



# International Journal of Agriculture and Food Science

ISSN Print: 2664-844X

ISSN Online: 2664-8458

NAAS Rating (2026): 4.97

IJAFA 2026; 8(9): 1027-1031

[www.agriculturaljournals.com](http://www.agriculturaljournals.com)

Received: 11-06-2026

Accepted: 04-08-2026

Published: 30-09-2026

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# Risk management behaviour of grape growers in Sangli district of Maharashtra: practices, associated factors and constraints

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DOI: <https://www.doi.org/10.33545/2664844X.2026.v8.i9n.1983>

## ABSTRACT

Grape cultivation is associated with several production, climatic, technological and marketing risks. Effective risk management is therefore essential for maintaining productivity and farm income. The present study was undertaken to assess the risk-management behaviour of grape growers, identify the relationship between selected characteristics and risk-management behaviour, and document the major constraints faced by growers in managing risks. The study was conducted among 140 grape growers in Sangli district of Maharashtra. Primary data were collected through a structured interview schedule and analysed using frequency, percentage and correlation coefficients. The results revealed that 84.29 per cent of grape growers had an average level of risk-management behaviour, 10.00 per cent had poor behaviour, 4.29 per cent had good behaviour and 1.42 per cent had excellent behaviour. Among the individual risk-management practices, well-drained soil selection (72.85%), selection of soil pH up to 7.5 (65.71%), purchase of planting material from government-approved nurseries (70.00%), support-by-stick training system (84.28%), Y-system training (70.00%), fully automated nutrient management (65.71%) and direct farm marketing (74.28%) were reported as adopted by substantial proportions of growers. Crop insurance coverage was adopted by 47.85 per cent, while crop-cover technologies were adopted by 40.71 per cent. Correlation analysis revealed positive and significant relationships between education, annual income, mass media exposure, social participation, extension contact, scientific orientation and risk orientation with risk-management behaviour. Age, experience and land holding were not significantly associated with risk-management behaviour. Major constraints included lack of information regarding weather forecasts (95.71%), maximum initial investment (91.42%), losses due to natural calamities (87.85%), unavailability of skilled labour (82.85%), exploitation by middlemen and wholesalers (82.14%), fluctuations in market prices (80.00%), lack of knowledge about exports (77.85%), delayed cash payments (72.85%) and lack of knowledge regarding banned chemical molecules (70.00%). The study indicates the need for strengthening weather information services, financial support, labour availability, market information and training related to risk-management practices.

**Keywords:** Risk management, Grape growers, Constraints, Weather information, Marketing, Crop insurance, Sangli

## 1. Introduction

Agricultural production is inherently exposed to uncertainty arising from weather variability, pest and disease outbreaks, input costs, labour availability and market fluctuations. These risks can be particularly important in commercial horticultural crops such as grapes, where production requires substantial investment and careful management throughout the crop cycle. Risk management involves the adoption of practices that reduce the probability or impact of adverse events and improve farmers' ability to cope with uncertainty. In grape cultivation, risk-management measures may include appropriate soil selection, improved planting material, suitable training systems, timely pruning, nutrient management, pest and disease management, post-harvest diversification, marketing arrangements, crop insurance and protective technologies. The effectiveness of these practices may vary according to growers' socioeconomic and psychological characteristics. Education, income, access to information, extension contact, scientific orientation and risk orientation can potentially influence farmers' decisions concerning risk management. Despite the importance of grape cultivation in Sangli district, growers face several constraints related to weather information, investment requirements, labour, markets, exports and natural calamities. Understanding the risk-management behaviour of growers and the constraints they face is therefore important for developing appropriate extension and institutional interventions.

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## 2. Objectives

The study was undertaken with the following objectives:

1. To assess the risk-management behaviour of grape growers.
2. To determine the relationship between selected characteristics of grape growers and their risk-management behaviour.
3. To identify the major constraints faced by grape growers in risk management.
4. To document suggestions for improving risk management in grape cultivation.

## 3. Materials and methods

### 3.1 Study area and sample

The investigation was conducted among 140 grape growers in Sangli district of Maharashtra.

### 3.2 Data collection

Primary data were collected through personal interviews using a structured interview schedule. Information was collected regarding risk-management practices adopted by the respondents, selected personal and socioeconomic characteristics, and constraints experienced in grape production and marketing.

### 3.3 Risk-management behaviour

Risk-management behaviour was assessed using a set of practices covering: Soil type and soil pH, Selection of improved varieties, Training systems, Pruning, Nutrient management, Growth regulator application, Pest and disease management, Post-harvest management, Marketing and Natural calamity management. Accordingly respondents were classified into very poor, poor, average, good and excellent categories according to their risk-management behaviour scores.

