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EVALUATION OF RURAL WASTE MANAGEMENT VILLAGES UNDER THE COVERAGE OF HEALTH CENTERS IN EAST AZERBAIJAN PROVINCE IN 2011

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ABSTRACT

water and wastewater management is one of the important issues due to the interconnected relationship of these issues to the health and disease prevention. The purpose of this study was to assess the status of rural waste management in villages under the coverage of health centers in East Azerbaijan Province in 2011. data collection was done by a questionnaire and its validity was estimated using the opinions of professors and its reliability was estimated using spss software with 95% confidence interval. The population is 1320 villages in East Azerbaijan and its sample is estimated as 10% of the population or 132 villages. Data were analyzed after importing into spss19 software. The most common way of wastewater disposal due to washing in rural areas of East Azerbaijan is through the absorbent well (41.02%) and the minimum wastewater disposal due to washing in rural areas of East Azerbaijan is through the collection in store (0.04%).The dominant method used to dispose of wastewater from toilet is using the absorbent well (89.72 %). Government reduces the gray wastewater though direction into the public roads but the Islamic councils in villages has not played a special role in relation to rural waste management.

Keywords: *Village, Waste Management, Health Center, East Azerbaijan*

INTRODUCTION

Today, due to lifestyle changes at all levels of society, and increasing access to sanitary facilities including safe water and etc. the waste management of different uses of water, due to its important role in environmental pollution and health effects resulting from it should be considered . Development of urban consumption pattern and the rush of urban pollution sources to villages and rural consumption pattern have created the environmental degradation in villages, thus preserving the rural environment should be further addressed as part of national programs located in cities. One glance at the situation of water and wastewater in the country and expanded water supply in recent years shows that the possibility of using safe water in rural areas is increasing gradually like urban areas. As a result, the wastewater of water consumption that rises with the development of various technologies will increase the pollution of surface water, groundwater, and even its use in irrigation in rural areas. Studies in different countries show that in rural areas, due to the flow of wastewater in public places and its entering the surface water will increase the pollution and the possibility of disease transmission due to domestic wastewater with toilet waste(Husseinian 2000). According to the national census of 2006, about 31% of the country's populations of 70 million people, with a population of about 22 million people live in 68,000 villages. About 5,000 villages that include 7.35 % of the number and 47.3% of the rural population of the country with a population of 200 households (about a thousand people). About 0.6% of villages in the country are under the coverage of Collection and sanitation services. According to the Vision Development this amount should reach to 30% by the end of the year 2025. For achieving this purpose, at first the current status should be identified and the strengths and weaknesses of rural wastewater sanitation should be

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determined. To achieve the required information in this regard, the current methods must be collected and human waste (toilets) , waste water from washing (gray) and current environmental health and sanitation conditions in the villages must be assessed. Organic material in the wastewater are considered as the most important part of wastewater due to the adverse consequences of the interaction of these materials with microorganisms and activity of microorganisms in disease transmission and according to the recent studies Per cubic meter of wastewater can pollute 40 cubic meters of clean water.(Husseinian 2000). So that 4 billion people in the world, namely two-thirds of the world's population, have no sewage treatment systems(Mara, 2001). The main hospital wastewater contaminants include pathogenic viruses and bacteria, disease molecules due to non- metabolized drugs organo-halogen compounds such as halogenated compounds, radioisotopes, disinfectants, silver and mercury(Zeiton, Gholami, Farzadkia, Javadi, & Moabedi, 2009).

The study of Mohammad Fahimi nia et al (2007) on identifying the current status, limitations and strategies for rural wastewater management shows that in 52% of rural households with over 200 households (about 2,400 villages) the preliminary studies of sewage should be conducted by observing the prioritizing plans and classifying the villages over the vision program (until 2025). The most common health and environmental problems caused by hygienic disposal of sewage in rural areas in order of importance include the contamination of surface water resources 45%, damage to landscaping 33.5%, subterranean sources of water pollution in rural areas 18.7% groundwater contamination 14.12%, pollution of drinking water supply in villages 12.25% and the prevalence of water-borne diseases 10.40% (Fahiminia, Memari, & Akbari, 2007).

