

Housing project for the poor

A plan with no aim

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Abstract

A state housing plan, called Mehr, by the Iranian government is criticized in this paper. The plan aimed to help the poor to invest in affordable housing and enjoy low interest bank loans. The plan did not succeed as promised. The growth rate of the construction remained almost the same, and at most sites the houses did not get ready for inhabitants. Banks invested, by state force, a lot, and there is no hope to get the loans back. The focus of the paper is on the satisfaction of the people who invested in this plan. The case studied is a small town in the center of the country. Different alternatives to the plan are investigated using a SD model. The main criticism against the plan is to change the small towns with very low rise buildings to accommodate medium rise buildings while the land is freely available, and the maintenance charges to keep buildings is more than the income of the inhabitants.

Key words: System dynamics, Housing, Satisfaction

1. Introduction

Different countries for resolving the housing problem have carried out some different techniques, some have tried to rehabilitate slums around the cities, some of them gave mortgage to eligible, some gave land with cooperation of municipalities to eligible, some taking tax on uninhabited houses, giving facilities to mass manufacturers etc. We have high inflation and high cost of housing in Iran. Demanding more than supply housing has negative effect on inflation. Demanding housing is divided in two parts in Iran: a) Real demand of housing based on household needs. b) Investment demand to maintain equity. Needing more supply to improve situation. Mass housing project is the best way for more supply. Nowadays housing problem has been one of the greatest of people's concern. The ninth and tenth government has been giving mortgage, land and mass housing to eligible to decrease or eliminate housing problem in Iran. No ownership of housing or ownership records of housing or residential land that haven't used governmental sources for housing and are in charge a house, are eligible for taking facilities. The government decided to implement the mass housing project called Mehr housing in all cities. Thus after passing the Mehr housing project in cabinet in 2007 and passing the official process, the government started to build housing cooperative in cities and enrolling eligible individuals who lived in desired city for 5 years.

In economics, investment cost is inversely related to the investment. On one hand the provision of land and its cost has always been an obstacle for investment in the housing department. The national lands were used to implement Mehr housing to crossing this obstacle and lower the cost of a residential unit for eligible. In this project, government will take a very small fee to rent land. In section 1.2. is described.

Ardestan is located in the center of Iran. Mehr housing cooperatives were established under one management and began to build apartments. Apartments building have several advantages such as land saving compared to villa type, also in this type of construction the cost of building is lower than villas thanks to dividing building foundation cost among all residents. In addition apartment building has disadvantages, the lack of apartment

living culture in many small towns, the increase in side costs of housing as charged etc. reducing useful space of housing units with hallways and elevators can be disadvantages. Considering of the advantages and disadvantages of present situation simulation together can show performance of this type of building in Ardestan. After that, in order to increasing performance, we can offer some recommendations. This showed that if we implemented this project, the applicants satisfaction would increase. Actually, applicants housing problem would be resolved in the Ardestan city.

The following are researches on housing issues, low income housing policy with system dynamics (SD) approach in [1] for US. Evaluation of housing market with SD approach in [2] for UK. The study of land market and its effect on housing market with SD approach [3]. The validity of mortgage policies with SD approach [4] for Korea. Evaluation of housing affordability with SD approach [5] for Iran. The reasons why, alternative housing have been inefficient and uneconomical in developing country [6] for Bogota, Colombia.

Study of housing issue contain, economic decisions such as mortgage amount, taxes etc. government decisions such as services, issue priority etc. applicants interests such as the design of units, size of units etc. for addressing that issue they should be examined simultaneously. There is the interaction of various factors of social, economic and political in housing issue so we are faced with a complex system. We need to know the policies feedback to understand the efficiency of policies and applicant satisfaction of Mehr housing and also proposed alternative policies. On one hand system dynamics has ability of solving complex problems of nonlinear and feedback loops. In the system dynamics approach, first, we have a description of the problem then identifying the level and the rate of problem, on the next steps simulation and alternative policies will be discussed.

We have faced with some limitation in study of housing issue and Mehr housing efficiency. Due to lack of development and not paying attention to the importance of statistics in Ardestan, housing exact number isn't clear and for this reason, that is not available on national or provincial official portals. But by reviewing informal different statistics, its approximate amount has been identified. So we can work according to it. However, this problem doesn't have effect on healthy simulation and its results. Some of costs are hidden and not calculated. It means that don't has any cost for applicant but the government paid this cost without taking payment as regards applicants don't pay for that, so in the paper it hasn't been discussed.

