Journal of American Science

Websites:
http://www.jofamericanscience.org
http://www.sciencepub.net

Emails:
editor@sciencepub.net
sciencepub@gmail.com

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

Identification of Effective Social, Economic, and Human Factors on Damages of Maintenance and Storage of Strategic Products in Mazandaran Province (Case Study: Wheat)

Noora Ghanadzadegan

Payam Noor University, Damavand Branch, Iran

Abstract: The present paper studies the effective social, economic, and human factors on damages to maintenance and storage of wheat as a strategic product in Mazandaran Province. The statistical universe comprises all employees of Industry, Mine, and Trade Organization of Mazandaran Province (400 persons). To gather data, a questionnaire was used in the form of 36 questions and 6 dimensions which measured the effective factors on maintenance and storage of wheat. Cronbach's alpha was used to measure validity of the questionnaire (r=0.91). To analyze data, Kolmogorove- Smirnov, Wilcoxon, Freidman, and Chi-square tests were applied at the significance level P≤0.05. The results reveal that among the studied parameters, the maximum effect pertains to the social factors system and the minimum effect pertains to the economic factors. In general, the results support the hypothesis indicating that there is a significant difference among effective factors on wheat storage in Mazandaran Province; and functions of the Business Organization has the maximum share.

[Seyed Mehdi Khadem.**An exploration on the relationship between emotional intelligence and staff creativity (Case Study: Iran Khodro Co.)***Am Sci 2021;17(6):56-65]. ISSN 15451003 (print); ISSN 23757264 (online). http://www.jofamericanscience.org 7*.doi:10.7537/marsjas170621.07.

Key words : Maintenance and storage, social factors, economic factors, human factors, strategic products, wheat

1. Introduction

Maintenance and storage of the strategic perishable goods is an economic activity with multi dimensional role so that by transmitting a product from one period to another period, a new value added is created for the product and the expected time profit is created for the suppliers. Favorable storage and maintenance of strategic products are considered among structural elements of production and distribution. This originates specially from the fact that population growth consistent with income growth has increased demands for food and strategic products and has added political and economic importance to it at a global scale. Nowadays, nations and economic planners have seriously considered increase, control, and supervision of the strategic products storage system as among the most important components of their national plans (Sheikhi, 2003).

Organic features and periodic properties of the production of such products require observing storage seriously. In general, proper warehouses and fridges are not only effective on reducing wastes but they also influence production, distribution, and consumption and price dispersion and warrants food security of the society.

Since wheat is the most widely used product existing in the food market of our country and monopoly of its trade is in the hands of the government, it is expected to study properly the different stages from culture to harvest and then storage. Supply and maintenance of the products required by the organization is the objective of establishing warehouses whether in the public or private sectors (Anvari Rostami, 2010). Warehousing refers to all activities pertaining to supply, maintenance, and delivery of the required materials at a proper time, and warehouse management refers to planning, organizing, coordinating, guiding, and controlling warehousing operation (Hasangholipur, 2010).

This paper is aimed at studying different effective factors on the wheat storage and evaluating the importance of each factor by applying different tests.

1. Research Literature

1.1 Theoretical Bases

Supply and maintenance of the goods required by the organization is the objective of establishment of warehouses whether in the public or private sectors (Anvari Rostami, 2010). Warehousing refers to all activities pertaining to supply, maintenance, and delivery of the required materials at a proper time, and warehouse management refers to planning, organizing, coordinating, guiding, and controlling warehousing operation (Hasangholipur, 2010).

Different organizations are organized differently depending upon their needs. Sometimes in some institutions, warehouse is directly under the

supervision of managing director, and different warehouses including warehouse of materials, parts, products, wastes, etc. are under the supervision of warehouse manager. In the state and non-profit organizations, the storage unit is under the supervision of procurement unit which is per se one of the subordinate units of administrative affairs (Hasangholipur, 2010). In general, importance and necessity of warehousing are evident for everyone. Particularly, existence and quality of warehouses of strategic goods are highly important.

