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Chitrasena Padhy

Ph.D. Student/Assistant
Professor, Agricultural
Extension, M.S. Swaminathan
School of Agriculture, Centurion
University of Technology and
Management, Odisha, India

Pakalpati Satyanarayana Raju

Professor Emeritus, Agronomy,
M.S. Swaminathan School of
Agriculture, Centurion
University of Technology and
Management, Odisha, India

Rabindra Kumar Raj

Professor and Head, Agricultural
Extension and Communication,
Institute of Agricultural Science,
SOADU, Bhubaneswar, Odisha,
India

Corresponding Author:

Chitrasena Padhy

Ph.D. Student/Assistant
Professor, Agricultural
Extension, M.S. Swaminathan
School of Agriculture, Centurion
University of Technology and
Management, Odisha, India

Stress factors in cotton cultivation and perception of the growers

Chitrasena Padhy, Pakalpati Satyanarayana Raju and Rabindra Kumar Raj

Abstract

Cotton cultivation provides the prime source of sustenance for the livelihood of farmers in tribal region of Odisha. In Gajapati and Rayagada districts of Odisha, a study was undertaken on 240 cotton growers from four blocks of two districts. Data was collected personally on the stress factors relating to physical, technological, harvesting, post-harvesting, as well as marketing of the produce. The respondents had to acquire seeds, fertilisers, and other inputs prior to land preparation. They had to contact various dealers for getting quality inputs and underwent mental pressure. The respondents had to raise extra seedlings for gap filling to maintain optimum plant population. Preparing leaf bags, preparing soil mixture, delinting seeds, sowing, and watering regularly for good germination were causes of worry for the respondents. The input dealers generally charged more price and the respondent farmers had no option but to purchase at the higher rates. The sale price of cotton was not only reduced but also created disinterest among the traders due to smoke discolouration of cotton in storage causing frustration among farmers. The respondents were also under mental stress due to the possibility of fire hazard in storage. Cotton should be properly cleaned prior to sale. The traders while procuring the produce asked unnecessary queries and made demands that increased the frustration of the respondents. The district administration has to increase extension contact and take necessary support measures for easy marketing of the produce at remunerative price. The attributes of the respondents, such as land holding size, extension contact, and house type significantly influenced stress in cotton cultivation.

Keywords: administrative support, extension contact, frustration, mental stress, remunerative price

Introduction

The burden of an uncertain and unreliable economy is being felt by farm families. The farmers are concerned of financial problems, legal issues, and physical and mental well being. Farmers are forced to parcel off their land, file for bankruptcy, deny their children inherency rights, and take secondary jobs outside the farm to provide health insurance and extra income to make both ends meet. Mental or emotional distress, substance abuse, anxiety, depression and even suicide may affect them due to these stressors (University of Maryland Extension, 2021) ^[1]. A free online webinar on “Communicating with Farmers under Stress” is offered by Nebraska Extension in partnership with Michigan State University Extension. This workshop helps individuals such as bank lenders, agricultural suppliers, educators and consultants, healthcare professionals, and anyone involved with the lives of farmers and ranchers (University of Nebraska-Lincoln, 2021) ^[2]. The associated chronic stress in farming impacts the mental and physical well-being, relationships, and decision making of farmers. Farmers, families, businesses, and communities are helped by extension to remain resilient by learning how to manage stress. Extension uses planning tools to make sound decisions and create a road-map for the future (University of Wisconsin-Madison, 2021) ^[3].

The use of poor quality seeds and pesticides results in low productivity of cotton. Due to this the cost of cultivation increases. Multiplicity of cotton varieties/hybrids leading to rampant mixing is another one among the main problems. Poor fibre attributes of most varieties, rapid worsening of fibre quality of hybrids with consecutive pickings, delayed transfer of agricultural technologies to the farmers’ fields and poor infrastructure at market yards and high trash content (4-7%) in cotton are other deficiencies in cotton sector (Textile Magazine, 2011) ^[4].

The important climatic factors that significantly affect flower and boll production are sunshine duration, evaporation relative humidity, surface soil temperature, and maximum air temperature.

