

## PROFILE ANALYSIS OF RISK MANAGEMENT PRACTICES ADOPTER FARMERS IN DRIP IRRIGATED BANANA CULTIVATION

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### ABSTRACT

*Recognizing the fast decline of irrigation water potential, drip irrigation method is relatively one of the most acceptable method in Indian agriculture. Through nodal agency like GGRCL, Govt. of Gujarat took lots of efforts for initiating drip irrigation system in different horticultural crops and banana is one of them. But, drip irrigated banana cultivation involves different risks. Different aspects pointed out that drip irrigated banana growers should have perfect awareness and knowledge regarding risk management in drip irrigated banana cultivation. Systematic knowledge, planning, and adoption of some of the important risk management practices can help drip irrigated banana growers to find out suitable ways to survive during situations of emergency. The present study analysing the profile of farmers adopting risk management practices in drip irrigated banana cultivation was conducted in Anand district of Central Gujarat. A random sample of 220 drip irrigated banana growers were selected from nine villages of three talukas viz., Anand, Umreth, and Ankalav. The study revealed that majority of banana growers belonged to the middle to old age group, educated up to higher secondary to graduation & above level, six to ten years to less than five years of experience in drip irrigated banana cultivation, nuclear type of family, membership in one organization, had medium to large size of land holding, small to marginal size of land under drip irrigated banana cultivation, dependence on agriculture plus animal husbandry, more than ₹ 4 lakh of annual income, had average to poor level of extension contacts and high to very high level of mass media exposure. In case of psychological traits of respondents scientific orientation, economic motivation, risk orientation, and market orientation was observed in high to very high level. While, the vast majority of them had medium to high level of achievement motivation, very high to high level of innovation proneness and highly positive attitude towards drip irrigated banana cultivation.*

**Keywords:** risk management, drip irrigation, adoption, banana growers

### INTRODUCTION

Banana is one of the oldest fruit known to mankind. Banana is grown throughout the year and is well within the reach of a common man, that's why this fruit is called as "Poor man's apple." It is not only the staple food of millions of people but also the most important commercial fruit crop of the tropical region. Banana is mainly cultivated in 10 major countries. India ranks first in terms of area and production of banana in the world and contributes 20 per cent world's total production. Gujarat is one among the major banana growing states in the country with an estimated area of around 60863 hectares of cultivation, out of this, 16 per cent of the area under banana is under drip irrigation (Anonymous 2009). Banana is widely grown in almost all districts of the state.

The drip irrigated banana growers face many risks from land preparation to harvesting stages of drip irrigated banana cultivation. Factors like weather condition are uncontrollable; at the same time, there are some other factors,

which are more deleterious such as soil born problems, poor irrigation management, poor management of drip irrigation system etc. These are manageable if farmers give proper attention to them to get higher yield through adopting risk management practices. The risk management is the ability of the farmers to adopt certain practices to stand against the risk included by a concentrated period of climate, weather and other man or situation created factors. Systematic knowledge, planning, and adoption of some of the important risk management practices can help drip irrigated banana growers to find out suitable ways to survive during situations of risk. The objective of our study was to analyze the profile of the drip irrigated banana growers in Anand district of Gujarat considering the benefits availed by the adoption of risk management practices in drip irrigated banana cultivation.

### OBJECTIVE

To know the profile analysis of risk management practices adopter farmers in drip irrigated banana cultivation

