

THE SENSE OF HOME PLACENESS IN HOUSING RECOVERY
FOLLOWING BAM EARTHQUAKE

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To my dear son, Rayan

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ABSTRACT

The widespread incidence of natural disasters with increasing rate of casualties highlights the significance of post-disaster studies. Consequently, housing reconstruction programmes regarded as an interdisciplinary theme of concern plays a crucial role in attaining an effective level of recovery following natural disasters. Beyond this point, coping with “home loss” challenge is a notable experience for affected communities facing such conflicts. This study examines the sense of “home place” concept from residents’ points of view following the Bam 2003 earthquake and housing reconstruction efforts. It aims to explore the significance of the home place in the healing process from sense of loss following natural disasters using the residents’ perceptions and their means of expressions leading to long-term satisfaction of new housing. The study implements the mix of qualitative, quantitative, and visual methods to suit the socio-cultural concerns as well as the specifications of the context. The study explores different aspects of contributing factors to the interdisciplinary study of the post-disaster housing recovery process by questionnaire, visual base approach to observe the means of expression in the new housing, and interviews to find out the reasons and preferences. The stratified sample selection is used to provide a clear vision of the local community in dealing with an unexpected natural calamity and several dimensions of the concept of “home place” are tested. The findings indicate a positive correlation between expressing positive attribute about the newly built homes and the level of participation in the reconstruction process. It is implied from this research that there are certain clues through which housing would accelerate the recovery process from sense of loss. In this regard, the residents who had opportunity to participate directly in the new housing process feel more attached to their homes and have tried obviously to personalize their home settings as well. In addition, the framework is suggested to evaluate the degree of success of the post-disaster housing reconstruction efforts.

ABSTRAK

Insiden bencana alam yang meluas serta peningkatan kadar mangsa menonjolkan kepentingan kajian pasca bencana. Justeru itu, program pembinaan semula perumahan yang mempunyai tema integrasi pelbagai disiplin memainkan peranan penting dalam mencapai tahap keberkesanan pemulihan bencana alam. Selain itu, menghadapi cabaran kehilangan rumah adalah satu pengalaman yang penting bagi masyarakat yang terlibat dalam menghadapi konflik sedemikian. Dengan menilai usaha-usaha pembinaan semula perumahan pasca gempa bumi Bam 2003, kajian ini mengkaji konsep perasaan tempat tinggal dari sudut pandangan penduduk. Ia bertujuan untuk meneroka kepentingan pemulihan rasa kehilangan rumah yang berpunca daripada bencana alam. Oleh itu, objektif kajian ini adalah untuk mengenalpasti persepsi penduduk dan cara luahan mereka yang membawa kepada kepuasan perumahan baru untuk jangka panjang. Penyelidikan ini mengimplementasikan kaedah pencampuran kualiti, kuantitatif, dan kaedah visual untuk penyesuaian terhadap sosio-budaya serta spesifikasi konteks. Kajian ini meneroka pelbagai aspek yang menyumbang kepada kajian interdisiplin pemulihan perumahan pasca bencana alam yang melibatkan pengisian borang soal selidik, pendekatan visual untuk memperhatikan cara ekspresi terhadap perumahan baru, dan wawancara untuk mengetahui sebab dan kehendak penduduk. Prosedur pemilihan sampel berstrata digunakan untuk menyediakan visi yang jelas daripada masyarakat setempat dalam menghadapi bencana alam yang tidak dapat dijangka dan beberapa dimensi tentang konsep “tempat kediaman” dikaji. Sehubungan itu, kajian ini menunjukkan korelasi positif yang kuat antara pernyataan sifat positif terhadap rumah yang baru dibina dan tahap penyertaan dalam proses pembinaan. Kajian ini menunjukkan bahawa terdapat petunjuk-petunjuk tertentu melalui perumahan yang akan mempercepatkan proses pemulihan rasa kehilangan. Sehubungan itu, penduduk-penduduk yang berpeluang untuk menyertai proses perumahan baru mempunyai lebih perasaan terikat kepada rumah-rumah mereka dan mereka mencuba untuk memperibadikan suasana rumah mereka. Selain itu, kajian ini mencadangkan langkah-langkah yang wajar digunakan untuk menilai tahap pencapaian usaha-usaha pembinaan semula perumahan pasca bencana.

