

# Content Creation and Development of Prototype of Mobile Application of Sesamum and Mustard Crops in Northern Telangana Zone, India

## ABSTRACT

Smart phones are widely recognized as one of the greatest inventions of the twentieth century, and they have become inseparable from everyone's pocket. Smart phones are becoming increasingly widely used due to its capabilities in communication, gaming, education, entertainment, technical support, information, daily news coverage, trade, and business. Apps for mobile phones, tablets, and other devices are software programmes that operate on these devices. The design and implementation of a mobile application for farmers seeking information on agro consulting services is required. This study aims to identify the most relevant information needed and accessed by the farmers pertaining to the crops Sesamum and Mustard. It revealed that among the pest, disease, seed, marketing and other problems, Incidence of aphids (62%), phyllody (36%), Powdery mildew (21%), non following of seed treatment (63%), price fluctuations (52%) and difficulty in harvesting (42%) was ranked first as the major problems in sesamum. Incidence of aphids (42%), downy mildew (32%), Not following seed treatment (66%) and lack of marketing facility (72%) were observed in mustard crop. A prototype of mobile application was developed based on the relevancy of content received from judges (30 No.s).

*Keywords: Mobile application; relevant information; sesamum; mustard.*

## 1. INTRODUCTION

In India more than half of the population, about 70% is directly or indirectly relying on agriculture as a source of livelihood. Generally the main source of information for agricultural prices, weather forecast and advice on agricultural practice is the farmer's own observation and experimentation followed by a conversation with other farmers. In India most of the rural areas have lack of connectivity and accessibility to people as well as lack of agriculture market information. Farmers need to spend a lot of money and time to chasing information and officials, which affects agricultural productivity and related issues [1,2]. Generally farmers do not know market information like commodity prices and input supplies which lead to injustice by middlemen and farmers' loss of income. Indian telecommunication revolution has started make it possible to reach the previously unreachable located consumers through mobile services.

Most smallholder farming systems are much less productive and profitable than they could be. The reasons include lack of access to inputs and credit, and the inability to bear risks. Another major contribution is the information and skills gap that constrains the adoption of available technologies and management practices, or reduces their technical efficiency when adopted [3]. ICT, and in particular mobile technologies,

are often seen as a game changer' in smallholder agriculture.

In this existing scenario, it is expected that the integration of ICT in agricultural extension will provide much needed impetus to agricultural sector and ICT can complement the traditional extension system for "Knowledge Resource" delivery to the millions of the farmers [4].

Among ICTs, impressive penetration of mobile phones in many of the developing countries changing the agricultural communication process and mobile phones have made personal communications readily accessible, for the first time, to women and men, poor and prosperous, rural and urban dwellers in developing as well as in industrial countries [5].

The agricultural sector is critically important in developing economies because over 80% of the workforce is employed in fields related to agriculture. 70% of these farmers were women who have low level of education and also have a primary unpaid responsibility for all household duties. 80% of population of Cambodia live in rural areas and are depending on farming business. Their quality of life is very low due to insufficient health-care, broken roads and limited communications infrastructure which impact on

their livelihood (Fitzgerald et al., 2010). This country has to take action against post-harvest inefficiency, lack of agriculture marketing and farming information, high cost of transportation and illegal check points. Currently main source of the problem is the traders with conflicting interest and farmers lack of access to market because farmers are so poor or there are non-existent relationships between buyers and sellers. Due to poor communication and the lack of marketing information about the price, quality requirements and alternative buyers, farmers lose their profit margin [6,7].

Many farmers are able to perform their day-to-day activities using mobile apps. When it comes to the agricultural field, the introduction of mobile apps has shown very useful benefits, starting from better land management judgements to quality yield. Farmers have even started using different type of mobile applications to review the health of the yields during crop-cycle. Also, there are some of the latest mobile apps, which are being used to make necessary farming decisions related to the use of fertilizer and pesticides. Now, the farmers have got the advantage of making decisions based on advanced results rather than only intuition or tradition (Rosena De pama 2018).

