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Research Article

INVESTIGATING THE ROLE OF NATURAL DISASTERS CAUSED BY TORRENT IN NEW URBAN DEVELOPMENT AND SUSTAINABILITY (CASE STUDY: FARAGHI)

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ABSTRACT
Rural inhabitants of Golestan, mostly those of Kalaleh has made their houses alongside rivers as they need water as a crucial source for their agriculture and animal husbandry_ their main economies_ without considering the potential risks of doing that including floods. As has happened in 2005, in two times in a period of 10 days, 13 villages have been destroyed 100% and seven ones have been damaged harshly. As a result of that, the government has made a draft for movement and concentration of villages including: Ghopan Olia, Sofla, Pashay, Ghare Bash, Ghoolagh Kosan, Ghezel Otagh and etc). But, some of them disagreed with that and remained in their old houses. Some others accepted the movement but not the concentration and choose the upper farmlands of their villages. The purpose of present study is to investigate the role of natural disasters caused by torrent in new urban sustainability and development of Faraghi. The population is its habitants. We have used a questionnaire including 12 questions investigating its natural economical components. Planning model was SWOT and it has shown that people prefer their current villages than a new town because of their jobs at agriculture and animal husbandry. Based on questionnaire, agricultural activities take expensive costs (56% has chosen very high, 24% high, 15% moderate and 5% low). Even their establishments' shortages such as: power outage, schools' suspension, health issues, Tele communications and etc. couldn't make them to move to a new town.

Keywords: *Natural Disasters (Flood), Faraghi, Agricultural and Animal Husbandry Activities*

INTRODUCTION
Researchers have determined different kinds of natural disasters for different areas depending on their conditions. For example, highlands disaster would be avalanche due to heavy snowing. In Golestan, 67% of people live in very dangerous areas, 14.5% in dangerous areas, 11.9% in moderate risk areas and 6.6% in low risk areas (Montazeri *et al.,* 2013).
Rural inhabitants of Golestan, mostly those of Kalaleh has made their houses alongside rivers as they need water as a crucial source for their agriculture and animal husbandry_ their main economies. But, with the advance in meeting the needs and raising costs of animal husbandry and its stagnation, the inhabitants tend mostly to agriculture. In fact, chopping down the trees, not following the principles of culturing, detention and harvesting, destruction of jungles' terracing, excessive animal husbandry in grassland, destruction of dams due to floods and etc. lead to more occurrences of floods. "We've never seen such a flood in our lives before", the inhabitants said.
The government along with the unexpected disasters organization, Enghelab housing institution of Kalale and other related engineers has made the draft of movement and concentration of foresaid villages. But some of them were disagreed about the draft and chose the upper lands for movement. Those who agreed developing 10 new villages by buying about 110 Hectare agriculture land and 130 Hectare grassland (240 hectare in aggregate), which makes a new town in east of the estate, 20 km from Kalale.
This new town, Faraghi, is in 220m above the sea level, have a moderate humid climate, general slope and its prevailing wind is east-west. Its population is 5222 containing 1465 families with growth rate of 1.35 of Turkman (googlan) (table 1).

Table 1: Faraghi population information (without considering Pishkamar, Teymoor Abad and Zabol Abad)

Female	Male	Population	Families number
2572	2650	5222	1465

MATERIALS AND METHODS

The present study is operational and descriptive analytic. Data collecting is based on field studies and library studies using books, articles and dissertations. In field studies, we've used interviews, maps, pictures, direct observation and a questionnaire containing 15 questions using Likert scale. The sample was 100 individuals (table 2).

Table 2: Subjects' age average

Age average	Highest age	Least age	Subjects
42	66	24	100

The results from the diagram have shown that in present study, most frequency was of those who acts in agriculture and animal husbandry (47%) (Should note that because some of them have agriculture and animal husbandry simultaneously, we put them together). 34% of them are labors, repairmen and etc. finally, 11% of them are households and only 8 individuals have a job in governmental organizations.

