

# CONSTRAINTS IN ADOPTION OF AGRICULTURAL ENGINEERING TECHNOLOGY FOR GROUNDNUT CULTIVATION

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## ABSTRACT

*The agricultural engineering technologies generated for groundnut, have not reached to the farmers fields. The present study was conducted to find out the extent of adoption of AET for groundnut cultivation and the constraints faced by the farmers in their adoption. Majority of the farmers had medium level of adoption of AET. The bullock drawn implements including multipurpose implement; earthening attachment; hand metering seed drill; and interculturing implements were adopted by majority of the respondents. Similarly, the diesel engine operated thresher was also used by the majority of the farmers. Contrarily, none of the respondents have used either power tiller, or single bullock implement, or semi automatic gap filler, or bullock drawn groundnut digger cum shaker and pod exposure in the farming of groundnut.*

## INTRODUCTION

The success of any agricultural technology development program lies on the extent to which it ultimate users accept the technology (Mundhwa and Patel; 1998). Saurashtra is the bowl of groundnut crop as it is the dominant crop in terms of area and production. The GAU has generated many agricultural engineering technologies (AET), suitable for groundnut cultivation. Still there exist need for a sizeable research work in the areas of agricultural engineering and technology. In spite of adequate efforts, it has been observed that the technology have not reached to the farmers fields.

Farmers of South Saurashtra Agro Climatic Zone have adopted several recommendations of farm machinery and power for groundnut cultivation and get good economical returns. However, all the farmer of the area did not adopt farm machinery and power technology so abundantly.

Keeping this in view, the present study was carried out with the following objectives:

- (1) To find out the extent of adoption of AET for groundnut cultivation.
- (2) To identify the constraints faced by the farmers in adoption of AET.

## METHODOLOGY

For the present investigation twenty taluka of 9 agro ecological situations of the South Saurashtra Agro Climatic Zone were purposely selected. One village having good number of groundnut growers' was randomly selected from each of the twenty selected taluka. Ten groundnut cultivators were randomly selected from each selected village. In all, two hundred farmers were selected from these twenty villages.

A specially designed questionnaire was formed to collect the data. The data were collected personally. It was then tabulated and simple comparisons of data have been

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**Table 1** Distribution of the respondents according to their level of adoption AET

Level of adoption of AET	Frequency	Per cent
High	40	20
Medium	134	67
Low	26	13
<b>Total</b>	<b>200</b>	<b>100</b>

made on the basis of frequency and percentage (Mundhwa, et. al. 1997).

There is no standard index to measure the level of adoption of AET. All the 17 recommendation of agricultural engineering for groundnut cultivation were selected by consulting concerned scientist. The relative importance of recommendation was determined by seeking the opinion of the 41 expert scientists, extension workers and progressive farmers working in the field.

## RESULTS AND DISCUSSION

### LEVEL OF ADOPTION

The respondents were asked to mention the level of adoption of the recommended AET. As per their responses, the assigned score was given for particular practice if they had adopted as per recommended, while zero score for non-adoption of the recommendation (Singh, et al. 1998). Data in these regards are presented in Table 1. The respondents were grouped into three categories on the basis of mean and standard deviation. Majority of the farmers are in medium level adoption for adopting AET.

### EXTENT OF ADOPTION OF AET

Data in Table 2, reveals that only 33 per cent farmers have adopted technology of primary tillage. Of these, less than five per cent have adopted tractor drawn disk plough. There were 18 per cent farmers using tractor drawn while 10.5 per cent farmers using bullock drawn M B plough for primary deep cultivation.

It is observed that more than ninety per cent farmers have adopted secondary tillage using either tractor drawn or bullock drawn furrow opener triphali. Nearly 60 per cent farmers have adopted blade harrow; 52 per cent have adopted planker while 81 per cent have adopted multipurpose implement.

The data indicates that nearly 72 per cent farmers are using either bullock drawn or tractor drawn earthening attachment for bunch ground nut variety. Nearly 85 per cent groundnut growers have adopted seed treatment, of which only 3.5% have used seed treatment drum while the rest are using hand mixing. There are less than one fourth farmers who adopted automated seed cum fertilizer drill.

