



PUBLIC HOUSING PROVISION AFTER THE HANSHIN-AWAJI EARTHQUAKE DISASTER

**KENJI KOSHIYAMA¹ YOSHITERU MUROSAKI²
IKUO KOBAYASHI³ SHIGEO TATSUKI⁴**

SUMMARY

Housing recovery plan is one of main programs for urban reconstruction after disaster. In the case of the Hanshin-Awaji Earthquake disaster, the provision of new housings built by public sectors has been an important part of them. Public sectors (Hyogo prefecture office, Kobe city office and damaged city offices) built about 40000 housings in the damaged area for three years, and provided them for victims who lost their living housing. Now we can find big and new public mansions for disaster victim. But then, there are many problems for housing providing process pointed by housing planning experts and professional men. In this paper I would like to report the housing conditions in current damaged area and consider the part of public housing provision in the housing recovery plan in Hanshin-Awaji Earthquake disaster.

The procedures employed in this analysis as follows.

- 1) I analyzed public statistics about housing dates to grasp the housing condition in a damaged area.
- 2) I collected and analyzed the data about the public housings providing. (location, situation, scale, resident senses)
- 3) I considered the relationship between the public housing provision and the urban reconstruction process.

I pointed out about the direction of an ideal plan of the housing provision after disaster finally.

INTRODUCTION

The housing reconstruction is the most important issue for damaged areas after disasters, because they provide not only places to live for the sufferers who damaged by disasters but also life reconstruction. The urban reconstruction depends on the program of housing reconstruction. Recently, the big earthquake occurred on the urban area and did serious damage in the many places in the world. By their disasters, many houses were destroyed and those who were living there needed the supports to recover their life and get living places anywhere. The government of

¹ Disaster Reduction and Human Renovation Institution

² Kobe University

³ Co-Plan Inc.

⁴ Doshisha University

damaged areas made and implemented the housing reconstruction programs adaptable for each regional matter. As a result of which, there are many programs in the world and we get a lot of philosophies of support programs for those who repossess their living places.

The common procedure of housing reconstruction has three stages which are 'evacuate', 'temporary living', 'reconstruction' in the sight of many practices. By which, the sufferers can recover their life and it will lead to the urban reconstruction. On the account of which, the government or the municipality office must plan the strategy for the support program in each stage and manage the urban reconstruction, mainly housing reconstruction.

There are two major methods to support getting new living places for victims. The one method is to give the victims money resource for repossessing a new house. To give cash directly, to lend money at low rate, to issue vouchers for life and housing reconstruction are included in this method. New housings to need for them will be built by private sectors, and they can get new housing on the market. This means to provide housings indirectly on the whole of the housing reconstruction activity in damaged areas. Another one is to supply new buildings in damaged areas directly. The public sector and the government supply the required number of units. This method is often used for the case in which there are many low-income victims. The houses (apartments) built by them are used as rental housings or they are sold for victims at low-price. This means to provide housings directly.

This paper shows the mainly housing reconstruction process of the case of the Hanshin-Awaji Earthquake disaster and the analysis of Disaster Recovery Public Housing Providing which is one of the policies which the public sector produced to reconstruct damaged areas on the basis of the Community Survey by Hyogo Prefecture office.

