International Journal of Agriculture Innovations and Research
Volume 7, Issue 1, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy):
Received: 17/07/2018 | Accepted on: 26/07/2018 | Published: 01/08/2018

Expansion of Area in Gujarat State for Quality Bulb Production of White Onion for Processing Industry and Export Purpose

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Abstract **– The present demonstration of White onion variety - Agrifound White was conducted in NHRDF Rajkot & Talaja center in Gujarat state during the year of Rabi season 2009 – 2010 and 2010-2011 with help of financial assistance of NHB Gurgaon for 32 ha. Per year. The result observed from demonstration of 4 districts i.e. Amreli, Bhavnagar, Junagadh Rajkot, onion bulb yield levels were higher in Amreli & Bhavnagar compared to Rajkot & Junagadh district. In Amreli district, yields ranged from 215 to 252 quintal per ha. In demonstration with average of 229.7 qt./ha. Compared to 202 qt. per ha in General plots, thereby giving more than 13% increase in yield. Similarly yield level of demonstration was ranging from 218-247 qt. per hectare for demonstration plots of Bhavnagar area with average yield 232.8 qt. per hectare compared to 206 qt. per hectare in general plots, thereby giving 13% increase in yield. The T.S.S. & Dry matter ranged even up to 16-17% at some location in Bhavnagar district indicating that these areas can produce better quality of white onion as required for processing industries & export purpose.**

Keywords **– Demonstration, White Onion, Dehydration, Export, Processing.**

I. INTRODUCTION

Onion is an important commercial crop of India with 10, 87,000 ha with production of 175, 11,000 MT and productivity of 16.1 t/ha (Anon, 2012a). In Gujarat state onion is grown in an area of 62000 ha with a production of 1464000 MT and with a productivity of 23.61 t/ha (Anon, 2012b). In Gujarat state these as good scope area expansion for quality production of white onion in sourastra region the soil and climate in suitable for production of white onion and good scope for modify of white onion excess. It is field necessary to be up work on area expansion and guidance to farmers for increasing production of improved quality of white onion in Gujarat state. Good quality high TSS white onion production is the first & impotent attribute to the dehydrated industries/ plants of onion for export of white onion flakes, white onion mince/ granule and white onion power. Keeping above view NHB Gurgaon provide financial Assistance to arrangement of demonstration of white onion variety A.W. by NHRDF Rajkot & Talaja center in Gujarat state. The demonstration was arranged on white onion production of improved varieties like Agrifound White having high TSS and suitable for dehydrations industries well as locally selected adopted variety of Gujarat state is suitable for processing purpose the demonstration was arranged on farmer's field for 0.4 ha. Area under each demonstration in 4 districts in Gujarat i.e. Amreli, Bhavnagar, Junagadh and Rajkot. These demonstrations would help the farmers of these districts to learn the technology suited to their condition to get higher production and better quality of onion bulbs. Major Onion Exporting Countries China, India, Netherlands, Egypt, Iran, Turkey, USA, Brazil and Major Onion Importing Countries Sri Lanka, Malaysia, Maldives, Nepal, Dubai, Kuwait, Indonesia, UAE, Singapore, Seychelles, Pakistan, Saudi Arabia, Qatar, Bangladesh.

II. METHODOLOGY

The present demonstration was arranged in 4 districts in Gujarat state i.e. Amreli, Bhavnagar, Rajkot & Junagadh. The manly above district comes in north Saurashtra Agro climatic Zone – VI consist forty taluka of five districts except only Junagadh Rajkot district is a part of North Saurashtra Agro climatic zone – VI of Gujarat state. The above four district were selected purposively for demonstration and progressive and interested farmers were selected in four district of Gujarat state each and every district 8 ha area arrange for Demonstration (0.4ha area each farmers) were 20 farmers each district seed distributed. So total 32 ha. Areas were distributed to 80 no of farmers in four districts. A quality seed of white onion variety Agrifound white along with literature on improved package of produce were supplied to the farmers free of cost. The Technical guidance at different crop stage provided by Rajkot and Talaja center by inspection of demonstration plots. During cropping be nod of white onion 20 training programme were arranged at different growth stages with the thereof quality production of white onion for processing industries and export. The above training programs were arranged periodically in selected potential villages and experts from NHRDF as well as JAU Junagadh, officers of KVK and agriculture department officers were invited to disseminated technical know how to the demonstration growers and other farmers in the area. After harvested of the plots yield of demonstration plot compared to general plots were collected and quality characters like TSS %, Dry Matter% and pyruric acid were estimated. The all data's recoded by NHRDF- Technical person on time to time.