There are many reasons why farmers are not using the existing Apps. This indicates a tremendous scope for app developers. The challenge is to identify proper requirements, make apps relevant and user friendly. If they can use general applications they can certainly use agriculture specific apps. Possibly the apps which are available and the need of farmers are not in sync with each other.

### 1.1 Objectives

1. To study the profile characters of the farmers cultivating Sesamum and mustard.
2. To study the existing pest, disease, seed and marketing related problems of the farmers cultivating Sesamum and mustard.
3. Content creation on sesame and mustard crops
4. Development of prototype of mobile application of Sesamum and mustard crops

## 2. MATERIALS AND METHODS

### a) Sampling procedure:

## 3. RESULTS AND DISCUSSION

Northern Telangana Zone was purposively selected for the study. From Northern Telangana Zone, 10 districts were selected purposively. From each district Sesamum and mustard growing mandals and villages were selected purposively. From each Sesamum and Mustard growing villages 10 respondents were selected purposively thus comprising 100 respondents for Sesamum and 60 respondents for Mustard crop and data was collected from respondents. In order to identify relevancy of package of practices for sesamum and mustard a list of practices were sent to experts (30 Nos.) in districts growing Sesamum and mustard.

### Data collection and analysis:

Structured interview schedule was developed to collect information of profile characters of farmers and study the existing constraints by the farmers.

For content creation the existing practices of sesamum and mustard were collected. The information collected on existing practices were sent to experts for relevancy weightage of each practice in each district of Northern Telangana Zone. Then content suitable for the district was developed.

### Statistical Tools employed

#### ➤ Frequency and percentage and Ranking Technique

The data were subjected to frequencies and used to know the distribution of respondents according to selected variable.

Frequency is the number of items a variable is repeated.

Percentage is the number, amount, rate etc. expressed as if it is the part of total 100.

#### ➤ Class interval

$$C.I = \frac{\text{Maximum score} - \text{Minimum score}}{\text{No. of classes}}$$

#### ➤ Relevancy weightage= (Most relevant x2 + Relevant x1+Not relevant x0)/ Maximum possible score)

A prototype of mobile application was developed by using suitable software.

## 1. Profile Characters of Respondents

**Table 1. Profile characters of respondents**

S.No	Independent variable	Category of Majority of Respondents	
		Sesamum	Mustard
1	Age	Middle aged(79%) (35-55 years)	Middle aged (63.33%) (35-55 years)
2	Education	High school education (26%)	Intermediate (31.66%)
3	Farming experience	Low farming experience (44%)	Low farming experience (46.66%)
4	Information management behaviour	Medium level of Information management behaviour (38%)	Medium level of Information management behaviour (46.66%)
5	Irrigation source	Majority of respondents are having Bore wells(71%)	Majority of respondents are having Bore wells(65%)
6	Cropping Pattern	Cotton -Sesame (28%) Turmeric -Sesame(27%)	Maize -Mustard (61.66%)
7	Mass media exposure	Medium (42%)	Low(43.33%)
8	Innovativeness	Medium (38%)	Low (46.66%)
9	Socio political participation	Low(58%)	High(56.66%)
10	Risk taking ability	Medium (38%)	Low(53.33%)

## 2. Pest, disease, seed and marketing related problems of the farmerscultivating sesamum and mustard.

The study revealed that among the pest, disease, seed , marketing and other problems, Incidence of aphids(62%), phyllody (36%), Powdery mildew(21%),non following of seed treatment(63%), price fluctuations (52%) and difficulty in harvesting(42%) was ranked first as the major problems in sesamum.

In mustard crop Incidence of aphids(42%), downy mildew (32%),Not following seed treatment (66%) and lack of marketing facility (72%), less Yield(36%) and difficulty in harvesting(32%)were observed.

## 3. Content creation on sesamum and Mustard

Relevancy weightage was worked out for the content. The relevancy scores were received from 30 judges.