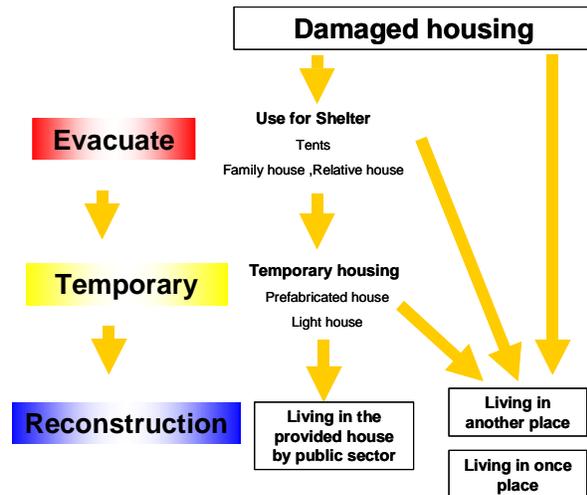


Figure 1. Stages in the housing reconstruction process

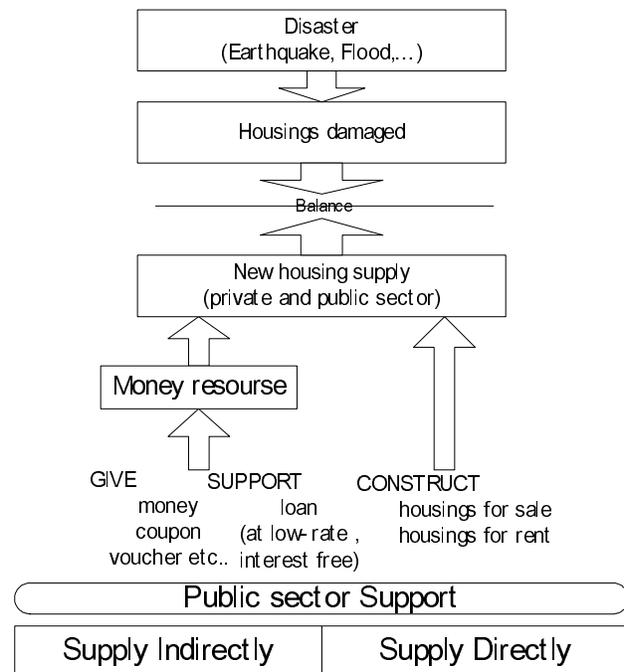


Figure 2. Housing reconstruction Support programs of public sectors

THE CHARACTERISTICS OF THE HOUSING PROGRAM OF THE HANSHIN-AWAJI EARTHQUAKE DISASTER

Many surveys and comments about the housing reconstruction process of the Hanshin-Awaji Earthquake disaster are implemented and published by not only Japanese researchers but also researchers in other countries. There are many points for them already, and I am not concerned here with each theory. This paragraph shows the information of the housing reconstruction process and the focus on the points in this paper.

Figure 3 shows the whole housing reconstruction process after the Hanshin-Awaji Earthquake disaster. (ICHIKO, NAKABAYASHI, 2002) The Earthquake hit in the densely-populated area, and the result many housings were collapsed -about 200,000 units- and many people were died there -6,432 people-. Those who had lived but lost their houses entered the 'Evacuation' stage in the housing reconstruction process soon after the earthquake. In that cases many sufferers stayed in damaged areas and had lived in the shelter (school, public center, etc..) for six months as the case. Next stage is 'Temporary'. The public sector had provided many prefabricated housings (48,300 units) and rental public housings (11,689 rooms) as the temporary housings for sufferers who were able to acquire a new place to live in. It took about five years to dismantle all of them. After that, in 'Reconstruction' stage the difference of individual housing reconstruction speed appeared. The housing condition recovers mostly from the damage in the terms of the number of housings, but a part of sufferers have not been back in once living place regardless of their wishes, specially who had lived in the low rental housings. (a wooden apartment, etc..) Most of them are living in the Disaster Recovery Public Housing. (40,772units)