Problem Statement

Iran is a land which consists mostly of dry and semi dry climate. Flood, its intensity, stability and extension is one of the main problems of all countries, especially Iran (Hatami, 2003). Annual rainfall rate is also less than its average rate in other countries (about one third). Even this low rate doesn't have an appropriate timing and spreadness, as one third of it belongs to the central desert, one third belongs to 10% of country's area and the other one third belongs to the rest (Vahhabi, 2002). According to statistics, today, there are 365 highly populated areas alongside rivers. So, there is an increasing rate of construction in those areas. As a result of that and due to vast jungle destruction, the probability of flood occurrence is increasing annually. According to meteorology organization' purpose, there were appropriate measures done in floods occurred in 1380 and 1381in Gloestan, leading to less losses (Baratian, 2002).

Based on conclusions, 20.5% of estate' areas are in very high risk areas, 20.7% are in high risk, 39.6% are in moderate risk and 19.2% are in low risk ones. Also, 18.6% of villages' inhabitants are in very high risk areas, 14.5% are in high risk, 11.9% are in moderate risk and 6.6% are in low risk areas (Montazeri *et al.*, 2013).

There were 45 individuals killed and 22billion Rial loss in flood occurred in 2003. There were also 22 individuals killed in 2005 due to the destruction of 20 villages caused by flood. Although no media covers it, there were three individuals killed in Siah Marzkooh due to flood in 2005 and 70% of unexpected disasters organization' budget had been allocated to its losses. The dominant believe is that 22% decrease in jungles' area during three recent decades is one of the main reasons of flood occurrence in Golestan (17% of that belongs to recent two decades and Golestan is in first place by the loss of 21% of its jungles).

Two floods have been taken place in Kalale and Marave Tappe villages due to heavy raining in a period of few days in 2005. Based on reports, the second one's rate was 135mm which was the most horrible one in recent century and it is worse ten times than the first one. Four villages (Upper Haji Beig, Lower Haji beig, Ghopan and Pashay) had the worst loss. Although Emdad personnel have warned them against its occurrence, the inhabitants didn't take it so serious and didn't leave their homes. As a result, 300 house in 70 villages have been destroyed and 1500 Hectare of farmlands, as well. Aftermath, people and officials decided to do the movement and concentration plan. But there was a problem; more than 80% of

inhabitants are farmers which have livestock in their yards in a completely traditional way (5000 hectare and 1000 cows and lambs and more than 2000 sheep).
After concentration, they can't keep going like that in a small place and they have to spend excessive costs for their agriculture activities. Although the government works on Faraghi's development, there is no attempt to develop the industry and job creation (table 3).

But the most important issue is that life doesn't have its real meaning for them without livestock. Their main job is agriculture and animal husbandry, but there is no animal husbandry site, as it is behest and no place for keeping agricultural tools and vehicles. This is one reason for them to prefer their previous houses. Golidagh inhabitants live also in an at risk place.

Their movement was done in past years. But some of them remained in their houses, although they took their house and farms in new site. So, there is no other solution for the government but the cancelation some general services.

However, some of the services would be back by official consistencies. Another problem is that they have sold their livestock because of new condition. Living in a small place like this new site made them unsatisfied even mentally.

The increase of population is also another problem rising after concentration in a small place. They are all Turkman (Googlan tribe). Their formal language is Persian. We should note that the foresaid tribe is a sublayer of Ishan, Sorly, Agh Injg, Sheikh and etc.

Main Question
It seems that natural disasters caused by torrent affect the urban development: Case Study Faraghi.
Research Realm
Being approved as a town by the government in 2012 consists of 11 concentrated villages. It is located alongside the road connecting Kalale and Maraveh Tappe; somewhere near historical wall of Gorgan e.g Ghezel Alal (belonged to Sasanian Era).
Its coordinates are 37° 42' to 37 22' N, 55 54' to 55 20' E. it is located 20km from center of Kalale. Its elevation is 220 meters above the sea level. It has a population of 7200. Faraghi has its name before famous poet of 1733 A.D, Makhtoom Gholi Faraghi.

