

RESEARCH NOTE

A Study of Adoption of Improved Grape Production Technology Followed by Grape Growers

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ABSTRACT

The present investigation was undertaken in Sangli district where grape is major fruit crop. From the district 120 grape growers were selected from the core area of the district with the purposive selection. After data collection and analysis of one hundred twenty samples it is revealed that cent per cent had complete adoption of recommended practices were observed in primary tillage operation, methods of training, time of pruning, use of micronutrient, only a few components were found to be less than cent per cent of completely adoption of improved production technology such as soil type, P^H of soil, Tas-A-Ganesh variety, recommended rootstock, size of pit, methods of planting, management of pruned leaves and branches, chemicals used for sprouting of new eye buds, recommended dose of fertilizer, NPK Should applied in split doses, right time for Irrigation, right time for girdling, benefits from girdling, disease management- powdery mildew, downy mildew, right time of harvesting and selling of their produce. Majority of farmers had partial adoption of such practices as adoption of plant protection management of thripes, mealy bug, mites, anthracnose, byproducts made from grapes, and export of grapes. However, majority of farmers did not adopt such practices as sonaka variety, manik chaman variety, recommended control measures for physiological disorders maximum permissible limits of chemicals. In all medium level adoption was observed in majority of grape growers (63.33%).

Keywords: *Adoption; Grape Growers; Grape Production Technology;*

The cultivation of grape is one of the most important fruit crops of Maharashtra state. Grape (*Vitis vinifera* L.) is a temperate fruit crop and also cultivated under tropical and subtropical regions in the world. In India it is cultivated under temperate, subtropical and tropical climates. Grape is grown under variety of soil and climatic conditions (Shikhamany, 2001). Maharashtra, Karnataka, Punjab, Andhra Pradesh, Tamil Nadu and Haryana are the major grape growing states in India. India having area under total fruit 62.42 Million Ha. Out of which grape occupied 1.22 Million ha. Area under grape cultivation which producing 32.05 Million tonnes out of total fruit production of India for 2014-2015 is 862.83 Million tonnes. (Anonymous, 2015). Maharashtra is the leading grape producing state. The area in Maharashtra under various fruit crops during 2014-15 was estimated to be 18.46 lakh ha, out of which

the area under grapes 0.90 lakh ha. (Anonymous, 2016).

At present the cultivation of grape is mostly concentrated in the six districts namely Nasik, Pune, Sangli, Solapur, Satara and Ahmednagar. Kautilya in his 'Arthashastra' written in the fourth century B.C. mentioned the type of land suitable for grape cultivation. The cultivated grapes are believed to have been introduced in to the north India by the Persian invaders in 1300 A.D., from where they were introduced into the South (Daulatabad in Aurangabad district of Maharashtra) during the historic event of changing the capital from Delhi to Daulatabad by King Mohammed-bin-Tughlak. Ibn Batata, a Moorish traveler who visited Daulatabad in 1430 A.D., reported to have flourishing vineyards in South India. From Delhi, Daulatabad, Madurai, Salem it was spread in different parts of the

country. Cultivation of fruit crops plays an important role in the prosperity of nations. This is attributed to the geographical situation with amazing diversity in micro as well as macro climates in different grape growing regions of Maharashtra (Patil *et al.*, 2011). The area under crop has grown rapidly in last two decades; there is continuous addition in grape production technology through the efforts of scientists. In spite of this the production and quality of grapes are far from standard. The efforts to increase grape production have been made by central and state government by starting horticultural development programmes. The subsidy on purchase of fertilizer and plant protection chemical has also been made available to the orchardist. Despite this, the production of grape per hectare in Sangli is still low because of lack of proper resource management and use of the traditional methods of cultivation. So, in order to boost up the production within the available range of resources, farmers need to adopt new techniques of grape cultivation. Therefore, it is understood to know the adoption of recommended management practices of grape by the farmers.

With this study, it comes to know the improved cultivation practices of grape and adoption in between improved practices of grape and its actual adoption by the grape growers. The variation in rate and extent of adoption of improved practices in grape production and reasons thereof, need to be thoroughly understood. The present study aims at analysing the extent of adoption of improved cultivation practices of grape.