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CHAPTER 1

INTRODUCTION

Highlighting the significance of housing reconstruction process in attaining holistic recovery following natural disasters, present study aims to examine certain measures for the evaluation of such interdisciplinary topic of concern in terms of architecture. Accordingly, the research is conducted in Bam –that has been hit by a disastrous earthquake in 2003– as the case of a reconstructed city. It examines the sense of home placeness among the survivors considering the lost and new settings as the most significant means of the housing recovery following the disaster. This chapter provides a general introduction to the research in the following sections. It presents the background to the study, problem statement, aims and objectives, its significance, and the structure of the study.

1.1 Background

The long-term consequences of recovery following disasters reveals that housing reconstruction plays a significant role in this process due to the crucial function of home place in all aspects of human's life. However, depending on the overall background and current characteristics of the affected communities various systems of coping while recovery from sense of loss may be used, but there are certain similar stages followed by people which is observed worldwide. These

strategies and relevant matters to their attitudes toward their lost and new reconstructed homes are regarded as basic structure of present study.

Hence, the loss of home as the main source of sense attachment, archive of memories, and even the most notable part of one's belonging highly represents the material and incorporeal means of loss faced by survivors. And the acceptable degree of housing recovery could be a key indicator while assessment of the outputs of disaster management plans in this regard. Besides the variety of approaches and policies for housing reconstruction within its interdisciplinary context, the final goal must definitely be the overall satisfaction of residents. And considering the special context of such programmes and their emergent formation, the evaluation of residents' satisfaction should be refined and revised; since a sort of comparison would always appear and impress the procedure.

Furthermore, the involvement of affected community in different steps of new housing –from early decision making policies to construction works– is considered as a means of their participation. Briefly, keeping in mind the multidimensional essence of holistic recovery process after natural disasters as well as the urgent role of architecture in healing from sense of loss, perceptual and objective indicators related to housing reconstruction are regarded as the main theme of the research.

In particular, regarding the context of present case study and due to its geographic location in high seismic plateau of Iran, many catastrophic disasters with major casualties have hit the country during the time. However, the site selection is based on several considerations remarking it as the right choice for further studies as well. Exploring different aspects of mid-term to long-term consequences of permanent housing reconstruction, the occurrence of Bam earthquake in late 2003 enables proper evaluations in this regard. In fact, despite the pass of acceptable duration of time after the catastrophe to attain some degrees of recovery, the reconstruction details and related memories of lost settings are still alive in residents' mind. Thus, they would be able to certainly compare and express their feelings and attributes toward their lost and new homes. In other words, stated time period

enables them to discuss about pre and post–disaster situation as the details are not forgotten, but the sad memories are blurred to some extent which may not be that extremely annoying to talk about them.

The other inspiring reason to study the case of Bam earthquake was that due to my great interest at the interdisciplinary field of post–disaster reconstruction, I have been working for two international organizations (Diakonie Emergency Aid – based in Germany– and Support to life –based in Turkey–) for almost two years being involved in post–Bam 2003 earthquake housing reconstruction and recovery programmes after doing M.Sc in architecture. Such involvement has made me familiar with the characteristics of the city as well as the reconstruction process following the disaster. Additionally, there are two impressive strategies considered in selection of the context for post–disaster housing recovery evaluation. First, the great notable vernacular method of traditional construction style used in Bam before the quake presented perfectly in its old citadel known as the world’s largest adobe structure. And second, the strategy of building back the city in its original location. Consequently, people are not moved from their owned land, so the sense of place could be analyzed in similar setting which enables a more accurate comparison of residents’ sense of home place regarding lost and newly built homes.

1.2 Problem Statement

The essential reactions defined within the recovery process in post–disaster studies are regarded as coping skills that accelerates the holistic healing following such natural hazards. Accordingly, the recovery process includes a wide of range of offered programmes followed by either relevant organizations or survivors toward normalization. In that matter, the ultimate target is to be set concerning the comprehensive aspects of human life in its most possible degrees.

At that point, the level of post–disaster housing satisfaction is the clue to assess the successfulness of an important phase of the recovery process following

natural disasters. Accordingly, the housing reconstruction that is to be evaluated considering the pre-disaster situation of the affected area (Figure 1.1), the degree of casualties of the disaster (Figure 1.2), and the post-disaster reconstructed area's condition (Figure 1.3) contributes to identify the effective factors that accelerate the healing process from the sense of home loss.

