffering from anemia because of their iron material. Mangos also assist the adequate absorption of iron due to their vitamin C value. For their aroma and not for their color mangoes are chosen which differs between different varieties. It must have a distinct and refined flavor. Choose those who have no bleak places, places and splits when shopping for mangoes.

On a median, the fresh mangoes are about four inches wide and measure 9 ounces with 4 pounds each. While purple mangoes are brown and mature mangoes have yellow or purple to purple colors, color is not always a mark of development. Some types maintain their green color in mature mangoes. Thus, prevent mangoes that are not aromatic. Also, don't choose unripe handles that have an uncomfortable flavor if you eat straight (Kabiru, Joshua, Raji, & Abdulganiy, 2013)

Adverse effects

Mango mangoes have a wealthy protein supply, so they often boost the amount of body sugar. People with diabetes are recommended not to consume mature mangoes because their fruit is often hazardous.

The mango has 3 g of fibers in the medium size. Just imagine taking fiber from mangoes if one cannot accept the attraction of excessive fruit consumption. Excessive consumption of fibrous berries leads to diarrhea, which is one of the mango's most prevalent side impacts. Over-alimentation of mangoes should, therefore, be restricted entirely.

Some allergies to chewing mangoes are frequently seen in fruit-sensitive people. The signs may differ in severe instances from wet hair, runny nose, and issues with ventilation, abdomen, sneezing, and even anaphylactic shock. A chemical called urushiol is considered to include Mango juice. Many individuals are susceptible to this drug, leading to dermatitis touch. In this situation, the skin is swollen, itchy, flaccid and blistering. Mango is full of calories, but not poor in design. However, unnecessary mango consumption often leads to increased weight. Being a wealthy cause of glucose, individuals with weight gain are regarded as poor. So, prevent buying mangoes if you want to keep your waistline (PrakashMaran, Swathi, Jeevitha, Jayalakshmi, & Ashvini, 2015)

Itching that may trigger other severe side impacts. It is also called mango latex allergy and creates severe neck corners, teeth and tongue tips to irritate the body. Vomiting, swallowing problems and even diarrhea can be serious instances.

Although the berries have some side impacts, the advantages are mainly overlooked. However, if you are a healthy individual, the doctor should always be consulted before eating the fruit. There are some side impacts of strawberry that can present a possible safety risk.

1.4 Types of mango

Mango is a tropical plant that everyone loves, and it is a great item to contribute to your preferred food. Mangos, of course, also are useful for preparing and enjoying smoothies, shots, pickles, jams, desserts. It's delicious, nutritious and easy to find. And our most delightful family experiences in winter are pleasant flavors of this pleasure when you speak of mangoes. But you understand that in India, there are about 1500 mango types (Sethy, Behera, Sangita, & Rath, 2019)

Totapuri

Mild, yellowish and tasteful, this kind of mango feels like a beak for the parrot. The meat of this type is not like other types, but good for salads and pickles, Karnataka's hails, Andhra Pradesh and Telangana. If it's mature, it's yellowish and feels like a bird in a parrot.

□ Alphonso

This range has been cultivated in Gujarat and some areas of Karnataka and is native to Maharashtra. This is the most costly range to be transported to other areas of the globe if one goes through **Fig 1**. It has a different intrinsic flavor; its skin is saffron-colored and fibreless.

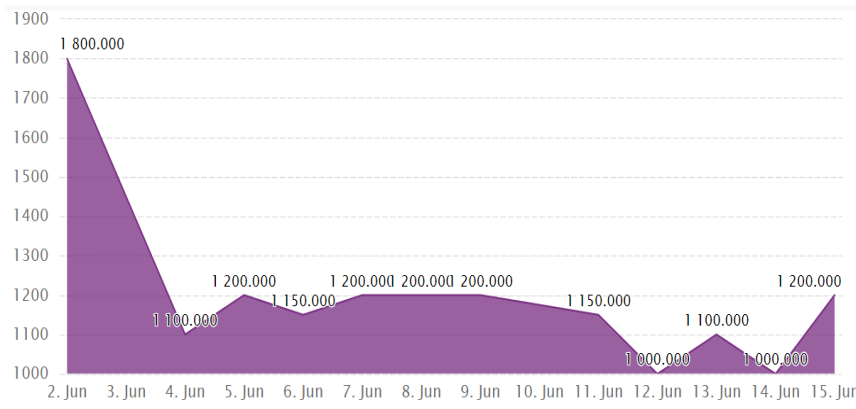


Fig 1: Wholesale price of Alphonso in India

(Source: <https://www.ceicdata.com/en/india/wholesale-price-national-horticulture-board-fruits-by-cities/wholesale-price-nhob-fruits-mango-alphonso-mumbai>)

□ Ratnagiri

The renowned 'Ratnagiri Aam ' has been discovered in Ratnagiri, Devgarh, Raigad and Konkan Maharashtra, and each mango averages between 150 and 300 grams. Interestingly, they have a very strong weight. This Mango is one of the finest and most costly mangoes in India. This variety can easily be identified by finding a red tinge on the fruit top.

□ Chausa

This range was launched during its 16th-century rule by Sher Shah Suri. It is popular in North India and in Bihar. Named after a town in Bihar, its smooth pulp and shiny golden skin characterize this range. Its yellow-golden color is distinguishing.

□ Raspuri

This range is well-known in India as Queen of Mangoes, cultivated and eaten in Old Mysuru of Karnataka. The latter will be accessible in the month of May by the beginning of June. It is best filled with yogurt, jam and smoothie. It is triangular in form and approximately 4 to 6 inches wide.

Pairi

Like Safeda, Pairi is a leading market variety. The skin has a yellowish tinge and a sour taste, and is used in Gujarat for the production of amras. This type of mango has High fiber and sweet reddish tinge.

Sindhura

This variety is cute but has a little sweetness, which has a long-lasting aroma in your throat. This is excellent for shots because the pulp is true yellow. Separate in shape with cute golden peel, red on the outside.

Banginapalli

This mango range is manufactured in Banaganapalle in the Kurnool district of Andhra Pradesh, significantly bigger than your Alphonso peers. They are rectangular and with soft skin and enjoyable flavour. It has a light-yellowish rectangular form and has only a few places.

Himsagar

The characteristic of the West Bengal and Orissa is a candy scent. This medium-sized product averages between 250 and 350 grams, and is made from a crème body that is suitable for preparing desserts and shakes. This plant is cultivated in all parts of the land, generally discovered in June in excess. They are small compared to other types with an olive peel. They have orange skin and are smaller in quantity than other mangoes.

Malgova

Malgova is a round strawberry with a purple hue, and Malgova's round fruit is a purple color. It is reddish, slight yellow pulp and is accessible mainly in May and June. It is reddish-oblique in form with 300-500 grams of small stone.

Malda

Malda is totally non-fibrous and is also renowned as 'King of Mangoes,' which makes it a great selection for chutneys. It has a sweet, delightful flavor. It is pulpy. Compared to other mangoes, it has a thicker layer and a nice aroma.

Langra

Langra is a renowned fruit, which was developed in Uttar Pradesh, Varanasi. It is accessible between July and August. Even if it's mature, it's yellow in shape of an oval.

Kesar

The pulp colour resembles saffron, as Kesar is among the most costly variants, the spice after which it was known. This plant was first cultivated by the Nawabs of Junagarh in 1931, and was appointed Kesar in 1934. It is grown mostly in and around Ahmedabad and Gujarat. It tastes like kesar, its characteristic flavor.

Badami

Badami is the major fruit crop in Karnataka and best eaten between April and July. This plant, packed with proteins, has a very tight peel and is commonly referred to as the Karnataka Alphonso.

1.5 mango producing states in India

India is a residence for many different kinds of mangoes worldwide. The color, flavor and fragrance of all these mangos are well recognized. This fruit is not only taste but also packed with essential nutrients, rendering it one of the most versatile Indian Subcontinent fruits. It is free of fat and reduces the body's poor cholesterol. In fact, it includes vitamin A, C and dietary fibre, calcium, polyphenols and carotenoids. Among the world's favorite crop, Maharashtra Alphonso is one of the

best-produced mango species in Ratnagiri, Sindhudurg and Raigad, Maharashtra districts, and in the Conkan Region, India. Maharashtra Alphonso is the strongest mango species produced in the Maharashtra and the Sindhurg and Raigad districts. It is also one of Mango's most popular and competitive. It has a rich taste and sweetness. Mango frooti also contains of the Alphonso mangoes and is produced of this range apart from a large number of ice creams, mousse and soufflé. Mango shake is best made with those mangoes, the preferred summer drink. Mulgoa, Kesar, Vanraj, Gulabi, Mankurad, Rajapuri and Pairi are other variants (Yadav, and Pandey, 2016).

In Jharkhand, Jharkhands are produced such varieties as Chausa, Amrapalli, Jardalu, Bombai, Mallika, Gulabkhas, Langra and Himsagar. The mango Chausa has a medium shape and a white, yellow color when prepared. In subtropical and tropical climates, mango growth is very convenient. Mangoes are manufactured in Jharkhand in a variety of locations, including Hazaribagh, Godda, Ranchi, Gumla, Sindega and Sahibganj.

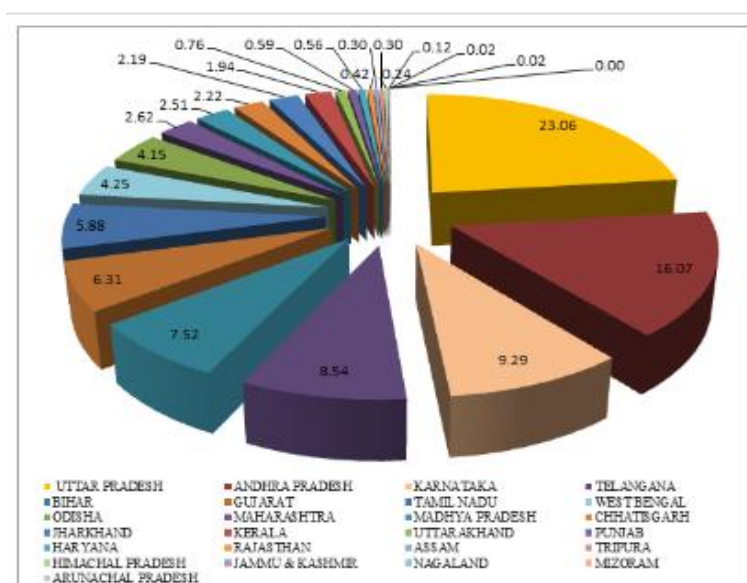


Fig 2: Per cent contribution of different states in total mango production (2016-17)

(Source: <http://mangifera.res.in/indianstatus.php>)

West Bengal Also recognized as Gulabkhas, Himsagar, Mallika, Langra, Kishen Bhog, Amrapalli, Bombai and Fazli, these are variations of the same kind. Mango production is mostly established in places such as Malda, Nadia and Murshidabad. The Himsagar is one of western Bengal's most distinctive varieties. According to **Fig 2** this is one of the top five mango types to be served at least twice. Banganapalli, Gir Kesar, Ratangiri Hapus and Banarasi Langda are the other four most common animals.