METHODOLOGY

The present study was conducted in Sangli district of Maharashtra state. The area where the cultivation of grape is comparatively more was selected for the study. To conduct the research an Ex-post-facto design of social research was used in the present investigation. Tasgaon, Khanapur and Miraj tahsils were purposively selected for the study on the basis of more grape growers. From these three tahsils fifteen villages that is five villages from each tahsil was selected by random sampling method from the villages of maximum grape growers. From the list obtained from Taluka Agriculture Officer, 8 grape growers from each of selected village were selected randomly to constitute the sample of 120 respondents. Keeping in view the objectives of the study, structured interview schedule was designed which

contains questions to collect the data of independent variable and dependent variable in grape cultivation practices followed by the grape growers in adoption of recommended practices of grape cultivation. Interview schedule was suitably modified after pretesting of ten grape growers and data were collected through personal interview of the respondents at their convenient place. The data were tabulated and processed through the primary and secondary tables. Data thus collected was analysed using appropriate statistical tools.

RESULTS AND DISCUSSION

Adoption of Improved Grape production Practices: The practice wise distribution of respondents according to extent of adoption about recommended grape cultivation technology was ascertained and findings with respect to them. Some of the individual practices were adopted in complete or not adopted at all, while among some practices, partial adoption was recorded. The results are presented in Table 1

A critical look at the Table 1 revealed that in case of Land Preparation of Improved grape cultivation practices in which recommended type of soil for grape majority were adopted completely, by 98.33 per cent farmers. About 1.67 per cent of them have adopted partially. In case of PH of soil, majority of the respondents (63.33.00%) were observed under complete level of adoption, followed by 15.00 per cent and 21.67 per cent of the respondents under partial level and no adoption level of improved grape cultivation practices, respectively. About primary tillage, cent per cent of respondents were observed in complete level of adoption. Majority of respondents were taking good care of land preparation in their orchards. These findings were supported by findings of *Dodamani (2014)*.

With regards to recommended Varieties of grape, In case of Tas-A-Ganesh variety, majority (71.60%) of farmers were adopted completely and only 28.33 per cent farmers did not adopt the recommended variety Tas-A-Ganesh in their grape orchards. In case Manik chaman variety, majority (95.00%) of were them not adopted and only 5.00 per cent of farmers adopt completely in their orchard. About Sonaka variety of grape, majority 87.50 per cent of them did not adopt and only 12.50 per cent respondents were complete adoption of Sonaka variety completely in their orchard. No one farmer found in partial adoption of

recommended varieties of Tas-A-Ganesh, Manik Chaman and Sonaka grape varieties respectively.

The adoption about propagation practices of grape, maximum numbers of respondents 65.83 per cent were observed under complete adoption. This was followed by 20.00 per cent of the respondents comes under partial adoption and only 14.17 per cent of them observed under no adoption about propagation. While studying the adoption about size of cuttings in which, maximum 47.50 per cent farmers observed in complete adoption, followed by 30.00 per cent and 22.50 per cent of them in partial and no adoption, respectively.

In case of planting practices, in which as pits size is concerned, more grape growers 72.50 per cent were observed under complete adoption level, followed by 27.50 per cent and no farmers observed under no adoption level it means that all farmers adopted recommended size of pit for their grape orchard either completely and partially. While studying the adoption of planting time of dogridge in which it was observed that, maximum no of respondents (58.33%) were found under complete adoption of planting time of dogridge followed by 25.84 per cent and 15.83 per cent of them under partial and low adoption level, respectively. About adoption of methods of planting of grape in which, majority of respondents (75.83%) were observed in complete adoption of methods of planting followed by 24.17 per cent of respondents observed in partial adoption of methods of planting.

In case of planting distance practices, maximum numbers of respondents were (62.50%) adopted the recommended planting distance in grape, whereas 25.83 per cent and 11.67 per cent of respondents were observed under partial and no adoption level, respectively.

In case of training practices, after harvesting season, farmers adopt the practice of training and pruning. Methods of trainings are to be used to support grape vines in which cent per cent of respondents were found to adopt this improved practice in their grape orchards. About training systems in grape crop in which, more than two third respondents (69.17%) were observed to adopt completely the recommended trainings systems, whereas 19.17 per cent and 11.66 per cent of respondents adopt partially and no adoption of this practice, respectively. These findings were supported by findings of *Dodamani (2014)*.

