

Constraints Faced by the Groundnut Farmers in Adoption of Sustainable Cultivation Practices in Groundnut

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Abstract

The present study was conducted to identify and analyze the constraints faced by groundnut growers in the adoption of sustainable cultivation practices in groundnut cultivation in Chittoor and Ananthapur districts of Andhra Pradesh during 2025–26. An ex-post facto research design was employed for the study. A total sample of 180 groundnut farmers was selected through multistage random sampling technique from six mandals and twelve villages of the selected districts. Primary data were collected using a pre-tested interview schedule. The identified constraints were categorized into technical, financial/economic, personal, support and services, agro-climatic, and marketing and processing constraints. The severity of constraints was analyzed using a three-point continuum and ranked based on mean scores. The findings revealed that among technical constraints, high weed intensity (Mean = 1.422) emerged as the most severe constraint followed by incidence of pests and diseases (1.150) and problematic soils (0.817). Under financial constraints, high wage rates (1.656) was perceived as the major constraint followed by high cost of seed material (1.200) and high cost of fertilizers and pesticides (1.172). In the category of personal constraints, lack of awareness on sustainable cultivation practices (0.883) ranked first, followed by unwillingness of farmers to take risk (0.833). Regarding support and services, inadequate supply of high yielding quality seed material (1.005) and inadequate availability of manures and bio-fertilizers (1.000) were the major constraints. Among agro-climatic constraints, untimely rains (1.194) and drought at critical stages of crop growth (1.050) were identified as the most serious problems affecting sustainable cultivation. In marketing and processing constraints, lack of information about prices and markets (1.022) and exploitation by market intermediaries and local dealers (0.950) were perceived as the major issues by the respondents. The study concluded that groundnut farmers faced multifaceted constraints in adopting sustainable cultivation practices, particularly related to labour costs, weed management, climate variability, inadequate quality inputs, lack of technical awareness, and marketing inefficiencies. Strengthening extension services, ensuring timely availability of quality inputs, promoting climate-resilient technologies, improving market intelligence systems, and enhancing institutional support mechanisms may significantly improve the adoption of sustainable groundnut cultivation practices among farmers.

Key words: Groundnut, Sustainable cultivation practices, Constraints, Adoption, Farmers, Extension support, Agro-climatic factors

Groundnut (*Arachis hypogaea* L.) is one of the most important oilseed and food legume crops cultivated across tropical and subtropical regions of the world. It plays a significant role in ensuring food security, nutritional security, and livelihood sustainability for millions of small and marginal farmers. Groundnut kernels are rich in edible oil, protein, carbohydrates, vitamins, and minerals, making the crop an important component of human nutrition as well as livestock feed. In India, groundnut occupies a prominent place among oilseed crops and contributes substantially to agricultural income, rural employment, and the edible oil economy. The crop is cultivated under diverse agro-climatic conditions and serves as a major cash crop in rainfed farming systems. Despite its economic importance, the productivity of groundnut remains

comparatively low due to several technological, environmental, and socio-economic constraints [1].

In recent years, sustainable cultivation practices have gained increasing importance in agricultural production systems owing to concerns related to soil degradation, declining water resources, climate variability, and excessive dependence on chemical inputs. Sustainable groundnut cultivation practices include the use of improved and climate-resilient varieties, integrated nutrient management, integrated pest and disease management, crop rotation, organic amendments, water-saving irrigation methods, soil conservation measures, and efficient weed management practices. These practices are intended to enhance productivity while conserving natural resources and maintaining environmental balance. Adoption of such

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sustainable technologies is essential for improving farm profitability, resilience to climate change, and long-term agricultural sustainability [2]. Although several improved technologies and sustainable practices have been recommended by agricultural scientists and extension agencies, the adoption level among groundnut farmers is often unsatisfactory. Farmers encounter numerous constraints that limit the effective adoption of sustainable cultivation practices. These constraints may be technological, institutional, economic, infrastructural, climatic, or socio-psychological in nature. Lack of awareness regarding recommended practices, inadequate technical guidance, poor access to quality seed and inputs, insufficient irrigation facilities, labour shortages, high cost of machinery, and fluctuating market prices are among the major challenges reported by groundnut growers. Institutional constraints such as inadequate extension support, poor credit facilities, and weak market linkages also significantly influence technology adoption among farmers [3].