## METHODOLOGY

The present study was carried out in three talukas viz., Anand, Umreth, and Ankalav of Anand district of Central Gujarat. From the selected three talukas, nine villages viz. Ode, Sarasa, Khambholaj, Thamna, Bharoda, Bhaleja, Ankalav, Bamangaon and Khadol having a maximum number of drip irrigated banana growers were selected. List of talukas along with their total number of drip sets installed in the banana crop was obtained from the Office of the Deputy Director of Horticulture and District Agriculture Officer, Anand. Proportionally, a proper number of drip irrigated banana growers were selected randomly from each selected village. Thus, by multistage sampling technique, a random sample of 220 drip irrigated banana growers was selected for the study. The methodological procedure consisted of dependent and independent variables. The independent variables studied were; age, education, experience in drip irrigated banana cultivation as personal variables; type of family, social participation as social variable; land holding, occupation, area under drip irrigated banana cultivation, annual income as economic variables; extension contact, mass media exposure as communicational variables; scientific orientation, economic motivation, risk orientation, market orientation, achievement motivation, innovation proneness and attitude towards drip irrigated banana cultivation as psychological variables. The scale developed by Patel (2007), Supe (1969), Samantha (1977), Singh (1974), Feaster (1968) was used in the present study to measure psychological variables like scientific orientation and risk orientation, economic motivation, market orientation, achievement motivation, and innovation proneness respectively with due modification. To measure the attitude towards drip irrigated banana cultivation attitude scale was developed, standardized and employed in the study. Among the techniques available, researcher selected 'Scale product method' which combines the Thurstone's technique (1928) of equal appearing interval scale for selection of items and Likert's technique (1932) of summated rating for ascertaining the response on the scale as proposed by Eysenck and Crown (1949). A structured interview schedule was developed in accordance with the objectives of the study and it was translated into Gujarati. The data of this study were

collected through personal interview method. The collected data were classified, tabulated, analyzed and interpreted to make the findings meaningful.

## RESULTS AND DISCUSSION

### Personal characteristics

The personal characteristics of the respondents play a significant role in the adoption of any farm technologies (Khot 2011, Smitha 2013, Mohamad 2014). Some of the following personal variables were selected, analyzed and are presented in Table 1. It is evident from the data presented in Table, one half (50.91 per cent) of the drip irrigated banana growers had middle age, followed by slightly less than one third (31.82 per cent) and slightly less than one fifth (17.27 per cent) of them had old and young age, respectively. Slightly more than one third (34.55 per cent) of the drip irrigated banana growers had higher secondary level of education, followed by 33.64 per cent and 23.64 per cent of them had graduation and above and secondary level of education, while 8.18 per cent of drip irrigated banana growers had primary level of education and none of them was illiterate. The majority (67.73 per cent) of the drip irrigated banana growers had six to ten years of experience in drip irrigated banana cultivation, followed by 30.00 per cent and 2.27 per cent of them had less than five years and above ten years of experience in drip irrigated banana cultivation, respectively. Thus, over whelming (97.73 per cent) of banana growers had between six to ten years to less than five years of experience in banana cultivation. The district Anand was predominant in the cultivation of tobacco, rice and horticultural crops like acid lime. Due to some marketing problems in tobacco and comparatively low income in rice and understanding the possibilities of higher income from per unit of land and suitability of soil, water and suitable weather conditions for the horticultural crop like banana and government as well as GGRC support in the adoption of drip system, the drip irrigated banana has been adopted as remunerative crop by the farmers for last ten years. This might be the reason to have a considerable level of experience in drip irrigated banana cultivation among the majority of banana growers.

**Table 1 : Personal characteristics of drip irrigated banana growers**

**n = 220**

Variables	Categories	Measurement	Number	Percent
Age	Young age group (up to 35 years)	Years	38	17.27
	Middle age group (36 to 50 years)		112	50.91
	Old age group (above 51 years)		70	31.82
Education	Illiterate	Standards	00	00.00
	Primary education		18	08.18
	Secondary education		52	23.64
	Higher Secondary education		76	34.55
	Graduation and above		74	33.64
Experience in drip irrigated banana cultivation	Less than 5 years	Years	66	30.00
	Between 6 to 10 years		149	67.73
	Above 10 years		05	02.27

**Social characteristics**

Social participation brings an individual in close contact with other members of society through social organizations. The data in Table 2 revealed that drip irrigated banana cultivation was preferred by (52.73 per cent) of farmers living in a nuclear family and 47.27 per cent of farmers living in a joint family. The more than two fifth (43.64 per cent) of the drip irrigated banana growers had membership in one organization, followed by 41.82 per cent, 9.09 per cent and 5.45 per cent of them had no membership in

any organization, membership in more than one organization and position holder in any organization, respectively. The result indicates considering high revenue in drip irrigated banana cultivation, it was famous almost equally amongst the farmers living in the nuclear and joint family too. While in case of social participation drip irrigated banana growers might have understood the importance of social organization as an important source of sharing useful information or inputs for farming. This might be the reason for the above findings. The presented results are similar with the findings of Deshmukh et al. (2017) and Damor et al. (2017).