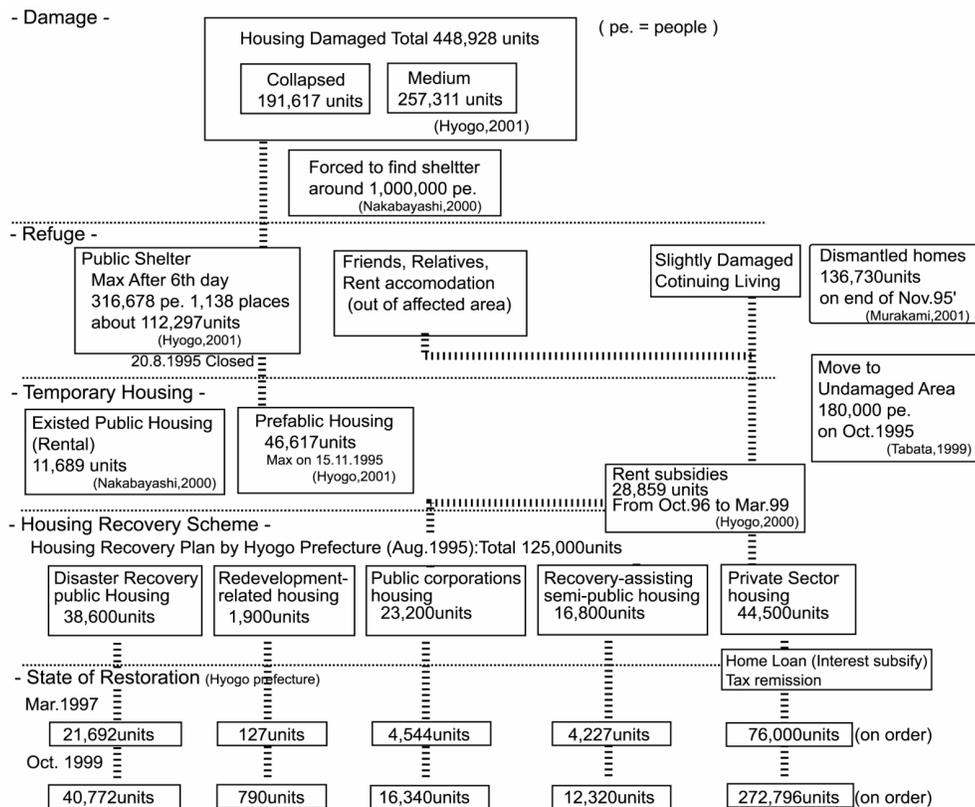


Figure 3. Housing Reconstruction Process After the Hanshin-awaji Earthquake disaster (ICHIKO, NAKABAYASHI, 2002)

Table.1 shows the housing units supplied by public sectors in the housing reconstruction programs on recently earthquake disasters. The characteristics of the Hanshin-Awaji Earthquake housing reconstruction program is shown as follow:

a. Supply of Rental housing units

It is a rare case that the public sector supplies the rental housing units for the victims after disasters. In both cases of Mexico and Turkey, the housing units built by the public sector were sold at low-price for victims. In the cases of Hanshin-Awaji, 59,000 rental housing units managed by public sectors have been provided for victims. The method to provide rent apartments is used to supply affordable housings for low-incomers on disasters. According to survey for those who was living on temporary housings, many residents would live the public housings then. In fact, the public sector (mainly Hyogo Prefecture government) met the needs of them and built many public housings in damaged areas and so on. As a result of which, they have achieved the rapidly recovery of housing units and almost of the victims live on new housings, but then there are many issues which are many remains of vacant rooms on mansions built by private sectors and the maintenance and management of many public housings so on.

The use of this method in the disaster depends on the system of supply of public housings in regular program. In that sentence, supply of public housings as affordable rent apartments is the unique method in the housing reconstruction program after disasters.

Table 1. Housing units built by public sectors in recently earthquake disasters

Earthquake	Destroy Housing units (Collapsed)	Number of housing units supplied by the public sector	%
Hanshi-Awaji(1995)	190,000	70,000	37%
Mexico (1985)	100,000	50,000	50%
Northridge (1994)	25,000	0	0%
Turkey (1999)	95,000	43,000	45%
Taiwan (1999)	50,000	1,500	3%

Table 2. Progress of 3 years for Hyogo Housing Reconstruction (1999)

	Public Sector		Private sector	Total
	For rent	For sale		
Planned	67,500	13,000	44,500	125,000
Completed (1999)	58,862	11,360	250,782	321,004

b. Many housing units supplied by public sector

Figure 4 . The scales and locations of the subject development in damaged areas. It is not high rates of housings units built by the public sector in Hanshin-Awaji earthquake. But the amount of the units is as much as that of the cases of Mexico and Turkey. In the cases of Northridge and Taiwan, main programs used by victims were to give or lend their money resource for the reconstruction home. From the viewpoint of use of existing house stocks and power of private sectors, the latter is the main stream on the housing reconstruction program recently. There were discussions on that issue in the case of Hanshin-Awaji, but the government of Japan was extremely reluctant to redress the damaged housing as individual properties directly. As the result, many housings units were supplied by public sectors for those who not be able to reconstruct houses or acquire rental housings by themselves.