Studies conducted in different regions have highlighted that inadequate knowledge of recommended production technologies and lack of awareness about new agricultural innovations are major barriers to adoption among groundnut farmers. Similarly, studies from other developing regions have reported that climate variability, pest and disease incidence, lack of organized support systems, and inadequate access to improved varieties continue to hinder sustainable groundnut production. Recent findings also indicate that high machinery costs, insufficient technical training, and inadequate storage and post-harvest infrastructure adversely affect the adoption of improved cultivation and post-harvest technologies among groundnut growers [4]. The successful adoption of sustainable agricultural practices depends not only on the availability of technologies but also on farmers' perceptions, socio-economic conditions, extension support, and policy interventions. Understanding the nature and severity of constraints faced by farmers is therefore essential for designing effective extension strategies, policy measures, and development programmes aimed at enhancing sustainable groundnut production. Identification of adoption barriers can help researchers, extension personnel, and policymakers formulate location-specific interventions to improve technology dissemination and strengthen farmers' capacity for sustainable agriculture [5].

Against this background, the present study was undertaken to analyze the constraints faced by groundnut farmers in the adoption of sustainable cultivation practices. The study aims to identify the major technological, economic, institutional, and infrastructural barriers influencing adoption behaviour and to provide suitable recommendations for improving the adoption of sustainable groundnut cultivation technologies among farmers.

MATERIALS AND METHODS

The present investigation was carried out in the state of Andhra Pradesh during the agricultural year 2025-26 to study the constraints faced by groundnut farmers in the adoption of sustainable cultivation practices in groundnut. An ex-post facto research design was employed for the study, as the phenomenon under investigation had already occurred and the researcher had no control over the independent variables. The design was considered appropriate for assessing the existing conditions, perceptions, and constraints experienced by the respondents in relation to sustainable groundnut cultivation practices. The study was conducted in Chittoor and Ananthapur districts of Andhra Pradesh, which were selected purposively due to their predominance in groundnut cultivation and their substantial

contribution to the total groundnut area in the state. Groundnut is one of the major commercial crops cultivated in these districts under rainfed as well as irrigated conditions, making them suitable locations for the present investigation. From each selected district, three mandals having the highest area under groundnut cultivation were selected purposively. Thus, a total of six mandals were included in the study. Further, two villages from each selected mandal were selected randomly from the list of villages where groundnut cultivation was extensively practiced. Consequently, a total of twelve villages constituted the locale of the study. For the selection of respondents, a comprehensive list of groundnut growers was obtained from the concerned agricultural offices and village records of each selected village. From each village, 15 groundnut growers were selected through simple random sampling technique. Thus, the total sample size comprised 180 groundnut farmers representing the selected districts. The study was primarily based on primary data collected directly from the respondents. A well-structured and pre-tested interview schedule was developed in accordance with the objectives of the study. Before final administration, the interview schedule was pre-tested in a non-sample area to assess its clarity, relevance, and suitability. Necessary modifications and corrections were incorporated based on the responses obtained during pre-testing. Personal interview method was employed for data collection to ensure accuracy, completeness, and better understanding of the responses from the farmers.

The constraints related to the adoption of sustainable groundnut cultivation practices were identified through review of literature, consultation with agricultural experts, extension personnel, and interaction with farmers during preliminary field visits. The identified constraints were categorized under technological, economic, institutional, infrastructural, and socio-psychological dimensions. The respondents were asked to express the severity of each constraint using a three-point continuum, namely major constraint, minor constraint, and not a constraint, with assigned scores of 2, 1, and 0, respectively. To analyze the constraints faced by the respondents, mean score analysis was employed. The scores obtained for each constraint from all respondents were summed and divided by the total number of respondents to obtain the mean score for each constraint. The mean score was calculated using the following formula:

$$\text{Mean Score} = \frac{\sum fx}{N}$$

Where;

$\sum fx$ = Total score obtained for a particular constraint

N = Total number of respondents

Based on the calculated mean scores, the constraints were ranked in descending order. Constraints with higher mean scores were considered more severe and critical in influencing the adoption of sustainable cultivation practices among groundnut farmers. Appropriate statistical tools such as frequency, percentage, mean, and ranking techniques were used for interpretation and presentation of the data.

RESULTS AND DISCUSSION

A list of constraints faced by groundnut growers in adoption of 'sustainable cultivation practices' were presented in the following (Table 1). The constraints in adoption of sustainable cultivation practices were classified into major types which were associated with technical, financial, personal, support and services, agro-climatic factors, marketing and processing constraints.