The Orissa squares are well established for the cultivation of mangoes such as Puri, Malkanpuri, Ganjam, Bolangir, Rayagada, Dhenkanal, Sonapur, Koraput, Gajapati and Gunpur. In Orissa there are a number of varieties. Yet Mallika, Suvarnarekha, Neelum, Baneshan, Amrapalli and Langra are the most famous. Himsagar is once again one of the specialties of Orissa (Ram and Verma, 2015).

There are some of the largest varieties of mangoes such as Neelum, Alphonso, Romani, Banganapalli, Mulgoa, Bangalora and Totapuri in sites like Madurai, Theni, Vellore, Dharmapuri and Tiruvallur. Totapuri is one of the best known mangoes in Karnataka, Tamil Nadu and Andhra Pradesh in the south of the country. Mulgoa is also one of South India's most well-known mango species, Alphonso, which is mainly cultivated on Tamil Nadu.

Gujarat Mango is cultivated and cultivated in Gujarat, for example Totapuri, Rajapuri, Langra, Alphonso, Vanraj, Dashehari, Kesar, Neelum and Jamadar. Kesar Mangoes are also called Gir Kesar, as they are grown mainly on the Girnar hills in the Gujarat region of Junagadh and Amreli. In addition, Bhavnagar, Valsad, Surat, Khera and Mehsana were also listed (Dubey, Agarwal, & Sarkar, 2018)

It is renowned for its large-scale farming of Kishen Bhog, Himsagar, Dashehari, Chausa, Fazli, Langrá, Gulab Khas, Bombai, Sukul, Zardalu and Bathua. Bihar is also known for its various varieties. Malda is cultivated in the suburb of Patna called Digha. These malda mangoes have a very thin skin and are renowned for their great taste. This is easy to commit. Khas Gulab is another plant grown in Bihar, famous for its rosy fragrance and taste. As the name suggests, it also looks reddish.

In the areas of the karnataka varieties Neelum, Baganapalli, Bangalora, Pairi, Totapuri, Alphonso and Mulgoa are famous for their production in the Bangalore, Kagu, Kolar and Tumkur regions. Pairi is one of the season's early fruits. Baganapalli, which is recognised as the King of Mangoes in South India, is one of the popular varieties for Karnataka. Raspuri is a mango in oval shapes and has an excellent, juicy taste. The Queen of Mangoes is known in India. In Karnataka it is also called Peddarasalu and Rasapuri.

Khamman, Vishakhapatnam, Krishna, Adilabad, East and West Godavari, Srikakulam, Vijaynagar, and Chittoor are the most famous mango growing belts of Andhra Pradesh. Baganapalli, also known as Began Phali, in Andhra Pradesh is Andhra Pradesh's most popular form. Suvernarekha, Allumpur Baneshan, Cherukuram, Bangalora, Neelum, Himayuddin and Totapuri are the other varieties grown in Andhra Pradesh. Another lesser known variety of mangos grown in Andhra Pradesh is Imam Pasand (Komal & Goyal, 2019)

As per the **Fig 3** Uttar Pradesh is ranked as the top mango producing state in India. Uttar Pradesh has a variety of mango manufacturing locations such as Saharanpur, Lucknow, Bulandshahar, Varanasi and Faizabad. Mostly are manufactured such as Safeda Lucknow, Dashehari, Chausa, Bombay Green, Langra and Fazli. Uttar Pradesh is the top mango producer of Dashehari. This variety is also exported from Uttar Pradesh to the Philippines, Malaysia, Hong Kong, Singapore and other countries in South-West Asia.

States	2014-15			2015-16			2016-17		
	Area	Prod	Productivity	Area	Prod	Productivity	Area	Prod	Productivity
UTTAR PRADESH	250.74	4347.5	17.3	263.28	4512.71	17.1	264.93	4540.23	17.1
ANDHRA PRADESH	315.42	2822.08	8.9	327.31	2803.66	8.6	332.97	3163.32	9.5
KARNATAKA	175.41	1646.51	9.4	181.7	1725.67	9.5	192.61	1829.21	9.5
TELANGANA	196.44	1801.75	9.2	194.05	1778.32	9.2	180.62	1681.6	9.3
BIHAR	148	1272	8.6	149.14	1464.93	9.8	150.64	1479.58	9.8
GUJARAT	150.05	1219.71	8.1	153.18	1241.59	8.1	153.18	1241.59	8.1
TAMIL NADU	147.48	896.78	6.1	125.98	975.11	7.7	160.94	1156.99	7.2
WEST BENGAL	95.43	799.65	8.4	96.74	693.39	7.2	97.93	836.07	8.5
ODISHA	197.74	769.93	3.9	199.29	778.72	3.9	199.3	816.2	4.1
MAHARASHTRA	157.77	758.84	4.8	162.08	463.17	2.9	157.07	514.87	3.3
MADHYA PRADESH	26.71	396	14.8	27.89	371.48	13.3	40.08	494.36	12.3
CHHATISGARH	67.12	386.67	5.8	71.52	420.61	5.9	73.99	437.58	5.9
JHARKHAND	51.84	523.14	10.1	50.41	393.67	7.8	52.24	430.22	8.2
KERALA	44.85	252.86	5.6	70.12	382.52	5.5	69.11	382.38	5.5
UTTARAKHAND	40.7	150.62	3.7	35.91	149.73	4.2	35.93	149.76	4.2
PUNJAB	6.75	113.44	16.8	6.74	113.5	16.8	6.85	115.35	16.8
HARYANA	9.22	88.72	9.6	9.26	89.97	9.7	9.42	109.74	11.6
RAJASTHAN	5.45	78.68	14.4	5	82.27	16.5	5	82.5	16.5
ASSAM	4.59	45.69	10.0	4.62	46.15	10.0	5.58	58.49	10.5
TRIPURA	11.18	62.56	5.6	11.75	59.06	5.0	11.64	58.47	5.0
HIMACHAL PRADESH	41.11	47.61	1.2	41.52	37.63	0.9	41.52	47.4	1.1
JAMMU & KASHMIR	12.46	20.93	1.7	12.67	23.74	1.9	12.67	23.74	1.9
NAGALAND	0.51	3.57	7.0	0.57	3.74	6.6	0.64	4.19	6.5
MIZORAM	0.89	4.18	4.7	0.87	4.18	4.8	0.89	4.18	4.7
ARUNACHAL PRADESH				0.05	0.03	0.6	0.05	0.03	0.6
OTHERS	5.62	17.58	3.1	6.91	27	3.9	6.98	28.87	4.1
TOTAL	2163.47	18526.98	8.6	2208.56	18642.53	8.4	2262.77	19686.93	8.7

Fig 3: State-wise Area ('000 ha), Production ('000 MT) and Productivity (MT/ha) of Mango.

(Source: <http://mangifera.res.in/indianstatus.php>)

1.6 Packaging of mangoes

Marking and labeling consumer packages

The specific provisions refer, in contrast to the Codex General requirement for labeling of prepackaged foods, if the brand is not noticeable from outside, to the following specific requirements: the identity of the item each box must be labeled as to the name of its product and can be branded as a variety title (Durge, Phalle, & Mantha, 2019)

Non-retail container

Each packet has to contain, whether legibly and amazingly signed and noticeable from the outside in letters clustered on the same side or in documentation accompanying a delivery, the following details.

- All information must be included in a report covering the products of items shipped in bulk.
- Exporter, packer and/or dealer designation name and address. Code of identification (facultative).
- Produce design Product name if the material is not publicly apparent. Variety title and type of business (optional).
- Producing country of origin or, as the case may be, the district where the name of the product is grown or global, state or local (Dubey & Gills, 2019)
- Commercial classification
 1. Class
 2. Size (scale or grammatical weight)
 3. Number of units (optional)
 4. Label for Official Command (optional)

Contaminants and heavy metals

Mangoes are to follow the permissible heavy metals requirements defined for this product by the Codex Alimentarius Commission.

Pesticide residues

The mangos shall adhere to the limitations set by the Codex Alimentarius Commission on pesticide residues for this plant.

Hygiene

It is recommended to plan or assemble, in compliance with the relevant sections of the Standard International Code of Practice–General Standards of Food Hygiene, Code for Hygiene of Fresh Fruits and Vegetables and other related documents of the Code, such as Codes of Hygienic Procedure and Codes of Practices.

The goods should follow certain microbiological requirements that have been defined according to the Food Microbiological Requirements Establishment and Implementation.

1.7 Research Aim and Objectives:

The research is aimed at evaluating the consumption of mango among Indian customers and their preferences.

The objective of the research can be summed up as,

1. Explaining the behavior of the customers while choosing a particular type of mango
2. Explaining the factors which affect the supply of mangoes in the local markets
3. Explaining the procedures which will enhance the supply of mangoes in the local markets

1.8 Research Hypothesis:

The list of research Hypothesis which will help to evaluate the consumption of mango and the preferences of Indian customers are,

1. The relationship between the taste and appearance of mango and the customers' selection procedure are positively correlated.
2. Income of the customers is positively correlated with the consumption of mangoes in India.
3. Use of harmful ripening agents is negatively correlated with the consumption of mangoes in India.
4. Supply chain network is responsible for wastage of mangoes supplied in the market.
5. The consumption of mangoes depends more on the price of mangoes than any other factors.

1.9 Purpose of the Diploma thesis:

In this study, the purpose is how Indian customers view quality and establish preferences to spend a special price for delicious fruits like mango. It is very well established that mango dominates the place of 'King of fruits' owing to its reputation among many fresh fruits cultivated locally in India. However, mango cultivation is firmly rooted in India, so the national market consumes 65-79 % of the local mango species in the summer months. As just that, both the government and private industries are involved in boosting the mango industry's ability to compete with the help of improved investment, expecting the sector will also be able to increase India's economy.

The existing study has concentrated mainly on Indian mangoes genetic characteristics. However, consumer research is restricted from the marketing view. A segmentation strategy to recognize consumer value priorities for recognizing mango users' significance and many ideas for enhancing supply chain procedures in India's mango sector.

1.10 Structure of the Diploma thesis

The Diploma thesis is described below in sequence

Chapter 1: Introduction:

In this section, the introduction part is a summarization of the studies in order to determine the mainframe of the remaining research study. The dissertation is described below in sequence. The author will assess the reason and history of the study, the goals, objectives and the research questions selected.

