

## International Journal of Agriculture Extension and Social Development

Volume 7; SP-Issue 8; August 2024; Page No. 192-195

Received: 03-05-2024  
Accepted: 07-06-2024

Indexed Journal  
Peer Reviewed Journal

### Knowledge of the respondents towards improved Kaji lemon cultivation practices in the Kamrup district of Assam

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i8Sd.958>

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#### Abstract

India's economy is heavily dependent on agriculture, which boosts GDP and almost half of the workforce is employed. The Kaji Lemon is a significant economic factor in Assam. Using a descriptive survey approach with 120 respondents, this study investigates farmers' knowledge of Kaji Lemon Cultivation Practices in Rani, Boko, Bihidia Jajikona, and Hajo Blocks in Kamrup District of Assam. According to the socio-economic profiles, middle-aged farmers (45%) make up the majority of those who are illiterate and lack formal education (37.50%). The study found that while 75.83% of respondents showed medium knowledge of the improved Kaji Lemon cultivation practices and 14.17% reported high knowledge, 10% of respondents had poor knowledge, indicating limited use or awareness. Knowledge is influenced by a number of factors, including age, education, size of landholding, and economic standing. High extension contacts are essential for spreading agricultural innovations. The results emphasize the necessity of focused interventions, such as specialized training and resource support and raise knowledge rates, which will further improve Kaji Lemon Cultivation Practices.

**Keywords:** Knowledge, improved kaji lemon cultivation practices

#### 1. Introduction

The north-eastern region of India is reported to be the centre of origin of many Citrus species and as such Assam is the home to many exotic citrus fruits. The state of Assam has as many as 17 species, 53 varieties and 7 probable hybrids of citrus of which 8 species are commonly cultivated in the region including Kaji lemon (*Citrus limon*). One of the most common and popular citrus fruit found in this state is the Kaji lemon (Assam lemon). This is an indigenous lemon of Assam and it has certain uniqueness in terms of quality which is essentially attributable to its place of origin ie. Assam. Kaji lemon fruit is widely used for culinary, beverages, industrial and medicinal uses. It is comparatively larger than the regular lemon. It has a tendency of cluster bearing habit which generally produces seedless fruits with 9-12 segments. Assam had been awarded Geographical Indication (GI) tag for Kaji lemon.

Kaji lemon is sour in taste due to the organic acids present in juice predominantly. Citric acid with aroma mainly coming from peel in the form of essential oils. All the citrus fruits differ in their sensory qualities due to variations in acid content and essential oil composition. Likewise, taste and aroma of kaji lemon' differs from other citrus fruits like 'Gul-nemu' (Round Lemon) which is unique and the people of Assam has been experiencing and relishing it generation after generation. Flavour of Assam lemon is different from other Lemon varieties found in Assam. It has a unique

aroma of "Lemon". The uniqueness of the fruit lies in its bearing habit. Even if it gets ripened it doesn't fall from the tree up to a very long period. Fruits are born in clusters on new shoots. The variety kaji lemon' (*C. limon*) has originated as a chance seedling raised in the citrus station, Burnihut from the progeny of variety collected under the name China-kaghi from the village Hashara, in the district of Sivasagar. This has been propagated by vegetative means as a clonal horticultural variety and named as 'Kaji lemon'. Kaji lemon (Assam Lemon) is grown in almost all the districts of Assam. The geographical area of production of kaji lemon in the Kamrup district is 26.3161° N, 91.5984° E. Records state Kaji lemon (Assam Lemon) is cultivated in 437 hectares of land with an average annual production of 3747 tonnes during the period 2012-2013. After harvesting, the fruits remain marketable for weeks when stored at Ambient temperature, but weight loss occurs due to loss of moisture through transpiration and thus fruit texture also deteriorates along with its freshness. Individual shrink wrapping of kaji lemon fruit stored at ambient temperature (30-32° C and 80-85% RH) has been found to be beneficial because it helps 12 extending the shelf life without deterioration of quality of fruit. It retains freshness, colour and firmness of the fruit up to 1 month without decay. Kaji lemon can be subjected to value addition by production of juice, squash, RTS beverage and pickle. Extraction of essential oils from leaves and peels and juice vesicles of the

fruits show another potential sector for this crop.