In case of pruning practices, After harvesting season, farmers adopt the practice of pruning, as suitable time for pruning in grape crop practice was concerned that Cent per cent of respondents adopt this practice completely means all farmers aware about this practice. While studying the Management of pruned leaves and branches after April & Oct. pruning practice, majority of respondents (87.50%) were found to adopt completely the recommended time for pruning which followed by 12.50 per cent respondents were partially adopt. In case of chemicals used for sprouting of new eye buds practice in which, majority of respondents (80.00%) were revealed to adopt completely followed by 18.33 per cent were revealed to adopt partially. Negligible respondents (1.67%) were under no adoption at all, respectively. About Management of grape vines practice in which, maximum numbers of respondents (58.33%) were conclude to adopt this practice completely, followed by 31.67 per cent and 10.0 per cent of respondents were partially and not adoption of this practice, respectively. These findings were supported by findings of *Dodamani (2014)*.

In case of manures & fertilizer, about recommended dose of fertilizer in which, majority of respondents (83.34%) were found to adopt completely whereas 10.83 per cent and 0.83 per cent respondents were adopt partially and did not adopt recommended dose of fertilizer in their grape orchard, respectively. Only (47.50%) of farmers were completely adopt recommended dose of manures, followed by 30.00 per cent of farmers did not apply manures while 22.50 per cent of farmers apply manures partially in their grape orchard. Depending on the availability of manures and fertilizers, rainfall, irrigation water and labour, farmers were found to apply manures and fertilizers at varying times. In case of recommended NPK Should applied in split doses in which, majority of respondents (88.33%) were found to adopt completely, followed by 30.00 per cent of farmers adopt partially in their grape orchard while 22.50 per cent of farmers did not apply NPK as per recommended spite doses in their grape orchards. About use of micronutrient, Cent per cent of farmers were observed to applied micronutrients completely in their grape orchards.

In case of adoption of improved irrigation practices, about irrigation methods only 48.33 per cent of farmers were adopting best practices of irrigation methods

completely. While 41.67 per cent were adopting best practices of irrigation method only partially. However, 10.00 per cent of them did not adopt improved practices of irrigation in their grape orchards. In case of right time of irrigation, majority of farmers 75.83 per cent were completely adoption of improved practices of irrigation time in their grape orchards. Followed by 15.84 per cent of them did not adopt the recommended irrigation time due to non-availability of water at right time. However, 8.33 per cent of them found to adopt partially of improved practices of irrigation in their grape orchards. These findings were supported by findings of *Dodamani (2014)*.

In case of weed control, complete level of the adoption observed in weed control method used for weed eradication by the 61.67 per cent of the respondents. This was followed by the 32.00 respondents and only 5.83 per cent of them were observed in partially and no adoption, respectively.

In grape, use of plant growth regulators are recommended for getting bigger berries and uniform ripening of grapes, and for controlling grape malformation. In case of growth regulators, complete level of the adoption observed in use of recommended growth regulators for dipping or spraying by the 62.50 per cent of the respondents. This was followed by the 21.67 respondents and only 15.83 per cent of them were observed in partially and no adoption of use of recommended growth regulators for dipping or spraying, respectively. While, studying adoption of about practices of use of growth regulators at recommended concentration and stages of grape crop, maximum numbers of the respondents (42.50%) were observed under completely adoption of this practices followed by 35.00 per cent of them under partial level of adoption and minimum numbers (22.50%) farmers of them did not adoption of use of growth regulators at recommended concentrations and stages of grape crop, respectively.

In case of adoption of girdling practices, complete level of the adoption observed in right time for girdling practices by near about two third 63.33 per cent of the respondents. This was followed by the 25.83 per cent and only 10.83 per cent of them were observed in partially and no adoption of right time for girdling practices in their grape orchard, respectively. While, studying adoption of about practices of benefits from girdling,

maximum 64.17 per cent of farmers were completely adopting the practices of benefits from girdling. While 20.00 per cent were adopting practices of benefits from girdling only partially. However, 15.83 per cent of them did not adopt improved practices of benefits from girdling in their grape orchards.

In case adoption of thinning practices, complete level of the adoption observed in thinning practices for maintain plant population by maximum numbers of the respondents 44.17 per cent of the respondents. This was followed by about one third 33.33 per cent and only 10.83 per cent of them were observed in partially and no adoption of thinning practices in their grape orchard, respectively.