The studies of rural areas in Palestine by Mubarak et al 2004 it was shown that there is not the possibility of establishing wastewater treatment system located in rural areas Due to water shortage and lack of financial resources and the best option in these areas for black sewage is septic tanks and for domestic wastewater (gray) is the transmission through drainage channels. Both of them require skilled management and community cooperation(Al-Sa'ed & Mubarak, 2006). The study of Noori Sepehr and et al 2005 on non-conventional methods of wastewater collection and treatment session in the villages of Semnan province showed that Simple, low cost models in wastewater collection and disposal can solve the problems of Unsanitary waste disposal in rural areas(Nori Sepehr, Abdoosi, haj Alian, & Salimi, 2005).

Fahimi Nia et al 2005 in a study emphasized the necessity of scientific and practical mechanisms to prioritize towns and villages of the country and study the development of water and wastewater facilities. The results of this study indicate that currently two methods of absorbent well and collection network are used to manage human waste and four methods of absorbent well, collection network and public places with / without raceway are used for sanitary wastewater management(Fahiminia, Hajrasooli, Memari, & Akbari, 2007). Currently about 18% of urban areas in Iran is a part of the city covered by wastewater collection system that is much less than the middle-income countries. However, with the completion of the projects, this value can be increased by as much as 19% and reaches 37%. Also, in 19.9% of total urban areas, the refinery construction projects are being implemented(Fahiminia, Fazlzadeh davil, heidari, Sadeghi, & Bakhtiari, 2011).

METHODOLOGY

Because establishing the proper systems of collection and disposal of sewage in rural areas is performed in accordance with the rural population, so this project was performed in the villages covered by health centers of East Azarbaijan (main villages). Given the number of villages covered by health centers that were 1320 villages and a questionnaire was prescribed for 10% of them Therefore, based on random sampling and the number of villages and cities of East Azarbaijan and the belonged percentage to each city, 132 villages were selected and the above-mentioned questionnaire was completed as field by referring to the related health center and information in the field of health center and registration of information. The study variables included the rural population, number of households and government

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and after completing the questionnaires; the variables were calculated and analyzed by spss software with 95% confidence interval.

FINDING

In this study, 132 villages with a population of 100,833 people and 24,882 households were studied. 50/8 % of the villages (67 villages) had government and 49.2% (65 villages) had no government. 81.1% of villages (107 villages) had Islamic councils and 18.19% (25 villages) had no Islamic council. In 29.5% of villages (39 villages) conducting projects have been implemented or are being implemented and in 70.5% of villages (93 villages) conducting projects have not been implemented. Among 132 villages, 56.1% (74 villages) were covered by Rural Water and Wastewater Company and 43.9% (58 villages) have not been covered by Rural Water and Wastewater Company.(Table 1).

Rural water supply source has been 40.9% (54 villages) of wells, 44.7% (59 villages) of springs, 3.8% (5 villages) of Aqueducts, 8.3% (11 villages) of Rivers and 2.3% (3 villages) of other sources. In terms of water supply network 90.9 % of villages (120 villages) with private split, 4.5% of villages (6 villages) with the public valve and 4.5% (6 villages) had no plumbing network.

Table 1: Frequency distribution of rural organizations and effective plans for sanitary disposal of waste water

Rural organizations and programs	YES		NO	
	Frequency	Percent	Frequency	Percent
Government	67	50.8	65	49.2
Islamic Council	107	81.1	25	18.9
conducting projects	39	29.5	93	70.5
Rural Water and Wastewater Company	74	56.1	58	43.9

Wastewater disposal of washing (gray) and wastewater of toilets (black) have been shown in Table 2 based on the frequency and percentage of households in the surveyed villages. (Table 2).

There is a significant relationship between the government and the wastewater disposal of washing through the absorbent wells. (P value = 0.001) There is a significant relationship between the government and the wastewater disposal of washing through the Public places. There is not a significant relationship between the government and the wastewater disposal of washing through the canal system, collecting in store and through the collection network and treatment. In the surveyed villages that had government, the common method of wastewater from washing 35.95% was by absorbent wells (Table 3).

There is not a significant relationship between the presence of government and the disposal of wastewater from toilet through the canal system, absorbent well, conducting through public roads and in-store collection. In the surveyed villages with government, the majority of families (93/15%) dispose the wastewater from the toilet through absorbent wells. Because the disposal of wastewater from toilet was performed as zero through collection and treatment systems this case was not regarded in the results analysis. (Table 4).