### 3.4 Statistical analysis

Frequency and percentage were used to describe adoption of individual practices and distribution of respondents. Correlation coefficients were calculated to determine the relationship between selected independent variables and risk-management behaviour.

## 4. Results and discussion

### 4.1 Overall risk-management behaviour

The distribution of grape growers according to risk-management behaviour revealed that the largest proportion (84.29 %) belonged to the average category. About 10.00 per cent had poor risk-management behaviour, whereas 4.29 per cent had good and 1.42 per cent had excellent risk-management behaviour. None of the respondents fell into the very poor category. The results indicate that although most grape growers practised several risk-management measures, only a small proportion achieved higher overall risk-management scores.

**Table 1.** Distribution of the grape growers about risk management behaviour

| Sr.no | Category                 | Frequency | Percentage |
|-------|--------------------------|-----------|------------|
| 1.    | Very Poor (Up to 05)     | 0         | 0.00       |
| 2.    | Poor (06 to 10)          | 14        | 10         |
| 3.    | Average (11 to 20)       | 118       | 84.29      |
| 4.    | Good (21 to 25)          | 06        | 4.29       |
| 5.    | Excellent (26 and above) | 02        | 1.42       |
| Total |                          | 140       | 100.00     |

### 4.2 Adoption of soil and planting-material management practices

Among soil-related practices, 72.85 per cent of respondents adopted well-drained soil, while 65.71 per cent followed soil pH up to 7.5. With respect to planting material, 70.00 per cent purchased planting material from government-approved nurseries. Planting material obtained from relatives or friends was adopted by 53.57 per cent. These findings suggest that growers placed considerable emphasis on basic soil suitability and quality planting material, although reliance on informal sources of planting material remained substantial.

### 4.3 Training systems

The support-by-stick system was adopted by 84.28 per cent of respondents. The Y-system was adopted by 70.00 per cent and the bower system by 58.57 per cent. The T-system was adopted by 36.42 per cent. The variation in adoption across training systems indicates differences in production practices and growers' preferences for vineyard management systems.

### 4.4 Pruning management

Early April pruning was adopted by 50.71 per cent of growers and late April pruning by 54.28 per cent. Early October pruning was adopted by 49.28 per cent, while late October pruning was adopted by 32.14 per cent. The relatively divided adoption pattern suggests that pruning schedules varied among growers, potentially reflecting differences in local production conditions and management practices.

### 4.5 Nutrient and growth-regulator management

Fully automated nutrient management was reported by 65.71 per cent of respondents, whereas traditional nutrient management was adopted by 30.71 per cent and semi-automated nutrient management by 24.28 per cent. Manual application of growth regulators was adopted by 57.85 per cent of grape growers, compared with 38.57 per cent who used machine application.

### 4.6 Pest and disease management

The use of pesticides and fungicides from branded companies was reported by 32.14 per cent of growers. Nearly half (49.28 %) reported using cheaper pesticides and fungicides available in the market, while 36.42 per cent reported using pesticides and fungicides according to consultancy-agency advice. The findings indicate scope for strengthening scientific guidance concerning pesticide and fungicide selection and application.

### 4.7 Post-harvest management and marketing

Only 15.00 per cent of growers reported adoption of fresh grape marketing as the specified post-harvest strategy, while 44.28 per cent adopted raisin making and 16.42 per cent had industrial links for grapes. Direct farm marketing was adopted by 74.28 per cent of respondents, while only 6.42 per cent reported marketing through the local market/APMC. Export through agencies was reported by 46.42 per cent.

The results demonstrate the importance of direct marketing and value addition as components of growers' risk-management strategies.

**4.8 Management of natural calamities**

Crop insurance coverage was adopted by 47.85 per cent of respondents, while 40.71 per cent adopted crop-cover technologies.

Thus, fewer than half of the respondents had adopted the specified insurance or crop-cover measures, indicating an area requiring further

attention in risk-management programmes.