Chapter 2: Research Methodology:

This section contains several sections such as research methods, research design, legitimate and accurate study instruments, data types and data analysis tools, study legitimacy and authenticity, research ethics and restriction.

Chapter 3: Literature Review:

The following section of this study is a survey of the literature in which the extent to how Indian customers view quality and establish preferences to spend a special price for delicious fruits like mango is evaluated in considered literature. The knowledge of customer price choices is regarded as vital in order for the horticultural quality systems to achieve ideal output from government and personal sectors. There is now a general view that the profitability of the private sector and the effectiveness of public policy cannot be attained without an understanding of customer desires and issues. At the same moment, customer awareness about the value of nutrition, security and sanitation problems is also rising as live norms modifications are triggered by development in revenue, urbanization and globalization. Through relevant theoretical knowledge, the review of the literature will investigate how Indian shoppers view quality and set choices to pay a proper price for mangoes.

Chapter 4: Data Analysis

The section analyzes the information and analyzes the results from the gathered information to analyze the significance of the Indian shoppers to buy mangoes.

Chapter 5: Conclusion and Recommendations

In this last section, the investigator will discuss the final findings obtained from the past debates. Additional comments on prospective suggestions, constraints and scopes for further studies are provided.

2. Objectives and Methodology

2.1 Introduction

In the past few centuries, customers have shown increasing requirement for premium new foods in India owing to their metropolitan lifestyles, schooling, increasing disposable incomes per annum and food retail globalization. This is why the marketing of horticultural products are important. In order to seize the possibilities, stakeholders in the gardening sector and companies are entering this market segment. This has led the author to deal with this problem from the point of view of consumer science and marketing.

In this research, the consumers in India understand excellence and develop desires for fresh fruits which may be costly. Mango is renowned for its famed status as a 'King of Fruits' among many regionally produced fresh fruits in India. Nonetheless, the Indian fruit usage has a strong root; hence, in summer, 90%-95% of the local mangoes are consumed on the regional market. In current research, the physiological and biological characteristics of Indian mangoes are the primary focus. Since the promotional design relies on altering requirements and customer desires, it is essential for the business performance to comprehend such adjustments together with the requirements of companies to develop.

From the point of view of customers, the goal of fruit businesses is to focus on performance in new products. Previous studies showed that views of performance have an important effect on the probability of payment for new products of a hefty premium. As a result, agri-food businesses are extremely probable to understand how to update customer requirements for food quality into physical characteristics if they stay viable. The methodology of research enables the author to appropriately manage the diploma thesis. The suitable research methodology develops a suitable structure for collecting relevant study topic-related data.

2.2 Research Philosophy

The philosophy of research plays an important role in the research method since it allows the authors to understand the appropriate methods for collecting important

study data. The research philosophy properly defines the hypothetical thinking of the authors. It is completely up to authors to decide the assumption process for conducting the study. The inference technique is different in all inquiries. The philosophy of research should be well combined with the domain of research; otherwise the surveys data is pointless. The research philosophy can be divided into three classes. They are,

1. Interpretivism
2. Positivism
3. Realism

The philosophy of positivism of research focuses on thinking and gathering data which were not very easy to find. Positivism is totally controlled by the systematic attitude to data compilation. Positivism excludes Epistemologies and detailed experience-based data collection is extremely efficient. With the aid of interpretivism, various arrangements of social sciences can be explained in a very effective way. The leadership of the business can be well defined with the assistance of Interpretivism. In order to identify the domain of research, interpretivism rejects scientific principles because it utilizes natural law. Interpretivism shows the way to research by modifying the element of data collection. In comparison, realism is a mixed conceptual and beneficial strategy. With the support of the author, it can describe personal beliefs as well as very beneficial in connection with communication between people with other living environments. Positivism is embraced as a research philosophy by the author that assisted the author who is useful to collect all the comprehensive data linked to the research subject.

2.2.1 Review for selecting the research philosophy

In this research, the author implemented positivism is chosen as a research philosophy in order to evaluate the data collected effectively. The author is ready to collect information on the preference of the Indian customers while purchasing mangoes through can be collected aptly with the research philosophy of positivism. The Diploma thesis needs to be done within a time period. The philosophy of

interpretativism and realism cannot therefore be embraced as they take longer period of time to complete.

2.3 Research Approach:

Research approach Provide the author with the research mode necessary for the correct functioning of the research. There are two research approaches,

1. The inductive research approach
2. The deductive research approach

The deductive research approach is applied in those studies, which concentrate on the practical application of research-related concepts. In the notion of pure information collection from participants, the deductive method of studies is helpful. The inductive study strategy depends on the analysis of the purchase of research-related information. In particular studies, the inductive method of research is often used to create new thoughts on research, where the appropriate statistical data is not available to authors. According to the difficulty of research and information compilation procedures, the investigator selects a study approach.

Authors find the development of suitable concepts with additional requirements and the applicable data analysis procedure is deductive.

2.3.1 Review for selecting the research approach

The author has a deductive approach to conduct this research, because there is adequate scope for collecting information. The author has been aided in understanding the preference of the Indian customers to buy mangoes from the market and in the specific accumulation of information in accordance with the research needs.

2.4 Research design

The structure of the study can probably be developed with the help of research design. The selection of information and the data analysis sequence can be properly selected using the research design. It is important to identify techniques for collecting and analyzing data for the research design. The concept and beliefs

required for proper analysis are recognized by Exploration research design. The explanatory design of the research is based on the link between causes and effects that describe how an incident occurs and what can be the after effects. The author finds Descriptive Research design to collect all appropriate information relating to the research.

2.4.1 Review for selecting the research design

The effects are only focused on the right depiction of the data in the descriptive research design. The author suspended the explanatory design from taking place because it focuses on the experimental study and not viable for this research.

2.5 Data collection Procedure

In order to comprehend the possibility of Consumption of Mango and Consumers Preferences in India, primary as well as secondary data must be gathered by the author. The author obtains information from the mango Sellers in local shops as well as the customers of those shops. The author seeks to obtain quantitative data through the application of the survey questionnaire techniques.

A closed questionnaire was given to the respondents participating in this study. Including set replies, the closed questionnaire chosen the desired response from the alternatives provided. In addition to compacting, the closed issues play a significant part in personification of the answers (Patten and Newhart 2017). The author has chosen closed issues are that they are conclusive and easy to quantify. In order to recognize the statistical impacts of the research, the author categorized the participants to incorporate the close-ended questions in distinct subgroups.

2.6 Sample Size

The author has selected 10 Metropolitan cities for the research. The fruit shops in the local Markets in the neighboring area of the ten cities are selected by the author to collect data. The author collected primary data from 200 fruit shop owners selling mangoes in all the ten cities along with collecting information from 10 customers of each shop with the help of a survey questionnaire. The researcher approached 350 fruit shop owners and only 200 cooperated with the researcher. The survey

questionnaire contains five questions for the customers and five questions for the shop owners. Total 885 customers responded out of 2000 customers approached.

2.7 Data Analysis Tools and Techniques

Qualitative data analysis works a little better than linear data, especially because qualitative data is composed of sentences, remarks, images and symbols. The full importance of such data is almost hard to obtain; therefore it is mostly used for Diploma thesis. Although there is a significant distinction between data preparation and the assessment stage in quantitative research, qualitative studies is often analyzed when data is available. Different qualitative data analysis methods are available. They are:

- Discourse analysis
- Content analysis
- Narrative analysis

The author has carried out narrative analyses to assess content from a number of places, such as surveys with respondents, floor reports or questionnaires from the study. The data analysis focuses mainly on the use of the stories that are transmitted by people to deal with the issues raised by the author (KUSUMA & BASAVARAJA, 2013). The authors select surveyed to gather pure information about Indian consumers' preferences and purchasing behaviors in the purchase of mangoes. Failure to evaluate results does not only prevent the validity of the research but also render its findings useless. The author must prefer the methods of quantitative data estimation thoroughly to make the research results are instructive and workable.

2.8 Ethical Considerations

While undertaking the research, the author must retain the necessary ethical factors. In implementing the research, the author must follow a protocol of behavior created to define suitable and inappropriate behavior. The author must obey the ethical concerns necessary to accomplish the research without any difficulties when analyzing the preference of mangoes and consumption of the fruit in India.

Data from participants from several fruit shops across India were gathered by the authors. The interviewees took part in the survey questionnaire process for data collection according to their will and not under pressure. No member was pressured into answering all concerns by the investigator.

The participants are responsible for answering their requests and also for leaving the information gathering method if the whole method is not convenient for them.

The authors are not allowed to use the information for business reasons solely for scholarly reasons and in no conditions. The investigator must maintain the confidentiality of the information and it is the investigator's duty that no information is transmitted outside without the author's understanding.

The authors must keep the name and other characteristics of the respondents' secret, and the investigator should never disclose the identity of the respondents. During the study, the author has followed the aforesaid ethical factors and investigated the guidelines of ethics.

2.9 Research Limitations

The whole research also has certain constraints. The main restriction is that conducting a research all over India is quite complicated and costly.

- The research to understand the preference of mango consumption in India is quite costly. The nature of the preference and consumption will render designing the framework of the research difficult for the author. Mango requirements or the preference of mango varieties may vary from place to place.
- The author collected important data using interviewers from the managers of the supermarkets, local fruit shop owners and most importantly the customers. Participants can become partial and have an impact on their preferences and dislike with the supermarkets or local fruit shops, thus authors are unable to correctly define issues linked to the reliability of the data collected. The author validates the data before using the data for assessment.
- There has been very little time to complete the diploma thesis.

- The author was forced to collect insufficient data and to correctly collect more data to conduct the research.
- Funding allotted to the author was not sufficient to conduct research activities. The lack of funding also restricted authors from using advanced software for data analysis.

2.10 Time Horizon

Main activities	Month 1	Month 2 to Month 8		Month 9 to Month 14		Month 17 to 22	Month 23	Month 24
Selection of research topic								
Data collection								
Literature review								
Selection of the Research Techniques								
Primary data collection								
Analysis & Interpretation of Data Collection								
Findings of the Data								
Conclusion of the Study								
Formation of Rough Draft								
Submission of Final Work								

3. Literature Review

Mango is a significant fruit that in India has been cultivated and eaten. Because of its socio-economic impacts, it maintains an important role in the economy. India is one of the world's major mango manufacturers and exports, and its mangoes are known countrywide for delicious taste, savor and flavor.