ANALYSIS

1) Summary of the Survey

Hyogo prefecture office implemented the survey "Community survey of Disaster Recovery Public Housings" to grasp the current situation of residential life and community activities there. The subjects of this survey were 323 housing developments built for Disaster Recovery Public Housings built by public sectors in Hyogo Prefecture. 27,348 family units living there were surveyed as sufferers. There were five researches in this survey (Visual Observation of environmental conditions, Questionnaire Research for residents, Interview Research for representative persons of resident's associations, Questionnaire Research for helpers and supporters who not living in the subject housing development, Collect and Analysis of building and residential data which the public sector has), but this analysis are shown by two research result (Questionnaire Research for residents, Collect and Analysis of building and residential data which the public sector has) to clarify the relationship between the technical problems of the housing providing and the social problems as residential senses.

2) Scale of the housing development and residential age characteristics

Table 4. shows the number of places and residential units by the scale of the housing development. 52.0% of the housing developments are small scales. (less 50 units), but the proportion of residents rates of less than 15%. The public sectors provided the housings in damaged areas as much as possible, but the lack of the space for the housings and the need of the provision speed and mass lead to this result. Many of large developments locate on the coastal areas and new settlement in the suburbs. Some of them which locate in urban areas are high-rise apartment buildings. On the other side, small developments locate mainly in the damaged areas. In case of the Awaji island, almost of them are small. The figure 4. shows the proportion of the age group of residents. The figure 5. shows the population pyramid of the residents which live in the subject developments. Many elderly residents live there and many of them on their own as table 3. shows. And the aged rate in the small development is higher than that in the large place. This is the most problem in damaged areas. The public sectors do many plans about supports for them, but it is not ease to solve it.

Table 3. Responder characteristics

Age group			the number living together	
20's	478	2.8%	one	6,388 37.4%
30's	1,110	6.5%	two	5,466 32.0%
40's	1,025	6.0%	three	1,911 11.2%
50's	2,545	14.9%	four	1,027 6.0%
60's	4,850	28.4%	more five	523 3.1%
70's	4,885	28.6%	no answer	1,764 10.3%
80's	1,674	9.8%		
no answer	512	3.0%	alone age 65 over	25.8%

Table 4. Subject development characteristics

the number of units	percentage of places	percentage of residents
less 50	52.0%	14.3%
50-200	33.1%	33.1%
more 200	14.9%	52.6%

(N=323)

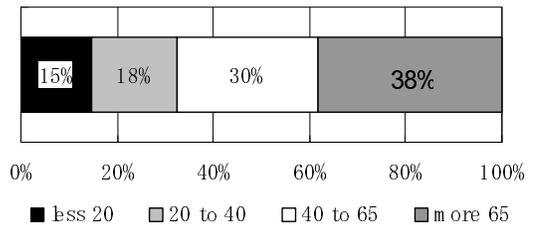
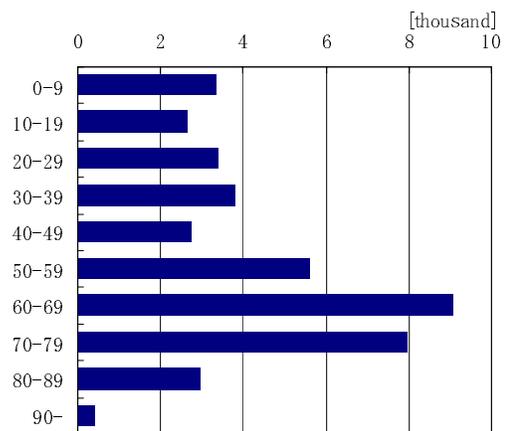