In this paper after the introduction of some important elements, we described the model then present situation simulation and predicting applicant satisfaction using software "IThink". Finally alternative policies and comparing them with the current policy in Ardestan are presented.

2. Model Description

Mehr housing located in Ardestan city with the area of 23 hectare along with 49 residential blocks and 588 units is being built by Mehr housing cooperative unions. So far 12 residential blocks and 114 units have been completed. The work that has been done in this paper is based on the collected data of 114 residential units.

2.1. Construction cost of per square meter (PSM)

Construction cost is divided to indirect and direct costs.

2.1.1. Indirect cost

It means that the costs which are not related to the materials demanded for building construction but these costs are necessary to build a building.

2.1.1.1. Bureaucratic cost

The sum of costs including in registration and notary public office's costs, general and administrative costs, costs of evaluation and segregation of units price and also costs of build license and building end issue are determined by municipality named bureaucratic costs and they described in table 1.

Table 1- Bureaucratic cost

Cost name	Building end issue	Evaluation & units price separation	Build license	General & administrative	Registration & home office	Sum cost (Rials)
PSM cost	6099	1814	28462	64854	14778	116000

2.1.1.2. Monitoring cost

The sum of monitoring costs is determined by construction engineering organization and monitoring resident or consultant. Although these costs don't effect directly on building construction, it have used for Mehr housing. It mentioned separately in table 2.

Table 2- Monitoring cost

Cost name	Resident	Engineering organization	Sum cost (Rial)
PSM cost	4300	14700	19000

2.1.1.3. Design cost

The cost of site designing and plan of administrating are determined by a company, which is introduced by Mehr housing cooperative unions in Esfahan province. It costs approximately 14700 Rials PSM.

2.1.1.4. Cost of insurance and taxes

This part of costs is divided in two parts: insurance cost and tax of cooperatives, and also insurance and tax costs of contractors. The sum of insurance and tax cost are approximately 295 thousand Rials PSM.

2.1.1.5 Branches cost

The branch allowance of gas, electricity, telephone, water and wastewater are considered as branches cost which are described separately in table 3.

Table 3- Branches cost

Cost name	Water & wastewater	Electricity & phone	Gas	Sum cost (Rial)
PSM cost	31177	25769	10368	67000

2.1.1.6. Land cost

As it is mentioned in section 1, government has reduced the amount of land cost for reduction the applicants' submitted housing cost. The land which is considered to project, are as a long-term land rent for 99 years in accordance with operational right of eligible applicants, and government will receive approximately 7000 Rials per each year PSM.

2.1.2. Direct cost

All costs affected directly construction of residential units have been named direct cost. For example, landscaping, joinery, materials and labor force etc.

2.1.2.1. Operational cost

The cost of masonry, joinery, implementation of elevator and radiators are assessed as operational costs. The main part of cost spent on this section is described separately in table 4.

Table 4- Operational cost

Cost name	Radiator	elevator	Joinery	masonry	Sum cost (Rial)
PSM cost	65994	82085	1327480	1224828	2700000

2.1.2.2. Preoperational cost

This section of cost has been divided in two parts: site interior landscaping and land preparation. The sum of preoperational cost is approximately 68800 *Rials* PSM.

In general, the sum of constructional cost per each square meter of 144 units is finished approximately 3200 thousand *Rials*. According to the data shown separately in section 2.1.1.and 2.1.2, the percentage and contribution of each component is shown in diagram 1.