In case of plant protection practices, about adoption of practices for insect pest management in which, as thripes, maximum numbers of respondents (44.17%) were adoption of recommended chemicals for their controls followed by 43.33 per cent and 12.50 per cent of respondent were partially adoption of recommended chemicals for control of thripes. While, studying adoption of recommended chemicals for the controls of mealy bugs, one half of respondents (50.00%) were partially adoption of recommended chemicals for the controls of mealy bugs. Followed by near about one third 30.00 per cent of them found to completely adoption of recommended chemicals. However, one fifth 20.00 per cent of them did not adopt the recommended chemicals for the controls of mealy bugs in their grape orchards. Only (49.17%) of farmers were partially adopt recommended chemicals for the controls of mites in their grape orchards, followed by 27.50 per cent of farmers adopt completely recommended chemicals. while 23.33 per cent of farmers did not adopt recommended chemicals for the controls of mites in their grape orchards. In case of adoption of apply recommended chemicals for the controls of beetles in their grape orchards, partial level of the adoption observed in applying recommended chemicals for controls of beetles by near about two fifth 37.50 per cent of the respondents. This was followed by the 34.17 per cent of them apply partial adoption and minimum percentage of 28.33 per cent of them did not adopt recommended chemicals for the controls of beetles in their grape orchards, respectively.

In case of adoption of disease management, With regards to recommended chemical for control of

powdery mildew disease of grape, in which it was observed that, majority of the respondents (81.67%) were found to completely adoption of recommended chemicals for control of powdery mildew followed by 18.00 per cent of them were adopt partially. In case of downy mildew disease of grape, in which it was observed that, large majority of the respondents (98.33%) were found to completely adoption of recommended chemicals for control of downy mildew followed by Very less number of the respondents (1.67%) were partially adoption of recommended chemicals for control of downy mildew in their grape orchard. In case of anthracnose disease of grape, in which it was observed that, maximum numbers of the respondents (63.34%) were found to completely adoption of recommended chemicals for control of anthracnose followed by one third of respondents 33.33 per cent of them were adopt partially for control of anthracnose. Very less number of the respondents (3.33%) of them did not adopt recommended chemicals for control of anthracnose disease in their grape orchards

with regards to the practice of harvesting i.e. appropriate stage of harvesting, maximum number of respondents (72.50%) comes under completely level of adoption followed by only 15.83 per cent of the respondents comes under partial level of adoption and only 11.67 per cent of them did not adopt recommended right time of harvesting in their grape orchard, respectively.

In case of post harvest management, about adoption of by-products made from grapes, complete level of the adoption observed by the 56.67 per cent of the respondents. This was followed by the 43.33 per cent respondents of them were found in partially adoption of by-products made from grapes, respectively. In case of adoption of use of cold storage facilities for their grapes, only near about one fifth of respondents (19.17%) were completely adoption of the use of cold storage facilities for their grapes. While 15.00 per cent were adoption of partially use of cold storage facilities for grapes. However, maximum numbers of respondents (65.83%) of them did not adopt the use of cold storage facilities for their grapes, respectively.

In case of physiological disorders, Grape crops suffer from a series of physiological disorders like Sterility, Mummification, Short berries, pink berries Specific control measures are recommended to control

these physiological disorders. But only 35.83 per cent of orchards were adopting recommended control measures for these physiological disorders in their grape orchards.

In case of marketing, about adoption of size of grapes demands by consumer, nearly maximum numbers of the respondents (62.50%) were observed in complete level of adoption, followed by 21.67 per cent of them were in partially adoption and only 15.83 per cent respondents comes under no adoption level for marketing. In case of adoption of export of grapes, maximum numbers of respondents (45.00%) were partially adoption of exports their grapes followed by near about one third of respondents (29.17%) of them did not adoption of export of grapes of their some part of produce and only 25.83 per cent of them completely adoption of export of grapes of their some part of their total produce. In case of adoption of practices of checking the maximum permissible limits of chemicals, in which it is observed that, maximum numbers of respondents (43.33%) were did not adoption of checking the maximum permissible limits of chemicals by the grape orchardist. Followed by 35.00 per cent them completely adoption of checking the maximum permissible limits of chemicals and minimum percentage of 21.67 per cent of them adopt partially of checking the maximum permissible limits of chemicals before applying on grape orchards, respectively.

