Study of Profile Characteristics of Farmers about Modern Practices for the Storage of Food Grains

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Abstract: *The present investigation was undertaken in Sangli district of Maharashtra. From the district 132 farmers were selected from the core area of the district with the purposive selection. After data collection and analysis of 132 samples it is revealed that that majority of the farmers were from middle age group, received secondary education, belonged to SC, ST, VJ, NT caste, medium annual income, medium social participation, belonged to nuclear family, medium size of family, maximum respondents were medium experience in storage of food grain, medium quantity of annual food grains production and stored, cent per cent of of farmers were growing Jawar and Maize as their food grain crops, main causes for rat damage as expressed by respondents were burrows in mud floor (16.67%), whereas 15.15 per cent of respondents expressed that insect damage to food grains was caused by excess moisture in grains, while very few of the respondents opinioned that the main causes for bandicoots damage were burrows in mud floor (4.55 %), about two per cent of respondents indicated that moisture damage was due to wet floor, It was observed from the results that the type of loss due to insects was mostly in the form of powder formation (35.60%), in case of rats the loss was in the form of broken grains (20.45%), for bandicoots the loss was in the form of whole grains eaten by rats (5.30%), for moisture the loss was in the form of Black mould development (2.27%) and it is found that higher quantity (more than 50.00 per cent) of Jawar, Bajara and Wheat was retained by farmers for domestic purpose.*

Keywords: *Food Grains, Modern Practices, Profile Characteristics, Storage.*

INTRODUCTION

The food is the symbol of life and prosperity. Food grains comprising of cereals, millets and pulses, forms the primary and staple food of majority of the population in India. The introduction of high yielding varieties in the early sixties which has ultimately blossomed in to Green Revolution has helped India, to emerge as one of the leading developing country in the front of agricultural economy resulting in increased food grain production, touching more than 257.13 million tone in the year 2012-13, and in the year 2013-14 the total food grain production was more than 264.77 million

tonenes and the Maharashtra state produce food grain production in 2013-14 was 13.92 million tonnes which share 5.26 per cent about total food grain production of India. (Anonymous, 2015). India is experiencing colossal losses of food grains in storage. In 2010, as per official reports, loss of 11,700 tonnes of food grains was reported to have occurred in the government godowns. In a surplus producing state like Punjab alone, out of procurement during 2008-09 and 2009-10, loss of 48,000 tonnes wheat was reported to have rotten, the stock which is enough to feed around five lakh people for a year (Chahal, 2011). It is reported that about 30 per cent losses in

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food grains is due natural contamination of food grains is greatly influenced by environmental factors such as to unavailability of storage facilities, temperature, moisture etc. during storage quantitative and qualitative losses occurs due to insect, rodents and micro-organism. Also lack of knowledge regarding storage. Farmers store food grain by using different storage structure and use various practices in household. Various practices followed by farmers for storage of food grains while adopting these practices of food grain storage, the farmer faced many constraints.

Agriculture is one of the strong holds of the Indian economy and accounted for 14.2 per cent of the country's gross domestic product (GDP) in 2010-11, according to the Central Statistical Organizations (CSO) estimates. As a result of strategic approach followed after independence, the food grain production which remained at 51 million tonnes in 1951 has impressively gone up to 234 million tonnes in 2008-2009 (Chahal, 2011). The per capita availability of food grains which remained less than 400 gm/day in the past has reached beyond 500 gm/day in recent peak production years.

Based on this fact to find out best Modern practices followed by the farmers for food grain storage and also to document these practices and to identify the constraints of these farmers the study has undertaken with the specific objective of determining the personal and socio-economic characteristics of farmers engaged in storage activities.

METHODOLOGY

The present study was conducted in Tasgaon, Jat and Miraj tahsil of Sangli district. 4 villages were selected from each tahsil for study. From each village 11 respondents were selected, total 132 respondents were selected by using proportional random sampling. To conduct the research an Expost-facto design of social research was used in the present investigation. 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 about modern practices followed by the farmers for storage

of food grains. Interview schedule was suitably modified after pretesting of ten farmers 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. The information of qualitative nature was converted into quantitative form. Data thus collected was analysed using appropriate statistical tools.

RESULTS AND DISCUSSION

Profile characteristics of farmers about Modern practices for storage of Food grains:

The data pertaining to the age of the respondents were collected, tabulated and analyzed. The results are presented in the Table1. The respondents are categorized as per government standards.

