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Decision-making process of farmers towards adoption of climate resilient practices: Evidence from cotton growers in Southern Telangana Zone

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Abstract

The study entitled Decision-Making Process of Farmers towards adoption of climate resilient practices: Evidence from Cotton Growers in Southern Telangana Zone analysed how farmers progress through different stages of decision making while adopting climate resilient practices (CRPs) in cotton. The rational model consisting of six stages namely problem recognition, generation of alternative solutions, evaluation of alternatives, selection of best alternatives, implementation and evaluation of decision effectiveness was used as the analytical framework. The study was conducted in Mahbubnagar district of Southern Telangana Zone with a purposive sample of 120 innovative cotton farmers from six villages. Results showed that all farmers identified production problems but only 46.67 per cent generated alternatives 31.67 per cent evaluated them and 25.00 per cent selected the best alternative. About 15.00 per cent directly implemented decisions without evaluation and 6.67 per cent reviewed their effectiveness. About 33.33 per cent implemented decisions after progressing sequentially. Finally, 28.33 per cent of farmers reached the stage of evaluating decision effectiveness. Farmers displayed rational behaviour influenced by peer learning and practical field experience. The process served as a continuous cycle of learning that strengthened farmers' consistent use of climate resilient practices in cotton.

Keywords: Decision-Making process, rationale model of decision making, climate resilient practices, cotton farmers, behavioural transformation

Introduction

Decision-making has been widely acknowledged as a fundamental aspect of human behaviour, particularly in the context of agricultural production where farmers continually face the need to choose among various technological, economic and environmental alternatives. According to the *International Encyclopaedia of the Social Sciences*, decision-making is viewed as a social process that involves identifying a problem, generating a set of possible alternatives and selecting one alternative for implementation (Snyder, 1962). This perspective emphasizes that decision-making does not occur in isolation but is embedded within social, cultural and institutional contexts that influence the choices of individuals.

In the present study, the rational model of decision-making has been adopted as the guiding framework to analyse the decision-making process of farmers involved in the adoption of climate resilient practices in cotton cultivation. The rational model conceptualizes decision-making as a structured, systematic and goal-oriented process that unfolds in a sequential manner. It assumes that decision-makers act logically and make choices based on an objective assessment of available information and possible outcomes. The model delineates six distinct yet interrelated stages: (1) identification or recognition of the problem, wherein the decision-maker becomes aware of a situation requiring attention; (2) formulation or definition of the problem, which involves specifying the nature and scope of the issue; (3) generation of alternative solutions, where multiple courses of action are developed; (4) evaluation of alternatives, during which each option is examined in terms of its feasibility, costs, expected benefits and potential risks; (5) selection of the best alternative, representing the selection of the most rational and beneficial option and (6) implementation of the decision, which involves executing the chosen alternative through systematic planning and coordinated action. A final implicit stage involves evaluation of decision effectiveness, where the decision-maker assesses the effectiveness of the decision and its outcomes over time.

In the agricultural context, this rational model provides a valuable analytical lens to understand how farmers identify problems related to climatic risks, assess alternative adaptation strategies, and make informed choices regarding

climate resilient practices. Given that cotton cultivation in Telangana is increasingly affected by erratic rainfall, rising temperatures and pest incidence farmers' decision-making becomes a critical determinant of responsive behaviour. Projections suggest that cotton yields in semi-arid regions of Telangana could decline by 12-18 per cent by 2050 due to climate change, if adaptation measures are not implemented (ICAR-CRIDA, 2021). These projections underscore the need for widespread adoption of climate resilient practices (CRPs), which can mitigate yield losses by 20-30 per cent. Therefore, analysing the process through the rational model enables a comprehensive understanding of how farmers move from problem recognition to practical implementation in adopting climate resilient practices in cotton.

Accordingly, the rational model was selected for the present study to systematically assess each stage of farmers' decision-making process and to identify factors that facilitates effective adoption of climate resilient practices in cotton.

In the present study decision making process was operationalised as the using or passing of different procedures or the series of stages by the farmers in adoption of climate resilient practices in cotton. The series of stages consists of all the decisions and activities, their impacts that occur from recognition of a need or a problem, generating, evaluating, selecting best alternative, implementing the decision and evaluating decision effectiveness in adoption of climate resilient practices in cotton. The present study was framed with objective:

- To analyse the decision-making process of farmers involved in adoption of climate resilient practices in cotton.