The strategic product is a vital product for a country and its shortage will bring about economic and political crises in the country. The product strategic importance depends upon the country and time and culture of consumption. In Iran, wheat is among strategic products (ShahriariZad, 2009). Furthermore, these products will help the government to achieve its specific goals for people livelihood by three features namely,

1) They provide an important part of the government revenues for supplying welfare and development in the country.
2) The potentials of production and supply of these products are ready in the country.
3) They can influence other axes of development such as political, social, and cultural axes (Rahmani, 2007).

According to the importance of the strategic products, the effective factors on maintenance and storage of wheat that is among these products can be classified into three social, economic, and human groups. Any of these factors affects the quality of the product in the warehouse by other parameters. The interaction of guilds, functions of the government and business organization are effective on the maintenance and storage of the strategic products and the effective damages on maintenance and storage of these products. Maintenance and storage costs of strategic products, as the economic factors, and also lack of specialized manpower and lack of health control in store-pits, as human features, are effective on damages caused by maintenance and storage.

1.2 Research Background

Importance and necessity of warehousing as well as the effective factors on its damages have been evaluated by the researchers inside and outside the country. Vankastel (1986) carried out a research on the wheat grain production and elaborated conditions related to the wheat maintenance by which wheat can be stored with a higher quality. The ripe grains must be sound when they are transmitted to the maintenance location, the temperature and location must be proper and inaccessible to birds and rodents, and use of pesticides must be controlled continuously. A research was carried out in 2005 by Pankaj Ashvani under the title of maintenance management of agricultural products with an emphasis on refrigerated storage in HeidarAbad in India. The results of his research revealed that refrigerated storage creates a proper relation between production and consumption of strategic goods and it can reduce the costs of consumption for the consumers. Another research was carried out in 2010 by Pederson in the University of Kansas titled as "Preserving quality and marketing wheat stored in the farms and lifter (agricultural machinery) in Kansas". In this paper, equipments and methods of controlling pests and wheat storage under the conditions that the grain quality is preserved have been studied. Aeration methods that save grain and fumigation were studied. In this paper, grain cooling by aeration is the most effective method of fighting with insects and has the lowest variable cost but it is often managed weakly. This paper investigated the relation between supplier and buyer and wheat quality (particularly affected factors during storage) and the price. It has summarized methods of wheat marketing and has presented some recommendations about Health Integrated Program, aeration, and supervision. Also in 2008, a research has been carried out regarding "grain displacement and costs of storage in the lifters" by Fil Kenel in the Agriculture Economy Department of Oklahoma University. In this paper, touching the grains and storage costs have been increased for below reasons: increase in the products price, number of human forces, costs of instruments, and increase in the current costs (like power). To create an adequate profit margin in the grain sale and contracts and to set appropriate costs of storage, it has studied information of grain storage costs accurately.

Some researchers have studied the effects of social and economic damages on the maintenance and storage of wheat or other strategic products inside the country. Sameti (2007) has studied the effects of privatization on the efficiency of wheat storage units in the Iranian Business Organization. He reports that privatization policy commenced from 1980s in the developed countries. This policy increased the efficiency in some of the economic sectors of these countries. The same policy was followed in the developing countries including Iran as well. This paper seeks to study the effect of privatization on the efficiency of positive storage locations. So there is a direct relation between privatization and reduction of storage problems. Therefore, by increase in the presence of private sector in the storage location, efficiency is increased. Based on the results of ratio scale model, wheat storage locations increase the ratio scale.

According to Sheikhi (2003), weaknesses and deficiencies of storage can be elaborated as following:

- Lack of adequate knowledge of traditional systems about the importance of the role and function of system components in the whole system and so lack of planning for removing deficiencies of each component.
- Lack of definition for the storage model and lack of storage spaces.
- Food security of the consumer through creating security shield of food supply, particularly in the regions and at the times of production deficiency and drought.
- Integration of demand and supply in the time and space dimensions.
- Security of production at the times of surplus production.
- Pricing to the benefit of consumer and manufacturer.

2. Materials and Methods

2.1 Research Method

The present paper is a descriptive research in terms of data collection and so questionnaire has been used to gather the required data. Data is collected through field and library methods. In the field method, data is gathered by a questionnaire and in the library method, first hand and second hand references have been used. This paper is an applied research in terms of objective and data is analyzed via SPSSwin software.