Table 3: Faraghi's Worker in variant sectors

Whole population	Those who above 10 years old	Active ones	percentage workers	workers	indices
28.75	37.5	72.3	80.55	1325	agriculture
21.5	2.82	5.7	6.07	100	Industry, mine and construction workers
4.75	6.23	12.5	13.38	220	Commerce and service
35.65	46.55	93.5	100	1645	total

RESULTS AND DISCUSSION
According to table 4, the results of different indices could be analyzed through the follows:

Table 4: Result of the question

results					question	rows
total	low	moderate	high	very high		
100	6	17	24	53	How much floods affect the immigration?	1
100	32	46	12	10	How much do you satisfied with the new place?	2
100	earthquake 28	flood 4	wind 64	lightning 2	Which disasters put you at risk in your new town?	3
100	9	15	57	19	How much do you like to come back to your previous place?	4
100	7	12	24	57	How much do you like to come back to your previous place?	5
100	15	28	51	6	How much the movements change your security against natural disasters?	6
100	63	24	13	0	How was job creation in your new town?	7
100	9	26	27	38	How much the movements affect your jobs?	8
100	0	27	42	29	How much the movements affect your previous jobs?	9
100	5	15	24	56	How much the movement rise your costs of agriculture?	10
100	58	22	13	7	How much your agriculture and animal husbandry grows by the movement?	11
100	6	11	24	59	How much of your agriculture and husbandry activities decrease or emitted due to the movement?	12
100	28	64	8	0	How much do you gain of movement?	13
100	26	37	22	14	How much are you satisfied by the way you've been inhabited in your new town?	14

According to question 1, natural disasters especially flood was the main reason for immigration.
Question 3 shows that new town's disasters are as follows according to the questionnaires: 2% Lightning, 64% wind, 4$ flood and 28% earthquake.
Question 4 shows their tendency to go back to their previous houses as follows: 19% very high, 57% high, 15% moderate and 9% low.
Question 5 shows their tendency to go back to their previous houses as: 57% very high, 24% high, 12% moderate and 7% low. In fact this question refers to the time before the concentration and compares to diagram 5 Referring to the time after the concentration. The difference between the two diagrams is because of the costs they've been imposed after movement.
Question 6 shows that there is a big effect of their security against natural disasters after the movement as the answers are as follows: 6% very high, 51% high, 28% moderate and 15% low.
Considering job needs is shown in Question 7. And the answers are as follows:
0% very high, 13% high, 24% moderate and 63% low. In fact, there is no remarkable consideration to job creation. Question 8 shows the job change of the inhabitants due to movement and answers are: 38% very

high, 27% high, 26% moderate and 9% low. They've chosen selling because there is no establishment for animal husbandry and agriculture. Many of them immigrate to Tehran and Semnan as a result of unemployment.

Question 9 shows the answers to the question "how much the movement affect their previous jobs such as: agriculture, animal husbandry, handcrafts and …" as follows: 29% very high, 44% high, 27% moderate and 0% low. This shows that all the foresaid jobs are in depressions or emitted. Question 10 shows the results about increasing costs of agriculture and animal husbandry as follows: 56% very high, 24% high, 15% moderate and 5% low.

Question 11 shows the results about agriculture growth as follows: 7% very high, 13% high, 22% moderate and 58% low. This shows its depression and emission. Question 12 shows the results about the effects of movement on agriculture activities' decrease as follows: 59% very high, 23% high, 11% moderate and 7% low. This shows negative effect of movement on agriculture activities.

Question 13 shows the loss level caused by movement as: 54% very high, 26% high, 14% moderate and 6% low. At last Question 14 shows the inhabitants' satisfaction of new town as: 14% very high, 22% high, 37% moderate and 26% low. This shows the fact they've imposed some economical loss, though their problems tend to be solved.