Methodology

Telangana state was purposively selected as the locale of the study owing to the researcher's familiarity with the region and local language, which facilitated effective interaction and in-depth exploration of the subject. Mahbubnagar district, representing the Southern Telangana Zone, was purposively chosen due to its high climate vulnerability index (0.828) and low adaptive capacity (0.32) as reported in the Telangana State Action Plan for Climate Change and Human Health (2022-2027). Among its seventeen mandals, three mandals Chinna Chintha Kunta, Jadcherla and Midjil were selected based on the highest area under cotton cultivation. Two villages from each mandal, namely Aloor, Gangapur, Boinpalle, Kothur, Mutchintala and Nellikondi, were randomly selected. Five climate resilient practices were purposively identified: water conservation (dead furrows and raised beds), mulching, intercropping with redgram, Integrated Pest and Disease Management (pheromone and sticky traps) and micro-irrigation (drip and sprinkler). From each village, twenty innovative farmers who had adopted these practices for at least three years were purposively selected, constituting a total sample of 120 respondents.

The decision-making process was examined through six stages capturing how farmers moved from identifying problems to evaluating outcomes. Each stage included specific questions reflecting actions like recognizing issues, generating and assessing alternatives, selecting suitable practices, implementing decisions and reviewing the results. Each correct response received a score of one with the total score ranging from 1 to 34.

Results and Discussion

The decision-making process of farmers was examined using the rational model, which assumes a logical progression from problem recognition to evaluation of decision effectiveness. While all farmers 100 per cent identified problems in cotton cultivation, only 46.67 per cent generated alternatives and 31.67 per cent evaluated them. About 25.00 per cent selected the best alternative, whereas15.00 per cent moved directly from problem identification to implementation, indicating skipping behaviour influenced by experience and peer advice. Only 6.67 per cent evaluated the effectiveness of their decisions and 28.33 per cent completed all stages. Overall, farmers showed a selective and practical decision-making pattern, adopting familiar and cost-effective climate resilient practices suited to local conditions.

Table 1: No. of farmers passed through the different stages of decision-making process

S. No.	Stages of Decision-Making process	Farmers (n=120)	
		Frequency	Percentage
1	Problem Identification / Recognition	120	100.00
2	Problem Identification + Generation of Alternative Solutions	56	46.67
3	Problem Identification + Generation of Alternative Solutions + Evaluation of Alternative Solutions	38	31.67
4	Problem Identification + Generation of Alternative Solutions + Evaluation of Alternative Solutions + Selection of the Best Alternative	30	25.00
5	Problem Identification + Implementation of the Decision	18	15.00
6	Problem Identification + Generation of Alternative Solutions + Evaluation of Alternative Solutions + Selection of the Best Alternative + Evaluating the Decision Effectiveness	8	6.67
7	Problem Identification + Generation of Alternative Solutions + Evaluation of Alternative Solutions + Selection of the Best Alternative + Implementation of the Decision	22+18 = 40	33.33
8	Problem Identification + Generation of Alternative Solutions + Evaluation of Alternative Solutions + Selection of the Best Alternative + Implementation of the Decision + Evaluating the Decision Effectiveness	26+8 = 34	28.33

Climate Resilient Practices Adopted by Farmers in the Decision-Making Process

To analyse the decision-making process of farmers towards adopting climate resilient practices (CRPs) in cotton, fifteen (15) major practices commonly followed in the study area were identified. These practices address key challenges such as rainfall variability, pest incidence and soil moisture stress, forming the empirical basis for assessing the six sequential stages of the rational decision-making process.

Table 2: List of climate resilient practices adopted by farmers for analysing decision-making Process

CRP No.	Climate Resilient Practices	Interpretation in relation with climate change adaptability
1	Adjusting sowing dates to match monsoon	Aligns sowing with monsoon onset to ensure better germination and crop establishment.
2	Intercropping with redgram (4:1 / 6:1)	Improves soil fertility, reduces pest incidence and minimizes economic risk.
3	Timely weed management	Prevents competition for moisture and nutrients, sustaining yield during dry spells.
4	Drip irrigation	Ensures efficient water use and uniform soil moisture under rainfall scarcity.
5	Ridge and furrow method	Conserves rainwater and prevents waterlogging during heavy rains.
6	Pheromone traps for pink bollworms	Enables early pest detection and reduces pesticide dependency.
7	Foliar spray of 1% KNO_3	Mitigates moisture stress and enhances boll development.
8	Selection of Bt hybrid brands	Increases pest resistance and yield stability under variable climate conditions.
9	Mulching with crop residues and polythene sheets	Conserves soil moisture, suppresses weeds and reduces evaporation losses.
10	Summer deep ploughing	Controls pests and improves soil aeration and water infiltration.
11	Sticky traps for whitefly	Helps control whitefly and prevents viral disease spread.
12	Dead furrows for in-situ moisture	Enhances in-situ moisture conservation and rainwater harvesting.
13	Raised bed planting method	Improves drainage and root growth during excess rainfall.
14	Foliar spray of 19:19:19 + 2% urea	Supports nutrient uptake during stress periods.
15	Soil test-based fertilizer management	Ensures balanced nutrient supply and enhances soil health.