Age

The respondents are categorized as per government standards. However, in the present study it was found that the average age of the respondents was 38 years whereas minimum was 28 years and maximum was 58 years. Thus, it is concluded that a majority of the farmers had middle age group ranging from 36 to 50 years. This might be due to the member in middle age group were actively participating in the storage of food grain. The findings are in line with the findings of Neelaveni *et al.* (2002), Uplap (2003) and Charles belt *et al.* (2007).

Education

The results are presented in the Table1 the respondents are categorized as per government standards. The data in the Table1 revealed that the 46.21 per cent of respondents were educated up to secondary level, followed by higher secondary level (28.79%) and college level (18.18%) where as 5.30 per cent respondents were educated up to primary level and 1.52 per cent respondents were illiterate. This clearly indicates that large proportion of the respondents had secondary education. The possible reason might be inadequate schooling facilities available in rural areas coupled with attitude of the

Table 1
Profile characteristics of selected farmers about Modern practices for storage of Food grains:

Sr. No.	Category	Number of respondents (n=132)	Percentage
	Independent variable		
1	Age group (Year)		
i.	Young (Up to 35)	23	17.42
ii.	Middle (36 to 50)	86	65.16
iii.	Old (51 and above)	23	17.42
2	Education		
i.	Illiterate (No Education)	2	1.52
ii.	Primary (Upto 4th std.)	7	5.30
iii.	Secondary (5th to 10th std.)	61	46.21
iv.	Higher secondary (11th to 12th std.)	38	28.79
v.	College (Above 12th std.)	24	18.18
3	Caste		
i.	SC, ST, VJ, NT	81	61.36
ii.	OBC	6	4.54
iii.	General	45	34.10
4	Annual income (Rs.)		
i.	Low (Up to Rs. 87,738)	25	18.94
ii.	Medium (Rs. 87,738 to Rs. 1,47,459)	79	59.85
iii.	High (Rs. 1,47,460 and above)	28	21.21
	Mean: 117598.48 S.D.: 29860.97		
5.	Social Participation:		
i.	Low (Up to 2 Score)	34	25.76
ii.	Medium (3 to 4 Score)	76	57.57
iii.	High (5 score and above)	22	16.67
	Mean: 3.52 S.D.: 1.317		
6	Family type		
i.	Nuclear Family	105	79.55
ii.	Joint Family	27	20.45
7	Size of Family		
i.	Low (Up to 3)	13	9.85
ii.	Medium (4 to 8)	92	96.70
iii.	High (9 and above)	27	20.45
	Mean: 5.80 S.D.: 2.23		
8	Knowledge of food grain storage		
i.	Low (Up to 27)	22	16.66
ii.	Medium (28 to 30)	78	59.10
iii.	High (31 and above)	32	24.24
	Mean: 28.92 S.D.:2.11		
9	Experience in storage of food grains		
i.	Low (Up to 11 yr)	22	16.67
ii.	Medium (12 to 21 yr)	77	58.33
iii.	High (22 yr and above)	33	25.00
	Mean: 16.42 S.D.: 5.30		
10	Quantity of food grain produced and stored		
10.1	Quantity of food grain produced		
i.	Low (Up to 17 quintal)	10	7.58
ii.	Medium (18 to 32 quintal)	99	75.00
iii.	High (33 quintal and above)	23	17.42
	Mean: 25.08 S.D.: 7.54		
10.2	Quantity of food grain produced		
i.	Low (Up to 13 quintal)	12	9.09
ii.	Medium (14 to 23 quintal)	96	72.73
iii.	High (24 quintal and above)	24	18.18
	Mean: 18.55 S.D.: 5.50		

no highest level education. These findings are in line with the findings of Uplap (2003).

Caste

Hereditary group to which the respondents farmers belonged. The information in respect of caste of the respondents is presented in Table1, the data in the Table1 revealed that maximum number of farmers (61.36 %) belonged to SC, ST, VJ and NT while 34.10 per cent of them belonged to General category and only 4.54 per cent respondent farmers belonged to OBC caste. Thus it is concluded that a majority of the farmers belonged to SC, ST, VJ, NT caste. It might be due to the fact that lower cast respondent were having low economic status and they do the farming and storing the food grain at their level. These findings are similar to the findings of Ingale (1987).

Annual income

The results are presented in the Table1. The respondents are categorized as mean ± S.D. The data in the Table1 revealed that the majority (59.85%) of the respondents had medium annual income. The high annual income respondents were 21.21 per cent whereas 18.94 per cent had low annual income. This situation may because the member of rural families having main job is farming, but they belongs to dry area so having annual income is also medium level. These findings are in line with the findings of Parvathy *et al.* (1999) and Kanwar *et al.* (2006)

Social Participation

The data in the Table1 revealed that the majority 57.57 per cent of respondents had medium social participation; while 25.76 per cent of them had low social participation, followed by 16.67 per cent respondents had high social participation in the organizations of their locality. This is because of illiteracy, medium social organizations in the village and less exposure in the city. These observations are in line with the findings of Bhamre (2006), Jeeva (2006) and Karthikeyan (2009).