How the Inhabitants being Inhabited in Faraghi

They have been inhabited in their new houses under supervision of officials, Islamic councils and other related ones through a draw. But each village' inhabitants were inhabited in a separated block from other villages' inhabitants (table 5).

Table 5: Population statistics of Faraghi's inhabitants and other villages after 1384 flood

female	male	population	family	hamlet	village	canton	county	province
24	27	51	16	Pashay	Zavkooh	pishkamar	Kalale	Golestan
__	__	__	__	Sheikh lor	zavkooh	pishkamar	Kalale	Golestan
26	28	54	14	sidler	zavkooh	pishkamar	Kalale	Golestan
155	159	317	70	Agh Tappe	shelmi	Golidagh	Marave Tappe	Golestan
15	13	28	6	dooji	temran	markazi	Kalale	Golestan
80	67	147	39	kurk	shelmi	Golidagh	Marave Tappe	Golestan
155	146	301	76	chatal	shelmi	Golidagh	Marave Tappe	Golestan
70	77	147	46	Ghopan sofla & Ghare bash	shelmi	Golidagh	Marave Tappe	Golestan
224	258	477	139	Ghopan olia	shelmi	Golidagh	Marave Tappe	Golestan
91	87	178	35	Ghezel otagh	shelmi	Golidagh	Marave Tappe	Golestan
25	32	57	15	Khooje lor	shelmi	golidagh	Marave Tappe	Golestan

SWOT Model

We've used SWOT (Strength, Weakness, Opportunity and Threat) to determine the town's weakness scores, strength scores, opportunities and threats (table 6). This model was first used by George Albert Smith and Roland Christiansen, two graduated students of Harvard, in 1950. This model has made so many successes on the time and being an appropriate tool in management. Weakness and strength nature is related to inner issues and opportunity and threats are related to environmental issues.

Table 6: SWOT's factors

Domestic factors		**Non-domestic Factors**	
(S)	**(w)**	**(O)**	**(T)**
Buildings stability against disasters	Job creation and opportunities	Less distance to city	Institutional facilities
Health centers	Health facilities	Transportation network	Rising costs of agriculture
Gas piping	Parks	Quality of landscapes	Household jobs' emission
Educational centers for	Cultural Sites for spare times	Recreational site for local people	Banking centers
Street asphalt	farmlands as sites for construction	Library for neighbor villages	Wind, a probable disaster
electricity	Immigration to neighbor provinces for job	More communications between villagers and cities	Agricultural cooperatives
Social security	Transportation accessibility	Weakly bazaar for villagers	Local customs

Results

We investigated the research question according to tables 7 to 12. It seems that natural disasters have meaningful effects on urban development and stability. According to table 3, one could understand that not only the villages' population didn't decrease after movement, but also they live there with the least facilities available. We should note that based on question 5 and 6 (table4), the inhabitants have more tendencies to live in their villages rather than Faraghi due to their main jobs e.g. agriculture and animal husbandry and the fact that there are no facilities to do them in Faraghi. "I can handle my family's needs with a few live stocks, but I can't do the same here in Faraghi" one of the inhabitants said.

Table 7: Threats components list of Faraghi

Impact coefficient	**Probability percentage**	**Impact weight**	**(T)**
3.10	0.9	3.45	Institutional facilities
2.92	0.8	3.65	Rising costs of agriculture and husbandry
1.9	0.95	2	Household jobs' emission
2.16	0.9	2.40	Banking centers
1.2	0.6	2	Wind, a probable disaster
2.16	0.9	2.40	Agricultural and animal husbandry cooperatives
1.9	0.95	2	Local cultural customs
2.19			average

Table 8: Opportunity components list of Faraghi

Impact coefficient	Probability percentage	Impact weight	(O)
1.4	0.8	3	Less distance to city
3.8	0.95	4	Appropriate Transportation network
2.7	0.9	3	Quality of landscapes
2.62	0.75	3.5	Recreational site for local people
2.8	0.8	3.5	Library for neighbor villages
1.95	0.65	3	More communications with cities
1.1	0.55	2	Weakly bazaar for neighbor villages
2.33			average