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III. Result and Discussion

White onions are grown on commercial scale in few states, Maharashtra, Gujarat that too restricted to few districts. Due to lake of adequate infrastructure non existence of pre and post harvesting technological inputs as well as dirth of dedicated R & D effort; The state dehydrated plants has only remained as producer to red onions for fresh market. Red onions is not suitable for dehydration & export primarily due to poor quality, low productivity, low solids low pungency level & high reducing sugars. Dehydrator onion mostly white, having high solids more than 17%, even up to 22-27% T.S.S. in some hybrids comparatively low moisture content Less than 84%, globe shaped having small based. Agrifound White variety selected from NHRDF Nasik grown during Rabi & Late Kharif season. Bulbs are globular in shape, tight skin silvery attractive white Colour and 4-6cm in diameter T.S.S. more than 15% and pyruvic acid 12micro mole/g. Good variety for dehydration with drying ratio 7.10.1. (Bhonde S.R. and Singh R.K. 2012). From report of field demonstration presented in table -1. It is observed in Rajkot Distt the bulb yield of demonstrated plots ranged between 200-215 qt/ ha. Compared to 187-206 qt per hectare in general fields. Thereby giving about 5% increased in the bulb yield. The T.S.S. and dry matter ranged from 13-14% showing the suitability of bulbs for use in processing dehydration similarly the pyrubic acid contents rare more than 11 moles per gram as required for processing of onions.

Resules of distt Junagadh demonstration plot presented in table 2 and observed average yield 205.5 qt per hectare Compared to 195 qt per hectare in general fields. Thereby giving about 5% increased higher yield in demonstration. The T.S.S., dry matter and pyruvic acid contents were in the same level as that for Rajkot & suitable for processing. Result for Amreli District presented in table-3, the yields range from 215 to 252 qutt. Per ha. In demonstration with average of 229.7 qtt. Per ha. Compared to 202 qtt. Per ha in General plots, thereby giving more than 13% increase in yield. Similarly yield level for demonstration Bhavnagar Distt presented in table -2 and ranging from 218-247 qt. per hectare for demonstration plots of Bhavnagar area with average yield 232.8 qt. per hectare compared to 206 qt. per hectare in general plots, thereby giving 13% increase in yield. The T.S.S. & Dry matter ranged even up to 16-17% at some location in Bhavnagar district indicating that these areas can produce better quality of white onion as required for processing and export.

Trainings:

Total 40 no. Farmer's trainings have conducted at 4 district places during Rabi 2009-10 and Rabi 2010-11 cropping period of white onion and lump sum 4000 – 4200 no Farmers benefited the above training programmes. In the farmers training programmes covered different aspect of white onion crop production like Nursery management, field crop management, post harvest management and storage. The training programme have supported by exhibition and audio video aids to get the proper adoption of technology by the farmers. The training has conducted with the help of Junagadh Agriculture University-Junagadh Scientist, Department of Horticulture Govt. of Gujarat state, NHRDF-Scientist and expert from processing industry and exporters.

Table 1. Farmers wise and district wise white Onion Production Potential in Gujarat state for the year 2009-2010.