The region grew mangoes, mango packaging and sales have risen considerably over time, yet the industry's output falls far short of global norms. This inefficiency is attributed to a broad spectrum of manufacturing, post-harvest and advertising inefficiencies. In addition to these limitations, there is an increasing realization of the absence of understandings of customer desires and issues regarding the consumption of mango in the Indian mango sector. As a result, these systems do not produce the quality required by customers and not only influence the profitability of performers involved in the value chain but also result in the mango industry's general sub-optimal output

A basis of academic knowledge regarding consumer choice for mangoes and their purchasing behavior is set out in this specific section. With the assistance of this base, the investigator and the reviewers will have a chance to improve the subject in more detail and to comprehend the critical views. In order to properly analyze the findings in the subsequent sections, the use of different theories and designs is made possible by adding literature to the subject.

3.1 Types of mangoes grown in India

Agriculture is India's foundation providing 20% of the country's total GDP. Horticultural cultivation like mango, orange and vegetables are extremely valuable for commercial output among agricultural commodities. Such plants' agribusiness is increasing in both national and global markets such as Germany, Australia, and the USA.

India is the world's fourth-biggest mango producer, competing with Pakistan, China and Mexico, generating over one thousand mango varieties and high commercial value varieties such as Alphonso, Langra, Kesar, Chausa, Dashehari and Himsagar.

In India the season of mango extends over four months, starting in April and finishing in late August. Such widely cultivated mango species are known for their flavour, color and size. However, at the prolonged phase, Alphonso and Langra are grown thereby receiving massive output. The aroma and light yellow color of these two varieties are distinct (Yadav & Pandey, 2016)

3.2 Visual, Smell and Taste Components

An examination of the findings reveals that the perception of the food experience elements is obviously among the most appropriate and appreciated reasons for the purchase and that they are prepared to settle more for viable Research. Quality of fruit like mango consists of a combination of characteristics which differs with the consumer. The primary elements are taste and flavor, texture and color and form.

Visual, taste and taste elements were often rated top-rated among the mentioned characteristics, logical as they constitute fundamental food enjoyment elements. These empirical characteristics are more essential for marketers but less a problem because customers receive and update data at every moment they buy. Therefore, in this research, we decided to concentrate on the subgroup of credentials. However, there are obvious links among different trait kinds, as organic and small economic impacts are common because they are assumed to be inferior in aspects of flavor. In addition, these parts were used as indices on the general performance of the fruit like mango.

It is hard to define the concept of the quality since it includes different characteristics, which interconnect tightly, but go beyond flavor, scent, color, volume, strength and freshness. Only a few surveys look at and describe value in all its significance while others do not describe value (Yadav & Pandey, 2016). The majority of the authors define a certain number of aspects but it can be warranted that the way in which these experiencing attributes are controlled for different studies varies considerably.

3.3 Factors influencing consumer preferences

Many research characteristics which relate to the mango origin have been found to be important or substantial. The production origin generally is categorized as a

"local" feature of a series of components which customers perceive as interrelated, including tastes, financial concerns and the objective of promoting domestic civilization or a variable which somehow applies to the buying or gaining decisions. The local feature generally seems to be crucial for our evaluation to buy fresh mangoes. The bias for local economies reduced as revenue levels rose (Sekar, Subramanian, Subramanian, & Prakash, 2014).

At greater incomes, specialty shops and web-based distributors improved their degree of choice. Family volume in dedicated shops had a major adverse effect. Larger families didn't want to buy mangoes in the supermarkets. The considerable adverse impact that marital status has on web-based distributors shows that individual customers favor web-based techniques more than married customers. Jobs have a considerable beneficial effect on mango's choice but an adverse effect on supermarkets.

Employed customers favor local shops more often than unemployed customers, but they favor major corporations less often. The degree of choice for supermarkets is increasing as people contribute to the full revenue of households. The choice for local shops is declining as the amount of staff in the household goes up. The rate of organic mango purchases has an adverse effect on the local industry, but a beneficial effect on growers and specialist businesses. The greater the frequency of purchases, the more green manufacturers and specialty shops they favor. Since customers are in more strong agreement with the concept that fruits especially mangoes contain traces of pesticides, enzymes or other chemicals that are hazardous to natural safety, the degree of choice for local economies is increasing, while specialist shops and websites are losing priority. Consumers in India can be inferred as preferring the buying of organic fruit and plants more in the local shops than in the supermarkets.

In India, the fruit market is dominated by intermediaries and brokers who manipulated the supply from harvest to market in accordance with their own interests. They think in revenues rather quality and accredited norms since they are keen on commissioning over transactions.

India's internal wholesale markets are extremely disorganized, composed of tiny stores, and the prices of mango vary depending on the shop's place. All of these stores purchase their products primarily from wholesale markets regulated by intermediaries and brokers. Supermarkets like Big Bazar, Reliance Fresh and Spencers' are growing in large towns, but the prices of specific fruit and vegetables have very little impact. These establishments are growing in significant areas but still in an initial phase of acquiring credible sources of high quality fruit.

Troubles such as the inappropriate flow of information between conventional farmers and big-end markets, lack of a market awareness system for structured products, lack of a cool agricultural fields-to-market chain mechanism, and bad road facilities are significant obstacles to establishing India's premium-quality domestic mango value chain. Therefore, there is no impartial mediator between farmers and customers, which reinforces the position of intermediaries who not only dominate the market but also regulate the bulk of the selling price.

There is an excellent opportunity for consumption of prized mangoes in India's domestic markets, especially as the middle to high-income communities become aware of the value and have the desire and economic capacity to purchase prized mangoes. Given the capacity for premium mangoes in domestic markets, an issue emerges: "How do customers identify distinct intangible and inherent characteristics that generate their readiness to pay a hefty amount for quality mangoes"?

It is now commonly accepted that the profit margins of the corporate sector and the implementation of public policy cannot be accomplished without understanding the views and interests of consumers. At almost the same period, owing to modifications in living standards triggered by revenue generation, urban development and globalization, customer awareness of nutritional quality, security and health problems is also growing. Significant changes are also being encountered by consumers in India, very little is explained about what they price in agricultural products these days as well as mango in specific. This research is therefore performed to obtain insight into the perceptions of mango consumption and

consumer issues in India, in order to suggest measures to improve the mango industry in India.

3.4 Health Related attributes

Along with image, scent and flavor elements, health-related characteristics are seen as the major factors for buying sustainable foods by customers. The apparent variations in private safety connected with mangoes can be connected to the nutrition elements, the existence of nutrient elements and the presumed danger of using agrochemicals according to this literature review. Consumers see viable mangoes as being innate, with a greater amount of vitamins and nutrients, and fewer or no pesticides and additives than standard mangoes according to a big amount of research.

In general, the future damage which standard mango ripening processes can bring to their health and government wellness issues appears to be of particular concern to individuals.

They are therefore prepared to charge greater prices to decrease immediate and social risks experienced in connection with the use of pesticides, GMOs and additives. In relation to danger issues, the term "free from pesticides" is seen as another significant feature of consumers' conduct as they were prepared to receive a premium of 15% above the standard cost for fresh mangoes that do not include pesticides.

However, customers do not seem to care whether one or more pesticides are the cause of danger.

Retail methods, such as elevated rates, top of cartons of bad fruits and improved fruit performance and blending, show an absence of classification in fruit retailers in India. Such issues could be solved by developing norms and norms implemented by domestic or local regulations. Training of distributors, especially traditional distributors, on how to guarantee smooth, secure and high-quality fruit is crucial for customers. Traditional distributors should upgrade their procedures to keep their clients in business and contend with contemporary businesses. In India, customer

preference for fresh retail models gradually rises, but there are concerns about the value and rates of apples marketed in contemporary shops and supermarkets. These distributors need to tackle these concerns by improved performance methods and sustainable marketing in order to draw customers.

In order to achieve ideal efficiency of horticultural quality systems, understanding customer values choices is essential. This article offers insight into mango customers' price choices in India, using them to suggest steps to improve their output. The qualitative information produced by these debates was analyzed for topical material. Results have shown that mango is a famous apple, both fresh and processed. Consumers attribute value to their liking, wellness, cultural and socio-cultural value. Price, flavor, freshness, and relief from harm and blemish were the primary characteristics of customers when purchasing mangoes. Consumers voiced concern about elevated mango rates, lack of safe mangoes, malpractices by retailers and public inefficient regulation. These results showed that mango price chains companies have not taken appropriate account of customer demands.

But as customers become better conscious and encounter greater working norms, the profitability of members in the quality system, many of whom will need to upgrade their practice, will not impact their worries. The research also proposed that the government should guarantee that appropriate organizations and organizations properly address customer issues such as those pertaining to food safety.

3.5 Origin and nutrient related attributes

In a number of research attributes that refer to the source of the product were considered significant or somewhat significant. Production source is usually classified as a "local" characteristic of a set of elements that may be perceived by customer to interlink with each other, including flavors, economic issues and an aim to promote the local culture of the home area, or as a factor that is somehow or less applicable to purchasing or earning choices. The local characteristic seems usually important in the choice to purchase new mangoes according to our assessment.

Scientific investigations were undertaken to match different concentrations of nutrients among fresh and preserved mangoes. Vitamins are a heavily researched element because the essential measure for dietary value. Vitamins are essential to

the public's safety; they are however also readily wasted in manipulation and processing circumstances. Two measures are taken to process frozen foods: bleaching and freezing. The processes used to blanch the mangoes by steam or warm water stop the chemical response of the plant, which results in a loss of flavor, color, vitamins and texture.

Ice particles develop during the freezing phase, triggering modifications in mango structure that harm fruit cells. At present, many treatment plants are using the flash freezing technique, where mangoes rapidly froze, for example with liquid nitrogen, by subjecting them to cryogenic conditions. This stops the formation of big ice droplets, reducing crop tissue harm. With respect to the harm to the nutrients, authors have discovered that the blanching method has reduced the vitamin levels in mangoes, but vitamin output has increased minimally during mangoes.

Fresh mangoes also suffer nutrient reduction while not being processed. A research of mango, like new food purchased in a supermarket, discovered higher casualties of antioxidants for chilled mangoes or for their dried peers. This is because mangoes are harvested by antioxidants and the decline remains while they are transported and stored.

3.6 Reasons of popularity

Indian mangoes, exceptionally delicious, wealthy and soft, are among the worlds best and therefore a very popular sign of national pride and identification. Since the delicious crop is only accessible for a couple of months every year, Mango festival becomes both culturally and environmentally domestic sensation. These are six truths that are lesser-known concerning the fruit of India.

Come March, everyone looks forward to signing up in the local fish shops for the first batches of fresh mangoes. They will eventually publish the news when they come and daily journals will regularly update rates and accessibility in the summer. India is the biggest mango manufacturer worldwide for a lengthy time and grows more than 40% of global supplies. But the global fruit trade speaks for only about one third. Issues of import legislation implied that Indian mangoes were not readily accessible in the United States, the United Kingdom and Europe. However,

domestic supply is so big that the majority of mango generated worldwide can be consumed locally in India.