Table 1 Constraints faced by the groundnut growers in adoption of sustainable cultivation practices

S. No	Constraints in adoption of sustainable cultivation practices	Major constraint		Minor constraint		Not a constraint		Total score	Mean	Rank
		(2)		(1)		(0)				
		(F)	(P)	(F)	(P)	(F)	(P)			
I. Technical constraints										
1.	Problematic soils	17	9.44	113	62.78	50	27.78	147	0.817	III
2.	Lack of short duration /pest and disease/ drought resistant varieties	9	5.00	104	57.78	67	37.22	122	0.678	IV
3.	Not aware of the recommended seed rate	9	5.00	79	43.89	92	51.11	97	0.539	VI
4.	Poor germination of seed	1	0.56	93	51.67	86	47.78	95	0.528	VII
5.	Incidence of pest and diseases	41	22.78	125	69.44	14	7.78	207	1.150	II
6.	Not aware of recommended moisture conservation methods	3	1.67	108	60.00	69	38.33	114	0.633	V
7.	High weed intensity	86	47.78	84	46.67	10	5.56	256	1.422	I
8.	Non synchronization of dates of maturity of intercrops	6	3.33	74	41.11	100	55.56	86	0.478	VIII
II. Financial / Economic constraints										
9.	High cost of seed material	47	26.11	122	67.78	11	6.11	216	1.200	II
10.	High cost of fertilizers and pesticides	40	22.22	131	72.78	09	5.00	211	1.172	III
11.	High wage rates	120	66.67	58	32.22	02	1.11	298	1.656	I
12.	Inadequate availability of credit	11	6.11	103	57.22	66	36.67	125	0.694	V
13.	Lack of remunerative market prices	15	8.33	128	71.11	37	20.56	158	0.878	IV
III. Personal constraints										
14.	Lack of education	14	7.78	107	59.44	59	32.78	135	0.750	V
15.	Lack of awareness on sustainable cultivation practices	15	8.33	129	71.67	36	20.00	159	0.883	I
16.	Poor economic status of the farmers	17	9.44	108	60.00	55	30.56	142	0.789	III
17.	Unwillingness of the farmers to take risk	13	7.22	124	68.89	43	23.89	150	0.833	II
18.	Traditional beliefs	12	6.67	112	62.22	56	31.11	136	0.756	IV
IV. Support and services										
19.	Inadequate supply of high yielding quality seed material	20	11.11	141	78.33	19	10.56	181	1.005	I
20.	Inadequate availability of manures and bio-fertilizers	15	8.33	150	83.33	15	8.33	180	1.000	II
21.	Lack of timely training on sustainable cultivation practices	24	13.33	91	50.56	65	36.11	139	0.772	VIII
22.	Non-availability of timely inputs	10	5.56	122	67.78	48	26.67	142	0.789	VII
23.	Poor quality of inputs	10	5.56	119	66.11	51	28.33	139	0.772	VIII
24.	Lack of knowledge about the use of micro nutrients/biofertilizers	10	5.56	86	47.78	84	46.67	106	0.589	XI
25.	Lack of suitable machinery for different operations	8	4.44	142	78.89	30	16.67	158	0.878	IV
26.	No supply of implement on subsidy basis	7	3.89	120	66.67	53	29.44	134	0.744	IX
27.	Lack of proper extension support	20	11.11	103	57.22	57	31.67	143	0.794	VI
28.	No declaration of support price of the crop well ahead of the season	3	1.67	139	77.22	38	21.11	145	0.806	V
29.	Lack of insurance provision	19	10.56	123	68.33	38	21.11	161	0.894	III
30.	Non availability of chemical in time for seed treatment	11	6.11	93	51.67	76	42.22	115	0.638	X
V. Agro-climatic factors										
31.	Untimely rains	55	30.56	105	58.33	20	11.11	215	1.194	I
32.	Poor pod/grain setting	31	17.22	96	53.33	53	29.44	158	0.878	III
33.	Drought at critical stages of crop growth	29	16.11	131	72.78	20	11.11	189	1.050	II
34.	Severe temperatures	17	9.44	115	63.89	48	26.67	149	0.828	IV
VI. Marketing and processing										
35.	Exploitation by market intermediaries and local dealers	18	10.00	135	75.00	27	15.00	171	0.950	II
36.	Lack of information about prices and markets	27	15.00	130	72.22	23	12.78	184	1.022	I
37.	Non availability of technology in processing	9	5.00	104	57.78	67	37.22	122	0.678	IV
38.	Lack of processing facilities in the area	2	1.11	91	50.56	87	48.33	95	0.528	VII
39.	Poor marketing system and access to markets	11	6.11	94	52.22	75	41.67	116	0.644	V
40.	Lack of appropriate means of transport	11	6.11	80	44.44	89	49.44	102	0.567	VI
41.	High transportation costs	14	7.78	132	73.33	34	18.89	160	0.889	III