**Table 2.** Statement wise distribution of Grape growers about risk management behaviour

| Sr. No.                              | Statement                                                      | Adopted        | Not Adopted    |
|--------------------------------------|----------------------------------------------------------------|----------------|----------------|
| <b>Soil type and Soil pH</b>         |                                                                |                |                |
| 1                                    | Fertile                                                        | 41<br>(29.28)  | 99<br>(70.71)  |
| 2                                    | Well Drained Soil                                              | 102<br>(72.85) | 38<br>(27.14)  |
| 3                                    | Soil pH up to 7.5                                              | 92<br>(65.71)  | 48<br>(34.28)  |
| <b>Selection of Improved Variety</b> |                                                                |                |                |
| 1                                    | Purchase of planting material from government approved nursery | 98<br>(70.00)  | 42<br>(30.00)  |
| 2                                    | Planting material from relative/ friend                        | 75<br>(53.57)  | 65<br>(46.42)  |
| 3                                    | Planting material produced on their own farm                   | 65<br>(46.42)  | 58<br>(41.42)  |
| <b>Proper training system</b>        |                                                                |                |                |
| 1                                    | Support by sticks                                              | 118<br>(84.28) | 22<br>(15.71)  |
| 2                                    | Bower system                                                   | 82<br>(58.57)  | 58<br>(41.42)  |
| 3                                    | Y System                                                       | 92<br>(70.00)  | 48<br>(30.00)  |
| 4                                    | T System                                                       | 51<br>(36.42)  | 89<br>(63.57)  |
| <b>Pruning in Grapes</b>             |                                                                |                |                |
| 1                                    | Early April Pruning                                            | 71<br>(50.71)  | 69<br>(49.28)  |
| 2                                    | Late April Pruning                                             | 64<br>(45.71)  | 76<br>(54.28)  |
| 3                                    | Early October Pruning                                          | 69<br>(49.28)  | 71<br>(50.71)  |
| 4                                    | Late October Pruning                                           | 45<br>(32.14)  | 95<br>(67.85)  |
| <b>Nutrient Management</b>           |                                                                |                |                |
| 1                                    | Traditional Method                                             | 43<br>(30.71)  | 97<br>(69.28)  |
| 2                                    | Semi-automated nutrient management                             | 34<br>(24.28)  | 106<br>(75.71) |
| 3                                    | Fully-automated nutrient management                            | 92<br>(65.71)  | 48<br>(34.28)  |
| <b>Use of growth regulator</b>       |                                                                |                |                |
| 1                                    | Manual application                                             | 81<br>(57.85)  | 59<br>(42.14)  |
| 2                                    | Machine application                                            | 54<br>(38.57)  | 86<br>(61.42)  |
| <b>Pest and Disease Management</b>   |                                                                |                |                |

(continued on next page)

| Sr. No.                        | Statement                                                      | Adopted        | Not Adopted    |
|--------------------------------|----------------------------------------------------------------|----------------|----------------|
| 1                              | Use of pesticide and fungicide from branded companies          | 45<br>(32.14)  | 95<br>(67.85)  |
| 2                              | Use of pesticide and fungicide which are cheaper in market     | 69<br>(49.28)  | 71<br>(50.71)  |
| 3                              | Use of pesticide and fungicide according to consultancy agency | 51<br>(36.42)  | 89<br>(63.57)  |
| <b>Post harvest management</b> |                                                                |                |                |
| 1                              | Fresh grape marketing                                          | 21<br>(15.00)  | 119<br>(85.00) |
| 2                              | Raisin making                                                  | 62<br>(44.28)  | 78<br>(55.71)  |
| 3                              | Industrial link of grapes                                      | 23<br>(16.42)  | 117<br>(83.57) |
| <b>Marketing</b>               |                                                                |                |                |
| 1                              | Direct farm marketing                                          | 104<br>(74.28) | 36<br>(25.71)  |
| 2                              | Local market / APMC                                            | 09<br>(06.42)  | 131<br>(93.57) |
| 3                              | Export through agencies                                        | 65<br>(46.42)  | 75<br>(53.57)  |
| <b>Natural calamity</b>        |                                                                |                |                |
| 1                              | Crop insurance coverage                                        | 67<br>(47.85)  | 73<br>(52.14)  |
| 2                              | Crop cover technologies                                        | 57<br>(40.71)  | 83<br>(59.28)  |

#### 4.9 Relationship between selected characteristics and risk-management behaviour

**Table 5.** Relationship between independent variable and risk management behaviour

| Sr. No. | Independent Variables           | Correlation coefficient (r) |
|---------|---------------------------------|-----------------------------|
| 1.      | Age                             | 0.148 <sup>NS</sup>         |
| 2.      | Education                       | 0.267*                      |
| 3.      | Experience in grape cultivation | 0.112 <sup>NS</sup>         |
| 4.      | Land holding                    | 0.158 <sup>NS</sup>         |
| 5.      | Annual income                   | 0.298**                     |
| 6.      | Mass media exposure             | 0.275**                     |
| 7.      | Social participation            | 0.240*                      |
| 8.      | Extension contact               | 0.243*                      |
| 9.      | Scientific orientation          | 0.187*                      |
| 10.     | Risk orientation                | 0.210*                      |