During the season, several mangoes mature throughout various areas of the nation. Mild, buttery and strong, Totapuris smoothly mashed previously. A few decades ago, when ripening around May and June, delicious northern Indians, including ripe, purple langras and extended dussehris and chausas are made accessible. Like a good vintage, individuals enjoy identifying the area from which fruit is produced on the basis of flavor.

It is usual to offer mangoes to buddies, relatives and employees by tens. Markets are available both offline and internet for sales of mangoes only. Even big businesses ship mango packages to their leading members, clients, staff and vendors. Although the crop does not appear to be especially luxurious, mangoes cannot be costly. Up to 200 rupees per item the best value of Alphonso.

While mangoes taste fabulous by themselves or with just a dollop of vanilla ice cream, they are also used in all types of sweet as well as savory treatments. There are even unique menus for the summer in restaurants. The most famous item in the refrigerator is smoothies, cookies and tarts, wineries, chutneys and even curries.

3.7 The post reaping management of mangoes

The post reaping management of mangoes involves handling the plucked in order to bring vitality, freshness and a pleasing look. After reaping In order to deliver a quality item to the sector, and ultimately to the consumer, to offer the manufacturer a concentrated advantage, genuine post-collection management is a must.

Nearly 20-25 per cent of natural products is wasted due to defective post-collection work during collection, storage, assessment and so forth. Thanks to correct and rational strategies this excess can be minimized a little. The subsequent development to give attention to products and necessary methods for viable marketing after selection administration can be regarded. After processing, the operations of managers include: aggregation, recovery, pre-treatment, assessment, and bundling, pre-cooling, and low-temperature transport, piling of tables, transporting and dependence on numerous inputs.

Pre-harvest influences affecting post-harvest management:

The ability of fruit for processing through altering biology, chemical composition, and the morphology of fruit is influenced by pre-harvest cultural practices, such as fertilizer usage, pest control, growth controls, climate and plant conditions as well as the wet and windy environment. The useful spray of calcium is found to improve storage life and increase marketability during the ripening period of mangoes. Likewise, fungicide pre-haves including Dithane M-45 (0.2%), Bavistin 0.1%, Topsin-M (0.1%), Captan (0.2%) are active in the management of storage conditions.

Maturity:

The accurate measures to determine fruit maturity are the exterior color, texture, pulp colour, and soluble solids quality. When the stone matures, the appearance of the pulp switches from white to cream. Fruit sinks in water in a few variants like Langra, and Chousa, at maturity level.

Exterior colour:

The skin color changes from green to yellow as the mangoes grow. Regular, yellow size fruit is ripe and ready for immediate harvest.

Fruit looks:

The region of the shoulder swells and peaks above the end of the neck. The end of the stem sank and a large pit was built around the base.

External pulp color:

The mango seed pulp colour varies from light yellow to dark yellow in maturity.

Value of soluble solids:

Mangoes are harvested if the soluble solids of mature fruit (sugars) produce a minimum of 10%.

Ripeness Indices:

- The ripeness indices shift from green to yellow color.
- "Shoulders" grow at the fruit end of the plant.
- The flesh of the fruits is white to yellow from the endocarp and passes out to the surface during maturation.
- The pulp color changes and the rock is rough from black to crème.
- In the case of Alphonso Mangoes, when the shoulder is outside the base, the fruit is known to be matured and its exterior colour light brown, a yellowish red flush. In the case of Alphonso Mangoes, the material is not considered mature.
- The maturity of the crops is up to 12 weeks in Dashehari and Langra. This requires approximately fifteen weeks in Chausa and Mallika.
- The hue of the fruit, converting cream into light yellow on maturity or rock hardening, is the easiest way to observe maturity of the mango.
- Mango fruits take from 120 to 140 days after the fruit is matured. Mango fruits have only a few details.
- If a few semi-ripe fruits drop from the vine, it is traditionally considered as ripe
- Fruit picks if their basic intensity is 1.01-1.02 give good value fruits
- Fruit falling in the water means full ripeness.
- Fruits dipping in 2,5% of salt but floating in 5% of salt.
- The settlement of 5% of Salt is overdone

Maturity stages:

- The fruit shoulders are consistent with the end of the stem and olive.
- Shoulders outgrow the stem-end and color is olive green.
- The outgrowth of the shoulder end and texture were made light.

- Fruit that is harvested at any of the above steps is well matured. The second and third steps, however, give the best of taste and flavor when a few totally non-ripe fruit are grown out of the tree.
- When immature mangoes are picked, white patches are made of fruit and air pockets are developed, with a taste and taste, while over-fresh fruit loses its lifespan. Some fruits are very difficult to handle.
- In order to facilitate growth, distant transport and maximum life cycle, it is important to select out the fruits during the right maturity period and thus boost their performance and market value.

3.8 Marketing of mango in India

Steps while processing:

During harvesting the following steps should be taken.

- Harvest should be carried out using appropriate tools such as clippers and turning and dragging the fruit from the tree carefully.
- Wet harvesting should be avoided as wet fruits are more prone to microbial growth and soil particles that stick to soil-borne red species.
- The better way to harvest the fruit in the late morning is to produce oil from these fruits in the early morning, which induces rapid discoloration.
- Always shake the tree in order to reap the seeds. To order to avoid mechanical damage, the fruits should not drop to the ground, rendering fruit more vulnerable to decline.
- The fruit should never be left in direct sunlight after harvest and should be maintained in the shadow.
- Fruit interactions with the ground should be stopped and properly stored in lined champagne bottles, well-ventilated plastic containers or bags of picking.
- The bags should be either strapped or placed on the shoulder around the waist.

- Pick bags should be produced to remove the fruit from the bottom to roll out the bag to the base of a wider field container or to roll over fruit.

The maturity of the fruit is the phase in which its growth and development have been concluded. Growers have a reasonable concept of the ripening fruit indicators. Maturity is assessed by any of the previous combinations:

1. Fruit form changes, e.g. filling of the lips, construction of hips, curve decrease between knee and the upper part of the citrus.
2. Change the color of the skin from red to purple.
3. White dust appearances like a coating on the potato surface.
4. Modify the color of body to green.
5. When natural flowers of one or two mature are fallen out of the tree.

But mangoes often occur before they reach the optimal ripening level in the early summer in order to profit from greater rates. Fruit harvest before optimal ripening contributes to yellow spots growth. It also reduces shelf lives and performance, along with the overall soluble medium, sugar, and bad flavor and aroma ratios. In order to increase quality, existence and advertising importance, mango should be collected at an adequate level of mature and reduced post-harvest costs.

Visual inspection is used for sorting and grading. Until now, undertake to remove the infested and mechanically wounded apples from insects, bruises, scars, ripens. The latex fruits are also ignored on the ground and can continue in the processed bunch. Minimum grading on the estate is performed. The grower sometimes divides and sells bigger berries individually.

In the hotter portion of the day, field heat and pre-cooling mangoes are usually collected. Sorted batch in pile is organized in the sector to be charged for marketing in the car. Although mangoes will be harvested at peaking times during the cooler part of the day, between April and June and the latest, the temperature in the Salem growing areas is usually around 40 to 42 degrees Celsius. The breathing rate is also elevated at such a elevated temperature.

It generates internal heat in the products and therefore improves the chance of spoilage. Mangoes are not carried away from latex, nor are the heat accumulation pre-cooled. Ripening Mangoes to be sold on the local exchange are ripened after achieving the target by traders on the installation line or farmers in the town and the produce which is to be sold on the remote sector. In increasing areas the mangoes coming from inland to various markets in India are mature. In a locked ventilated space Mango matures. The room is about 35 ° to 38 ° C in temperature. Over plum or corn grain, or wet vegetation 5-8 cm in thickness, the fruit is distributed into a separate coating (Sekar, Subramanian, Subramanian, & Prakash, 2014).

There are sometimes two to three parts above each other with the same fabric coated. In 5 to 6 days, the fruit will become purple because of rising temperature. As shortly as they begin to turn blue and rapidly ripen, fruits are distributed over the stroke or a wet hedge pad in one section. This prevents further build-up and deterrence of temperature. In the coated heap, calcium carbide will also accelerate maturation and create a stronger color. This, however, hampers nutritional value.

Storage growers do not store the product for a long time. When it is unripe, it is hardly kept for a day or two. This may be due to the absence of adequate space in the racing region. Because he is not willing to take the risk of retaining an inventory of lost products due to lack of adequate infrastructure, farmer cannot bargain for his products as finest price.

Packaging for transport to market producers brings the nearby mass assembly market unripe products. No packaging is used to move mangoes from the farm to the mills for assembly. The mangoes are measured and carried in five or 10 vehicles in order to ship to the handling facility or the biggest companies in the manufacturing sector. To cushion mechanical hazard products, seeds are used. Triple powered vehicle with three wheels. Tractor or heavy vehicles or camel carts are alternatively used to distribute mangoes in the markets in India. In order to prevent danger from the weather, transportation vehicles are protected by tarpaulin.

Packaging materials should ensure adequate protection of their contents, provide ease of product processing, attract consumers and sell the contents, and provide the consumers with inside information about the product.

Mango packaging materials rigid containers such as plastic boards for fresh mangoes are highly recommended as they provide sufficient protection from damage from compression. The finish is smooth and can be cleaned easily. They can also be stacked and reused or returned. Although the price per kg of product is comparatively low, although it is more expensive than traditional packaging containers, for long-term use, plastic crates.

Semi-rigid containers like baskets for bamboo must be used, but not over packed. Baskets should also be lined to avoid abrasion and rupture on the fruit using clean paper, jute sack or any suitable coating material, as the trays have a harsh inner finish usually.

Cartons must be fitted to avoid heat build-up inside the carton with a lateral divider in the middle and with air holes on either side of the carton. Fiberboards reduce physical strength as moisture is absorbed over time.