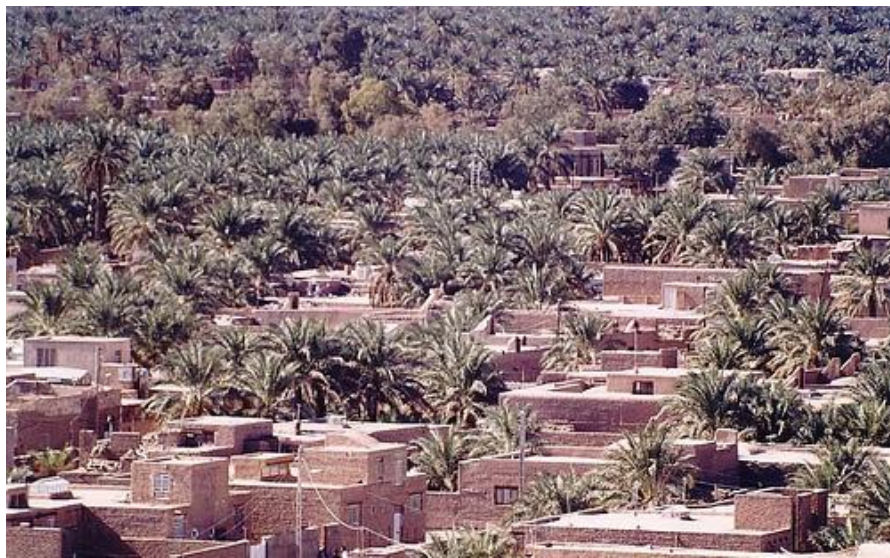


Figure 1.1: The texture of Bam city before the quake (Source: Ingham, J. (1995))



Figure 1.2: The catastrophic Bam earthquake (Source: Iran Students News Agency, (2003))

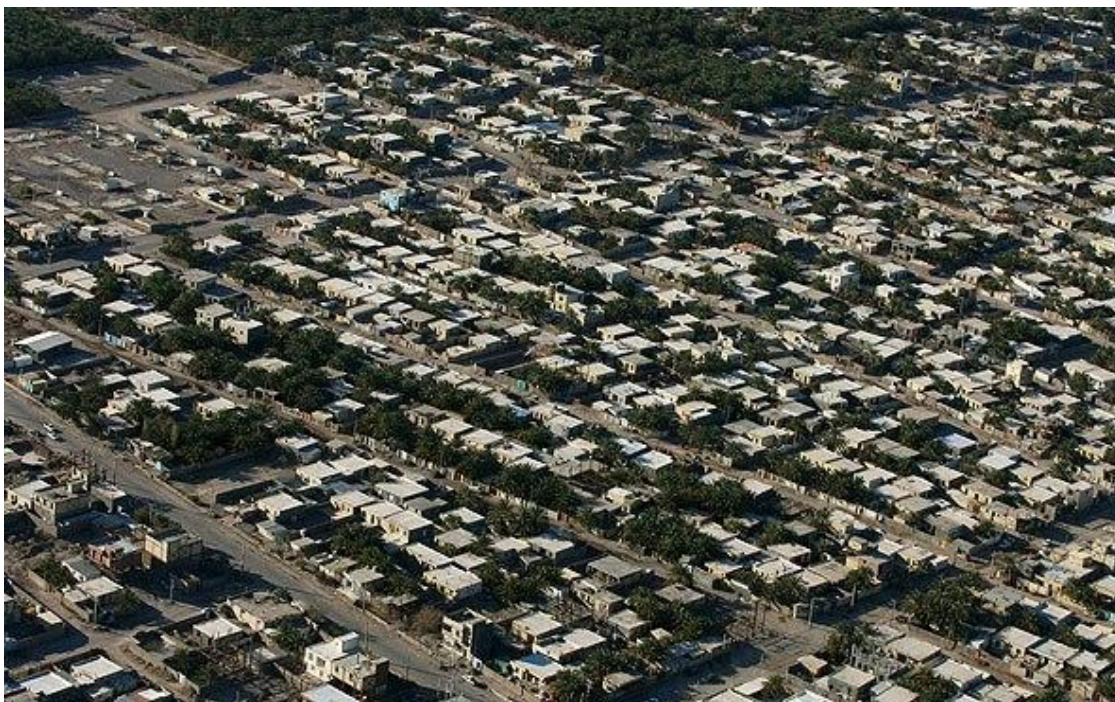


Figure 1.3: The newly built city (Source: Fars News Agency, (2008))