The most effective climatic factors during preceding and succeeding periods on boll production and retention are evaporation, minimum humidity and sunshine duration (Sawan *et al.*, 2017) [5]. Many factors such as length of the growing season, climate (including radiation, temperature, light, wind, rainfall, and dew), cultivar, availability of nutrients and soil moisture, pest incidence, and cultural practices affect cotton growth (EI-Zik, 1980) [6]. Soil fertility, cloudy weather, soil moisture plant spacing, and other factors such as temperature and relative humidity influence the balance between vegetative and reproductive development (Guinn, 1982) [7]. Weather, cultural practices, soil and cultivar affect crop growth interactively, sometimes leading to plants responding in unpredicted ways to their conditions (Hodges *et al.*, 1993) [8].

Materials and Methods

In the tribal region of Odisha, India the study was undertaken. Two tribal dominated districts, *viz.* Gajapati and Rayagada, having cotton cultivation were selected. In Gajapati district Rayagada and Kashinagar blocks and in Rayagada district Gunupur and Ramanaguda blocks were randomly selected. In each block four panchayats, *viz.* Sanatundi, Kumelsingha, Karadasingi, and Rayagada in Rayagada block, and Budura, Khandaba, Alada, and Goribandha in Kashinagar block, Gadhikhala, Sirijholi, Chalkamba, and Jaganathpur in

Gunupur block as well as Buting, Nilamguda, Bhamini, and Golumunda in Ramanaguda block were randomly selected. From all these panchayats around 15% of the farmers cultivating cotton were also selected randomly. In total, 67 farmers from Rayagada, 53 from Kashinagar, 62 from Gunupur, and 58 from Ramanaguda blocks were selected randomly as respondents for the study with the total sample size being 240.

Through a semi-structured schedule the data was collected personally after pretesting. Data was collected from the farmers on stress factors relating to physical, technological, harvesting and post-harvesting as well as marketing of the produce were selected as the variables for the purpose. On the scale point of severe, high, moderate, low and no stress were analysed with the score value of 5,4,3,2 and 1 respectively the data collected. The results obtained are discussed after analysis. The statistical tools such as mean score, gap percentage, rank order and correlation coefficient were employed to find the results.

Results and Discussion

i. Physical Stress

The respondents were asked to opine about various physical stresses that usually occurred in cotton cultivation. The responses received in this regard were analysed and presented in Table-1.

Table 1: Factors involved in physical stress

Sl. No.	Factor	Mean score		Pooled mean score (n=240)	Rank
		Gajapati district (n = 120)	Rayagada district (n=120)		
1.	Chemicals causing health problems	4.22	4.48	4.35	1
2.	Exhaustion due to heavy workload	4.23	4.38	4.30	4
3.	Adverse climatic situations	4.32	4.31	4.31	3
4.	Crop loss cause depression	4.13	4.23	4.18	5
5.	Indebtedness	4.38	4.28	4.33	2
6.	Psychological stress on dissatisfaction of family	4.03	3.93	3.98	6

Maximum obtainable score: 5

The data in Table-1 revealed that the respondents had maximum stress due to health problems in chemical use followed by indebtedness causing frustration, adverse climatic situations causing mental tension, exhaustion and tiredness due to more workload and above all crop loss causes depression.

The respondents were resource poor. They availed credit either from institutions or private money lenders for purchasing inputs. As they had to repay timely, they were repeatedly cautioned that created stress. Cotton crop requires timely management practices. Adverse climatic situations like

unprecedented rainfall, high temperature, and wind velocity affect both vegetative and reproductive stages of the cotton crop. These inconveniences caused mental tension. Many a times, the respondents were unable to do the managements practices timely due to labour scarcity, unavailability of inputs, or climatic hazard for which the respondents felt frustrated.

ii. Technological Stress

The data collected on technological stress from the respondents were analysed and results presented in Table-2.

Table 2: Factors involved in technological stress

Sl. No.	Factor	Mean Score		Pooled mean score (n=240)	Rank
		Gajapati District (n=120)	Rayagada District (n=120)		
1.	Input arrangements	4.10	4.50	4.30	1
2.	Authenticity of quality inputs	3.76	3.87	3.81	9
3.	Timely purchase of inputs	3.88	3.84	3.86	8
4.	Exploitation by input dealers	4.08	4.34	4.21	3
5.	Non-availability of repair facilities for implements	3.89	3.94	3.92	7
6.	Irregular rainfall	4.08	4.17	4.13	4
7.	Inability to do timely intercultural operation	3.80	4.18	3.99	6
8.	Tedious dibbling of seeds	3.99	4.13	4.06	5
9.	Raising extra seedlings in leaf bag	4.14	4.42	4.28	2

Maximum obtainable score: 5

From the above table, maximum stress was observed on mental pressure in input arrangement followed by difficulty on raising extra seedlings in leaf bags, exploitation by input dealers in credit supply causing mental tension, irregular rainfall creating anxiety for timely use of inputs, and the tedious work in dibbling of seeds creating frustration.