**Table 2. Pest related problems of Sesamum**

I	Pest related problems of Sesamum	Frequency	percentage	Rank
	Sesamum			
1	Aphids	62	62	1
2	Gall fly and bud fly	2	2	4
3	Leaf webber or capsule borer	12	12	3
4	Kodueega	0	0	5
5	Bihar Hairy Caterpillar	14	14	2
II	Disease management	Frequency	Percentage	Rank
6	Root rot and Stem rot	4	4	5
7	Alternaria leaf spot	10	10	3
8	Cercospora leaf spot	9	9	4
9	Phyllody	36	36	1
10	Powdery mildew	21	21	2
III	Seed related problems	Frequency	Percentage	Rank

11	Difficulty in purchase of quality seed.	24	24	3
12	Non germination	0	0	5
13	Non availability of HYV ofseed	21	21	4
14	High cost of seed	45	45	2
15	Not following seed treatment	63	63	1
<b>IV</b>	<b>Marketing Problems</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
16	Price fluctuations	52	52	4
17	Lack of market demand	12	12	2
18	Lack of marketing facility	42	42	3
19	Lack of storage facility for produce	39	39	
<b>V</b>	<b>Other problems</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
20	Lack of knowledge oncultivation	8	8	6
21	Problem of labour	36	36	2
22	Problem of weeds and weeding operations	26	26	3
23	Non availability of plant protection chemicals	6	6	5
24	Yield problem	12	12	4
25	Difficulty in harvesting	42	42	1
<b>I</b>	<b>Pest related problems of Mustard</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
1	Mustard aphid	21	42	1
2	Painted bug	6	12	3
3	Bihar hairy caterpillar	2	4	4
4	Mustard saw fly	10	20	2
<b>II</b>	<b>Disease management</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
1	White rust/ Downy mildew	16	32	1
2	Alternaria leaf spot	8	16	2
3	Powdery mildew	4	8	3
<b>III</b>	<b>Seed related problems</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
4	Difficulty in purchase of seed.	14	28	3
5	Non germination	6	12	5
6	Non availability of HYV of seed	15	30	2
7	High cost of seed	8	16	4
8	Not following seed treatment	33	66	1
<b>IV</b>	<b>Marketing Problems</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
13	Lack of remunerative Market price	12	24	3
14	Lack of market demand	21	42	2
15	Lack of marketing facility	36	72	1
<b>V</b>	<b>Other problems</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
16	Lack of knowledge oncultivation	8	16	6
17	Problem of labour	12	24	4
18	Problem of weeds and weeding operations	14	28	3
19	Non availability of plant protection chemicals	6	12	5
20	Yield problem	18	36	1
21	Difficulty in harvesting	16	32	2

**Table 3. Content creation on sesamum and Mustard**

<b>S.No</b>	<b>Practice –Sesamum</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1	Time of sowing	0.96	96	1.93
2.	Soil for cultivation	0.76	76	1.53
3.	Land management	0.8	80	1.6
4.	Seed rate 2.5 kg/acre	0.83	83.3	1.66
5.	Spacing: 30 cm× 15 cm	0.9	90	1.8
6.	Selection of variety	0.83	83.3	1.83
7	Fertilizer management	0.93	93	1.86
8.	Irrigation management	0.95	95	1.9
9.	Weed management	0.96	96	1.93
10	Sucking pest	0.96	96.6	1.93
11	Disease management	0.9	90	1.8
12	Harvesting	0.916	91.6	1.83
13	Storage	0.9	90	1.8
<b>S.No</b>	<b>Pest and identification</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1	Aphids	0.96	96.6	1.93
2	Tamara purugu/pachadoma	0.93	93	1.86
3.	Tellanalli	0.9	90	1.8
4.	Leaf webber and stem borer	0.85	85	1.7
5.	Kodueega	0.86	86	1.73
6.	Bihary hairy caterpillar	0.95	95	1.9
<b>S.No</b>	<b>Pest and identification</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1	Aphids	0.96	96.6	1.93
2	Tamara purugu/pachadoma	0.93	93	1.86
3.	Tellanalli	0.9	90	1.8
4.	Leaf webber and stem borer	0.85	85	1.7
5.	Kodueega	0.86	86	1.73
6.	Bihary hairy caterpillar	0.95	95	1.9
<b>S.No</b>	<b>Disease and Identification</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1.	Root rot, stem rot	0.8	80	1.6
2.	Alternaria leaf spot	0.86	86	1.73
3.	Cercospora leaf spots	0.9	90	1.8
4.	Phyllody	0.96	96.6	1.93
5.	Powdery mildew	0.95	95	1.9
<b>Mustard</b>				
<b>S.No</b>	<b>Practice</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1.	Time of sowing	0.96	96	1.93
2.	Soil	0.83	83.3	1.66
3.	Seed rate	0.76	76	1.53
4.	Method of sowing	0.8	80	1.6
5.	Seed treatment	0.9	90	1.8
6.	Variety	0.916	91.6	1.83
7.	Fertilizer management	0.83	83	1.66
8.	Weed management	0.83	83.3	1.66