Figure 4. Age group of residents



(N=49,863)

Figure 5. The population pyramid of residents

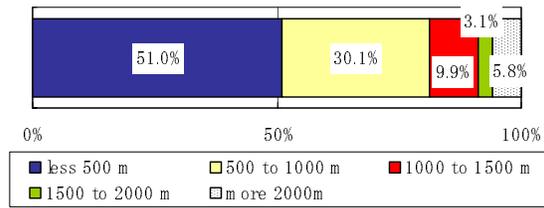
3) The location characteristics

We examined the distance of the nearest railway station and the market store and the number of stores within one-kilometer radius as the factor of the life convenience of the locations. The average of the distance to the nearest railway station is 682 m. (SD599.3) As figure 6. shows that more than half of the developments locate within 500 m radius. Many developments are high levels of the convenience of the railway. In the case of the small developments (less 50 units) that is 540 m (SD502.3) and in the case of the large development (more 200 units) that is 984.3 m. (SD681.5)

The average of the distance to the nearest store is 244.3m (SD160.6). That of the number of the stores within 1 km radius is 16.7 stores. (SD 11.0) Their factors vary widely according to the locality.

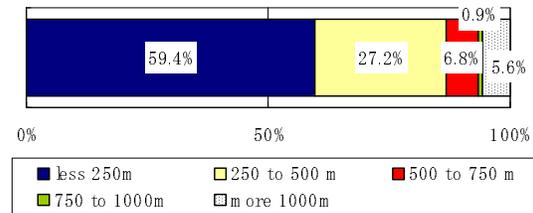
The public housing are provided in the urban area, mainly damaged areas, as compared with prefabricated housings in the ‘temporary’ stage. But it is difficult to provide all of the need housings in the place which sufferers lived in before. Some of the huge housing development were built in the suburb area as not damaged area.

The Characteristics of the Disaster Recovery Public Housings depend on the scales and locations, especially in the terms of life convenience factors.



(N=292)

Figure 6. The distance of the nearest railway station



(N=323)