The respondents had to contact various input dealers for getting quality inputs for which they had some mental pressure. The respondents had to raise extra seedlings for gap filling to maintain optimum plant population. The respondents were not financially sound and loan facilities were not available in time, they contacted the input dealers for supply

of seeds and fertilisers on credit. The input dealers generally charged higher price and if the respondents were paying lately they were charging high interest rates. There is recommendation for dibbling two seeds per pit during sowing as safety measure for obtaining good stands. Feasible solutions need to be suggested by the extension officers for all the factors in that create stress among cotton farmers.

iii. Stress in harvesting and post-harvesting

The stress factors stated by the respondents on harvesting and post harvesting have been indicated in Table-3 after analysis of the data collected.

Table 3: Stress factors involved in harvesting and post harvesting

Sl. No.	Factor	Mean Score		Pooled mean score (n=240)	Rank
		Gajapati District (n=120)	Rayagada District (n=120)		
1.	Hand picking	4.20	4.48	4.34	4
2.	Separation of plant debris from harvested cotton	4.21	4.49	4.25	6
3.	Non-availability of good drying floor	3.83	3.98	3.90	7
4.	Smoke discoloration in storage	4.28	4.56	4.42	2
5.	Non-disposal of produce immediately	4.25	4.42	4.34	4
6.	Fire hazard in storage	4.26	4.45	4.35	3
7.	Crop loss	4.41	4.48	4.44	1

Maximum obtainable score: 5

All the factors mentioned in the table were causing stress as opined by the respondents. However, the mean score values indicate that the stress factor of unavailability of drying floor was not severe.

Cotton is a risky crop and cost of cultivation is comparatively more than for other field crops. Crop failure due to any adverse situation caused loss and created mental agony. The sale price of cotton is not only reduced due to smoke discoloration which caused frustration among farmers. The respondents were also under mental stress due to the possibility of fire hazard in storage. Cotton should be properly

cleaned for sale. There was plant debris in the picked cotton which is difficult to separate. If the produce was not sold immediately at remunerative price, the risk of fire hazard and smoke discoloration during storage created mental stress among the respondents.

iv. Marketing Stress

The data collected from the respondents on stress factors involved in marketing have been analysed and presented in Table-4.

Table 4: Stress factors involved in marketing of the produce

Sl. No.	Factor	Mean Score		Pooled mean score (n=240)	Rank
		Gajapati District (n=120)	Rayagada District (n=120)		
1.	Non-timely disposal of produce	4.20	4.54	4.37	2
2.	Searching reliable traders	3.84	4.00	3.92	8
3.	Input dealers harassment to procure produce	3.98	4.13	4.05	5
4.	No immediate payment causes family disturbances	3.91	4.08	3.99	7
5.	Favouratism in mandis	3.96	4.21	4.08	4
6.	Frequent queries about produce by traders	3.95	4.10	4.03	6
7.	Low sale price	4.15	4.28	4.21	3
8.	Harassment by money lenders for distress sale	4.41	4.56	4.48	1

Maximum obtainable score: 5

The data in the table revealed that the respondents of both Gajapati and Rayagada district were of similar opinion on various stress factors on marketing. The respondents did not have much stress while searching reliable traders for disposal of produce as well as no immediate payment causing family disturbances.

Private money lenders pressurised the respondents for immediate disposal and pay-back of the credit amount. The respondents therefore were pressurised for distress sale of

produce. Similarly, the respondents were in mental stress due to low sale price. Favouratism in mandis by the officials created mental agony to the respondents. Input dealers supplying crop inputs on credit harassed the respondents to sell the produce to them at lower price. These were pertinent stress factors of the respondents for which the district administration and authorities have to make necessary supports for easy and timely marketing of the produce at remunerative price.