Family Type

Family type refers to whether the respondent performing the work of storage of food grain belonged to joint family or otherwise. The data in respect of family type of the respondents are presented in Table1.Tthe data in the Table1 revealed that the majority of the farmers 79.55 per cent belonged to nuclear family and only 20.45 per cent of farmers belonged to joint family. Thus, it is concluded that a majority of the farmers belonged to nuclear family. It is very interesting to note that due to number of factors like education, individual freedom, mobility and participation of urban value system in rural areas, the nuclear families are growing. Therefore, the number of nuclear families in rural areas also increases day by day. These findings are similar to the findings of Shipra Sood and Sharma (2009) and Loganthan *et al.* (2011).

Size of Family

The results are presented in the Table 1. The respondents are categorized as governmental standard. The data in the table1 revealed that the majority 69.70 per cent of respondents had medium size of family, followed by large size of family (20.45%) and small size of family (9.85%). However, in the present study it was found that the average family size 6 members whereas minimum size of family 3 members and maximum size of family was 15 members. This because the members of rural families are likes to break the size of family due to heavy expenditure and loves to live independently in small family. These observations are in line with the findings of Patil (2000), Mudhinamani (2007) and Nithya (2011).

Knowledge of food grain storage

The information about the level of knowledge about storage of food grain possessed by the respondents were collected and analyzed. The results are presented in the Table1. The data in the Table1 revealed that 59.10 per cent of the respondents were having medium knowledge level regarding the recommended food grain storage practices, while 24.24 and 16.66 per cent of them had high and low level of knowledge about the recommended food grain storage practices respectively. Respondent have medium level knowledge because of the farmers has medium communication with outer environment and also

medium level social participation. Also having annual income is medium so they cannot afford high cost technology. The findings are in line with the findings of Shinde (2000), Shobha Nagnur (2006) and Chavan (2009).

Experience in storage of food grain

Experience in storage of food grain refers to the number of year, the farmer engaged in storage activity. Distribution of respondents according to their experience in storage of food grain is given in Table1. It is revealed from Table1 that majority of farmers 58.33 per cent had medium experience in storage of food grain; while 16.67 per cent of respondents had less experience and only 25.00 per cent of them had high experience in storage of food grain.

Thus, it is concluded that a majority of respondents had medium experience in storage of food grain ranging from 12 to 21 years. Respondent having medium level of age so medium level of experience they have. These observations are in line with the findings of Sonika Thakur (1996), Uplap (2003) and Usha Rani (2007).

Quantity of food grain produced and stored

It refers to the total amount of the food grains produced and stored within year by the farmer.

Quantity of food grain produced

The data in respect of quantity of food grain produced are presented in Table1 it is revealed from Table-1 that majority of farmers 75.00 per cent had medium food grain production, while 17.42 per cent of them had high food grain production and only 7.58 per cent respondent farmers had low food grain production.

Thus, it is concluded that a majority of respondents had medium annual food grain production ranging from 18 to 32 quintals. Respondent do not have knowledge about the production of food grains so having food grain production was medium level. These findings are in line with the finding of Singh (1998), Chavan (2009) and Wilson (2013).

Quantity of food grain stored

It is revealed from Table 1 that majority of respondents 72.73 per cent had medium food grain storage, while 18.18 per cent of them had high food grain storage and only 9.09 per cent respondent farmers had low food grain storage. Thus, it is concluded that a majority of the farmers had medium food grains stored ranging from 14 to 23 quintals. Farmers having low need of the food grains in their house so they store medium level food grains for table purpose. These findings are in line with the findings of Chavan (2009).

Food grain crops grown

It refers to the number of food grain crops like cereals, pulses, oil seed crops grown by the families of farmer. Distribution of respondents according to their food grain crops grown is given in Table 2.