- Considers for the use of plastic crates— plastic crates—after using soap or detergent should be thoroughly cleared.
- Towards loading, stack and unloading with care;
- When sorting, don't use as seats
- Mangoes must be stored in a clean area to prevent insects and rodents being harbored.
- Store in order to prevent pollution from chemicals and agricultural machinery. Containers should not be kept in the external surroundings because they wear out quickly.
- Do not use fresh products for chemicals.
- Transportation The main objective of transportation is to ensure that mangoes reach the finishing market in good condition. Mangoes must be transported to the collection centre between different points in the supply chain:
 - The market to the retail market for wholesale

- Good transport activities described below should be followed at all of these stages: Handle containers carefully; they should not be lit or thrown at each other.
- Containers at the base of the stack should never be used as loading steps, especially in cases where semi-rigid containers such as cartons are used.
- Enable air to disperse in stacks or piles, offering space between stacks of the packaged goods. If canvass is used as a cover, give air space at the bottom and top of the stack; use light-colored stuff as a cover to reflect heat.
- plastic crates should be kept in a clean, shaded area, rather than exposure to sunlight Proper handling of plastic crates in-vehicle Loading Four-wheeled trolley facilitates the transport of products – Minimize delays or make it possible to transfer packages from part of the market to part of the market.
- Observing the purity of transport vehicles; producing safety is affected when:
 - The packages should consist of mangoes of the same type, range, value and weight. To order to properly safeguard the material, the visible part of the package's contents must be representative of the entire mangoes. To order to prevent any contamination from outside or internal to the item, the products used in the packaging must be new¹ and dry. The use of products, especially of papers and stamps with export requirements is appropriate given the non-toxic ink and adhesive has been used in printing and labeling.
 - Mangoes shall be shipped in each container, in keeping with the approved International Code of Practice for the Packaging and Transportation of Fresh Fruits and vegetable Definition of the containers. Packages should be without the smell of any foreign matter (Sekar, Subramanian, Subramanian, & Prakash, 2014).
- Insects and rodents in vehicles are present, used as the storage area for farm equipment when not in use. • Observing the cleanliness of the transport vehicle
- Mango farmers, buyers and other dealers serve as wholesale markets.

- Dump containers from delivery vehicles undercover with careful handling in order to prevent mechanical damages. The basic rules that should be witnessed are as follows.

- Mangoes re-sort using the sorting table.
- Mangoes must be re-graded in accordance with their size, appearance and ripeness as appropriate depending on the target market requirements.
- Download mangoes on the clean store or clean boxes.
- Keep unsold mangoes in stock with proper ventilation if the mangoes do not sell in one day.

Safe storage recommendations:

The following are security processing recommendations for mangoes.

Site selection (location):

- Processing system on a well-drained elevated site
- It should be available instantly.
- Excessive humidity, excess heat, direct sunrays and pests should be protected against structures.
- It should be installed at an elevation of no less than one foot from the ground to reduce moisture on a well-built base.

Washing storage structures:

- Correctly washing of storage structures in preparation of processing produce
- No structure, cracks, holes or grit that could harbor insects should be present.
- Cleaning and fumigating the steel system until loading.
- Mangoes should be washed and dried thoroughly prior to processing.

- To avoid performance deterioration and insect attack, infected fruits should be discarded.

Package cleaning:

- Fresh packets should be used as far as practicable. Until use, wash, dry and fumigate the old bags.
- New and old stocks should be kept separately for the intent of testing the infestation and ensuring the hygienic state of the godown.
- Adequate aeration: adequate aeration must take place.

Daily examination:

- The monitoring of the infestation should be carried out on a daily inspection of the stored produce. The health and sanitation of the inventory must be preserved.
- *Realities about the utilization of method of transportation:*
- For a span of around 8-10 km of market, transportation of natural products by head loads or by bullock truck is very normal.
- For far off creating focuses, transportation is done chiefly by street, rail, conduits in little amounts and air in next to no amounts.
- Because of particular focal points in shipping products by trucks contrasted and railroads, there has been a positive move for street transport of Mangoes.
- Trucks are currently utilizing over long separations of 800 to 1,000 km, interfacing creating focuses of one state with the devouring focuses in other.
- In Delhi, up to 90% of all out appearances are moved by street. In Chennai, 83% Mangoes are shipped by trucks.

Overall, there is a bad road in most part of India. During the trip, many highway discontinuities such as whole pod, obstacles, and path are found. The damage is mostly latent and only after ripening can be seen. Incorrect loading and unloading

techniques also contribute to a significant amount of damage. This leads to bad fruit value. The harm to shipping is linked immediately to the journey. The damage to the product would be more likely to be at a longer distance.

- Producer for the assembly industry pre-harvest operators ' traders and or commissioned APMC officers
- Producers to town traders and/or commissioners to assemble business traders
- Producer for assembly industry traders
- Producers or traders to order officers in assembly markets
- The market trader in the assembly department
- Producer or trader in the wholesaler or sub-bulker assembly market
- Retailer and consumer manufacturer

Most producers generally deliver their manufacture to retailers or local traders in assembly economies. If the returns are small, they are distributed straight to the retailer or sub wholesaler or the customer. Generally, because of the prior connections or because of the credit received from the trader, each manufacturer would go to the specific trader. This scheme prevails also when the manufacturer immediately gives goods to commissioners. These assembly industries are also supplied by large consumers.

3.9 Post-harvest operations

Mangoes do not usually require post-harsh treatment on local markets, other than regular water rinse for latex and dust removal. These are sometimes dipped into hot water, producing fungicide for disease control, on an industrial and export level. Nevertheless, after-harvest therapy in mangoes (HWT) is successful. The dipping in hot water of newly-harvests minimizes risk to the fruit fly, anthracnose and stem-end rot. The major post-harvest operations are treated, cleaned, graded, wrapped, packed, shipped, manufactured and sold etc.

Fruit ripening:

- The fruit is plucked early in the season to reach an early demand premature stage and traders are processed using carbide to chemically ripen the crop.
- Langra Mangoes will ripen in a wooden case lined with paper at room temperature in open, in a carbides-treated earthen cup, and in a wooden wool container.
- Ripening is much accelerated in the Alphonso fruits if mature fruit is stored in chambers of 10 000 ppm ethyl sodium hydroxide pellet-saturated ethylene gases.
- In the palatability and attractive production of colors, 4 g calcium carbide/kg fruit is best used to influence the impact of ethyl and calcium carbide on the Dashehari Mango plant. The TSS, glucose and carotenoid contents of these fruits are much higher but little lower.
- Calcium carbide (6 g / kg of fruit) maturing langra mangoes are stronger in taste if accompanied by ethyl (800 ppm) treated.
- The best way is to mature with ethylene.
- Acetylene gas can be used as natural ripening support, which is extracted from calcium carbide by adding water or by interaction with moisture in the soil.
- Acetylene grades of 0.4 ml / l may be progressed by softening and peeling color production within 24 hours at 250 C.
- Fruit matured around 19-210 C gives better performance than fruit matured at 28-300 C.
- A simple way is to place the fruits in baskets lined with calcium carbide and banana leaves. It culminated in the same fruit color, which was ripened without carbide within 2-3 days, but with poorer taste than grapes.

Ethyl maturation process has better quality, albeit sluggish. The use of calcium carbide, a chemical which is poisonous and extremely dangerous, used to ripen up to 99% of the mangoes in India. It is the most inexpensive process of mango

molding, but it is a banned material, not for fruit maturation. Such fruits do not grow reliably and fruit value is poor. For the sake of maturation, the fruits should be handled with ethylene (100 ppm) in the airtight space, with temperature and moisture in command for 24-48 hours.

The fruit may also be kept in hot water for 5 minutes, using the ethyl / ethhephon solution dip. It can be used four times with the same approach. Premature fruit can be ripened for tolerance by dipping the fruits into a solution containing 750ppm ethyl (fruit obtained up to 2 Weeks before maturity). In the same way, less mature and mature fruits can be matured by dipping the fruits in a solution of 500 and 250 ppm ethyl. The fruit is grown with these therapies in an enticing hue.

Cure, rinse and refreshing the mangoes:

Cure is important to store fruit for long periods of time in order to prolong shelf life. In the courtyard of the fields, the fruits are usually spread on the ground and almost 24 hours laundered to take away the soil with the blanket paddy straw and rice. Re cooling after harvest quickly removes champagne heat from fruit which is newly harvested and helps to stabilize the metabolism process. In Post-harvest curing, the Enzyme degradation and respiratory activity can be suppressed.

Reduce production of ethylene (maturing agent) in conjunction with performance control and post-harvest cooling, offers the stability to sell by enabling sales to take place in an optimal time. Slower or prevent the growth of decreasing microorganisms (moulds and bacteria) Some types for ventilation include space refrigeration, artificial air cooling and liquid cooling.

Grading:

Grading agricultural products in compliance with agreed standards of quality allows producers, sales agents, processors and merchants to sell effectively. Volume, weight, color and maturation help both producers and consumers. The fruit is labelled accordingly. It was noted that larger fruit requires 2-4 days longer to mature than smaller and are unable to mature uniformly. Classification by volume also plays a major role in fruit packaging. During gradation, the fruits should be

discarded: young, overripe, weakened or sick (Sekar, Subramanian, Subramanian, & Prakash, 2014).

3.10 Transportation:

Transport is regarded as an agricultural marketing backbone and lifeline. The movement of fruit by land, road, air and water must be done with utmost care.

Surface Transport:

The simple path of the olive groves to market makes the surface transport superior to other modes of transport. The transportation means of surface transportation is head packs, horseboxes, bullock-carts, carriages, vans, mini-trucks and buses and their use is based on the position of the vergers, the range between them and the markets, etc.

To shorter distances, a cart/tractor trolley, an automobile rickshaw and minibus is borne as head load, while for a range of ten to twenty kilometer it is quite popular. Of shipping fruits, more than 100 km, the easiest way of transport is by using trucks because of its easy access from the orchards to the markets.

Consigner chooses surface transport with readily accessible trucks, unlike cargoes. Their arrival on schedule, lack of pilferage and road infrastructure at consignor gates, and a quick shipment to the consumer are very reliable.

Often trucks add a lot of fruit stress and do not have tools those growing fruit temperatures. Therefore, it is essential to design and develop a suitable transport system. To order to reduce post-harvest losses, the cooled van should be used for transportation and export purposes.

The temperature, the moisture and the development of ethylene during shipment have an impact on the quality of the fruit, resulting in the fruit's redness and dehydration. For this purpose, separated and/or refrigerated Lorries should be used for long-distance transportation with extensive intake power.

Rail

The shipping by rail has some benefits over the transportation of the air. For rail transport, the harm is less than the damage caused by direct road transport. In this mode of transport, transport costs are also much smaller.

Rail transport is favored if the goods are shipped in bulk or the distances are wide. In trains, the failures are mainly due to regular disruptions in the movement of vehicles. The losses arise in general over longer distances.

Nevertheless, the Indian Railway's air-conditioning tank has done an appreciable job of spoilage reduction and reliability repair. Coaches must have controlled 25 degrees centigrade level and 60 per cent relative humidity.

Air transport:

The easiest but most costly form of transport is air transport. With high-value short-lived goods, though, this is important. Cooling plants are usually not accessible and, rather, low stress at high altitudes with higher RH is observed. It raises the product's level of water loss. PE film liner is needed for air transport to be perforated inside the carton or to overwrap the container. To order to counter the shortage of cooling systems, packaged products coming in for air transport must be adequately pre-cooled. Since there is no cold storage facility at airports in India, pre-cooled products must be shipped to airports in separated or cooled trucks or vans to prevent any late arrival delays or unused space on a given flight.