**Table 2 : Social characteristics of drip irrigated banana growers**

**n = 220**

Variables	Categories	Measurement	Number	Per cent
Type of family	Nuclear family	based on close blood relation and common residence	116	52.73
	Joint family		104	47.27
Social participation	No membership	Arbitrary method	92	41.82
	Membership in one organization		96	43.64
	Membership in more than one organization		20	09.09
	Position holder in any organization		12	05.45
	Between 6 to 10 years		149	67.73
	Above 10 years		05	02.27

**Economics characteristics**

In the adoption of any new technology economic characteristics like land holding, occupation and annual income play a vital role (Pandya *et al.* 2013, Singh 2015). In the present study Table 3, stipulate the economic characteristics of the drip irrigated banana growers.

It can be seen from Table 3 that, nearly half (49.55 per cent) of the drip irrigated banana growers had a medium size of land holding, whereas 28.18 per cent, 17.73 per cent and 4.55 per cent of them were with the large, small and marginal size of land holding, respectively. More than half (54.09 per cent) of the drip irrigated banana growers had a small size of land under drip irrigated banana cultivation followed by 23.18 per cent, 19.55 per cent and 3.18 per cent of them had a marginal, medium and large size of land under drip irrigated banana cultivation, respectively. While, more than half (53.64 per cent) of the drip irrigated banana growers were dependent on agriculture and animal husbandry, followed by 33.64 per cent had a dependency on Agriculture + business + service, while 12.72 per cent of them were dependent only on agriculture. The two fifth (40.91 per cent) of the banana growers had

above ₹ 4 lakh of annual income, while 31.82 per cent, 25.45 per cent and 1.82 per cent of them were observed with ₹ 2.01 to ₹ 3 lakh, between ₹ 3.01 to ₹ 4 lakh and between ₹ 1.01 to ₹ 2 lakh of annual income, respectively. Considering high investment, high risk and high-tech work, the drip irrigated banana cultivation might be preferred more by farmers with medium to large size of land holding than the farmers with the small and marginal size of land holding. While in case of the area under drip irrigated banana cultivation considering high investment and risk involved at the initial stage, the farmers might have preferred to install drip irrigation system in banana cultivation in small to the marginal size of land only taking incentives provided by government and Gujarat Green Revolution Company. The involvement of majority of the drip irrigated banana growers in agriculture and other income generating activities like animal husbandry, service or other business as well as remunerative income generated through the production of high quality banana all the way through drip irrigation system might have played role for having considerable income of more than ₹ 3 lakhs amongst majority of the drip irrigated banana growers.

Table 3 : Economic characteristics of drip irrigated banana growers

n = 220

Variables	Categories	Measurement	Number	Per cent
Land Holding	Marginal (Up to 1.00)	Hectares	10	04.55
	Small (1.01 to 2.00)		39	17.73
	Medium (2.01 to 4.00)		109	49.55
	Large (Above 4.00)		62	28.18
Area under drip irrigated banana cultivation	Marginal (Up to 1.00)	Hectares	51	23.18
	Small (1.01 to 2.00)		119	54.09
	Medium (2.01 to 4.00)		43	19.55
	Large (Above 4.00)		07	03.18
Occupation	Only agriculture	Years	28	12.72
	Agriculture + animal husbandry		118	53.64
	Agriculture + business + service		74	33.64
Annual Income	Up to ₹ 1 Lakh	Rupee (in Lakh)	00	00.00
	Between ₹ 1.01 to ₹ 2 Lakh		04	01.82
	Between ₹ 2.01 to ₹ 3 Lakh		70	31.82
	Between ₹ 3.01 to ₹ 4 Lakh		56	25.45
	Above ₹ 4 Lakh		90	40.91