Figure 7. The distance of the nearest store

Table 5. Categories for the analysis

	small less 50	mid-size 50 to 200	large more 200
urban	A	C	E
suburb	B	D	F

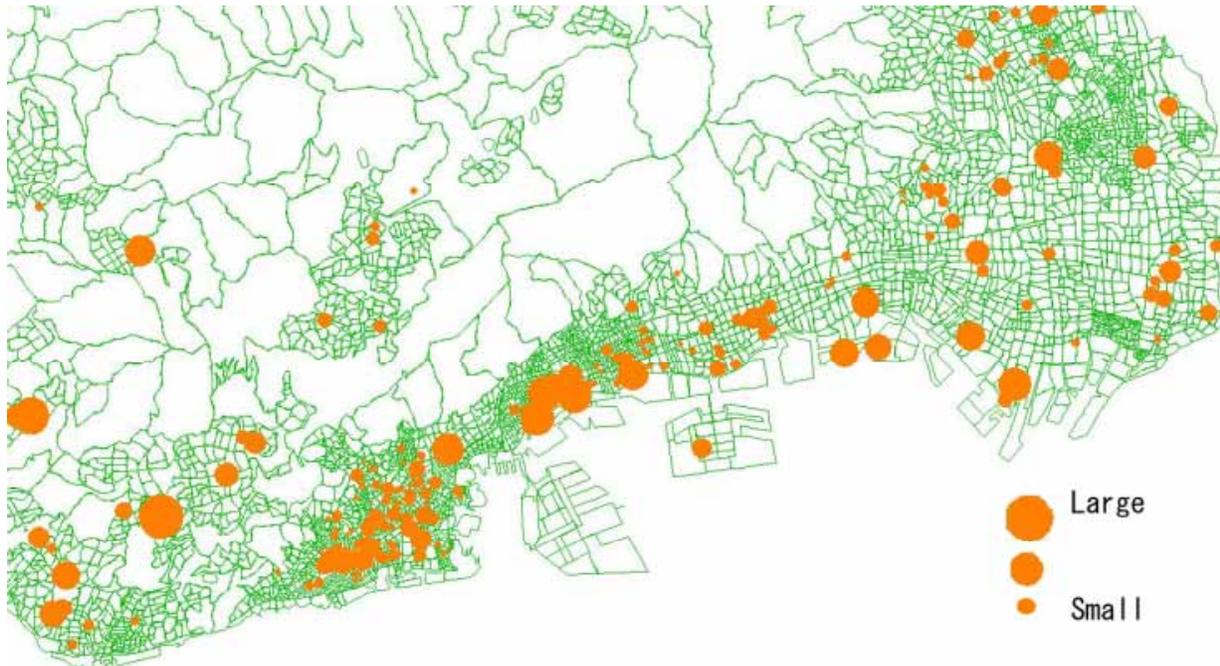


Figure 8. The scales and locations of the subject development in damaged areas.

This issue was produced by the technical problems of housing provisions, but it would appear as the social problems. In order to clarify it we analyzed the relationship between the two. Disaster Recovery Public Housings are divided into six categories on the scale and the location characteristic for the aim of comparison. (Table 5.)

4) Analysis of the relationship between the development characteristics and the residential senses

a- Reasons to select housings (Table 6.)

The most answer is 'Low house rent' (37.5%), and the percentage of 'Nowhere else to go' is 36.8%. Many sufferers selected their current housings for these negative reasons. From the sight of category of developments, reasons by the convenience of locations are high-rates in urban area developments. (A,C,E) In suburb area developments there are a lot of answers about 'Nowhere else to go', especially in the type F (large, suburb) that shows 49.2%. The reason of these results is that the large and suburb housing developments were built in the fast terms after the earthquake, so then sufferers didn't have the other choice. It seems that the technical problem about the housing provision lead to social problems as a result.

Table 6. Reasons of the select of the current housing (Multi-Answers)

	A	B	C	D	E	F	total
Think good of Housing and rooms	152%	20.0%	16.6%	21.2%	16.0%	20.5%	18.0%
Think good of support service	4.3%	5.7%	3.4%	6.2%	4.8%	5.3%	4.7%
Low house rent	36.3%	38.7%	34.6%	37.5%	38.5%	39.0%	37.5%
Place near the before living place	43.4%	31.2%	34.7%	16.2%	30.8%	9.4%	25.6%
Place near a friend house	11.7%	10.8%	11.0%	6.2%	9.5%	5.4%	8.6%
Place near a family house	15.5%	19.0%	13.4%	18.7%	12.5%	13.7%	14.2%
Convenient Place for living	34.8%	22.3%	31.0%	12.0%	22.3%	10.1%	21.1%
Convenient Place for coming to the hospital	20.1%	10.6%	16.3%	8.8%	13.7%	6.7%	12.4%
Convenient Place for coming a work	10.8%	10.3%	9.4%	6.2%	9.0%	5.4%	8.1%
To go to school for children	2.2%	4.1%	2.8%	3.1%	3.2%	2.4%	2.8%
Nowhere else to go	24.7%	30.0%	28.7%	40.3%	34.9%	49.2%	36.8%
other	10.1%	13.1%	13.3%	12.8%	10.7%	10.9%	11.6%
Valid response number	1.739	564	3.731	1.768	4.444	4.625	16.871

b- Trouble points about the housings (Table 7.)

Table 7. shows that many residents living there have the trouble points about location and community life. It is relatively low about the rate of having trouble points of residents in A development (small, urban). E development is as same as A. These results are mainly caused by the location.

Trouble points caused by the community life are not different from categories.