There is not a significant relationship between the presence of Islamic council in the village and the disposal of wastewater from toilet through the canal system, absorbent well, conducting through public roads and in-store collection. In the surveyed villages with Islamic councils, the majority of families 42.67% dispose the wastewater from the washing through conducting to public roads. (Table 5).

There is not a significant relationship between the presence of Islamic council in the village and the disposal of wastewater from toilet through the canal system, absorbent well, conducting through public roads and in-store collection. In the surveyed villages with Islamic councils, the majority of families 94.14% dispose the wastewater from the toilet through the absorbent well. (Table 6).

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Table 2: Wastewater disposal of washing (gray) and waste water of toilets (black) based on the frequency and percentage of households in the surveyed

	Frequency	Percent
Rural households that lead the wastewater of washing out of the village through the Canal system	8224	33.05
Rural households that lead the wastewater of washing out of the village through the absorbent wells	10209	41.02
Rural households that lead the wastewater of washing out of the village through the Public places	6094	24.49
Rural households that collect the waste water of washing in store	10	0.04
Rural households that collect and dispose waste water of washing through the network	345	1.38
Rural households that lead the wastewater of toilet out of the village through the Canal system	710	2.85
Rural households that lead the wastewater of toilet out of the village through the absorbent wells	22325	89.72
Rural households that lead the wastewater of toilet out of the village through the Public places	10	0.04
Rural households that collect the wastewater of toilet through the network places	0	0
Rural households that collect the waste water of toilet in store	1837	7.83

There is a significant relationship between the presence of conducting project and the wastewater disposal of washing through the absorbent wells. (P value = 0.015) There is a significant relationship between the presence of conducting project and the wastewater disposal of washing through the Public places. (P value = 0.003) There is a significant relationship between the presence of conducting project and the wastewater disposal of washing through the collection network. (P value = 0.015). There is a not significant relationship between the presence of conducting project and the wastewater disposal of washing through the in-store collection. In the surveyed villages that had government, the common method of wastewater from washing 39.7 was by canal systems (Table 7).

There is a significant relationship between the presence of conducting project and the wastewater disposal of toilet through the absorbent wells. (P value = 0.006) There is a significant relationship between the presence of conducting project and the wastewater disposal of toilet through the Public places. (P value = 0.004) There is a not significant relationship between the presence of conducting project and the wastewater disposal of toilet through the in-store collection. In the surveyed villages that had government, the common method of wastewater from washing 88.24% was by the absorbent wells (Table 8).

There is a significant relationship between the villages covered by the Rural Water and Wastewater Company and the wastewater disposal of washing through the absorbent wells. (P value = 0.000) There is a not significant relationship between the villages covered by the Rural Water and Wastewater Company and the wastewater disposal of washing through the in-store collection, collection network and treatment. In the surveyed villages that had government, the common method of wastewater from toilet 38.08% was by the absorbent wells (Table 9).

There is a not a significant relationship between the villages covered by the Rural Water and Wastewater Company and the wastewater disposal of toilet through the absorbent wells, canal systems, conducting to

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public areas and in-store collection. In the surveyed villages that had government, the common method of wastewater from washing 94.66% was by the absorbent wells (Table 10).

There is a not a significant relationship between the private Split and public valve and the wastewater disposal of toilet through the absorbent wells, canal systems, conducting to public areas and in-store collection. In the surveyed villages that had the water supply by private Split and public valve , the common method of wastewater from washing 44.56% and 54.53% was by conducting to public spaces (Table 11).

There is a significant relationship between the private Split and public valve and the wastewater disposal of toilet through the absorbent wells and canal systems. (P value = 0.000) There is a not significant relationship between the private Split and public valve and the wastewater disposal of toilet through the in-store collection, and conducting to public spaces. In the surveyed villages with private Split and public valve, the common method of wastewater from washing 96.13% and 66.66% was by conducting to public spaces (Table 12).

There is not a significant relationship between disposal of wastewater through absorbent wells and the desired drinking water in terms of microbe (P value = 0.163). Despite the disposal of wastewater through absorbent wells in 69% of villages, the desired drinking water is over 80%. (table 13).