## 2. Research Methodology

The study was conducted in the Kamrup district of Assam. There are 35 districts and 15 blocks in the Kamrup district of Assam, out of which four blocks i.e., Rani, Boko, Bihidia Jajikona, and Hajo development blocks were selected, based on maximum area under Kaji lemon plantation. From the 04 blocks, 06 villages have been selected randomly on the basis of the highest numbers of Kaji lemon farmers. Personal interview method was utilized by the investigator himself,

either at their home or at their field. The data collected from the respondents by using pre-structured interview schedule and respondents were selected from each village randomly by proportionate sampling method for the present study making a total of 120 respondents.

## Objectives

To determine the knowledge of the respondents towards improved Kaji lemon cultivation practices.

## 3. Results and Discussion

**Table 1:** Socio economic profiles of the respondents:

Sr. No	Variables	Frequency	Percentage
<b>1</b>	<b>Age</b>		
	Young (18-35)	45	37.50
	Middle (36-55)	54	45.00
	Old (Above-55)	21	17.50
<b>2</b>	<b>Education</b>		
	Illiterate	45	37.50
	Primary School	33	27.50
	High School	25	20.83
	Intermediate	11	9.16
	Undergraduate	4	3.33
	Postgraduate	2	1.67
<b>3</b>	<b>Family Types</b>		
	Nuclear	83	69.17
	Joint	37	30.83
<b>4</b>	<b>House Types</b>		
	Hut (Mud House)	35	29.17
	Semi-cemented	63	52.50
	Cemented	22	18.33
<b>5</b>	<b>Occupation Types</b>		
	Only Agriculture	81	67.50
	Agriculture + Business	36	30.00
	Agriculture + Service	3	2.50
<b>6</b>	<b>Land Holding</b>		
	Marginal farmers (< 1.0 ha.)	75	62.50
	Small farmers (1.0 ha to 2.0 ha)	33	27.50
	Medium farmers (2.0 to 4.0 ha)	12	10.00
<b>7</b>	<b>Extension Contacts</b>		
	Low	29	24.17
	Medium	67	55.83
	High	24	20.00
<b>8</b>	<b>Annual Income</b>		
	Low (< Rs 48,000/-)	45	37.50
	Medium (Rs 48,001/- Rs 96,000/-)	48	40.00
	High (Above Rs96,000/-)	27	22.50
<b>9</b>	<b>Mass Media Exposure</b>		
	Low	53	44.17
	Medium	56	46.67
	High	11	9.16

The data presented in Table 1 revealed that majority of the respondents (45.00%) belongs to the middle age group. It was observed that maximum number of respondents (37.50%) are illiterate of educational qualification. The study revealed that (69.17%) of respondents belonged from the nuclear family. It shows that maximum of the respondents (52.50%) lives in semi cemented house. The study revealed that majority of respondents (67.50%) main

occupation is agriculture. The study revealed that majority of the respondents (62.50%) belongs to marginal level of land holding. It was evident that most of the respondents (40%) earn medium level of annual income. It was evident that most of the respondents (55.83%) have medium level of extension contact. The study proves that maximum of the respondents (46.67%) has medium level of mass media exposure.