9.	Water management	0.8	80	1.6
10.	Pest management	0.9	90	1.8
11.	Disease management	0.9	90	1.8
12.	Harvesting	0.96	96	1.93
13.	Yield	0.9	90	1.8
<b>S.No</b>	<b>Pest and identification</b>	<b>R1</b>	<b>R2</b>	<b>R3</b>
1	Aphids	0.96	96.6	1.93
2	Bihar hairy caterpillar	0.85	85	1.7
3	Painted bug	0.86	86	1.73
4	Mustard saw fl y	0.95	95	1.9
5	Mustard leaf miner	0.83	83	1.66
6	Diamondback moth:	0.76	76	1.53
7	Cabbage head borer:	0.76	76	1.53
<b>S.No</b>	<b>Disease and identification</b>	<b>RW</b>	<b>RP</b>	<b>MRS</b>
1	Alternaria blight	0.85	85	1.7
2	White rust	0.95	95	1.9
3	Downy mildew	0.96	96.6	1.93
4	Powdery mildew	0.9	90	1.8
5	Bacterial blight/ black rot	0.76	76	1.53

- Home Screen**
- Option for crops
  - Pest diagnosis
  - Disease diagnosis
  - Link to PJTSAU website
  - Link to Department of Agriculture website
  - Downloads (farmer can download publications)



- **Crop**
- Selection option for two crops (sesame and Mustard)
- Farmer login option (Details of farmers are asked in the page and farmer is registered for any updates)
- Home page



- **Pest and disease diagnosis**
- For diagnosis the farmer are asked to select the symptoms of crops (farmers are asked to select 2-3 symptoms)
- Based on symptoms- of identified by the farmers
- Pest/disease images of symptoms are displayed so that farmer can confirm
- Recommendations are made based on identification of pest/disease

**Symptoms of identification of pest**

<input checked="" type="checkbox"/>	Pest infestation was observed during early stages of crop growth
<input checked="" type="checkbox"/>	Pest infestation is observed beneath the leaves
<input checked="" type="checkbox"/>	Infected leaves turn sticky and observation of ants near infected plants.
<input type="checkbox"/>	Pest infestation observed beneath the infected leaves
<input type="checkbox"/>	Leaves turn pale and dried off
<input type="checkbox"/>	Downward curling of leaves

Identification and recommendation

Yes I confirm to the symptoms above

**Symptom Image for confirmation**

Select anyone symptom



- Based on identification of the symptom the farmer will be recommended suitable recommendation

**Fig. 1. Development of prototype of mobile application of Sesamum and mustard crops**

**4. CONCLUSION**

A final prototype of mobile application is developed which would be helpful to upscale as mobile application for sesamum and mustard crops based on relevancy of the content on Sesamum and mustard. As the problems of Sesamum and mustard pertaining to pest, disease, seed and marketing were studied in the zone, the mobile application helps the farmers with adequate knowledge and specific advsories in those crops.

**Disclaimer (Artificial intelligence)**

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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- 1.
- 2.
- 3.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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