Table 3: Presence or absence of government with the method of waste water disposal from washing

Disposal of wastewater from washing (based on the proportion of using households)	Presence of government in village			absence of government in village			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	32.97	37.45	4.58	21.62	37.96	4.7	0.087
Through the absorbent well	35.95	38.27	4.67	16.17	31.3	3.88	0.001
Through guidance to public roads	29.9	35.54	4.34	61.62	42.95	5.32	0.0001
Through in-store collection	0.00	0.00	0.00	0.56	4.59	0.56	0.312
Through Collection and networks and treatment	1.16	7.06	0.86	0.00	0.00	0.00	0.188

Table 4: Presence or absence of government with the method of wastewater disposal from toilet

Disposal of wastewater from toilet (based on the proportion of using households)	Presence of government in village			absence of government in village			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	3.01	16.77	2.04	2.01	12.87	1.59	0.996
Through the absorbent well	93.15	21.71	2.65	96.83	13.73	1.7	0.224
Through guidance to public roads	0.04	0.26	0.03	0.31	1.9	0.23	0.264
Through in-store collection	3.77	14.47	1.76	1.76	4.37	0.54	0.118

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Table 5: Presence or absence of Islamic council with the method of waste water disposal from washing

Disposal of wastewater from toilet (based on the proportion of using households)	Presence of Islamic council in village			absence of Islamic council in village			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	29.38	38.16	3.68	18.83	37.03	7.4	0.213
Through the absorbent well	26.85	35.79	3.46	23.45	38.86	38.86	0.675
Through guidance to public roads	42.67	41.11	3.97	57.71	46.04	46.04	0.110
Through in-store collection	0.34	3.58	0.34	0.00	0.00	0.00	0.631
Through the canal system out of the village	0.72	5.6	0.54	0.00	0.00	0.00	0.519

Table 6: Presence or absence of Islamic council with the method of waste water disposal from toilet

Disposal of wastewater from toilet (based on the proportion of using households)	Presence of Islamic council in village			absence of Islamic council in village			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	3.11	16.54	1.59	0.00	0.00	0.00	0.35
Through the absorbent well	94.14	19.94	1.92	98.48	6.68	1.33	0.286
Through guidance to public roads	0.21	1.5	0.14	0.00	0.00	0.00	0.471
Through in-store collection	2.51	11.59	1.12	1.51	6.68	1.33	0.677

Table 7: Presence or absence of the presence of conducting projects and the method of waste water disposal from washing

Disposal of wastewater from toilet (based on the proportion of using households)	Presence of conducting projects			absence of conducting projects			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	39.7	36.69	5.87	22.22	37.58	3.89	0.015
Through the absorbent well	29.54	37.17	5.95	24.81	35.99	3.73	0.497
Through guidance to public roads	28.76	35.43	5.67	52.55	43.15	4.47	0.003
Through in-store collection	0.00	0.00	0.00	0.39	3.84	0.39	0.519
Through the canal system out of the village	1.99	9.22	1.47	0.00	0.00	0.00	0.038

Table 8: Presence or absence of the presence of conducting projects and the method of waste water disposal from toilet

Disposal of wastewater from toilet (based on the proportion of using households)	Presence of conducting projects			absence of conducting projects			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	5.17	21.84	3.49	1.41	10.77	1.11	0.187
Through the absorbent well	88.24	27.55	4.41	97.78	11.54	1.19	0.006
Through guidance to public roads	0.07	0.35	0.05	0.21	1.59	0.16	0.596
Through in-store collection	6.49	18.59	2.97	0.58	3.67	0.38	0.004

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Table 9: Presence or absence of the villages covered by the Rural Water and Wastewater Company and the method of waste water disposal from washing

Disposal of wastewater from washing (based on the proportion of using households)	covered by the Rural Water and Wastewater Company			Not covered by the Rural Water and Wastewater Company			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	29.10	37.18	4.32	25.20	39.31	5.16	0.561
Through the absorbent well	38.08	39.11	4.54	11.06	25.45	3.34	0.0001
Through guidance to public roads	31.60	34.88	4.05	63.29	44.55	5.85	0.0001
Through in-store collection	0.50	4.30	0.50	0.00	0.00	0.00	0.378
Through the canal system out of the village	0.70	6.08	0.70	0.43	3.34	0.43	0.764

Table 10: Presence or absence of the villages covered by the Rural Water and Wastewater Company and the method of waste water disposal from toilet