It was observed From Table2 that majority of farmers (100.00%) were growing Jawar and Maize followed by Gram (84.84%), Soyabean (82.58%), Bajara (71.21%), Groundnut (68.93%), Wheat

Table 2
Distribution of the respondents
by their food grain crops grown

Sr. No.	Food grain crops grown	No. of respondents (n=132)	Percentage
1.	Jawar	132	100
2.	Maize	132	100
3	Gram	112	84.84
4.	Soyabean	109	82.58
5.	Bajara	94	71.21
6.	Groundnut	91	68.93
7.	Wheat	82	62.12
8.	Black gram	67	50.76
9.	Cow pea	49	37.12
10.	Niger	42	31.82
11.	Green Gram	35	26.51
12.	Tur	29	21.97
13.	Bean	8	6.06
14.	Rice	5	3.78
15.	Wal	2	1.51
16.	Sava	1	0.75
17.	Varai	1	0.75

(62.12%), Black gram (50.76%), Cow pea (37.12%), Niger (31.82%), Green gram (26.51%), 21.97 per cent farmer growing Tur, 6.06 per cent Beans, 3.78 per cent farmer growing paddy, 1.51 per cent of Wal, However 0.75 per cent farmers growing Sava and Varai respectively. Thus, it is concluded that all of the respondents were growing Jawar and Maize measurably growing because of the respondents are from the dry area. These findings are similar to the findings of Uplap (2003).

Perceived factors causing damage to food grain during storage

The results presented in Table 3 showed that the main causes for rat damage as expressed by respondents were burrows in mud floor (16.67%) followed by oily nature of food grains (13.64%) and external entry through burrows (12.12%). Whereas 15.15 per cent of respondents expressed that insect damage to food grains was caused by excess moisture in grains followed by improper drying (10.60%), improper ventilation (9.09%) and very few of the respondents expressed that damage is due to access aeration (6.06%), lack of cleanliness (5.30%) About 7.58 per cent of the respondents did not

indicate any specific cause for damage to food grains due to insects. While very few of the respondents opinioned that the main causes for bandicoots damage were burrows in mud floor (4.55%), oily nature of food grains (3.03%) external entry through burrows (2.27%). About two per cent of respondents indicated that moisture damage was due to wet floor, excessive rain and improper drying. It was observed from the results that the type of loss due to insects was mostly in the form of powder formation (35.60%), chaffy seeds (18.94%) and development of holes on seeds (7.56%) and aggregate formation (1.52%). In case of rats and bandicoots the loss was in the form of broken grains (20.45% and 3.03%), whole grains eaten by rats (19.70% and 5.30%) and mix the grains with soil (2.27% and 1.52%) respectively.

Grain utilization pattern by respondents

The highlight of Table4 indicates that higher quantity (more than 50.00 per cent) of Jawar, Bajara and Wheat was retained by farmers for domestic purpose. While about one quintal of pulses like Groundnut, Cowpea, Tur, Beans, Green gram, Wal, were retained for domestic purpose. Contrary to this

Table 3
Perceived factors causing damage to food grain during storage:

Factor	Causes	No.	%	Type of loss	No.	%
Insects	Excess moisture	20	15.15	Powder formation	47	35.60
	Improper ventilation	12	9.09	Chaffy seeds	25	18.94
	Improper drying	14	10.60	Development of holes on seeds	10	7.56
	Climatic variation	6	4.55	Aggregate formation	2	1.52
	Access aeration	8	6.06			
	Long term storage	5	3.78			
	Lack of cleanliness	7	5.30			
	Attack from outside	2	1.52			
	No cause	10	7.58			
Rats	Burrows in mud floor	22	16.67	Broken grains	27	20.45
	External entry through burrows	16	12.12	Whole grains eaten by rats	26	19.70
	Oily nature of food grains	18	13.64	Mix the grains with soil	3	2.27
Moisture	Moisture from wet floor	3	2.27	Colour change	2	1.52
	Excessive rain	2	1.52	Black mould development	3	2.27
	Improper drying	2	1.52	Aggregate formation	2	1.52
	Ventilation	7	5.30			
Bandicoots	Burrows in mud floor	6	4.55	Broken grains	4	3.03
	External entry through burrows	3	2.27	Whole grains eaten by rats	7	5.30
	Oily nature of food grains	4	3.03	Mix the grains with soil	2	1.52

about 90.20 quintals Maize was sold for commercial purpose, only about 7.23 quintal Maize was retained for domestic use such as feeding to cattle. 84.00 quintals Soybean, 78.30 quintals of Gram and 40.53 quintals of Bajara was sold for commercial purpose, in Maize and soybean nothing retained for domestic purpose. Further it was observed that about the produce of maize (79.13 quintal), Soybean (83 quintal), Gram (65.17 quintal), Bajara (37.03 quintal), Jawar (21.40 quintal), Wheat (10.2 quintal), Groundnut (8.91 quintal), Black gram (3.48 quintal), Green gram (2.48 quintal), Tur (0.38 quintal) was sold immediately after harvest.