1.3 Research Aim and Objectives

1.3.1 Aim

This research aims to explore the deeper aspects of the home place in healing process from sense of loss following natural disasters. It also aims to suggest certain measures that are applicable to evaluate the successfulness of housing reconstruction efforts from residents' points of view. Accordingly, the target is to examine the sense of home placeness in housing reconstruction programme following 2003 Bam earthquake in Iran. In fact, the research investigates on the contribution of housing reconstruction to the holistic recovery after a disastrous natural phenomenon.

1.3.2 Objective I

The first objective is to find out the survivors' adjusting attributes in the housing reconstruction process.

The research investigates on the signs of change and continuity considered as means of cultural identity expressions in new housing. In fact, the way that local cultural values and terms have been expressed through residents' participation in housing reconstruction as well as their feelings about new and lost home settings would lead to analyze the overall procedure of the programme.

The reasons and obstacles of disability in such impressions would also clarify certain clues to be realized and underlined as lessons for the future while facing such unexpected disasters. It examines the factors that enable people to mitigate home loss challenge. In addition, it studies the instances which are regarded as threats that minimize the local potentials to use post-disaster reconstruction as a window of opportunity toward development. It explores the community's capacity to cope with sense of loss following the disaster and examines the healing power of home place in recovery process. It also investigates on the evaluation of the survivors' satisfaction and approach to their lost and new settings.

1.3.3 Objective II

The second objective is to investigate on the strategies contributing to the survivors' participation in housing reconstruction following the disaster.

The assessment is based on analyzing the self-built houses in order to monitor various aspects of residents' participation in housing reconstruction. Participation is regarded as the most impressive variable in successfulness of post-disaster housing strategies. The effects of housing policies followed by involved organizations, available building techniques and construction methods, and proposed

new designs and its relevance to family lifestyle; besides the socio-cultural, economic, and physical texture of pre and post-disaster situation are explored.

1.3.4 Objective III

The third objective is to propose a model for evaluating post-disaster housing recovery programmes.

Considering different aspects of home place in residents' lives and the key role of housing in recovery process from sense of loss, suggesting a conceptual model contributes to evaluate the successfulness of reconstruction programmes. The recovery is the least studied topic in disaster related literature; and its interaction with housing programmes after disaster needs to be more emphasized. Accordingly, housing reconstruction programme following 2003 Bam earthquake is evaluated through the proposed assessing measures as well.

1.4 Significance of the Research

Each year the lives of people and properties are threatened and affected or lost through natural disasters (Figure 1.4). And missing loved ones are the saddest part of life for grieving families. At the same time, losing some or whole part of assets is known as challenging experiences. Also the most important part of one's belonging could be his house that may take a whole life time spent on establishing it. This issue would be more complicated while owning a house costs a great amount of family income. The other most significant side of this fact could be loss of memories besides the sense of attachment to the possessions which seems to be so arduous to cope within the recovery process. These incorporeal losses that may not be immediately noticed would cause long term effects leading to deep changes in cultural values.