In case of adoption of marketing management, With regards to selling of their produce, in which it was observed that, majority of the respondents (87.50%) were found to completely adoption of selling of their produce followed by 7.50 per cent and 5.00 per cent of respondents were observed in partial and no adoption of selling of their produce either retailer of bulk, respectively. While, studying adoption of about Selling of their total produce through intermediaries, maximum numbers of the respondents (50.83%) were observed under completely adoption of this practices followed by 25.84 per cent farmers of them did not adoption of Selling of their produce through intermediaries and minimum percentage (25.84%) farmers of them partially adoption of Selling of their produce through intermediaries, respectively.

The data given in below Table 2 indicates that higher proportion (63.33%) of the respondents had medium level of adoption about scientific grape cultivation

Table 1. Distribution of the respondents according to their practice wise adoption in grape

Cultivation Practices	Complete Adoption		Partial Adoption		No Adoption	
	No.	%	No.	%	No.	%
Land Preparation:						
Soil type	118	98.33	2	1.67	-	-
P ^H of soil – (6.1-7.5)	76	63.33	18	15.00	26	21.67
Primary tillage- (2 Ploughing and 2-3 Harrowing.)	120	100	-	-	-	-
Varieties:						
Tas-A-Ganesh	86	71.60	-	-	34	28.33
Manik Chaman	6	5.00	-	-	114	95.00
Sonaka	15	12.50	-	-	105	87.50
Propagation :						
Propagation method generally used in this area- (Dogridge rootstock etc.)	79	65.83	24	20.00	17	14.17
Size of cuttings – (15 to 20 cm)	57	47.50	36	30.00	27	22.50
Planting:						
Recommended size of pit- 0.60 x 0.60 x 0.60 m	87	72.50	33	27.50	-	-
Recommended planting time of Dogridge – (Dec-Jan)	70	58.33	31	25.84	19	15.83
Methods of planting recommended for grape crop - Rooted cuttings (Dogridge), Own roots planting.	91	75.83	29	24.17	-	-
Spacing:						
Recommended spacing for grape crop – 3 x 1.5 m	75	62.50	31	25.83	14	11.67
Training:						
Methods of trainings used to support grape vines- (T method, Overhead method, Mandup method)	120	100	-	-	-	-
Follow recommended training systems in grape crop - (Head, V, Telephone, Expanded Y & Gable systems)	83	69.17	23	19.17	14	11.66
Pruning:						
Suitable time for pruning in grape crop - April and Oct. pruning	120	100	-	-	-	-
Manage pruned leaves and branches after April & Oct. pruning	105	87.50	15	12.50	-	-
Chemicals is used for sprouting of new eye buds - (Ethrel, Thiourea and mixture of bordo paste & thiourea)	96	80.00	22	18.33	2	1.67
Management of grape vine No. of canes/vine and leaves/cane	70	58.33	38	31.67	12	10.00
Manures & Fertilizers						
Whether you follow recommended dose of fertilizer	106	83.34	13	10.83	1	0.83
Manures: 22.50 kg/vine	57	47.50	27	22.50	36	30.00
NPK applied in split doses (April, Oct., At berry matured)	106	88.33	13	10.84	1	0.83
Use of micronutrient	120	100	-	-	-	-
Irrigation:						
Irrigation methods - (Drip, Micro and In-line)	58	48.33	50	41.67	12	10.00
Right time for Irrigation	91	75.83	10	8.33	19	15.84
Weed control:						
Methods used for weed control - (Mechanical / chemical /Biological)	74	61.67	39	32.50	7	5.83
Use of growth regulator:						
Growth regulator used for dipping or spraying – (GA, HCN, IAA, IBA, Cycocel etc.)	75	62.50	26	21.67	19	15.83
Use of growth regulators at recommended concentration and stages of grape crop	51	42.50	42	35.00	27	22.50

Girdling:

Right time for Girdling - (when berry attain size of Bajara grains)	76	63.33	31	25.83	13	10.83
Benefits from girdling – Increases viz. fruit setting, berry size, sweetness of berries, attractive color to berries.	77	64.17	24	20.00	19	15.83