Table 7. Trouble points about the current living housings (Multi-Answer)

	A	B	C	D	E	F	total
Inconvenience for shopping	13.5%	41.7%	27.5%	27.7%	14.1%	48.0%	30.3%
Inconvenience for working and coming a work	2.5%	14.1%	9.2%	6.2%	3.5%	17.5%	9.3%
Inconvenience for coming a hospital	9.3%	28.3%	16.1%	17.0%	10.2%	29.9%	19.4%
Small space for a hobby and sports	5.5%	8.4%	9.9%	7.0%	5.8%	11.6%	8.1%
Small space for a relax with friends	9.4%	10.5%	11.2%	9.1%	7.4%	12.4%	9.9%
Cannot have a pet	12.5%	14.6%	19.9%	10.6%	9.9%	12.5%	11.9%
Serious rules of common places	1.4%	2.2%	2.1%	1.7%	2.1%	1.7%	1.8%
Heavy door of one's house	6.2%	8.3%	9.9%	8.8%	7.4%	10.4%	8.6%
No user-friendly bathroom	2.9%	2.3%	2.0%	2.7%	2.7%	2.8%	2.7%
Too stuffy in the house	5.9%	5.4%	7.3%	6.0%	5.1%	3.9%	5.2%
Worry about a noise	30.8%	24.1%	21.1%	31.2%	32.5%	20.5%	27.5%
Expensive common cost for housings	6.9%	17.6%	16.0%	10.6%	10.5%	9.8%	10.9%
A lot of call-sales	17.8%	25.4%	25.7%	29.5%	22.8%	27.8%	25.8%
Difficult to pay a house rent	8.8%	13.6%	12.4%	13.7%	11.3%	13.5%	12.6%
Exist of people who don't keep common rules	12.5%	19.2%	11.7%	20.5%	21.2%	27.5%	21.3%
A lot of illegal parkings	10.1%	13.6%	9.6%	15.2%	10.1%	20.8%	14.7%
No problem	23.6%	14.2%	18.1%	15.7%	20.4%	13.6%	16.9%
Other	8.9%	11.0%	13.5%	11.1%	10.3%	12.3%	11.1%
Valid response number	1.739	564	3.731	1.768	4.444	4.625	16.871

c- Housing satisfaction

Figure 9. shows the result of the questionnaire about the level of satisfaction with current housings. Many residents have high level of housing satisfaction and the answers about the continuance of the life circumstance and safety are high-rates.

We carried about the factor analysis about these 9 results for the housing satisfaction and picked up 2 factors. (N=8,386) The first factor score is named “Housing Satisfaction Score”. Figure 10. shows it by development category. From the result, the satisfaction level of residents living in the urban area development is higher than that in the suburb area and that in the small scale development is higher than that in the large scale.

In the next, we analyzed the standardization of row scores of answers (on a one-to-three scale) about the housing satisfaction and compared the average score by development category. (Figure 11-12)

Figure 11 shows that most of residents have a consciousness of keeping living there and especially residents living in the urban area development think so more strongly than that in the suburb area.

Figure 12 shows that residents living in the large development are tendency of thinking that the life in the once place ,as their own house on the disaster, is better than that of the current place. This shows the value of the once living place depend on not only the distance from the once place to the current place but also the adaptability of the current situation.

The housing satisfaction level of residents in Disaster Recovery Public Housings is clearly different by category as a result. It is clear that the location and the scale of housings affect residential sense which live there materially. They are a still stage of life reconstruction from the disaster, and are easily affected by the environment of housings.