Transportation of water:

Rivers on the surface can be used for fresh fruit and vegetables as an effective means of transport.

Although maritime transport, in contrast to other modes of transport to cover long distances, is relatively slow, intercontinental transport is the cheapest and most energy-efficient boat. Some goods require low-temperature conditions with adequate ventilation to maintain CO₂ and ethylene concentration to minimal to survive long-distance waterway transport. For the reason that can be packed at the packing house/center and transported on trucks to the terminal, refrigerated rigid containers should be used for further transport.

3.11 Conceptual Framework

Most customers are unable to distinguish between premium fruit and conventional fruit even if there are noticeable distinctions. As such, customers buying mangoes in India often question the availability of genuine mangoes due to less knowledge on reliability and scarce consumer experience.

Different methods were used to clarify the performance viewed. Query characteristics illustrate that by immediate reflection, consumers verify the characteristic before buying or consuming. The customer sees color, shape, cost, suppleness, texture, stain, blemish-free shape and packaging as significant qualities while buying expensive mangoes.

4. Practical Part

4.1 Introduction

The author attempted to present the information assessment of the preferences of the customers while buying mangoes. Data analysis enables a portion of the study method to improve information quality and to provide a stronger assessment and result for an individual subject, with the assistance of qualitative and quantitative analysis. Analysis of information enables an author to implement theoretical understanding in practice (Silverman, 2018). Data analysis includes complexities and constraints, such as information handling, absence of authenticity and other factors. A cross-checking method is thus monitored in the research job through data analysis.

This section assesses the role of customers while taking decision while purchasing mangoes. The author attempted to obtain the information pertaining to the subject and therefore analyze the results to make data sets valid. Based on these results in this section, Customers and local shopkeepers selling mangoes are the respondents regarded for the data gathering method so that the particular investigation job contains more worried, specific and detailed information.

4.2 Quantitative Analysis

Four Metropolitan Cities, Delhi, Mumbai, Kolkata and Bangalore were chosen by the author for research to understand the preference of the customers to buy mangoes. The respondents are chosen to obtain information from the fruit stores in the local of the chosen cities. The author created a focus group to test the hypotheses. The Focus Group is chosen in this diploma thesis to find answers of the survey questionnaires with the help of an interactive session where the participants are mainly the customers of mangos and the local fruit shop owners in the chosen Indian cities. They discuss and provide effective information related to the consumption of mangoes along with answering the questions in the survey questionnaire.

The Focus Group comprised of the customers of mangos and the local fruit shop owners also helped the author to provide necessary information which helps the author to understand the importance of the various factor responsible for the consumption of mangos in India. Without the interactive session it won't be possible to gather the complete data by the author. Interactive session with the focus group has enabled the author to analyze the data more accurately. A study questionnaire was used by the author to gather primary data from 200 fruit sellers and 885 from 10 selected Indian cities. The survey questionnaire includes 7 questions for the customers and 7 questions for the owners of the fruit shops.

4.2.1 Quantitative Analysis: For Customers of mangos in India.

1. How often do you buy mangoes from this store?

Options	Number respondents	Total respondents	Response %
Only once	53	885	6
Once a month	107		12
Once a week	283		32
2 - 4 times a week	442		50

2. What type of mango is your favorite?

Options	Number respondents	Total respondents	Response %
Alphonso	71	885	8
Chausa	177		20

Langra	194		22
Himsagar	318		36
Gulabkhas	125		14

3. Do you find the quality of the mangoes up to the mark?

Options	Number respondents	Total respondents	Response %
Yes	778	885	88
Not up to the m	107		12

4. What are the reasons for choosing this shop?

Options	Number respondents	Total respondents	Response %
Convenience	249	885	28
Price	221		25
Variety of options	212		24
Assured quality of mangoes	203		23

5. Please choose your annual income

Options	Number respondents	Total respondents	Response %
Less than 1,00,000 INR	177	885	20
Between 1,00,000 & 2,00,000 INR	300		34
Between 2,00,000 & 5,00,000 INR	249		28
Between 5,00,000 & 10,00,000 INR	88		10
More than 10,00,000 INR	71		8

6. Would you mind buying mangoes with black spots and signs of damage?

Options	Number respondents	Total respondents	Response %
No	265	885	30
I don't mind	443		50
Buy them most of the time	177		20

7. Do you think the supply of mango is adequate in the market?

Options	Number respondents	Total respondents	Response %
Yes	664	885	75
I don't know	89		10
No	132		15

4.2.2 Quantitative Analysis: For Local fruit sellers

1. From where do you buy the mangoes?

Options	Number respondents	Total respondents	Response %
Local farmers	60	200	30
From the local wholesale fruit market	100		50
Other states	40		20

2. What are the most important criteria for the customers while buying mangoes?

Options	Number respondents	Total respondents	Response %
Price	50		25

Quality	60	200	30
Organically grown	30		15
Chemical-free ripened	60		30

3. Do you know the mangoes ripened with chemicals?

Options	Number respondents	Total respondents	Response %
Yes	90	200	45
No	110		55

4. Which fruit sales most in your shop in summer?

Options	Number respondents	Total respondents	Response %
Mangoes	180	200	90
Other fruits	20		10

5. Do the government representatives check the quality of the mangoes you sell?

Options	Number respondents	Total respondents	Response %
---------	--------------------	-------------------	------------

Yes	50	200	25
No	150		75

6. Do you receive all fresh mangoes or some of them are damaged?

Options	Number respondents	Total respondents	Response %
Yes	120	200	60
No	80		40

7. Do you find difficulties to store the mangoes in your stores?

Options	Number respondents	Total respondents	Response %
Yes	130	200	65
No	70		35

5. Results and Discussion

5.1 Findings and Analysis of data collected from the customers of mango

The findings have shown clearly that in summer, mangoes are popular in all areas of society. It can be observed in the discussions among the focus group of the customers about extensive use of the descriptive words like the 'prince of berries' and 'favorite of everyone'. The participants conveyed their powerful love of mango. Consumers have liked to drink mangoes, primarily because of their flavor they call it "sweet," "unique," "matchless" and "pleasant." The wellness advantages, the taste and the socio-cultural significance of mango were among other factors for loving mangoes. Consumers enjoyed mangoes because they saw it as a healthy source of power and diet for wellness advantages.

Mangoes have been noted for more than four months from the beginning of April through July as a contribution to the appeal of the customers. Mangoes were emphasized as encouraging their love of socio-cultural significance. The Mango Season offers respondents with the chance to meet buddies, particularly among medium or low revenue communities in India, through mango parties. Although none were hated by mangoes, very few people in particular, from medium or low incomes, indicated that their fruit consumption was comparatively small because of dread of diabetes.

Mango was defined as 'multipurpose fruit' by respondents. This product can be eaten in both fresh and processed types like pickles, milkshakes, ice-creams, squash and jams. However, fresh mango consumption has been considered to be the favorite type primarily because of the immediate flavor and easy consumption of the mango.

In India, several types of fruit are harvested and consumed, including Chausa, langra, himsagar, gulabkhas and Alphonso. In all participants, however, himsagar choice was greatest. Due to its flavor, flavor and simple accessibility, the participants have defined it as "the finest and the tastiest." langra rated second most popular mango range in terms of its special flavor and distinctive aroma. The declaration from a consumer in Kolkata demonstrates that langra has a special

flavor, and when it is placed in the vehicle, the aroma is thought all about the vehicle. In big earnings and academic circles, its desire was greater.

In the customers with limited incomes, its choice was poor primarily because of its significantly higher cost. In addition to these two variants, chausa and gulabkhas were also a favorite of the respondents. Because of its large appearance and comparatively low cost, chausa was mostly liked. This range has been articulated by mostly small and medium-sized income sectors. Alphonso was considered the highest priced variety and mostly preferred by the affluent customers. Some elderly respondents voiced their appreciation for the sweet and sour taste of the ancient style Langra.

All participant customers wished to purchase high-quality mangoes, while there was a wide range of perceptions among respondents of a nice quality mango in its characteristic features. Participants addressed various characteristics that were essential for the purchase of mangoes. Most respondents regarded the most significant characteristics in the procurement of mangoes, cost, freshness and pleasant smell, undamaged and unstained peel. There have also been some other characteristics, but they vary in the various clients.

Mango cleanliness, retailers' cleanliness and chemical-free maturing of mangoes were regarded as significant in the low-income category. This can be because low-income consumers can not purchase excellent quality mangoes from excellent distributors. As a consequence, mangoes were often bad quality and harmful primarily because of unnecessary use of calcium carbide a ripening solution had to be used. The top earnings bracket focused more on fiber variation, volume and lack. Some members of this community also emphasized the significance of contemporary licensed distributors. The large revenue band liked to purchase mature and juicy mangoes correctly. They believed that a good fruit value should be safe and that it should not be over or under matured.

The women customers regarded the information provided by the shopkeepers to be essential for the mangoes' diversity, appearance, juiciness. Color, flavor and firmness were regarded significant by the lay public.

The respondents wanted to eat nice mangoes and they were ready to charge bonus for them. The low-income band was prepared to receive an additional rupee per kg. The medium income band, the woman band, and the university team stated that they were prepared to receive an additional 15 to 25 rupees per kg more. The respondents in the greater revenue even were prepared to receive an additional 20 rupees per kg if mangos were accessible of their required value. Participants were commonly kept that it was worth purchasing fewer good quality mangoes than inexpensive, low-quality mangoes.

They also defined their retail outlet choices. As per the respondents, they favored the purchase of mangoes in traditional retails, especially cart stalls, owing to their quantity, excellent cost, excellent quality or excellent performance, on traditional places such as road sellers and continuous roadside stores as well as at contemporary supermarkets. Mangoes were accessible in traditional retail stores in the summer. Some respondents from the high incomes stated that contemporary consumers such as contemporary shops and supermarkets are preferred to buy mangoes. High quality, comfort, fixed price and fruit liberty were the main factors for these preferences. Higher prices, low quality and distant location were the main reasons those who didn't like contemporary shops.

5.2 Findings and Analysis of data collected from the sellers of mango

The findings have shown clearly that in summer, mangoes are popular in all areas of society and due to malpractice, such as profitable returns, topping, price mix; most customers were dissatisfied with mango distributors. The respondents claimed in the discussions of the focus groups that the distributors gained excessively large profit margins by establishing elevated rates that do not reflect the value of their services. The respondents criticized distributors for the unreasonable trade practice of ordering and blending value, as well as rates. Topping means putting good fruit on the screen and low-quality fruit below to draw clients. An educational community member who emphasized this issue indicated that the finishing procedure is not fixed in the mango chain.