Disposal of wastewater from toilet (based on the proportion of using households)	covered by the Rural Water and Wastewater Company			Not covered by the Rural Water and Wastewater Company			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	2.72	15.97	1.85	2.26	13.61	1.78	0.859
Through the absorbent well	94.66	19.34	2.24	95.36	16.90	2.22	0.827
Through guidance to public roads	0.01	0.15	0.01	0.37	2.02	0.26	0.128
Through in-store collection	2.59	11.39	1.32	1.99	10.13	1.33	0.754

Table 11: The relation of Water supply network to the method of wastewater disposal from washing

Disposal of wastewater from washing (based on the proportion of using households)	private Split			public valve			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	27.59	37.47	3.42	33.90	51.21	20.90	0.693
Through the absorbent well	26.87	36.17	3.30	15.87	38.88	15.87	0.470
Through guidance to public roads	44.56	41.63	3.80	50.21	54.53	22.26	0.750
Through in-store collection	0.30	3.38	0.30	0.00	0.00	0.00	0.824
Through the canal system out of the village	0.64	5.29	0.48	0.00	0.00	0.00	0.766

Table 12: Presence or absence of the villages with private Split and public valve and the method of waste water disposal from washing

Disposal of wastewater from toilet (based on the proportion of using households)	private Split			public valve			P value
	mean	SD	Standard error	mean	SD	Standard error	
Through the canal system out of the village	1.12	9.23	0.84	33.11	51.30	20.94	0.0001
Through the absorbent well	96.13	14.54	1.32	66.66	51.63	21.08	0.0001
Through guidance to public roads	0.18	1.41	0.12	0.21	0.52	0.21	0.956
Through in-store collection	2.56	11.32	1.03	0.00	0.00	0.00	0.582

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Table 13: The study of relationship between the disposal of waste water through absorbent wells and the desired drinking water

Disposal of through the absorbent well	Villages with toilet waste disposal method by absorbent well more than 50%		Villages with toilet waste disposal method by absorbent well less than 50%		P value
	Number	Percentage	Number	Percentage	
Desired drinking water over 80%	83	69.16	5	4.16	0.163
Desired drinking water less than 20%	32	26.66	0	0	

CONCLUSION

Since the wastewater management of each community especially in rural areas is one of the effective parameters influencing environmental health and prevention of diseases are associated with and given that in rural areas due to agriculture, horticulture and animal husbandry and agricultural water scarcity, there is the potential use of raw sewage to irrigate crops, the importance of proper management and rural wastewater in principle revealing. Our results mentioned in the previous chapter in three parts, sewage disposal, waste associated with rural organizations and agencies related to the implementation of rural sanitation programs are discussed and analyzed. Because wastewater management in any society, particularly in rural areas as one of the effective measures of environmental health and prevention of diseases related to and given that in rural areas due to agriculture, horticulture and animal husbandry and agricultural water scarcity, there is the potential use of raw sewage to irrigate crops, principles of waste management and rural unfolds. Our results point in the season three episode sewage disposals, sewage disposal associated with rural organizations and programs in connection with the implementation of sewage disposal in rural organizations is discussed and analyzed.

4-1 Waste disposal: In this study, the most common way of cleaning wastewater (sewage, gray) wells in the villages of the province through the absorber 41.02% patients. Fahimi nia et al studied the dominant method of sewage disposal and washing of the road with without the proper channels 75-7% (Mara, 2001). The least amount of waste is washed by collecting in-store 0/04% and the amount collected for disposal through networks of treatment was low 1.38% and did not represent the organizations in charge of a particular program waste management in rural villages. Although based on established law firms in rural water and sanitation and safe water supply and wastewater management in the rural areas of the body, Because the first priority of a safe water supply companies and other credit problems in this area are And other credit problems in this area have not had much success in relation to waste management. Most methods used to dispose of wastewater from toilets (black wastewater) in rural villages as well as the results of the study of Fahimi nia et al study in absorbing wells 89.72, respectively. Despite using the absorbent wells for disposal of toilet waste, contaminated drinking water utility in the country during a year of study was 80% and the relationship between this method and water contamination could not be found. In rural collected and filtered through a network, which is not disposed of any waste water from toilets Fahimi nia et al and colleagues investigated the level of 0/56 per cent of the villages have reported consistent(Mara, 2001).