This paper first describes data obtained from a survey research and uses descriptive and deductive statistics for analyzing the findings statistically. It has used Kolmogorove- Smirnov test for testing normality of data distribution and also Wilcoxon, Friedman, and chi-square tests. The hypotheses were analyzed at $P \leq 0.05$ level.

Chi-square test is of one of the most famous non-parametric tests that are widely used in the statistical analyses. By classifying a variable in several classes, this test calculates chi-square statistic, and it is applied in the goodness of fit of observed frequencies with the expected frequencies. The pre-requisite of using this test is random selection of samples with a proper size (the expected frequencies less than 5 in each class reduce the test reliability) (HematiNejad et al., 2009, p. 67). Freidman test was used since each dimension of the questionnaire had been considered as a separate measurement in a correlated group (statistical sample) so as to determine whether there is a significant difference among these measures (or the dimensions of the questionnaire) and use the obtained data for ranking the questionnaire dimensions. This test is among non-parametric tests. Wilcoxon test is also among non-parametric tests and it is used for pair-wise comparisons of two correlated groups.

2.2 Statistical Universe

The statistical universe comprises all employees of Industry, Mine and Trade Organization in Mazandaran Province (400 persons). With regard to the 400-person population, sample size is considered 196 based on Morgan table. So a 196-person sample has been considered by the researcher in this paper. Due to dispersion of the statistical universe in different cities, stratified random sampling method has been used. It is a method based on which the members of a universe are first divided into several non-overlapping groups and then a simple random sample is selected from each group. So to select the 196-member sample, $Pk=Nk/N$ formula is used (Nk denotes the number related to each city). In the following, based on the obtained Pk and 196 persons selected from the whole universe, the number of sample of each city is specified precisely. Moreover, 5-point Likert scale ranged from 1 (very low) to 5 (very high) was used for the answer options of each question.

Furthermore, all the issues pertaining to the maintenance and storage of strategic products in Mazandaran Province, as explained in the conceptual model, have been considered as the subject territory of the present paper. With regard to the ad hoc effects of different variables and particularly environmental variables on the research subject, the research time span has been considered from November 2011 to July 2012. The Industry, Mine, and Trade Organization of Mazandaran Province has been considered as the space territory. Statistical universe and sample is shown in Table 1

Table 1- Statistical universe and sample

Row No.	City	N	P_k	nP_k	Sample of each city
1	Galugah	5	0.0125	2.45	3
2	Behshahr	10	0.025	4.9	5
3	Neka	8	0.020	3.92	4
4	Sari	229	0.5725	112.21	113
5	Qaemshahr	11	0.0275	5.39	6
6	Babol	15	0.0375	7.35	8
7	Babolsar	13	0.0325	6.37	7
8	Juybar	10	0.0250	4.9	5
9	Savadkuh	13	0.0325	6.37	7
10	Noor	10	0.0250	4.9	5
11	Chalus	8	0.0200	3.92	4
12	Ramsar	10	0.0250	4.9	5
13	MahmudAbad	10	0.0250	4.9	5
14	Tonekabon	12	0.0300	5.88	6
15	Noshahr	11	0.0275	5.39	6
16	Amol	20	0.0500	9.8	10
17	Fereidunkenar	5	0.0125	2.45	3

3. Research Findings

3.1 Normality of Data Distribution

To examine normality of data distribution, Kolmogorove- Smirnov test was used. Below table shows that with regard to the obtained significance level in each test, the assumption of data distribution non-normality is rejected. The results of Kolmogorove- Smirnov test is shown in Table 2

Table 2- The results of Kolmogorove- Smirnov test

Questionnaire Dimension	Mean	Kolmogorove- Smirnov Z	Sig.
Interaction of guilds	3.19	1.83	0.00*
Government functions	3.17	1.49	0.02*
Business Organization functions	2.16	2.03	0.00*
Costs of maintenance and storage	2.81	2.15	0.00*
Lack of specialized manpower	3.08	1.52	0.01*
Lack of health control in the store-pits by human forces	2.78	2.30	0.00*
Proper positioning for establishment of storage place	2.89	2.22	0.00*
Quality of store-pits construction	2.76	2.37	0.00*
Transpiration system	3.47	1.73	0.01*
Accurate control of inventory in the store-pits	3.14	1.64	0.01*
Reorder point	3.08	2.85	0.00*
Existing laws and bylaws for maintenance	3.11	2.62	0.00*

* $P \leq 0.05$

3.2 Research Hypotheses Test

First hypothesis:

There is a significant difference among social, economic, and human factors in pathology of the effective factors on the maintenance and storage of strategic products.