S. N.	Amreli					Bhavnagar					Junagarh					Rajkot				
	TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha	
				Demo	General				Demo	General				Demo	General				Demo	General
1	14.5	15.7	11.9	205	200	15.3	14.8	11.0	240	210	12.3	13.5	13.2	185	175	12.4	13.4	10.5	208	198
2	14.6	15.7	11.2	247	195	12.7	12.9	10.1	220	203	14.5	15.6	12.9	225	208	13.0	14.0	11.1	203	200
3	15.2	15.5	11.0	240	198	14.5	14.3	10.6	235	198	12.9	13.5	11.0	183	172	14.0	14.1	12.0	204	200
4	15.2	15.3	11.1	220	207	12.9	14.1	10.7	225	210	12.5	13.6	10.5	230	210	12.7	14.0	11.2	207	200
5	15.0	15.4	11.1	235	205	13.2	13.4	10.1	240	200	13.9	14.9	11.9	231	218	12.0	13.0	10.0	200	190
6	15.1	15.2	11.2	235	210	14.1	13.2	10.2	220	194	14.9	15.6	12.8	228	208	12.0	13.3	10.0	205	200
7	14.3	15.2	11.1	211	195	14.2	14.1	10.2	230	210	11.7	13.0	10.0	183	165	14.5	15.0	12.0	207	200
8	15.3	16.2	11.0	240	198	14.3	15.0	10.6	225	205	13.4	14.2	11.3	205	200	13.2	14.6	11.2	200	187
9	14.0	16.3	11.7	236	203	16.1	14.6	10.8	245	217	13.1	14.1	12.9	213	207	14.3	15.4	12.0	195	183
10	14.3	15.3	11.1	232	213	15.1	14.3	10.8	240	200	14.6	16.0	13.0	245	221	13.2	14.4	11.9	198	188
11	15.5	14.5	11.1	217	205	15.2	16.8	10.6	230	205	11.7	13.4	10.0	185	170	13.1	14.2	11.3	200	190
12	13.7	14.6	10.8	230	205	16.0	14.3	10.5	233	209	12.6	13.6	11.1	210	198	11.3	12.2	09.9	205	198
13	14.8	15.2	11.6	213	197	13.8	14.0	10.6	218	190	14.5	15.5	12.9	208	195	12.2	13.2	10.1	200	196
14	13.3	16.0	12.2	222	195	14.3	16.5	10.5	234	203	11.8	13.0	09.9	182	168	13.3	14.5	11.0	203	198
15	13.4	16.1	11.3	240	210	13.9	15.5	11.1	230	209	12.4	13.4	10.9	188	175	13.2	14.3	11.6	200	191
16	14.0	14.3	10.6	230	210	13.6	14.5	11.0	231	220	14.3	15.1	12.5	188	175	12.6	14.0	10.5	203	190
17	12.8	14.4	10.2	240	210	12.0	13.7	10.5	230	211	12.5	13.2	11.2	180	170	12.3	13.4	10.2	210	195
18	11.9	14.6	10.2	225	188	13.0	15.0	10.9	225	213	14.3	15.3	12.2	185	171	13.2	14.5	11.2	210	200
19	12.5	14.0	10.2	230	108	13.2	14.1	10.3	228	205	14.0	15.0	11.5	250	225	14.6	15.3	12.5	197	185
20	12.4	14.1	10.3	228	118	12.1	14.0	10.0	238	215	13.7	14.5	11.9	182	170	13.1	14.4	11.5	201	189
Aver--age	14.09	15.18	11.04	228.8	193.5	13.97	14.45	10.55	230.85	206.35	13.28	14.3	11.68	204.3	190.05	13.01	14.06	11.08	202.8	193.9

International Journal of Agriculture Innovations and Research
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Table. 2. Farmers wise and district wise white Onion Production Potential in Gujarat state for the year 2010-2011.

S. N.	Amreli					Bhavnagar					Junagarh					Rajkot				
	TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha		TSS %	Dry Matter %	Pyruvic Acid u mole/g	Yield Qtls./ ha	
				Demo	General				Demo	General				Demo	General				Demo	General
1	14.4	15.8	11.8	215	195	15.2	14.9	11.1	241	208	12.2	13.6	13.3	180	170	12.5	13.5	10.6	215	200
2	14.7	15.6	11.1	252	200	12.8	13.0	10.0	218	201	14.6	15.7	12.8	230	210	12.9	13.9	11.0	205	199
3	15.3	15.4	11.2	237	196	14.5	14.4	10.7	236	200	12.8	13.6	10.9	185	175	13.9	14.0	11.9	206	204
4	15.1	15.4	11.0	218	210	12.8	14.2	10.8	227	215	12.4	13.5	10.6	231	211	12.8	14.1	11.3	205	198
5	14.9	15.3	11.2	231	201	13.1	13.5	10.0	242	200	13.8	14.8	11.8	236	220	11.9	13.1	9.8	202	192
6	15.2	15.1	11.0	230	203	14.2	13.1	10.1	221	195	14.8	15.7	12.7	230	210	12.1	13.4	10.1	208	201
7	14.4	15.3	11.0	215	198	14.2	14.0	10.1	232	213	11.6	13.1	9.9	185	160	14.6	15.1	12.1	210	206
8	15.2	16.3	11.1	242	200	14.4	15.1	10.7	229	209	13.3	14.3	11.2	202	198	13.3	14.7	11.0	206	198
9	13.9	16.4	11.8	238	205	16.3	14.5	10.9	247	215	13.0	14.0	12.8	215	210	14.4	15.5	12.2	200	188
10	14.2	15.0	11.2	235	215	15.2	14.2	10.9	239	196	14.7	15.9	12.9	250	230	13.3	14.5	11.8	202	191
11	14.6	14.4	11.0	219	203	15.3	17.0	11.7	232	207	11.8	13.3	9.7	182	168	13.2	14.3	11.4	203	193
12	13.6	14.4	10.7	231	207	16.1	14.2	10.5	236	213	12.7	13.7	11.0	206	200	11.4	12.1	9.7	208	199
13	14.5	15.0	11.7	215	200	13.7	14.1	10.7	221	185	14.4	15.6	13.0	210	198	12.0	13.1	10.0	205	201
14	13.2	15.9	12.3	225	196	14.4	16.6	11.6	237	206	11.7	12.9	9.8	180	170	13.4	14.4	11.1	208	202
15	13.2	16.0	11.2	239	208	13.8	15.6	11.2	231	215	12.5	13.5	10.8	190	173	13.2	14.2	11.7	202	187
16	13.8	14.2	10.5	232	212	13.5	14.6	10.9	235	227	14.4	15.2	12.4	190	178	12.7	13.9	11.6	209	198
17	12.6	14.3	10.1	241	208	11.9	13.8	10.4	232	215	12.4	13.1	11.1	182	173	12.4	13.5	10.3	212	203
18	11.7	14.5	10.2	229	189	12.9	15.1	10.8	227	217	14.2	15.2	12.1	180	170	13.3	14.6	11.4	215	206
19	12.3	13.9	10.1	232	210	13.2	14.0	10.2	231	209	13.9	14.9	11.6	260	230	14.5	15.4	12.6	202	187
20	12.1	14.2	10.2	230	219	12.2	13.9	9.8	241	218	13.6	14.6	11.8	185	171	13.2	14.5	11.6	208	201
Avera--ge	13.0	14.3	10.5	229.7	202.0	13.1	14.5	10.7	232.8	206.0	13.3	14.2	11.6	205.5	195.0	13.3	14.1	11.2	206.6	196.5