The (Table 1) explicitly depicts the constraints, which were ranked based on the order of highest mean score obtained within each major type of constraint. In consideration to technical constraints 'High weed intensity' (1.422) was ranked first and was felt as the most problematic by most of the groundnut growers. It was followed by decreasing order of mean scores of the constraints as 'Incidence of pests and diseases' (1.150), 'problematic soils' (0.817), 'Lack of short duration pest and disease/ drought resistant varieties' (0.678), 'Not aware of recommended moisture conservation methods' (0.633), 'Not aware of the recommended seed rate' (0.539), 'Poor germination of seed' (0.528), 'Non synchronization of dates of maturity of intercrops' (0.478) ranked second, third, fourth, fifth, sixth, seventh and eighth respectively.

In financial or economic constraints majority of the groundnut growers felt high wage rates with a mean score of (1.656) as the major constraint, followed by 'high cost of seed material' (1.200), 'high cost of fertilizers and pesticides' (1.172), 'lack of remunerative market prices' (0.878), and 'inadequate availability of credit' (0.694) ranked second, third, fourth and fifth respectively.

In personal constraints 'lack of awareness on sustainable cultivation practices' was felt as a major constraint with a mean score of (0.883) followed by 'unwillingness of the farmers to take risk' (0.833), 'poor economic status of the farmer' (0.789), 'traditional beliefs' (0.756) and 'lack of education' (0.750) ranked next to the major constraint respectively.

Regarding support and services 'Inadequate supply of high yielding quality seed material' was a major constraint for the groundnut growers with a mean score of (1.005), followed by 'Inadequate availability of manures and bio-fertilizers' (1.000), 'Lack of insurance provision' (0.894), 'Lack of suitable machinery for different operations' (0.878), 'No declaration of support price of the crop well ahead of the season' (0.806), 'Lack of proper extension support' (0.794), 'Non-availability of timely inputs' (0.789), 'Poor quality of inputs' (0.772), 'Lack of timely training on sustainable cultivation practices' (0.772), 'No supply of implement on subsidy basis' (0.744), 'Non availability of chemical in time for seed treatment' (0.638) and 'Lack of knowledge about the use of micro nutrients/biofertilizers' (0.589) ranked next to the major constraint respectively.

In agroclimatic factors 'Untimely rains' stood as a major constraint (1.194) followed by 'Drought at critical stages of crop growth' (1.050), 'Poor pod/grain setting' (0.878) and 'Severe temperatures' (0.828) were the constraints ranked second, third and fourth respectively. The major problems among all the categories were on providing of quality inputs, high cost of the inputs, labour availability, pest and disease management, knowledge of sustainable cultivation practices and marketing problems [6-8].

Regarding the marketing and processing aspects 'Lack of information about prices and markets' (1.022) was the major constraint followed by 'Exploitation by market intermediaries and local dealers' (0.950), 'High transportation costs' (0.889), 'Non availability of technology in processing' (0.678), 'Poor marketing system and access to markets' (0.644), 'Lack of appropriate means of transport' (0.567) and 'Lack of processing facilities in the area' (0.528) were the constraints ranked next respectively. Regarding marketing, most of the farmers felt the above constraints under minor constraints category [9-10].

CONCLUSION

The findings revealed that the most of the farmers who are growing groundnut are facing so many constraints that high weed intensity, high wage rates are the first major problems which should be solved by developing good pre-emergence and post-emergence herbicides and wage rates should be managed with development of machinery for weeding and harvesting and drone sprayings can be used for spraying of pesticides and fungicides. Lack of awareness on sustainable cultivation practices which can be created through awareness and training programmes, Inadequate supply of high yielding quality seed material should be given to the research stations as a challenge for developing good and pest and disease resistant varieties. Untimely rains which cannot be predicted and if predicted precautions to be taken accordingly and Lack of information about prices and markets which should be given by the government at least the Minimum Support Price should be higher for the produce which the farmers have produced will make the farmers to continue in agriculture and sustain their livelihood in an effective manner.

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