Table 3- Ranking dimensions and sub-criteria of the effective factors on maintenance and storage of strategic products

	Mean Rank	Rank		Mean Rank	Rank
Social factors	4.16	1	Interaction of guilds	7.30	4
			Government functions	7.35	3
			Business Organization functions	7.38	2
Economic factors	2.87	6	Costs of maintenance and storage	5.05	11
Human factors	3.31	4	Lack of specialized man power	6.61	7
			Lack of health control in store-pits by human forces	5.28	10

With regard to table 3, by ranking effective factors on maintenance and storage of strategic goods, the results of Freidman test revealed that these factors include functions of Business Organization, government functions, interaction of guilds, lack of specialized manpower, lack of health control in store-pits by human forces, and finally costs of maintenance and storage, respectively. So Business Organization functions have the maximum effect and costs of maintenance and storage have the minimum effect.

Also the results stipulated in table 3 show a comparison among social, economic, and human factors, and they are prioritized as social, human, and economic factors respectively. So social factors have the first priority and the economic factors have the last one.

Second hypothesis (related to social factors)

Interaction of guilds is effective on damages related to the quality of maintenance and storage of strategic products.

Table 4- Frequency of responses to the effect of guilds' interaction on damages related to the quality of maintenance and storage of strategic products

Option	Frequency	Frequency Percentage
Very low	26	4.86
Low	97	18.16
Medium	190	35.58
High	191	35.76
Very high	30	5.61
Sum	534	100

With regard to the results presented in table 4, 35.76 percent of the respondents believed that the effect of guilds interaction on the damages related to the quality of maintenance and storage of strategic products has been high, while 35.58 percent believed that this effect has been medium. The results of chi-square test confirm that the difference among the response options is significant (table 5). So it seems that the effect of guilds interaction on the damages related to the quality of maintenance and storage of strategic products have been significantly high.

Table 5- The results of chi-square test for comparing frequencies of responses to the effect of guilds interaction on the damages related to the quality of maintenance and storage of strategic products

	Interaction of Guilds
Chi-square statistic	248.45
Scope of changes	4
Significance level	0.00*

Third hypothesis (related to social factors)
Government functions are effective on damages of maintenance and storage of strategic products.

Table 6- Frequency of responses to the effect of government functions on damages related to maintenance and storage of strategic products

Option	Frequency	Frequency Percentage
Very low	21	3.93
Low	82	15.35
Medium	245	45.88
High	153	28.65
Very high	33	6.17
Sum	534	100

The results of table 6 reveal that near 45.88 percent of respondents believed that the effect of government functions on damages related to maintenance and storage of strategic products has been medium. Also about 28.65 percent of them believed that this effect has been high. The results of chi-square test approve that the difference among the response options is significant (table 7). So the results reveal that the effect of government functions on damages related to maintenance and storage of strategic products has been significantly medium.

Table 7- The results of chi-square test for comparing frequencies of responses to the effect of government functions on damages related to maintenance and storage of strategic products

	Government Functions
Chi-square statistic	324.50
Scope of changes	4
Significance level	0.00*

Fourth hypothesis (related to social factors)
Business Organization functions are effective on maintenance and storage of strategic products and effective damages on maintenance and storage of strategic products.

Table 8- Frequency of responses to the effect of Business Organization functions on maintenance and storage of strategic products

Option	Frequency	Frequency Percentage
Very low	22	4.11
Low	78	14.60
Medium	249	46.62
High	158	29.58
Very high	27	5.05
Sum	534	100

With regard to the results presented in table 8, near 46.62 percent of respondents believed that the effect of Business Organization functions on maintenance and storage of strategic products has been medium, and near 29.58 percent believed that this effect has been high. The results of chi-square test approves that

Table 9- The results of chi-square test for comparing frequencies of responses to the effect of Business Organization functions on maintenance and storage of strategic products

	Business Organization Functions
Chi-square statistic	348.60
Scope of changes	4
Significance level	0.00*

Fifth hypothesis (related to social factors)

There is a significant difference among different dimensions of social factors in terms of the effect on damages related to maintenance and storage of strategic products.