Thinning:

Whether you should Follows thinning	53	44.17	40	33.33	27	22.50
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Plant protection:

Pest management:

Thrips: Thiomethoxam or Spinosad or Fipronil	53	44.17	52	43.33	15	12.50
Mealy bug: Verticilium laccani (phule bugeeside)	36	30.00	60	50.00	24	20.00
Mites: Dimethoate or calshane	33	27.50	59	49.17	28	23.33
Beetles: malathion, phosphamidon or methyl dematon	41	34.17	45	37.50	34	28.33

Disease Management:

Powdery mildew: sulpher or Danocap or Penconazole for spraying or bunches dipped in carathen.	98	81.67	22	18.33	-	-
Downy mildew: Metalaxyl-Mancozeb / Cymoczanil-Mancozeb / Finomidon–Mancozeb.	118	98.33	2	1.67	-	-
Anthracoze: i) Remove diseased parts. ii) Spraying after April pruning. iii) Spraying after Oct. pruning.	76	63.34	40	33.33	4	3.33

Harvesting and yield:

Right time of Harvesting - (Feb to March)	82	72.50	19	15.83	14	11.67
Post harvest management:						
Whether byproducts made from grapes (Resins, Juice, Jam, Jelly etc.)	68	56.67	52	43.33	-	-
Use of cold storage facilities for grapes	23	19.17	18	15.00	79	65.83

Physiological disorders:

Follows Recommended control measures for Physiological disorders	43	35.83	25	20.83	52	43.33
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Marketing:

Size of grapes demands in market: (Capsules / Big sized)	75	62.50	26	21.67	19	15.83
Do you export grapes	31	25.83	54	45.00	35	29.17
Whether follows maximum permissible limit of chemicals	42	35.00	26	21.67	52	43.33

Marketing management:

Selling- (Bulky/Retailer)	105	87.50	9	7.50	6	5.00
Selling through intermediatories	61	50.83	28	23.33	31	25.84

Table 2. Distribution of the respondents by their level of adoption (N=120)

Level of adoption (Score)	No.	%
Low (Up to 94)	20	16.67
Medium (95 to 128)	76	63.33
High (129 and above)	24	20.00
Total	120	100.00
Mean: 112.43	S.D.: 16.97	

practices followed by one fifth (20.00%) respondents who were having high level of adoption and few (16.67%) of them were having low level of adoption.

It could be noted that, most of the respondents had medium level of adoption category. These findings are

in line with the findings of *Kharade (2003), Dhakane (2005), Hinge (2009), Garje (2010), Pimpale (2010), Rishikesh (2010), Atar et al. (2012), Gavade (2013) and Kumar et al. (2015).*

CONCLUSION

It is concluded that majority of grape growers were observed in complete level of adoption of about grape cultivation practices. In all medium level adoption was observed in majority of grape growers (63.33%). It may be due to that, the services provided by extension personal or NHM personnel, agro service centres and other private consultancy because grape is the major and popular crop of the area. But it needs to increase the efforts of extension agencies to improve the adoption

of farmers regarding that helps in increasing the adoption in grape cultivation and getting more productivity and ultimately more profit. Majority of the grape growers had cent per cent complete adoption of recommended practices were observed in primary tillage operation, methods of training, time of pruning, use of micronutrient and only a few components were found to be less than cent per cent of improved production technology such as soil type, P^H of soil, Tas-A-Ganesh variety, recommended rootstock, size of pit, methods of planting, management of pruned leaves and branches, chemicals used for sprouting of new eye buds, recommended dose of fertilizer, NPK Should applied in split doses, right time for irrigation, right time for girdling, benefits from girdling, disease management: powdery mildew, downy mildew,

right time of harvesting, selling of their produce. Majority of farmers had partial adoption of such practices as adoption of plant protection management of thripes, mealy bug, mites, anthracnose, byproducts made from grapes, export of grapes. However, majority of farmers did not adopt such practices as Sonaka variety, Manik chaman variety, recommended control measures for physiological disorders maximum permissible limits of chemicals. To promote by agril. department and agril. universities for create awareness about benefits of adoption of new production technology through demonstrations, farmers scientist forum, Shivar-Feri programme. To fosterage the production, productivity and profitability of grape growers which helps to courage the increasing area under grape orchard in future.

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