The distributors put special mangoes in great condition on top. During packaging, distributors mainly attempt to combine low-quality or spoiled fruit and excellent

stock of mangoes. Participants indicated that the inferior quality of the mangoes placed into shopping bags. All participants strongly criticized the position of govt in safeguarding customer rights. Participants kept public ineffectiveness accountable for elevated mango rates, economic and environmental interventions and the use of calcium carbide and retail malpractices.

It was a particular agreement, but their absence of compliance was a big problem, that there were public legislation and organizational agreements. Utilizing this scenario unduly, price chain performers, especially distributors, influenced customers by misconduct. The participating apple shop owners stressed the absence of grading in apple retailers in India as a result of retail procedures such as elevated rates, top grading cartons of bad performance berries with stronger value fruits and value blending. Through developing norms and norms implemented through domestic or local regulations, these issues can be solved.

It is vital that suppliers, especially traditional distributors, are trained in how to guarantee smooth fruit is smooth and secure. Traditional distributors should update their procedures to maintain clients and contend with contemporary businesses. In India, customer expectations in fresh sales styles gradually rise, but there is still concern about the value and price of apples marketed in contemporary shops and supermarkets, as do other developing countries. These distributors should tackle these concerns through improved performance methods and sustainable prices in order to draw customers.

5.3 Analysis of the hypothesis

The first hypothesis is the relationship between the taste and appearance of mango and the customers' selection procedure are positively correlated. This hypothesis is proved as the customers' prefer to buy flawless mangoes because they presume that the flawless mangoes are fresh and good to test.

The second hypothesis is the income of the customers is positively correlated with the consumption of mangoes in India. The above tables indicate that customers with high income also purchase more mangoes than others.

The third hypothesis is the Use of harmful ripening agents is negatively correlated with the consumption of mangoes in India. This hypothesis is also proved from the responses collected by the author. The customers are not in favor of buying mangoes ripened with calcium carbides.

The fourth hypothesis is also proved by the responses collected by the author from the local fruit sellers and their customers.

The fifth hypothesis is the consumption of mangoes depends more on the price of mangoes than any other factors. This hypothesis is also proved from the data collected from the customers and the local mango sellers.

6. Conclusion

6.1 Overall conclusion

Mango is a famous fruit in India that is commonly eaten in both natural and processed kinds. Consumers not only recognize the cost, freshness, absence of distortion and stain, and delicious flavor when purchasing mangoes but also recognize the characteristics associated with hygiene and branding. This demonstrates a change in buyer behavior that seeks worth for money. Customer awareness to all these characteristics, as in other nations, is anticipated to boost in future, motivated by increasing revenues and awareness of wellness. Considering this evolving situation, performers in the value chain, especially farmers, should enhance their mangoes' quality characteristics by aligning their activities with particular consumer demands.

Mango is a traditional fruit in India which is commonly eaten in both fresh and packaged types. Consumers not only take into account the prices and nourishment, amount of damage and harm, and sweetness when purchasing mangoes but also take into account health and marketing characteristics. This demonstrates a change in consumer behavior that seeks monetary worth. As in other nations, the customer will become more sensitive to these characteristics and become more aware of them in the future. Given this evolving situation, performers in the value chain, especially producers should enhance their mangoes' quality characteristics by aligning their activities with particular consumer needs (Yadav & Pandey, 2016)

Implication departments of the government of India should direct growers and managers to guarantee that new, securely matured mangoes are present on the market.

The lack of harmlessly grown mangoes means that the strings participants are insensitive to consumption requirements. This needs the instant focus of stakeholders in the public sector to guarantee that legal and regulative policies play a part in providing customers with secure excellent value handles. Authors should create faster and secure alternatives for mango ripening, and the state should

promote and guarantee the use by respondents in the price chains of these techniques to enable customers to purchase secure mangoes.

6.2 Recommendations:

- The mainstream attention of all parties in the mango production chain must be to maintain the value and ensure the security of the collected Mangoes from the plant until food reaches the customer. The losses of the supply chain after harvest will also be reduced.
- The amount and value losses happen after harvest at distinct stages in the processing cycle. Losses totaled 31% primarily owing to the decline that occurred at the retail point and other loss-related elements are bruising and weight loss that reflects the loss of marketable weight. The result of these failures can be bad picking, harsh managing and bad quality of storage and storage.
- The elevated rate of decomposition, particularly in the shape of anthracnose and stem ending rot, can be due in manufacturing to the elevated rate of pre-harvest infection. Anthracnose is a latent infection and only as the plant matures, the signs of the illness become obvious.
- The damages after collection are wasteful of assets, such as soil, workmanship, electricity, air, fertilizer, etc. Therefore, every attempt must be created to reduce such casualties. Without minimizing these losses, production gains are compensated and potential income cannot be achieved.
- In addition, consumer focus is progressively focused on performance and security. They look for good quality mangoes which are safe and want to pay a premium price. Nutritional value conservation goes hand-in-hand with quality degradation prevention. The need for good post-harvest handling is becoming a concern with changing consumers ' tastes and lifestyles and the need to reduce the large post-harvest losses. In order to satisfy the demand for better quality and safer products, the continued growth of supermarkets and local markets and the requirements of organizational buyers require greater attention to handling mango after harvest (KUSUMA & BASAVARAJA, 2013)

- Misfortune during travel by trucks is extremely little (about 1%) in light of the fact that trucks keep running during night, in this way dodging the exorbitant warmth of the day.
- At the point when organic product is shipped by rail, especially over longer separations, there is loss of 10-20% in the transfer, for the most part in view of continuous postponements in the development of the wagons.
- Subsequently, regardless of concessional cargo rates offered by the railroads for new Mangoes, move has proceeded towards street transport.
- Consigner favors street transport in view of prepared accessibility of trucks not at all like wagons, their landing in goal in time, nonattendance of pilferage enroute and offices of street at the entryways of the consigners and direct conveyance to the market.
- In spite of these focal points, transport by rail still wins when products must be shipped in mass or when the separations included are long.
- Cooled compartments on the Indian Railways have made an excellent showing in decreasing the deterioration and expanding the keeping quality.
- Holders keep up a temperature of 12.8-15.60 C with an overall moistness of 60%. Pre-cooling of organic products is in every case better. Railroad wagons or secured trucks can likewise be used for refrigerated
- Transport by cooling them with ice. Air must be flowed in vans by fitting a fan inside.

7. References

- Akoy, E. O. (2014). Experimental characterization and modeling of thin-layer drying of mango . *International Food Research Journal* , 1915-1920.
- Dubey, A. K., Agarwal, A., & Sarkar, A. (2018). Computer Vision-Based Fruit Disease Detection and Classification. *springer link* , 105-115.
- Dubey, S. K., & Gills, R. (2019). An Assessment on Value Chain Dynamics of Mango in Pratapgarh. *Journal of Community Mobilization and Sustainable Development* , 355=362.
- Durge, N. K., Phalle, S. S., & Mantha, M. V. (2019). Small Capacity Plant for Post-harvest Process of Mango. *springer link* , 387-398.
- Gopalakrishnan, S. (2013). Marketing System of Mangoes in India. *World Applied Sciences Journal* , 1007-1015.
- Kabiru, A. A., Joshua, A. A., Raji, & A. O. (2013). EFFECT OF SLICE THICKNESS AND TEMPERATURE ON THE DRYING KINETICS OF MANGO. *semantic scholar* , 45-49.
- Kamle, M., & Pradeep, K. (2013). Identification and phylogenetic correlation among Colletotrichum gloeosporioides pathogen of anthracnose for mango. *sciencedirect* , 285-287.
- Kodali, R. K., & Rawat, N. (2013). Wireless sensor network in mango farming. *Nirma University International Conference on Engineering* .
- Komal, K., & Goyal, S. (2019). Fruit Quality Assessment Techniques: A Review. *International Journal of Computer Science and Mobile Computing* , 161 – 166.
- KUSUMA, D. K., & BASAVARAJA, H. (2013). Stability analysis of mango export markets of India: Markov Chain approach. *Karnataka J. Agric.* , 39-45.

Mitra, S. K. (2014). Mango production in the world – present situation and future prospect. *ISHS Acta Horticulturae* , 145-165.

PrakashMaran, J., Swathi, K., Jeevitha, P., Jayalakshmi, J., & Ashvini, G. (2015). Microwave-assisted extraction of pectic polysaccharide from waste mango peel. *science direct* , 67-71.

Schulze, K., Nagle, M., Spreer, W., Mahayothee, B., & Müller, J. (2015). Development and assessment of different modeling approaches for size-mass estimation of mango fruits. *sciencedirect* , 269-276.

Sekar, C., Subramanian, K. S., Subramanian, J., & Prakash, V. (2014). Gender dynamics in mango production system in India. *IDRC Digital Library* , 254-265.

Sethy, P. K., Behera, S. K., Sangita, S., & Rath, A. K. (2019). Automatic Classification of Mango Using Statistical Feature and SVM. *springer link* , 469-475.

Singh, K. V., Singh, G. P., & Priyadarshi, A. (2010). Extent of Adoption of Improved Practices of Mango Production by. *Indian Res. J. Ext. Edu.* , 110-112.

Yadav, A. S., & Pandey, D. C. (2016). Geographical Perspectives of Mango. *Imperial Journal of Interdisciplinary Research (IJIR)* , 259-262.

8. Appendix

A) Survey questionnaire for the customers

1. How often do you buy mangoes from this store?

- Only once
- Once a month
- Once a week
- 2 - 4 times a week

2. What type of mango is your favorite?

- Alphonso
- Chausa
- Langra
- Himsagar
- Gulabkhas

3. Do you find the quality of the mangoes up to the mark?

- Yes
- Not up to the mark

4. What are the reasons for choosing this shop?

- Convenience
- Price
- Variety of options

- Assured quality of the mangoes

5. Please choose your annual income

- Less than 1,00,000 INR
- Between 1,00,000 and 2,00,000 INR
- Between 2,00,000 and 5,00,000 INR
- Between 5,00,000 and 10,00,000 INR
- More than 10,00,000 INR

B) Survey questionnaire for the Local fruit sellers

1. From where do you buy the mangoes?

- Local farmers
- From the local wholesale fruit market
- Other states

2. What are the most important criteria of the customers while buying mangoes?

- Price
- Quality
- Organically grown
- Chemical-free ripening

3. Do you find the mangoes ripened with chemicals?

- Yes
- No

4. In your shop which fruit sales most?

- Mangoes
- Other fruits

5. Do the government representatives check the quality of the mangoes you sell?

- Yes
- No