Table 10- Comparison of different social factors in terms of the effect on damages related to maintenance and storage of strategic products

	Dimension	Mean Rank	Rank
Social factors	Interaction of guilds	1.99	3
	Government functions	2.00	2
	Business Organization functions	2.01	1

With regard to the results presented in table 10, there is a difference among different dimensions of social factors in terms of the effect on damages related to maintenance and storage of strategic products. These dimensions are prioritized Business Organization functions, government functions, and guilds interaction, respectively. However, the results of Friedman test show that the difference among dimensions of social factors is not significant table 11).

Table 11- The results of Friedman test for comparing different dimensions of social factors in terms of the effect on damages to maintenance and storage of strategic products

	Dimensions of Social Factors
Chi-square statistic	0.071
Scope of changes	2
Significance level	0.96

Sixth hypothesis (related to economic factors)

Costs of maintenance and storage of strategic products are effective on damages to maintenance and storage of these products.

Table 12- Frequency of responses to the effect of costs of maintenance and storage of strategic products on damages to maintenance and storage

Option	Frequency	Frequency Percentage
Very low	55	10.29
Low	137	25.65
Medium	216	40.44
High	106	19.85
Very high	20	3.74
Sum	534	100

With regard to the results presented in table 12, near 40.44 percent of respondents believed that the effect of costs of maintenance and storage of strategic products has been medium, while near 25.65 percent believed that this effect has been low. The results of chi-square test approves that the difference among response options is significant (table 13). So the results reveal that costs of maintenance and storage of strategic products have a medium significant effect on damages related to maintenance and storage of these products through the lens of employees of Mazandaran Industry, Mine and Trade Organization.

Table 13- The results of chi-square test for comparing frequencies of responses to the effect of costs of maintenance and storage of strategic products on damages related to maintenance and storage

	Costs of Maintenance
Chi-square statistic	215.86
Scope of changes	4
Significance level	0.00*

Seventh hypothesis (related to human factors) Lack of specialized manpower is effective on damages related to maintenance and storage of strategic products.

Table 14- Frequency of responses to the effect of lack of specialized manpower on damages related to maintenance and storage of strategic products

Option	Frequency	Frequency Percentage
Very low	49	5.50
Low	174	19.55
Medium	361	40.56
High	192	21.57
Very high	37	4.15
Sum	890	100

With regard to the results presented in table 14, near 40.56 percent of respondents believed that the effect of lack of specialized manpower on damages related to maintenance and storage of strategic products has been medium, and near 21.57 percent believed that this effect has been high. The results of chi-square test approves that the difference among response options is significant (table 15). It seems that lack of specialized manpower have a medium significant effect on damages related to maintenance and storage of these products through the lens of employees of Mazandaran Industry, Mine and Trade Organization.

Table 15- The results of chi-square test for comparing frequencies of responses to the effect of lack of specialized manpower on damages related to maintenance and storage of strategic products

	Lack of specialized manpower
Chi-square statistic	424.58
Scope of changes	4
Significance level	0.00*

Eighth hypothesis (related to human factors) Lack of health control in store-pits by human forces is effective on damages to maintenance and storage of strategic products.

Table 16- Frequency of responses to the effect of lack of health control in store-pits by human forces on damages to maintenance and storage of strategic products

Option	Frequency	Frequency Percentage
Very low	49	9.17
Low	151	28.27
Medium	215	40.26
High	103	19.28
Very high	16	2.99
Sum	534	100

With regard to the results presented in table 16, near 40.26 percent of respondents believed that the effect of lack of health control in store-pits on damages to maintenance and storage of strategic products has been medium, and near 28.27 percent believed that this effect has been low. The results of chi-square test approves that the difference among response options is significant (table 17). It seems that lack of health control in store-pits have a medium significant effect on damages to maintenance and storage of these products through the lens of employees of Mazandaran Industry, Mine and Trade Organization.