It is also observed that none of the respondents have sown summer groundnut in view of insufficient irrigation facilities. Though, about 20 per cent farmers gave life saving irrigation by using boarder cum flooding method in kharif season.

Majority of farmers have undertaken interculturing using bullock drawn implements (92 per cent). Similarly 95 per cent respondents used manually operated knapsack sprayer for spraying insecticides. Almost 64 per cent farmers used thresher run by diesel engine, for threshing of groundnut. A majority (72 per cent) of the farmers are using open house for storage of groundnut.

Table 2 Extent of adoption of AET for cultivation of groundnut

Sr. No.	RECOMMENDED TECHNOLOGY	Extent of adoption
<b>1</b>	<b>PRIMARY TILLAGE</b>	
	1) Tractor drawn Disc plough	9 (4.5)
	2) Tractor drawn M. B. plough (Between 9" to 12 ")	36 (18.0)
	3) Bullock drawn M. B. plough (Between 6" to 9") (Improved Desi Plough)	21 (10.5)
	<b>Total</b>	<b>66 (33.0)</b>
<b>2</b>	<b>SECONDARY TILLAGE</b>	
	Cultivator Furrow opener Triphali	
	1) Tractor drawn	82 (41.0)
	2) Bullock drawn	99 (49.5)
	<b>Total</b>	<b>181 (90.5)</b>
	Blade harrow	
	1) Tractor drawn	44 (22.0)
	2) Bullock drawn	75 (37.5)
	<b>Total</b>	<b>119 (59.5)</b>
	Planker	
	1) Tractor drawn	70 (35.0)
	2) Bullock drawn	34 (17.0)
	<b>Total</b>	<b>104 (52.0)</b>
	Multi purpose implement	
	1) Tractor drawn (Small)	6 (3.0)
	2) Bullock drawn (Pipe framed)	156 (78.0)
	<b>Total</b>	<b>162 (81.0)</b>
<b>3</b>	<b>EARTHENING ATTACHMENT N=90</b> (Bunch varieties only)	
	1) Tractor drawn	6 (6.7)
	2) Bullock drawn	59 (65.5)
	<b>Total</b>	<b>65 (72.2)</b>
<b>4</b>	<b>SEED TREATMENT</b>	
	1) Use drum	7 (3.5)
	2) Use hand mixing	162 (82.0)
	<b>Total</b>	<b>169 (85.5)</b>
<b>5</b>	<b>SOWING</b> Automatic seed cum fertilizer drill	
	1) Tractor drawn	9 (4.5)
	2) Bullock drawn	38 (19.0)
	<b>Total</b>	<b>47 (23.5)</b>
<b>6</b>	<b>POWER TILLER</b>	<b>0 (0.0)</b>
<b>7</b>	<b>SINGLE BULLOCK IMPLEMENT</b>	<b>0 (0.0)</b>
<b>8</b>	<b>SEMI AUTOMATIC GAP FILLER</b>	<b>0 (0.0)</b>

<b>Sr. No.</b>	<b>RECOMMENDED TECHNOLOGY</b>	<b>Extent of adoption</b>
<b>9</b>	<b>IRRIGATION</b>	
	1) Use of border cum flooding method, in kharif groundnut	39 (19.5)
	2) Micro sprinkler in summer groundnut	0 (0.0)
	3) Drip irrigation in summer groundnut	0 (0.0)
	4) Irrigation scheduled for summer groundnut	0 (0.0)
	<b>Total</b>	<b>39 (19.5)</b>
<b>10</b>	<b>INTERCULTURING/WEEEDING</b>	
	1) Tractor drawn	16 (8.0)
	2) Bullock drawn.	184 (92.0)
	<b>Total</b>	<b>200 (100.0)</b>
<b>11</b>	<b>PLANT PROTECTION</b> Sprayer	
	1) Tractor operated	5 (2.5)
	2) Bullock cart operated	5 (2.5)
	3) Knapsack sprayer (manually-operated)	190 (95.0)
	<b>Total</b>	<b>200 (100.0)</b>
<b>12</b>	<b>HARVESTING &amp; DIGGING</b>	
	1) Bullock drawn groundnut digger cum shaker and pod exposér	0 (0.0)
	2) Blade harrow	
	· By tractor drawn	74 (37.0)
	· By bullock drawn	77 (38.5)
	· By hand picking	49 (24.5)
	<b>Total</b>	<b>200 (100.0)</b>
<b>13</b>	<b>THRESHING</b>	
	1) By tractor	72 (36.0)
	2) By Diesel engine	128 (64.0)
	<b>Total</b>	<b>200 (100.0)</b>
<b>14</b>	<b>STORAGE</b>	
	1) Open house	144 (72.0)
	2) Selling in the field	30 (15.0)
	3) In gunny bag and metal box use with pesticide treatment for seed purpose	26 (13.0)
	<b>Total</b>	<b>200 (100.0)</b>
<b>15</b>	<b>USE OF ADJUSTABLE YOKE</b>	<b>4 (2.0)</b>
<b>16</b>	<b>USE OF GAU IMPROVED SICKLE</b>	<b>57 (28.5)</b>