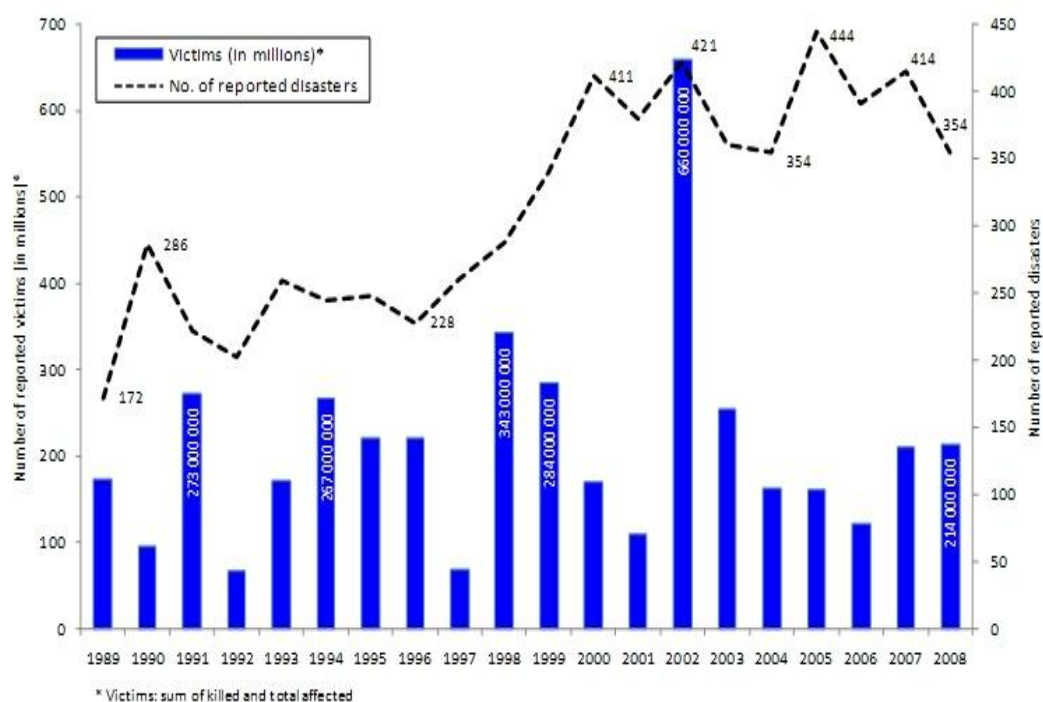


Figure 1.4: Natural disaster trends in occurrence and victims from 1989 to 2008 (Source: EM-DAT, www.emdat.be, accessed 10th Feb 2009)

Due to the very high risk of occurrence of natural disasters in the context area of this research (Figure 1.5), there is an emerging need for investigation on the post-disaster recovery studies. The location of the country among the most seismic hazardous areas in the world highlights the significance of the related knowledge in terms of minimizing all aspects of the casualties following the natural disasters.

Addressing the deeper aspects of home place as a notable clue in recovery process from sense of loss, this study examines the various attributes of residents toward their lost and new home settings within a significant contribution to the interdisciplinary theme of post-disaster recovery topic. Doubtless, housing reconstruction would highly interact with all aspects of future lives of affected communities. And there are certain linkages between resilience as well as the vulnerability of survived communities and the quality of life reconstructed houses following disasters.