### Communicational characteristics

The communicational characteristics of the respondents play an important role in the adoption of any farm technologies (Surya *et al.* 2010, Vaidya 2011, Dhodia *et al.* 2014 and Vinaya *et al.* 2016). The information seen in Table 4 disclosed that great majority (70.00 per cent) of the drip irrigated banana growers had average extension contacts, followed by 22.73 per cent and 7.27 per cent of them had poor and good extension contacts, respectively. It was surprising to note that none of the drip irrigated banana growers had excellent extension contacts. The systematic understanding created by the installer of drip irrigation system at the initial instalment stage and adoption of drip irrigated banana by well experienced innovative farmers with complete understanding of drip irrigation system as well as lack of satisfactory expertise amongst the extension personnel to give advice about drip irrigation system in banana cultivation experienced by the drip irrigated banana growers might be the probable reason to have average level of extension contacts amongst the majority of the drip irrigated banana growers. High to very

high level of mass media exposure amongst the majority of them might have satisfied them in getting useful information regarding drip irrigated banana cultivation, which could be one more reason to restrict them up to the average level of contacts with the extension personnel. Slightly less than three fifth (59.09 per cent) of the banana growers had a high level of mass media exposure, followed by 24.55 of them were with very high level of mass media exposure while, 13.64 per cent and 2.73 per cent of them were with the medium and low level of mass media exposure, respectively. The awareness about the significance of agricultural mass media in increasing useful agricultural information among majority of the drip irrigated banana growers, as well as positive impact demonstrated by media through eye-catching ways of presentation of messages with the great support of Gujarat Green Revolution Company as an implementing agency for drip system across the state in popularizing drip irrigation systems in many crops, might have played role for having excellent level of mass media exposure.

Table 4 : Communicational characteristics of drip irrigated banana growers

n = 220

Variables	Categories	Measurement	Number	Per cent
Extension contacts	Poor (up to 6)	Arbitrary method	50	22.73
	Average (07 to 12)		154	70.00
	Good (13 to 18)		16	07.27
	Excellent (above 18)		00	00.00
Mass media exposure	Very low (up to 3.8)	Arbitrary method	00	00.00
	Low (3.9 to 7.6)		06	02.73
	Medium (7.7 to 11.4)		30	13.64
	High (11.5 to 15.2)		130	59.09
	Very high (above 15.2)		54	24.55

**Psychological characteristics**

For the adoption of any innovation or technology psychological characteristics like scientific orientation, economic motivation, risk orientation, market orientation, achievement motivation, innovation proneness, and attitude play an important role (Borate 2015).

The distributional analysis pertaining to psychological characteristics of the banana growers mentioned in Table 5 indicates that slightly more than half (54.55 per cent) of the drip irrigated banana growers had above medium level of scientific orientation, followed by 44.09 per cent were with very high level of scientific orientation and 1.36 per cent were with average level of scientific orientation. The drip irrigated banana cultivation is such an exercise, where a person needs to adopt modern methods of cultivation, it is natural that farmers with highly favourable mentality towards scientific methods only will try to get involved more in it; this might be the reason for having an outstanding level of scientific orientation. Slightly less than half (49.09 per cent) of the banana growers had a high level of economic motivation, followed by 35.00 per cent of them were with very high and 15.91 per cent were with the medium level of economic motivation. The high degree of interest, favourable attitude, and risk bearing capacity for the adoption of drip irrigation system in banana might have motivated the farmers towards high economic motivation. The vast majority (80.91 per cent) of the drip irrigated banana growers had a high level of risk orientation, followed by 12.27 per cent and 6.82 per cent of them were with very high and medium level of risk orientation, respectively. The consideration of the advantages of the application of drip irrigation in getting a higher economic gain in banana cultivation as well as the help rendered by GGRC in terms of timely technical guidance and support might have helped them able to stand strongly

to handle calculated risk. The majority (62.73 per cent) of the drip irrigated banana growers had a very high level of market orientation, followed by 32.27 per cent had high of market orientation, respectively. The study was conducted in Anand district of the state, where tobacco is also another crop grown by the farmers. Due to marketing problem in this crop, nowadays farmers have shifted cultivation of tobacco to banana. Thus, banana growers might have learned the lesson of marketing from their past bad experiences of tobacco selling. From the same Table data indicated that two third (66.36 per cent) of the drip irrigated banana growers had a medium level of achievement motivation, followed by 31.82 per cent and 1.82 per cent of them were with high and very high whereas none of them was with very low or low level of achievement motivation, respectively. Almost all the banana growers involved in the management of drip irrigated banana cultivation might have understood and realized the significance of drip irrigated banana cultivation to reach up to medium to high level of progressive and prosperous life. The majority (62.73 per cent) of the drip irrigated banana growers had a very high level of innovation proneness, followed by 37.27 per cent of them were with a high level of innovation proneness. The necessity and demand in the process of drip irrigated banana cultivation to have practical and feasible changes in various horticultural and marketing operations might have the possible reason for having an excellent level of innovation proneness. The great majority (72.27 per cent) of the banana growers had a highly positive attitude towards drip irrigated banana cultivation, followed by 27.73 per cent of them were with a positive attitude towards drip irrigated banana cultivation. The experience of tremendous benefits of drip irrigated banana cultivation in terms of quality production, productivity, saving of water and other resources might have played a major role in building highly positive attitude towards drip irrigated banana cultivation.