Table 3 Constraints faced by respondents in adoption of AET for cultivation of groundnut

Sr. No.	CONSTRAINTS IN ADOPTION OF RECOMMENDED TECHNOLOGY	Extent of adoption
<b>1</b>	<b>PRIMARY TILLAGE</b>	
	<b>CONSTRAINTS OF DEEP CULTIVATION</b>	
	1) Sowing cannot be done immediately due to high moisture content became late	30 (22.4)
	2) Difficulties in other operations	23 (17.2)
	3) Require compaction not achieved	44 (32.8)
	4) Favorable condition for soil born diseases are prolonged	15 (11.2)
	5) Soil water goes down in sandy soil	10 (7.5)
	6) Less Soil depth	12 (8.9)
	<b>Total</b>	<b>134 (100)</b>
<b>2</b>	<b>SECONDARY TILLAGE</b>	
	<b>CONSTRAINTS IN USE OF BULLOCK DRAWN MULTIPURPOSE IMPLEMENT</b>	
	1) Lack of guidance	6 (15.8)
	2) Lack of capital	8 (21.0)
	3) Alternate implement is available	15 (39.5)
	4) Complicated design in use	9 (23.7)
	<b>Total</b>	<b>38 (100)</b>
<b>3</b>	<b>CONSTRAINTS OF EARTHENING ATTACHMENT</b>	
	1) Unfavorable climate condition	17 (68.0)
	2) Lack of availability of suitable implement in rocky soil	8 (32.0)
	<b>Total</b>	<b>25 (100)</b>
<b>4</b>	<b>CONSTRAINTS OF SEED TREATMENT DRUM</b>	
	1) Lack of awareness and guidance	8 (4.9)
	2) Lack of seed treatment drum	23 (14.2)
	3) Sowing becomes late	64 (39.5)
	4) No difference in production.	67 (41.4)
	<b>Total</b>	<b>162 (100)</b>
<b>5</b>	<b>CONSTRAINTS IN USE OF AUTOMATIC SEED CUM FERTILIZER DRILL</b>	
	1) Lack of awareness and guidance	19 (12.4)
	2) Implement is costly	21 (13.7)
	3) Small size of land holding	33 (21.6)
	4) Sowing becomes late.	38 (24.8)
	5) Sowing depth is higher than required, because machine is heavy (in rainy season)	42 (27.5)
	<b>Total</b>	<b>153 (100)</b>
<b>6</b>	<b>CONSTRAINTS IN USE OF POWER TILLER</b>	
	1) Costly	78 (39.0)
	2) Highly complex operations	34 (17.0)
	3) Alternate is available with less price	45 (22.5)
	4) Not superior than one pair of bullock	23 (12.5)
	5) Lack of small land holding	20 (10.0)
	<b>Total</b>	<b>200 (100)</b>
<b>7</b>	<b>CONSTRAINTS IN USE OF SINGLE BULLOCK IMPLEMENT</b>	
	1) Lack of awareness and guidance	125 (62.5)
	2) No availability in the market	50 (25.0)
	3) High balancing problem	25 (12.5)
	<b>Total</b>	<b>200 (100)</b>