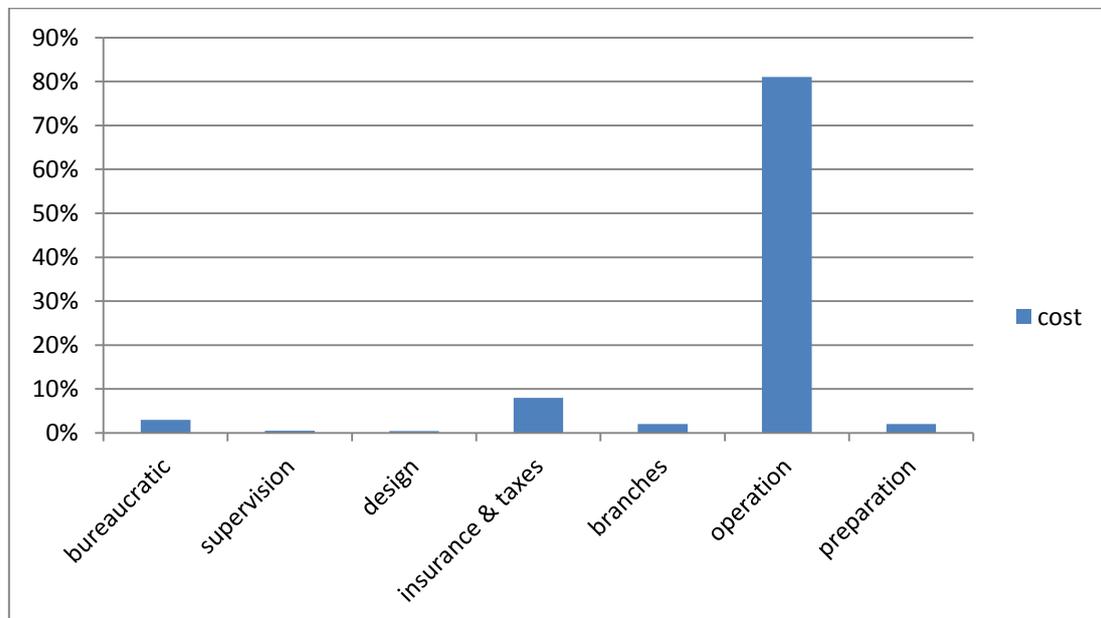


Diagram 1- The percentage and contribution of each component

2.2. Applicant cash

Each applicant has paid 100 million *Rials* as advance payment, 220 million *Rials* was paid as mortgage with 4% interest and a 15-years repayment by government. Monthly repayment each applicant is calculated from formula below:

$$\text{Monthly repayment} = (\text{mortgage})(1 + \text{interest})^{(\text{the number of repayment years})} \div (\text{the number of repayment years} \times 12)$$

2.3. Need house

Calculation of need house in each area is different due to the household and population, so, according to the Ardestan city population and average household (3.2) person, we are able to calculate the number of need house.

2.4. Existing house

According to the lack of clear detail statistics and mentioned descriptions about housing in section 1, studying and analyzing statistics showed that the amount of approximately 4900 houses can be considered for Ardestan. Furthermore, output for existing house cannot be considered because there is a lack of executable program for the reconstruction of old houses. In addition, only due to the annual build, the amount of growth rate for build can be considered.

2.5. Ardestan's population

The reason why we need to know the statistic about Ardestan's population is the fact that we are able to calculate need house. According to the latest statistics, Ardestan's population is close to 16000 people along with growth rate of -1%.

2.6. Iran's population

Capita income people and applicant income of Mehr housing are necessary to investigate satisfaction level, therefore, it is important to assess Iran's population and communicate with economical components. Moreover, Iran's population is considered approximately 76 million people with growth rate of 1.3%.

2.7. Applicant satisfaction

Several factors are involved in the applicant satisfaction, but we can consider some important factors which are the most weight or are of the highest priorities, such as the trend of project financing and power of host of project, supply and demand market condition, project design and the size of project are main factors that each of them have a separate weight between [0,1] and they have been considered for the sum of 1. Mehr housing applicants are considered as low-income deciles in society along with income close to work insurance rights. According to central bank of Iran, every household can almost spend 1 out of 3 of his income on housing issues. Project financing is expressed by purchasing power. If the total monthly repayment in section 2.2 of residential units like monthly charge per unit and land rent mentioned in section 2.1.1.6, were equal or low than cost in housing section for applicant, the related weight would be given them. As it is mentioned in section 1 in accordance with high inflation and high cost of housing in Iran, increase into housing demand instead of housing supply have negative effect on inflation. Thus, if housing supply and demand were equal or supply was more than demand, the weight of supply and demand market condition would be submitted. Project design is total of national regulations symbol of build (Industrialization) of Iran which is named Article (19), apartment living culture, design and project specifications. As it is mentioned in section 1, due to low rise of building and lack of individual custom of living in apartments, apartment living culture isn't conventional and it is not a part of the individual culture. In addition, in section of designing and apartment specifications, useful space of residential units were reduced which is why, they want allocate the space to design hallways and elevator, in spite of lack of modern facilities such as shooting , etc. in view of the average of 3 factors considered for project design, we can give their weight. Generally, in small town, the area of houses is large and compatible with their life style. Although living in apartment with the area of 75 meters in large cities is typical, this isn't considered desirable in small towns. Due to the area of houses, their weight can be given.