\*0.05 per cent level of significance \*\*0.01 per cent level of significance  
NS Non-significant

The findings indicated that education was positively and significantly related to risk-management behaviour. Annual income and mass media exposure showed positive and highly significant relationships. Social participation, extension contact, scientific orientation and risk orientation also showed positive and significant relationships with risk-management behaviour. In contrast, age, experience in grape cultivation and land holding did not show significant relationships. These results suggest that access to resources and information, along with communication and psychological characteristics, may be associated with greater risk-management behaviour among grape growers. However, the correlation coefficients alone do not establish causal relationships.

#### 4.10 Major constraints faced by grape growers

Table 4 revealed the constraints expressed by respondents. Lack of information regarding weather forecast (95.71), Loss because of natural calamities (87.85), maximum initial investment (91.42), Lack of knowledge about exports (77.85), Exploitation by middlemen and whole sellers (82.14), Up down in market price (80.00), Unavailability of skilled labour (82.85), Lack of knowledge about banned chemical molecule (70.00), Late in cash payment (72.85) etc.

**Table 4.** Constraints faced by the grape growers

| Sr. No. | Constraints                                      | Respondents (n = 140) |            |
|---------|--------------------------------------------------|-----------------------|------------|
|         |                                                  | Frequency             | Percentage |
| 1       | Lack of info. regarding weather                  | 134                   | 95.71      |
| 2       | Loss because of natural calamities               | 123                   | 87.85      |
| 3       | Maximum initial investment                       | 128                   | 91.42      |
| 4       | Lack of knowledge about exports                  | 109                   | 77.85      |
| 5       | Exploitation by middlemen and whole sellers      | 115                   | 82.14      |
| 6       | Up down in market price                          | 112                   | 80.00      |
| 7       | Unavailability of skilled labour                 | 116                   | 82.85      |
| 8       | Lack of knowledge about banned chemical molecule | 98                    | 70.00      |
| 9       | Late in cash payment                             | 102                   | 72.85      |

The major constraints reported by grape growers included: The highest reported constraint was lack of information regarding weather forecasts. The high proportion of respondents reporting this constraint indicates the importance of timely and locally relevant weather information for vineyard management. High initial investment was another major constraint, followed by losses caused by natural calamities. Labour availability and marketing-related problems were also prominent.

The results demonstrate that risk management in grape cultivation extends beyond field-level production practices. Financial, climatic, labour and market-related factors are also important components of the risk environment faced by growers.

## 5. Conclusion

The study showed that the majority of grape growers had an average level of risk-management behaviour. Several recommended or risk-reducing practices were adopted by substantial proportions of respondents, particularly appropriate training systems, soil management, improved planting material and direct farm marketing.

However, adoption of crop insurance and crop-cover technologies remained below 50 per cent. Major constraints included inadequate weather information, high initial investment, natural calamities, shortage of skilled labour, market-price fluctuations, middlemen-related problems, inadequate export knowledge and delayed payments.

Education, annual income, mass media exposure, social participation, extension contact, scientific orientation and risk orientation were positively associated with risk-management behaviour. Strengthening these dimensions through targeted extension and institutional interventions could support growers in managing production and market-related risks.

## 6. Recommendations

Based on the findings, the following measures are suggested:

1. Strengthen weather information services and provide timely, location-specific weather forecasts to grape growers.
2. Promote crop insurance through awareness campaigns, demonstrations and simplified information on eligibility and claim procedures.
3. Improve access to institutional credit and financial support because high initial investment was one of the major constraints.
4. Organize skill-development programmes to address the shortage of skilled agricultural labour.

5. Strengthen market information systems to help growers respond to price fluctuations.
6. Provide training on export procedures and quality requirements to interested grape growers.
7. Promote scientific pest and disease management through extension agencies and trained experts.
8. Encourage farmer groups and collective marketing to improve bargaining capacity and access to markets.
9. Increase awareness about protective technologies for reducing losses associated with adverse weather.
10. Strengthen extension contact and mass-media-based agricultural communication for timely dissemination of risk-management information.

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**How to cite this article:** Deshmukh B, Mandale A, Sadaphal S, Shinde S, Kharde P. Risk management behaviour of grape growers in Sangli district of Maharashtra: practices, associated factors and constraints. *International Journal of Agriculture and Food Science*. 2026;8(9):1027-1031. doi: <https://www.doi.org/10.3354/5/2664844X.2026.v8.i9n.1983>