**Table 2:** Distribution of respondents on the basis of Knowledge towards Improved Kaji Lemon Cultivation Practices:

Sl. No.	Statements	Knowledge					
		Fully Correct		Partially Correct		Not Correct	
		F	(%)	F	(%)	F	(%)
01	Sandy/loamy drained soil is suitable for Kaji lemon cultivation	73	(60.83%)	35	(29.17%)	12	(10.00%)
02	Field with a fine tilth for Kaji lemon is suitable	83	(69.17%)	27	(22.50%)	10	(8.33%)
03	Recommended dose of FYM before sowing: Approximately 1040 kg/acre	71	(59.17%)	33	(27.50%)	16	(13.33%)
04	Appropriate planting time of Kaji lemon is May to August during summer season	112	(93.33%)	08	(6.67%)	0	(0%)
05	Knowledge about the varieties of Kaji lemon in your field: (a) Gandharaj (b) Badami	45	(37.50%)	57	(47.50%)	18	(15.00%)
06	Seed rate: Minimum plant density of (208/acre hectare) should be maintained.	7	(5.83%)	53	(44.17%)	60	(50.00%)
07	Methods of Kaji lemon sowing: • Stem cutting • Leaf-bud cutting • Air layering	76	(63.33%)	29	(24.17%)	15	(12.50%)
08	Requirements of organic fertilizers: • FYM (0.5% N, 0.2% P, 0.5% K) • Compost (0.5% N, 15% P, 0.5% K) • Green manure (3.3% N, 0.7% P, 1.3% K) • Vermicompost (3% N, 1% P, 1.5% K)	47	(39.17%)	53	(44.17%)	20	(16.67%)
09	Biofertilizer for Kaji lemon: • Nitrogen fixers • Phosphorous solubilizers • Phosphorous mobilizers • Potassium • solubilizers	2	(1.67%)	43	(35.83%)	75	(62.50%)
10	Water management: • Watering twice a week when its newly planted. • After the plant matures, the amount of water is determined by the size of the plant, the growth conditions and the moisture level of soil. • Overwatering leads to development of the disease symptoms while same applies for Underwatering. Therefore, moderate watering is required.	101	(84.17%)	7	(5.83%)	12	(10.00%)
11	Weeds control practices: • Hand Hoeing • Chemical Control e.g., Monuron • Ploughing	95	(79.17%)	17	(14.17%)	8	(6.67%)

### Distribution of respondents based on level of Knowledge towards Improved Kaji Lemon Cultivation Practices in the Kamrup district of Assam

Sl. No.	Categories	Frequency	Percentage
1.	Low score (17-22)	12	10.00
2	Medium score (23-27)	91	75.83
3.	High score (28-34)	17	14.17
Total		120	100.00

An overview of Table 2 makes it clear that majority of the respondents i.e. 75.83% fell in the medium knowledge level group, whereas 14.17% respondents were observed in the high knowledge level group and remaining 10% respondents formed low knowledge level group. It is hereby concluded that majority of farmers were having medium level of knowledge followed by high and low knowledge level, respectively. These findings are in line with the findings of Kumar *et. al.* (2012) [2].

### Association of selected independent variables with dependent variables

**Table 3:** Correlation coefficient of independent variables with knowledge of respondents towards improved Kaji lemon cultivation practices

Sl. No.	Independent Variable	Correlation coefficient
1.	Age	0.669*
2.	Educational Qualification	0.705*
3.	Types of Family	0.919*
4.	Types of Houses	0.932*
5.	Annual Income	0.564*
6.	Occupation	0.207**
7.	Land Holding	0.305**
8.	Extension Contacts	0.987*
9.	Mass Media Exposure	0.503*

\* = Correlation is significant at the 0.01% level of probability

\*\*= Correlation is significant at the 0.05% level of probability

Table 3 shows that variables namely Age, Educational Qualification, Types of Family, Types of Houses, Annual Income, Extension Contacts and Mass Media Exposure were positively and significantly correlated with knowledge of respondents towards recommended Kaji Lemon cultivation practices with 0.01% level of probability and variables like Occupation and Land Holding were positively and significantly correlated with knowledge of respondents towards recommended Kaji Lemon cultivation practices at 0.05% level of probability.

### Conclusion

The study finds that farmers in the Kamrup District of Assam's Rani, Boko, Bihidia Jajikona, and Hajo Blocks have a varied understanding of Kaji Lemon Cultivation Practices. Although, Most participants indicate a moderate degree of knowledge, a significant proportion exhibit excellent knowledge with reference to enhanced practices. But the existence of a sizable ignorant population underscores the necessity of focused actions to raise the general awareness rates. These findings highlight the significance of ongoing education and provision of resources to enhance and augment output in Kaji Lemon Cultivation Practices

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