3. Dynamic description

As it is mentioned in section 1, within the method of system dynamics, after model was described, level and rate will be discussed. Then we bring simulation model. According to section 2, construction cost PSM, applicant cash, need house, existing house, Ardestan's population, Iran's population and applicants satisfaction are known as seven levels of issue. Other variable rate is known as a rate of issue. Simulation model is shown in figure 1. We introduced some parameters in this model which are given in abbreviated.

CCPSM: Construction Cost of Per Square Meter
ASFH: Ability Save For House

AGR: Ardestan Growth Rate
AHR: Available House Rate

TNR: The Number of Repayment

DCA: Design of project, Culture of apartment, Article 19

IAT: Insurance And Taxes

Diagram of simulated for amount of applicant satisfaction over next 20 years is shown in figure 2.

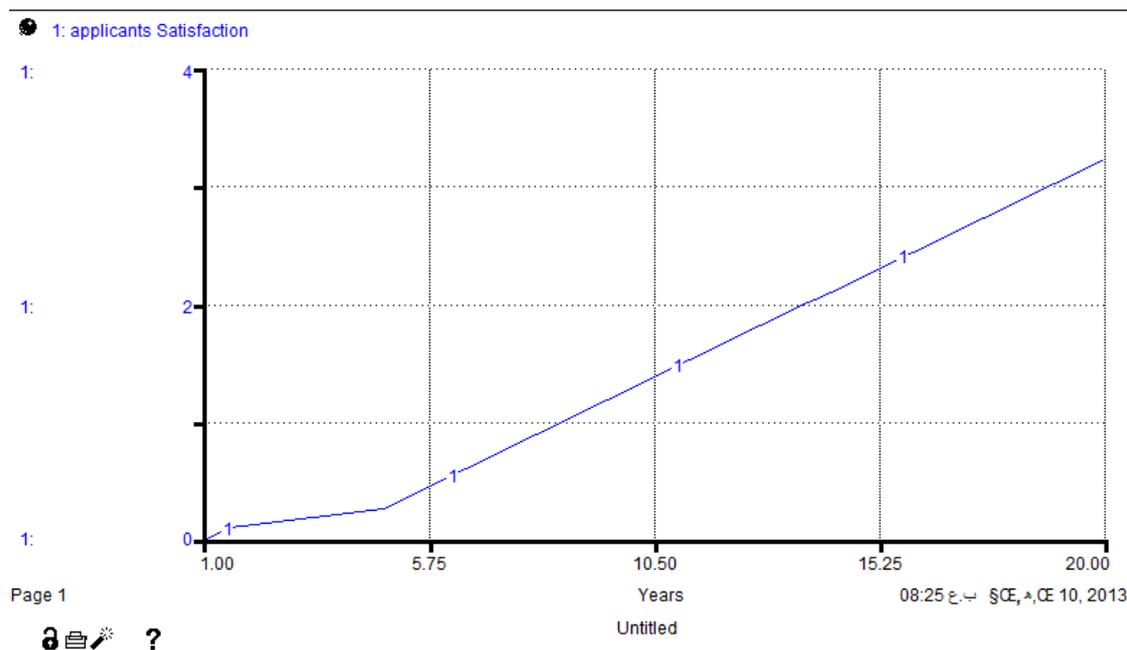


Figure 2- Applicant satisfaction over next 20 years

Solution will be presented to increase the applicant satisfaction in next section.