Table 5: Analyses of the stress factors

Sl. No.	Stress	Mean Score		Pooled mean score (n=240)	Rank
		Gajapati District (n=120)	Rayagada District (n=120)		
1.	Physical	4.22	4.27	4.24	2
2.	Technological	3.97	4.15	4.06	4
3.	Harvesting and post-harvesting	4.21	4.41	4.31	1
4.	Marketing	4.05	4.24	4.14	3

Maximum obtainable score: 5

The respondents had stresses due to all the factors. However, maximum stress was observed on harvesting and post-harvesting followed by physical and marketing and comparatively less on technological aspects. The district authorities involved in the promotion of cotton cultivation have to analyse the stress factors and take possible steps to

minimise the effects of the stress factors for the benefit of the cotton farmers.

Further attempts have been made to assess the influence of the socio-economic attributes of the respondents minimising the stress factors. The results obtained from the correlation coefficient analysis are presented in Table-6.

Table 6: Influence of socio-economic attributes minimising stress

Sl. No.	Attribute	Correlation ('r') Value	't' value
X ₁	Age	0.080	1.235
X ₂	Education	0.050	0.772
X ₃	Holding size	0.243**	3.865
X ₄	Farming experience	0.017	0.263
X ₅	Caste	0.096	1.488
X ₆	Social participation	0.052	0.803
X ₇	Cosmopolitaness	0.091	1.409
X ₈	Extension contact	0.185**	2.903
X ₉	Sources of information	0.018	0.278
X ₁₀	House type	0.186**	2.919
X ₁₁	Occupation	0.419**	7.116
X ₁₂	Annual income	0.076	1.176
X ₁₃	Social aptitude	-0.033	0.510
X ₁₄	Economic aptitude	0.091	1.409
X ₁₅	Scientific Orientation	0.088	1.363

** Significant at P<0.01

Correlation coefficient analysis in the table reveals that the attributes age, education, farming experience, caste, social participation, cosmopolitaness, source of information, annual income, social and economic aptitude, as well as scientific orientation of the respondents had no influence. In other words, the attributes of the respondents such as land holding size, extension contact, and house type had significant influence in minimising the stresses in cotton cultivation.

Conclusion

Cotton cultivation is of prime importance to the tribal people of Gajapati and Rayagada districts of Odisha. The tribals depend on cotton cultivation for the sustenance of their livelihood. However, they face stresses due to several factors. The respondent cotton farmers were unable to do the crop management practices timely due to labour scarcity, unavailability of inputs, and climatic hazards. The respondents became depressed due to crop loss. The respondents were not financially sound and loan facilities were not available in time. So they contacted the input dealers to supply seeds and fertilisers on credit. The input dealers generally charged more and the farmers had no option but to purchase and were submitted to mental tension for making payment as early as possible. When the produce was not sold immediately after harvest at remunerative price there were the risks of fire hazard and smoke discolouration and the respondents suffered mental stress. Input dealers supplying crop inputs on credit pressurized the respondents to sell the produce to them at lower price. The traders while procuring the produce asked unnecessary queries and made demands

that created frustration among the respondents. The district authorities involved in the promotion of cotton cultivation have to analyse the stress factors and take possible steps to minimise the effects of the stress factors for the benefit of the cotton farmers.

Reference

1. University of Maryland Extension, Farm Stress Management, 2021, <https://extension.umd.edu/FarmStressManagement>.
2. University of Nebraska-Lincoln, Communicating with Farmers under Stress, 2021, <https://ruralwellness.unl.edu/communicating-farmers-under-stress>.
3. University of Wisconsin-Madison, How Stress Affects Brain and Body, 2021, <https://farms.extension.wisc.edu/farmstress/how-stress-affects-brain-and-body/>.
4. Textile Magazine, Factors influencing cotton cultivation, 2011, <https://www.indiantextilemagazine.in/uncategorized/factors-influencing-cotton-production/>.
5. Sawan Z M, Sabatini S, Cotton production and climatic factors: Studying the nature of its relationship by different statistical methods, Content Biology, volume 3, 2017, <https://www.tandfonline.com/doi/full/10.1080/23312025.2017.1292882>
6. El-Zik KM. The cotton plant - its growth and development. Western Cotton Production Conference

Summary Proceedings, Fresno, CA., 1980, 18-21) [Google Scholar].

8. Guinn, G. Causes of square and boll shedding in cotton (USDA Technical Bulletin 1672). Washington, DC: USDA, 1982 [Google Scholar]
9. Hodges HF, Reddy KR, McKinion JM, Reddy VR. Temperature effects on cotton. (Bulletin Mississippi Agricultural and Forestry, Experiment Station No. 1993;990:15). [Google Scholar]