In summary, these fifteen (15) CRPs represent a blend of agronomic, water & pest management strategies that enhance the adaptability and resilience of cotton under changing climatic conditions.

Table 3: Overall Interpretation of the stages of decision-making process of farmers towards adoption of climate resilient practices in cotton

Decision making process	Farmer Behaviour Observed	Interpretation / Inference of farmers behaviour
Identification/Recognition of the Problem	All 120 farmers identified major constraints such as pest incidence, erratic rainfall, declining soil fertility and labour shortage etc.,	Established a clear foundation of awareness that initiated behavioural change and motivated farmers to explore and adopt suitable climate resilient practices in cotton.
Generation of Alternatives	56 farmers generated ten CRPs (2,4,5,6,7,9,12,13,14and15) through guidance from Agricultural Officers, KVK scientists and progressive farmers.	Farmers effectively blended traditional knowledge with scientific guidance to generate locally suitable and economically viable alternatives towards adaptation to climate variability.
Evaluation of Alternatives	38 farmers evaluated ten CRPs (2,4,5,6,7,9,12,13,14,15) and three CRPs (4, 9 and 13) were discontinued due to high cost and labour demand.	Served as an evaluative phase during which farmers critically examined different alternatives and retained those that proved practical, effective and well-suited to their field and socio-economic conditions.
Selection of Best Alternatives	30 farmers selected seven CRPs (2, 5, 6, 7, 12, 14 and 15) for adoption.	Reflected a systematic and rational selection process through which farmers identified practices compatible with available resources and local environmental conditions.
Implementation of the Decision	40 farmers implemented 11 CRPs (1,2,3,5,6,7,8,10,11,12 and 14); 22 progressed sequentially from stage IV and 18 adopted directly from stage I (1, 3, 8, 10 and 11).	Represented the stage of behavioural transformation in which farmers converted their decisions into concrete field-level actions guided by systematic reasoning and experiential confidence towards climate change adaptability.
Evaluating the Decision Effectiveness	34 farmers evaluated results; 26 sequential CRPs (2, 6, 7, 14) and 8 observational evaluators reviewed CRPs passing from stage IV (4, 9 and 13).	Indicated a reflective and participatory learning phase in which farmers reviewed outcomes, shared experiences and refine their practices for subsequent seasons.
Non-Linear Behaviour	18 farmers moved directly from Stage I to V and 8 farmers from Stage IV to VI showing nonlinear behaviour.	Demonstrated flexibility and adaptability in farmer behaviour, where decision-making was influenced by peer observation and community-based learning

From Table 3, it was evident that farmers' decision-making process towards climate resilient practices in cotton followed a logical and systematic approach rather than a random process. Their movement across stages, including instances of skipping or repetition, reflected flexibility shaped by peer learning and field experience. Farmers preferred practices that suited their existing systems, required limited resources and provided visible benefits. Overall, the process functioned as a continuous learning cycle, enhancing effective and sustained adoption of climate resilient practices in cotton.

Conclusion

The study revealed that farmers' decision-making towards climate resilient practices in cotton was predominantly rational yet flexible, reflecting adjustments to varying field conditions and experiential learning. All respondents were aware of production related problems which formed the base for informed decisions. Only a few systematically passed through all six stages of the rational model while many showed non-linear behaviour by skipping stages or directly implementing known practices based on experience and peer influence.

Peer learning, field observation and practical experience were major factors guiding decisions and often supported formal extension advice. Farmers preferred practices that were cost effective, resource efficient and suitable for their existing systems. The overall process reflected a cycle of

learning and adaptation where reflection and evaluation strengthened sustained behavioural change. Strengthening farmer decision making through participatory extension programs local demonstrations and regular feedback can further improve farmers' rational and adaptive capacity to adopt and sustain climate resilient practices in cotton.

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