4. Alternative policy

Ardestan has a traditional texture and the most of its buildings are one or two-floor. It has sufficient land for housing construction. Hence, Ardestan city has enough and suitable land for housing in low-rise. So we can offer to build villas instead of apartments in Mehr housing project. On one hand, due to the existence of lifestyle in apartments and jointly owned things used such as elevator, each residential unit obliged to pay monthly charged close to 1.2 million *Rials*. Also they have to pay repayment of monthly mortgage nearly 2.2 million *Rials*. On the other hand, the main applicants of Mehr housing encompass low income deciles in society and often their salary is close to insurance rights. As it is seen section 2.6. and in accordance with statistics of central bank of Iran, every household can pay nearly 1 out of 3 of their income on housing issue and monthly repayment of mortgage and monthly charged are more than their financing power. Due to the 3.2 million *Rials* PSM for building per each units and according to remark which are made by housing experts in the same time for apartments build, we could build villas instead of apartments and the cost of PSM is approximately 4 million. Because the villas don't have cost of elevator and radiators build and also don't have cost of charged, the government has heavy machineries, so it is responsible about preoperational land. Therefore the costs will be reduced approximately 200 thousand *Rials* PSM. So, if each applicant paid nearly 60 million *Rials* more or the government paid mortgage more than now, we could built villas for each applicants with the area of between [100,110]. In the field of repayment in accordance with investigation made, 15 years is the time that government considered to do this project, and it is optimal. Furthermore, by elimination of jointly owned space, we could increase the useful space of housing. In order to having Villas, we don't need to be know the living apartment culture and we could also oblige Article (19) mentioned in section 2.7. If we oblige these changes, which were mentioned, the applicants satisfaction level would be different about living in apartment. In figure 3, the amount of applicants satisfaction and alternative policy are shown.

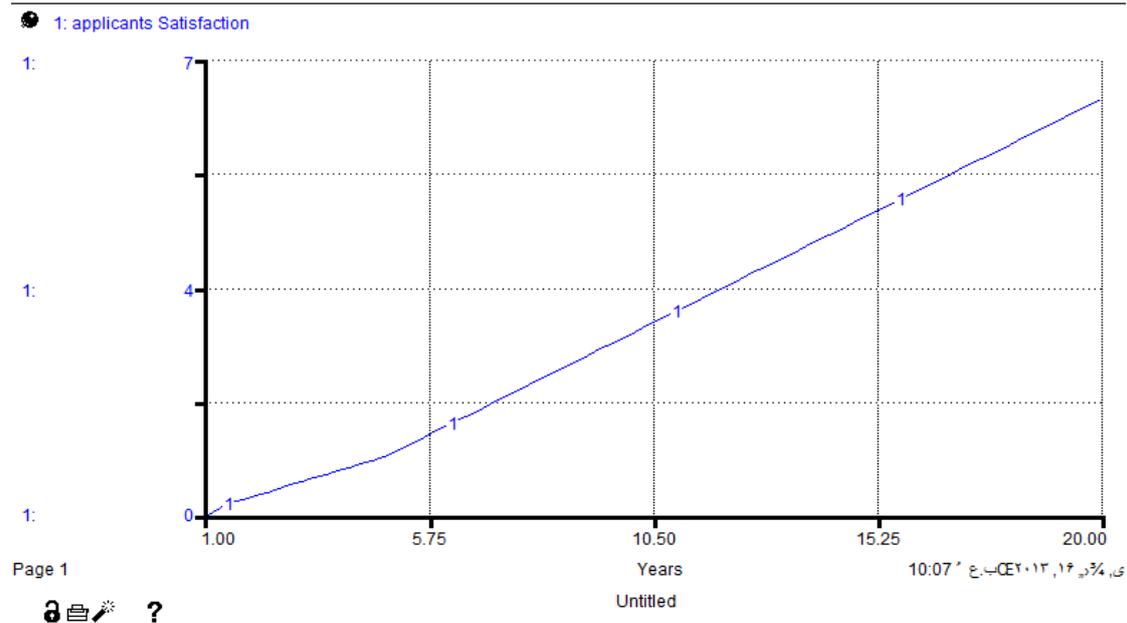


Figure 3- Applicant satisfaction over next 20 years after implementation of alternative policy

Results show that the amount of satisfaction of living in villas is doubled more than living in apartments.

5. Conclusion

After government submits lands to applicants who are qualifications as it describes in section 1, giving mortgage and mass housing construction put a major step to eliminate or decrease of housing problem.

Mehr housing is made in the shape of apartment. The most important reason for build of apartments is the fact that the aim of this project is to build apartment with high height instead of build apartments with excessive width and use of height thanks to lack of width. In cities like Ardestan, there are enough lands for building house. Moreover, it is possible to build mass housing in shape of villas.

In section 3, the satisfaction of this scheme has been shown in figure 2. Section 4 deals with expression and alternative policy review. The amount of satisfaction is shown after implementation of alternative policy in figure 3. The satisfaction of implementation of alternative policy is nearly doubled in current policy. So, implementation in building villas instead of building apartments is more compatible with the texture of Ardestan. This is obviously shown in figure 3. Ultimately, we offer to build villas in cities like Ardestan which have this kind of texture

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