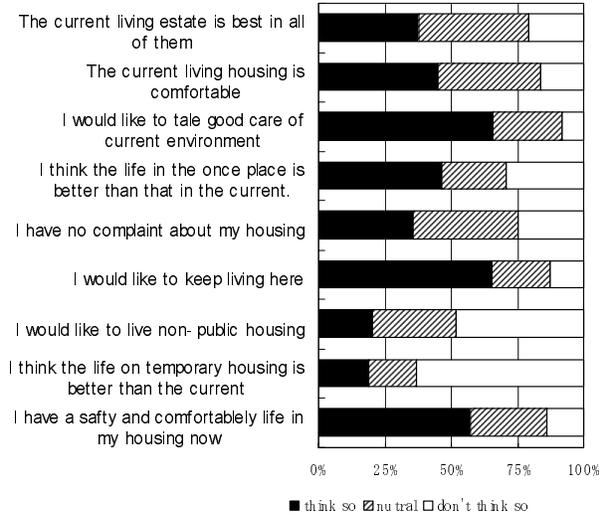


Figure 9. Answers about housing satisfaction

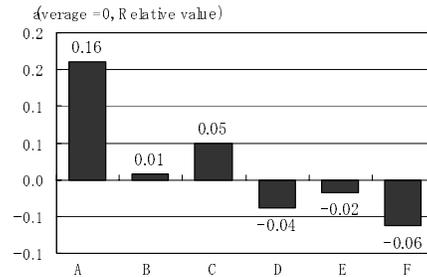


Figure 10. Housing satisfaction score

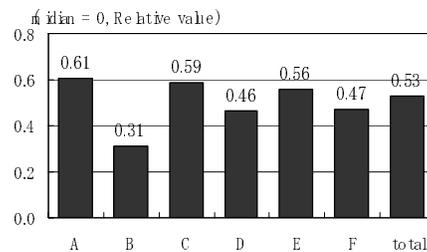


Figure 11. The “think to keep living” score

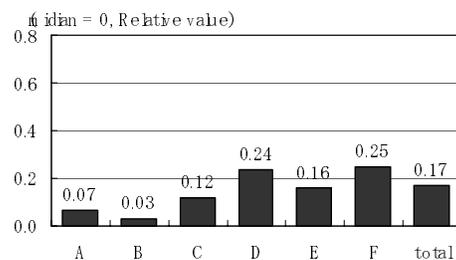


Figure 12. The “think life in the once place better than that in the current” score

CONCLUSION

In this paper it is clear to be relative between the location and the scale of housing developments and the housing satisfaction of residents there.

The problem when public sectors had provided the recovery housings for sufferers was about the building space. In damaged areas it was difficult for them to hold large spaces, because damaged areas were the densely-populated and after the earthquake many people lived there. So, they provided the huge housings in the suburb area or built high-rise building in the urban area. These housings are not necessary adaptable for the sufferers. Many of them used to live in the small wooden residence. There were the communications among neighborhoods. But the current housings living in are modern buildings made from rain-forced concrete. The large change of a housing circumstance and neighborhood environment leads to their confusions and mental stress. This tendency is clear in the large and suburb development.

Above all, the technical issue about the housing provision on the large disaster as destroyed 100,000 units would affect the housing problems in a long term, if they were provided speedy in the number of housing needed. The public sector should have the strategy and technical methods about them.

The housing reconstruction program, on the Hanshin-Awaji is unique as compared with cases in the world, but it is important to report and study them as not only the reconstruction method after disaster but also the urban housing issue in Japan.

This report only shows facts of current conditions of disaster recovery housings in Hyogo, but in particular it is necessary to focus the community activity there in detail. This report shows the direction of analysis about the relationship between physical environment (location, scale, building type) and community activity.

REFERENCES

1. Suminao Murakami, Support for housing reconstruction, Assessment Reports of the Global Assessment of Earthquake Countermeasure Vol.4 <Support of Disaster Victims>, 2000
2. T.Ichiko, A comparative study of Built-up Area Reconstruction Measure and Strategy among Earthquake Disasters of Hanshin Awaji, East Marmara and 921 Chi-chi, Proceedings of International Symposium on Urban Planning, b2.3.1-10, 2002
3. Hyogo Prefecture, Reports of housing reconstruction –Process of 3 year program of Hyogo Housing Reconstruction, 2000
4. Htogo Prefecture, Community Survey of Disaster Recovery Public Housings, 2003
5. Hyogo Prefecture, Life reconstruction Survey for sufferers, 2002