Table 9: Strength scores of Faraghi

Impact coefficient	Probability percentage	Impact weight	(S)
3.6	0.9	4	Buildings stability against disasters
2.25	0.75	3	Health centers
2.55	0.85	3	Gas piping
3.4	0.85	4	Educational centers for
3.8	0.95	4	Street asphalt
3.6	0.9	4	electricity
1.2	0.6	2	Social security
3.05			average

Table 10: Weakness scores of Faraghi

Impact coefficient	Probability percentage	Impact weight	(w)
3.6	0.9	4	Job creation and opportunities
1.5	0.75	2	Health facilities
2.1	0.6	3.5	Parks
1.9	0.95	2	Cultural Sites for spare times
2	0.8	2.5	farmlands as sites for construction
1.4	0.7	2	Immigration to neighbor provinces for job
0.6	0.2	3	Transportation accessibility
1.78			average

Considering job needs is shown in diagram 8. And the answers are as follows: 0% very high, 13% high, 24% moderate and 63% low. In fact, there is no remarkable consideration to job creation. Diagram 11 shows the results about increasing costs of agriculture and animal husbandry as follows: 56% very high, 24% high, 15% moderate and 5% low.

Generally, the inhabitants prefer to live in their villages because of their main jobs e.g. agriculture, animal husbandry and handcrafts. They even cope with the facilities' inaccessibility in villages like telecommunications, health and etc. Their main reason is that there is no consideration about agriculture and job creation as their main income source was agriculture.

Table 7 shows the threats components as follows: most weighted score is of institutional facilities 3.105 and the least effect coefficient is of wind as a natural disaster.

Table 8 also shows the opportunities components as follows: highest weighted score is of transportation network3.8 and the least effect coefficient is of selling agriculture tools 1.1 which is a weak score and less than the normal one.

According to table 9 the highest weighted score is of houses stability against natural disasters 3.6 and the least weighted score belongs to social security 1.2. Also, in table 10 the highest weighted score is of job creation 3.6 and the least one belongs to transportation accessibility 0.6. The average scores show the weakest score.

Conclusion

1. Destruction of 240hectares of farmlands for movement
2. There are some problems; there is only health center and county department, no bank and insurance ones.
3. The movement and concentration was done so rapidly without sufficient study and research, mainly because of inhabitants' mental tranquilizing.
4. Inappropriate place selecting for the city without considering climate and physical factors. Wrong construction pattern and street systems.
5. Organizations incoordination and their irregular planning and implementations
6. People are not satisfied with the movement and they miss their face to face relations available in their villages.
7. There is no plan for job creation and it leads to moving to Tehran and Semnan, especially for those who married recently.
8. Emission of some economical activities such as animal husbandry
9. Decrease in agriculture activities because of increasing costs for retail ones.
10. False brokerage; speculation for more future incomes.
11. Wrong planning for facilities' sites like educational and recreational sites; the rail road planned for future make their houses separated from the foresaid facilities.
12. Immigration through selling or renting their new houses due to inaccessibility to the facilities.
13. In fact, developing a new town like this by concentrating many villages in a small place like that without sufficient facilities and sites for their agriculture and animal husbandry is not as good as it was thought.

Suggestions

1. Job creation through workshops for retailers especially for youth. License issuance for those who tend to invest in these fields.
2. Constructing banks, insurance centers and etc. to ease people' affairs.
3. Faraghi is not like a real town because of urban culture and its environment structures.
4. Making establishments for animal husbandry somewhere out of town, having its economical supports.
5. Establishing some centers for selling animal husbandry productions and agriculture ones.
6. Offering them some long-term banking facilities in case of possible losses.
7. Renovating their mechanisms and agricultural tools to prevent problems caused by drown and etc.

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