Table 17- The results of chi-square test for comparing frequencies of responses to the effect of lack of health control on damages to maintenance and storage of strategic products

	Lack of health control in store-pits
Chi-square statistic	362.49
Scope of changes	4
Significance level	0.00*

Ninth hypothesis (related to human factors)

There is a significant difference among different dimensions of human factors in terms of the effect of damages to maintenance and storage of strategic products.

Table 18- Comparison of different dimensions of human factors in terms of the effect on damages to maintenance and storage of strategic products

	Dimension	Mean Rank	Rank
Human factors	Lack of specialized manpower	90.34	1
	Lack of health control in store-pits by human forces	83.42	2

With regard to the results stipulated in table 18, comparison of two dimensions of human factors reveals that lack of specialized manpower has more priority over lack of health control and has more effect on maintenance and storage of strategic products. The results of Wilcoxon test show that the difference between these two dimensions is significant.

Table 19- The results of Wilcoxon test for comparing different dimensions of human factors in terms of the effect on damages to maintenance and storage of strategic products

	Dimensions of human factors
Z	-4.14
Significance level	0.00*

4. Conclusions and Suggestions

The results of this paper show that the process of strategic products maintenance and particularly wheat requires attention to three main sectors namely, government, markets, and guilds to achieve maximum efficiency in this area. And if only one of the factors cannot undertake its duties properly, a great gap will certainly be created in this process. The results of this paper indicate that there is no significant difference among priority of different dimension of social factors, i.e. Business Organization function, government functions, and guilds interaction and this reflects the relative importance of each dimension. Every dimension must be taken into account so as to develop and improve wheat maintenance and storage system more than ever. As regards the effect of economic factors, it must be noted that near 40.44 percent of the respondents believed that this effect has been medium and about 25.65 percent believed that this effect has been low. Also data analysis reveals that lack of specialized manpower has more priority over lack of health control and has more effect on maintenance and storage of strategic products; albeit the difference between these two dimensions is significant. Also the present paper indicates that among three factors studied, social factors have the maximum effect and the economic factors have the minimum effect.

4.1 Suggestions

Consistent with the experience obtained from carrying out this paper, some suggestions are presented for other researcher in the future research.

- Studying and evaluating wheat maintenance and storage system through the lens of manufacturers.
- Carrying out research in similar organizations of other provinces simultaneously and comparing the results.
- Studying the factors evaluated in this paper for other strategic and non- strategic products.

References

1. Anvari Rostami, A., (2010), Purchase, Warehousing, and Distribution Systems, Payam-e Noor Publication.
2. Ashwani, P., (2005), commodity portfolio management of cold storage units in hyderabad (a.p.), university of agricultural sciences, harwad.
3. HasangholiPour, T., and EsmaeilPour, M., (2009), Purchase and Warehousing Management, Yadvareh Ketab Publication.
4. HematiNejad, M., et al., 2009, Non-parametric statistics in physical education and sports science and SPSS step by step training, Varasteh Publication, first edition.
5. Kenkel, P., (2008), Grain handling and storage costs in country elevators, Department of agricultural economics, Oklahoma state university.
6. Pedersen, J., (2010), Quality maintenance and marketing of wheat stoked on farms and in elevators in Kansas (Kansas state university).
7. Rahmani, T., (2008), Principles of Economy.
8. Sameti, M., Sameti, M., and Sadeghi, Z., (2007), A study on the effects of privatization on the efficiency of wheat storage units, Government Trading Corporation of Iran.
9. ShahriariZad, M., (2009), Processing of satellite images for predicting strategic products quantitatively and qualitatively, M.A. thesis, Tehran University.
10. Sheikh, A., (2006), Optimal model of wheat storage and distribution system, Ministry of Agriculture.
11. Sheikhi, A., (2003), A brief study on problems of wheat – flour – bread process with an emphasis on storage, Journal of Research and Development in Agriculture and Horticulture, No. 60.
12. Vancastel, A.J.G., bishaw, Z and Gregg, B. R., (1986), Quality seed production at pantnagar , india, Wheat seed production, available on: www.nmfeed.com.

1/2/2021