And also it is noticed that the 13.13 quintals of Gram, 11.07 quintals of Maize, 8.00 quintals of Jawar were retained for the sale

The average duration of storage was longer in Maize (26 days), followed by Bengal gram (20 days), Soybean (15 days), Groundnut (12 days), Bajara (9 days), Jawar (8 days) Black gram and green gram (4 days), Wheat (2 days). While it was interesting to note that storage duration for domestic use in all crops was over 212 day.

CONCLUSIONS

The study revealed that majority of the farmers were from middle age group, received secondary education, the possible reason might be inadequate schooling facilities available in rural areas coupled with attitude of the no highest level education. Belonged to SC, ST, VJ, NT caste due to the fact that lower cast respondent were having low economic status and they do the farming and storing the food grain at their level. Medium annual income situation may because the member of rural families having main job is farming, but they belongs to dry area so having annual income is also medium level. Medium social participation because of illiteracy, medium social organizations in

Table 4
Grain utilization pattern by the respondents:

Food grains	Total quantity harvested (Qtl.)	Storage for commercial purpose			Average duration (days)	Storage for domestic purpose		
		Quantity for commercial use (Qtl.)	Quantity sold immediately after harvest(Qtl.)	Quantity retained for sale (Qtl.)		Human and seed (Qtl.)	Cattle (Qtl.)	Average duration (days)
Jawar (n=132)	105.60	29.40	21.40	8.00	7.68	74.30	1.9	308.40
Maize (n=132)	97.43	90.20	79.13	11.07	25.78	0.00	7.23	252.30
Gram (n= 112)	87.60	78.30	65.17	13.13	19.90	9.30	0.00	255.00
Soybean (n=109	84.00	84.00	83.00	1.00	15.05	0.00	0.00	0.00
Bajara (n=94)	99.80	40.53	37.03	3.50	8.70	58.00	1.27	308.50
Groundnut (n=91)	14.56	12.03	8.91	3.12	12.10	2.53	0.00	314.70
Wheat (n=82)	42.90	12.00	10.2	1.80	1.93	30.90	0.00	340.62
Black gram (n=67)	4.55	4.18	3.48	0.70	4.02	0.37	0.00	310.00
Cow pea (n=49)	1.13	0.00	0.00	0.00	0.00	1.13	0.00	255.00
Niger (n=42)	0.50	0.00	0.00	0.00	0.00	0.50	0.00	240.00
Greengram (n=35)	2.84	2.70	2.48	0.22	4.02	0.14	0.00	260.00
Tur (n=29)	0.98	0.48	0.38	0.10	0.00	0.50	0.00	290.00
Bean (n=8)	0.42	0.00	0.00	0.00	0.00	0.42	0.00	100.00
Rice (n=5)	2.10	0.00	0.00	0.00	0.00	2.10	0.00	190.00
Wal (n=2)	0.10	0.00	0.00	0.00	0.00	0.10	0.00	150.00
Sava (n=1)	0.02	0.00	0.00	0.00	0.00	0.02	0.00	80.93
Varai (n=1)	0.03	0.00	0.00	0.00	0.00	0.03	0.00	88.49

the village and less exposure in the city. Belonged to nuclear family it is very interesting to note that due to number of factors like education, individual freedom, mobility and participation of urban value system in rural areas, the nuclear families are growing. Medium size of family this because the members of rural families are likes to break the size of family due to heavy expenditure and loves to live independently in small family. Medium knowledge level regarding the recommended food grain storage practices because of the farmers has medium communication with outer environment and also medium level social participation. Also having annual income is medium so they cannot afford high cost technology. Medium experience in storage of food grain due to respondent having medium level of age so medium level of experience they have. Medium quantity of annual food grains production and stored, cent per cent of farmers were growing Jawar and Maize as their food grain crops, main causes for rat damage as expressed by respondents were burrows in mud floor (16.67%), whereas 15.15 per cent of respondents expressed that insect damage to food grains was caused by excess moisture in grains, while very few of the respondents opinioned that the main causes for bandicoots damage were burrows in mud floor (4.55 %), about two per cent of respondents indicated that moisture damage was due to wet floor. It was observed from the results that the loss due to insects, rats, moisture and bandicoots was mostly in the form of powder formation (35.60%), broken grains (20.45%), Black mould development (2.27%) and whole grains eaten by rats (5.30%), respectively. It is found that higher quantity (more than 50.00 per cent) of Jawar, Bajara and Wheat was retained by farmers for domestic purpose. Extension personnel should give due consideration in selecting young and energetic farmers besides selecting experienced and middle aged group. There is ample need for encouraging young farmers to participate actively in developmental activities. The process of transfer of technology through trainings, field days, agricultural exhibitions, mass media and other similar location specific extension strategies.

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