**Table 5 : Psychological characteristics of drip irrigated banana growers**

**n = 220**

Variables	Categories	Measurement	Number	Per cent
<b>Scientific orientation</b>	Very low (up to 14)	Arbitrary method	00	00
	Low (15 to 28)		00	00
	Medium (29 to 42)		03	1.36
	High (43 to 56)		120	54.55
	Very high (above 56)		97	44.09
<b>Economic motivation</b>	Very low (up to 6)	Arbitrary method	00	00.00
	Low (7 to 12)		00	00.00
	Medium (13 to 18)		35	15.91
	High (19 to 24)		108	49.09
	Very high (above 24)		77	35.00
<b>Risk orientation</b>	Very low (up to 10)	Arbitrary method	00	00.00
	Low (11 to 20)		00	00.00
	Medium (21 to 30)		15	06.82
	High (31 to 40)		178	80.91
	Very high (above 40)		27	12.27
<b>Variables</b>	<b>Categories</b>	<b>Measurement</b>	<b>Number</b>	<b>Per cent</b>

<b>Market orientation</b>	Very low (up to 6)	Arbitrary method	00	00.00
	Low (7 to 12)		00	00.00
	Medium (13 to 18)		00	00.00
	High (19 to 24)		82	32.27
	Very high (above 24)		138	62.73
<b>Achievement motivation</b>	Very low (up to 6)	Arbitrary method	00	00.00
	Low (7 to 12)		00	00.00
	Medium (13 to 18)		146	66.36
	High (19 to 24)		70	31.82
	Very high (above 24)		04	01.82
<b>Innovation proneness</b>	Very low (up to 6)	Arbitrary method	00	00.00
	Low (7 to 12)		00	00.00
	Medium (13 to 18)		00	00.00
	High (19 to 24)		82	37.27
	Very high (above 24)		138	62.73
<b>Attitude towards drip irrigated banana cultivation</b>	Highly negative (up to 12 score)	Arbitrary method	00	00.00
	Negative (13 to 24 scores)		00	00.00
	Neutral (25 to 36 scores)		00	00.00
	Positive (37 to 48 score)		61	27.73
	Highly positive (above 48 score)		159	72.27

## CONCLUSION

From the above findings, it can be concluded that majority of banana growers belonged to the middle to old age group, educated up to higher secondary to graduation & above level, six to ten years to less than five years of experience in drip irrigated banana cultivation, nuclear type of family, membership in one organization, had medium to large size of land holding, small to marginal size of land under drip irrigated banana cultivation, dependence on agriculture plus animal husbandry, more than ₹ 4 lakh of annual income, had average to poor level of extension contacts and high to very high level of mass media exposure. In case of psychological traits of respondent's scientific orientation, economic motivation, risk orientation, and market orientation were observed in high to very high level. While, the vast majority of them had medium to high level of achievement motivation, very high to high level of innovation proneness and highly positive attitude towards drip irrigated banana cultivation. The study disclosed that majority of the drip irrigated banana growers had middle to old age, thus proper strategy should be made understanding state of mind and psychology of these aged farmers to speed up the rate of adoption of risk management practices in drip irrigated banana. The outcome of investigation concludes that majority of the drip irrigated banana growers had an education from higher secondary to graduation & above level. Thus, there is a need to popularize risk management practices of drip irrigated banana crop among banana growing farmers through printing materials and media like leaflets, folders, agricultural magazines, newspapers, and the internet. It was observed that the majority of the drip irrigated banana growers had intermediate experience of drip irrigated

banana cultivation. Thus, to stimulate their interest, proper marketing facility should be developed for the farmers. During the study, it was seen that extension contact did not show its impact on the adoption of risk management practices in drip irrigated banana cultivation of the farmers. It indicates that extension personal involved in the transfer of technology programme should bring quality in their efforts of transfer of drip irrigated banana cultivation technology programme to activate farmers towards the adoption of risk management practices in drip irrigated banana cultivation.