ACKNOWLEDGEMENT

The authors express their thanks to Managing Director of National Horticulture Board, Gurgaon for financial support of Expansion of Area in Gujarat State for Quality Bulb Production of White Onion for Processing Industry and Export Purpose.

Impact of Farmers Trainings:

Impact of training was very good. Farmers learned about demand of white onion in Gujarat state & out of country through exporters and processing industry person. Some farmers directly linked with processing industry, especially committed by Maharaja and Five Star Dehydrations plant. Mahuva A.P.M.C. is suitable for sale of white onion, which is produce by farmers. Sale rate will be decided on the basis of TSS value of white onion.

Farmers feel very happy by training at different place in Saurashtra because onion bulb yield and quality may be improved and also increase export of white onion. They are interested to know improve new technology in farming. Cultivation of white onion started in irrigated area and development the drip and sprinkler system of irrigation for export of now good quality onion bulb production. To reduce the expenditure and increase income and also to reduce the losses after harvesting farmers trained the problem comes in export and their removal measures. Control of insect pest and disease through biological control and their management, management of weed control and cultivated onion according to export & processing industry requirement. Farmers may take more returns by exporting their produce of white onion. Farmers also explained that how storage losses can reduces by adopting suitable storage of onion etc.

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AUTHORS PROFILE'

(1) Dr. H.M. Singh was born on 2nd July 1983 in a farmer family of Mahrajganj UP. He did. M.Sc. (Ag.) Hort. (Vegetable Science) in 2006 at AAIDU Allahabad and completed Ph.D. Horticulture degree awarded in 2017 from Mahatma Gandhi Chitrakoot Gramodya Vishwavidyalaya Chitrakoot Satna M.P. At present he is Senior Technical Officer (Hort.) Regional Station, NHRDF Kurnool A.P. He have 11 years experience in Horticultural extension and Research services since 2006 till date. Having more than 25 publications and major interest of research in vegetable seed production and post-harvest technology. Dr. Singh he recently facilitated young Scientist Award in the field of biological Science at Botanical Survey of India, Allahabad U.P. in March 2018 in a International Symposium organized by Blue Planet Society, Allahabad U.P. He has professional life membership of various repute horticultural societies of India.

(2) Dr. Satyendra Singh, was born on 01 April 1969in a farmer family of Sultanpur UP. He did M.Sc. (Ag.) Hort from P U Jounpur in 1992 and Ph.D. in Vegetable Science from NDUAT Kumarganj Faizabad (UP) in 1997. At present Dr. Singh, Dy. Director (Hort.) Regional Station, NHRDF Kurnool has 20 years experience in **horticultural** extension and Research services since 1997 till date. Having more than 100 Publications and major interest of research in vegetable plant health management, Post harvest & production technology and vegetable seed production. Dr. Singh recently facilitated outstanding Achievement Award in the field

of vegetable Science at MPUAT Udaipur in December 2017 in a International conference organized by Ashtha Foundation. He has professional membership of various repute horticultural societies of India. He has vide experiences in state planning of Vegetable in many state.

TRAINING GALORY

Lecture delivered to the farmers during white onion training programme on quality bulb production Post Harvest Management for dehydration & export purpose by Dr. H. M. Singh, STO (H), NHRDF during 2010-11.

See White Onion Nursery by Dr. Satyendra Singh, DDH and see harvested white onion bulbs by Dr. V.K. Singh, DDH NHRDF Rajkot, Gujarat at Farmers Field during 2010 – 11.