4-2 the relation of Waste disposal to the rural organizations: In rural areas of the province are having government dominant method of sewage disposal wells in absorber is washing however seems to reduce this kind of waste disposal is by directing the public roads. (29.9% in villages with government vs. 42.95% in villages without government) seems to village councils in rural wastewater management in connection with a specific role have not played since. Participation in rural water and sanitation coverage in rural areas that are most attractive method of sewage disposal in rural areas through the well and disposal of such waste in the villages covered by the guidance of the public roads of the villages covered

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under the lower seems to the rural of water fees observance consumption. (31.60% in the villages covered by the 44.55% in other villages covered)

4-3 the relation of waste disposal to the implementing programs of rural organizations: In the rural guide plan has been implemented or are being implemented to reduce waste in the conduct of public roads is seen washing (28.76% vs. 43.15% in rural non-conductor design,). In addition the direction of the sewage out the apparent increase in rural villages through conductor design and running of the villages showed no guide plan. (39.7% vs. 22.22%), these data suggest that it is conducting project management has a positive role in improving rural sanitation. Comparison of the water network between villages that are private split with villages that indicate valve general impression. Private split has caused sewage from the toilet through the channel leading out of the village is significantly lower than the general removal of valve. (1.12% vs. 33.11%) and other villages with private split the dominant disposal of sewage from toilets public withdrawals from the wells absorbent than milk, which can be of healthy water in better access to home . (96.13% vs. 66.66%) in the study of the problems of lack of access to information in rural areas in terms of geography, geology and waste management method in the study was able to the difficulties of rural to be useful. The present study shows that wastewater from washing and toilet in most cases the model of consistency despite the rural country with agencies and programs run by various organizations in the village is related and management for optimal and effective participation, there is a need for this purpose, the following is recommended:

- ✓ Creation or strengthening of rural and financing their governments.
- ✓ strengthening of Islamic Councils of environmental factors related to health.
- ✓ Increasing access of rural population to drinking water health through increased coverage of rural water and wastewater companies.
- ✓ Given that the first priority for rural water and sewer companies provide drinking water in rural areas has been the possibility of scheduled waste management in rural areas did not appear to be necessary measures to be taken for the purpose of credit to achieve the vision program in this field by 2025.
- ✓ Renovation and upgrading of rural

REFERENCES

- Al-Sa'ed, R., & Mubarak, S. (2006).** Sustainability assessment of onsite sanitation facilities in Ramallah-Albireh district with emphasis on technical, socio-cultural and financial aspects. *Management of Environmental Quality:An International Journal*, 17(2), 140-156.
- Fahiminia, M., Fazlzadeh davil, M., heidari, M., Sadeghi, H., & Bakhtiari, H. (2011).** Survey of Wastewater Management Status in Urban Areas in Iran. *Health Journal of Ardabil*, 2(3), 40-47.
- Fahiminia, M., Hajrasooli, M., Memari, G. A., & Akbari, G. R. (2007).** Assessment and prioritization of sanitation projects in rural areas *Water and Environment Journal*, 66, 52.
- Fahiminia, M., Memari, G. A., & Akbari, G. R. (2007).** To identify the current status, limitations, and strategies for rural wastewater management. Paper presented at the 10th National Conference on Environmental Health, Hamedan University of Medical Sciences.
- Husseinian, M. (2000).** Anaerobic wastewater treatment plants. Iran, Tehran: Technician Hosseinian.
- Mara, D. (2001).** Appropriate wastewater collection, treatment and reuse in developing countries. *Proceedings of the ICE - Municipal Engineer*, 145(2001///), 299-303. doi: 10.1680/muen.2001.145.4.299
- Nori Sepehr, M., Abdoosi, H., haj Alian, B., & Salimi, M. (2005).** Application of unconventional methods of wastewater collection and treatment in four villages of the province's natural. Paper presented at the 9th National Conference on Environmental Health, Isfahan University of Medical Sciences.
- Zeiton, A. K., Gholami, M., Farzadkia, M., Javadi, Z., & Moabedi, I. (2009).** Performance evaluation of Iran University of medical sciences' hospital wastewater treatment plants. *Iran Occupational Health*, 6(4), 44-51.