## REFERENCES

- Anonymous (2009). Strategic Research and Extension Plan (SREP) District: Anand, published by SAMETI, Gujarat state, Gandhinagar.
- Borate, H. V. (2015). Perception of the banana growers of middle Gujarat about good agricultural practices (GAPs). Ph.D. Thesis (Unpublished), Anand Agricultural University, Anand.
- Damor, V.A., Patel, J.K. and Patel, R.N. (2017) Association between profile of papaya growers and adoption of recommended technology of papaya. *Guj. J. Ext. Edu.* 28(1):58-62.
- Deshmukh, Dipti and Naik, R.M. (2017) Relationship between personal profile and empowerment of rural women through SHGs. *Guj. J. Ext. Edu.* 28(1):18-19

- Dhodia, A. J., Naik, R. M. and Tandel, B. M. (2014). Attitude of farmers towards training programme of mega seed project. *Gujarat Journal of Extension Education*, 25 (1): 9-12.
- Eysenck, H. J. and Crown, S. (1949). An experimental study in opinion-attitude methodology. *Int. J. Opin. Attitude Res.*, 3: 47-86.
- Feaster, J. C. (1968). Measurement and determinants of innovativeness among primitive agriculturist. *Rural Sociology*, 33: 339-348.
- Khot, A. V. (2011). Extent of economic gain through drip irrigation system by banana growers. M. Sc. (Agri.) Thesis (Unpublished), Anand Agricultural University, Anand.
- Likert, R. A. (1932). A technique for the measurement of attitude scales. *Arch. Psychol.* New York, No.140.
- Mohamad, A. and Khan, N. (2014). Adoption of New Agricultural Technology: A Case Study of Buksa Tribal Farmers in Bijnor District, Western Uttar Pradesh. *International Journal of Agriculture, Environment and Biotechnology*, 7(02): 403-408.
- Pandya, C. D., Bhatt, S. T. and Chauhan, N. M. (2013). Knowledge and adoption level of farmers about scientific cultivation of Okra in Tapi district. *Gujarat Journal of Extension Education*, 24: 102-104.
- Patel, M. C. (2007). Construction of scale to measure scientific orientation and risk orientation. Fourth Agresco sub-committee on Social Sciences, Anand Agricultural University, Anand.
- Samantha, R. R. (1977). A study of some agro-economic, socio-psychological and communication variables associated with repayment behaviour of agricultural credit users of Nationalized banks. Ph. D. Thesis (Unpublished), IARI, New Delhi.
- Singh, D. K., Pandey, N. K., Rana, R. K. and Singh, B. P. (2015). Extent and correlates of knowledge of farmers regarding scientific potato production technologies in Himachal Pradesh. *International Journal of Agriculture, Environment and Biotechnology*, 8 (2): 381-385.
- Singh, S. P. (1974). Planned change in tribal areas. *Ind. J. Public Administration*, 19 (3): 363-378.
- Smitha, S. (2013) Development of scale to measure attitude of the farmers towards greenhouse technology. M. Sc. (Agri.) Thesis (Unpublished), AAU, Anand.
- Supe, S. V. (1969). Factors Related to Different Degrees of Rationality in Decision Making among Farmers. In: Singh, K.N.; Singh, S.N. and Lokhande, M.R. (Eds). *Measurement in Extension Research Instrument Developed at IARI*. New Delhi: IARI Division of Agricultural Extension.
- Surya, R. and Indu, K. (2010). A trend analysis of farmers communication sources. *J.C.S.*, 28: 63-7.
- Thurston, L. L. and Chave, E. G. (1928). The measurement of opinion. *J. of Abnormal Social Psychology*, 22: 415-430.
- Vaidya, A. C. (2011). A study on crisis management practices adopted by the poultry farmers in Anand district of Gujarat. Ph.D. Thesis (Unpublished), Anand Agricultural University, Anand.
- Vinaya Kumar, H. M., Shivamurthy, M., Biradar, G. S. and Govinda Gowda, V. (2016). Fishery Based Farmers' Perception of Climate Change in Coastal Karnataka (India). *International Journal of Agriculture Sciences*, 8 (53): 2646-2650.

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