<b>Sr. No.</b>	<b>CONSTRAINTS IN ADOPTION OF RECOMMENDED TECHNOLOGY</b>	<b>Extent of adoption</b>	
<b>8</b>	<b>CONSTRAINTS IN USE OF SEMI AUTOMATIC GAP FILLER</b>		
	1) Lack of awareness and guidance	30	(15.0)
	2) Used slightly higher seed rate	40	(20.0)
	3) It is not a serious germination problem	130	(65.0)
	<b>Total</b>	<b>200</b>	<b>(100)</b>
<b>9</b>	<b>CONSTRAINTS IN USE OF MICRO-SPRINKLER AND DRIP IRRIGATION IN SUMMER GROUNDNUT</b>		
	1) Lack of guidance	15	(7.5)
	2) Water shortage for irrigation	106	(53.0)
	3) Problem of supervision	18	(9.0)
	4) Tenant cultivators	15	(7.5)
	5) High Initial investment	46	(23.0)
	<b>Total</b>	<b>200</b>	<b>(100)</b>
<b>10</b>	<b>CONSTRAINTS IN INTERCULTURING WITH TRACTOR</b>		
	1) Heavy weight of tractor	33	(17.9)
	2) Damaging plant population	144	(62.0)
	3) Lack of land holding	19	(10.3)
	4) Close distance between two rows	18	(9.8)
	<b>Total</b>	<b>184</b>	<b>(100)</b>
<b>11</b>	<b>CONSTRAINTS IN USE OF TRACTOR MOUNTED SPRAYER IN PLANT PROTECTION</b>		
	1) Difficulties in operation	55	(28.2)
	2) Damage in standing crop	97	(49.8)
	3) Small size of land holding	16	(8.2)
	4) Increase cost of plant protection	27	(13.8)
	<b>Total</b>	<b>195</b>	<b>(100)</b>
<b>12</b>	<b>CONSTRAINTS IN USE OF BULLOCK DRAWN GROUNDNUT DIGGER CUM SHAKER AND POD EXPOSER</b>		
	1) Lack of awareness	8	(4.0)
	2) Lack of guidance	24	(12.0)
	3) Small size of land holding	25	(12.5)
	4) Lack of implement	54	(27.0)
	5) Soil is not favorable in use of implement	45	(22.5)
	6) Damage harvested plant	34	(17.0)
	Difficulties in drying plant	10	(5.0)
	<b>Total</b>	<b>200</b>	<b>(100)</b>
<b>13</b>	<b>CONSTRAINTS IN USE OF USE OF ADJUSTABLE YOKE</b>		
	1) Lack of awareness	126	(64.3)
	2) Lack of guidance	32	(16.3)
	3) Not available in market	38	(19.4)
	<b>Total</b>	<b>196</b>	<b>(100)</b>
<b>14</b>	<b>CONSTRAINTS IN USE OF GAU IMPROVED SICKLE</b>		
	1) Lack of awareness	34	(23.7)
	2) Not comfortable in use	109	(76.3)
	<b>Total</b>	<b>143</b>	<b>(100)</b>

Most of the farmers have not adopted adjustable yoke (98 per cent) and GAU sickle (71.50 per cent) in groundnut cultivation.

It is surprisingly observed that none of the respondents have used either power tiller, or single bullock implement, or semi automatic gap filler, or bullock drawn groundnut digger cum shaker and pod exposer in the farming of groundnut.

#### **CONSTRAINTS FACED BY FARMERS IN ADOPTION OF AET**

As reported by majority of farmers, the constraints in adoption of AET includes more complex in operation and uncomfortable in use, high cost in adoption, lack of awareness and guidance of recommendations, small land holding and unfavorable climatic condition for adopting of recommendations. The recommendation wise detailed constraints are presented in Table 3.

#### **CONCLUSION**

Majority of the farmers are in medium level adoption for adopting AET. The bullock drawn implements including multipurpose

implement; earthening attachment; hand metering seed drill; and interculturing implements were adopted by majority of the respondents. Similarly, the diesel engine operated thresher was also used by the majority of the farmers. Contrarily, none of the respondents have used either power tiller, or single bullock implement, or semi automatic gap filler, or bullock drawn groundnut digger cum shaker and pod exposure in the farming of groundnut.

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