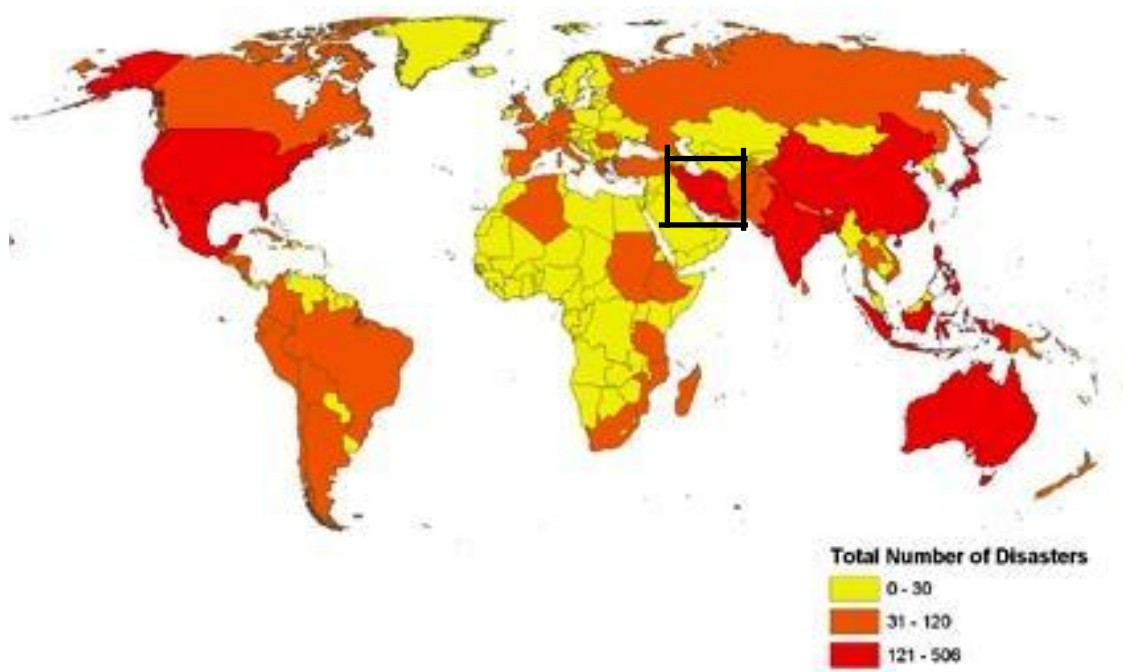


Figure 1.5: The location of Iran among the countries with large number of occurrences of earthquake disasters, 1974–2003, (Source: www.em-dat.net, accessed 10th Feb 2009)

In addition, the present research contributes to the post–disaster recovery process studies in terms of the significance of the architectural concerns. Accordingly, it focuses on the survivors’ deal with home loss challenge within housing reconstruction programmes. On this basis, the method designed to evaluate the successfulness of mid to long–term consequences of the housing reconstruction in the city of Bam is suggested to be adopted in studying the similar cases considering their certain specifications.

Looking for the roots that closely interact with evaluation of housing reconstruction programme and assessing the residents’ satisfaction, there is an essential need for comprehensive approach to different issues associating with the concept of home place. In other words, it would clarify what may happen to the meaning of home to the survivors of a natural disaster. And it would provide the strategies that accelerate meeting their real needs and desires as much as possible

which is urgent in increasing the level of satisfaction and the feeling of belonging to home place associating with recovery process. In conclusion, the results, evaluating criteria, and recommendations of this study reveal key issues and applicable measures for the assessment of similar projects.

1.5 Overview of the Study

Studying pre and post-disaster characteristics of housing, fundamental issues contributing to the satisfaction of residents are explored through analyzing various sets of data –collected via the field work survey– supporting each other toward exploring deeper aspects of home places significance in recovery process. It would then lead to understand how the residents evaluate their new settlement pattern and the way that they have experienced and cope with situation.

Hence, investigating the recovery process following 2003 Bam earthquake housing reconstruction and considering the characteristics of affected community, a group of 186 respondents have been selected by probability method of stratified sampling for further analysis. This random selection was made in the city context based on the result of the available study on the various degrees of catastrophe's casualties in different areas of Bam. Accordingly, our respondents represent the residents of self-built owners of reconstructed homes affected by varying degrees of loss that would enable to carry out the research toward a more realistic overview of the survivors to evaluate the housing programme.

The face-to-face communication approach was made in order to allow the survivors express their feelings and attitude as they deeply wish. In addition, this part of the applied method would help to understand and consider the certain measures and effective variables realized by residents due to their experience of new homes comparing to the lost ones. Thus, the arranged set of questions were asked to learn about their idea and home place experience while living in lost settings, temporary housing after the quake, and newly built homes as well.

Further, based on the reviewed literature on the sense of home place and home loss challenges following a disaster adjusted to the study context, residents were asked to fill up the questionnaires containing fifteen set of evaluating phrases. It presents their emotions regarding lost and new settings through which suggested scales are used to compare their sense of home placeness within a qualitative method as well. This section also contains fifteen extra scaling phrases enabling to learn how residents' participation in different stages of housing reconstruction may influence on their feelings and attitude toward newly built homes and their overall satisfaction of the present settings.

The stated procedure was followed by keeping visual records of exterior and interior views of the reconstructed homes to monitor residents' approach in expressing their desires through physical figures and architectural elements. In particular, these photographs could be used to compare the characteristics of lost and new living spaces and clarifies the roots of manifested attitudes toward new home places.

Consequently, each part of the method is designed to support the other set of collected and analyzed data in order to carry out the full assessment of the reconstruction programme. Obtained data from field-survey have been analyzed using SPSS programme and matrix charts in terms of qualitative part. The results of the analysis are presented in tables and in form of categorized discussion sets as well. And highlighting the significant role of home place in recovery from sense of loss, the results of the study would be considered as applicable measures that could be adjusted to evaluate the successfulness of housing reconstruction programmes.

1.6 Structure of the Thesis

This research is presented in six chapters. Figure 1.6 illustrates the sequence of the thesis organization. The first chapter provided a general introduction to the

study including its background, the statement of the problem, aim and objectives, the significance of research, and an overview to the whole research.

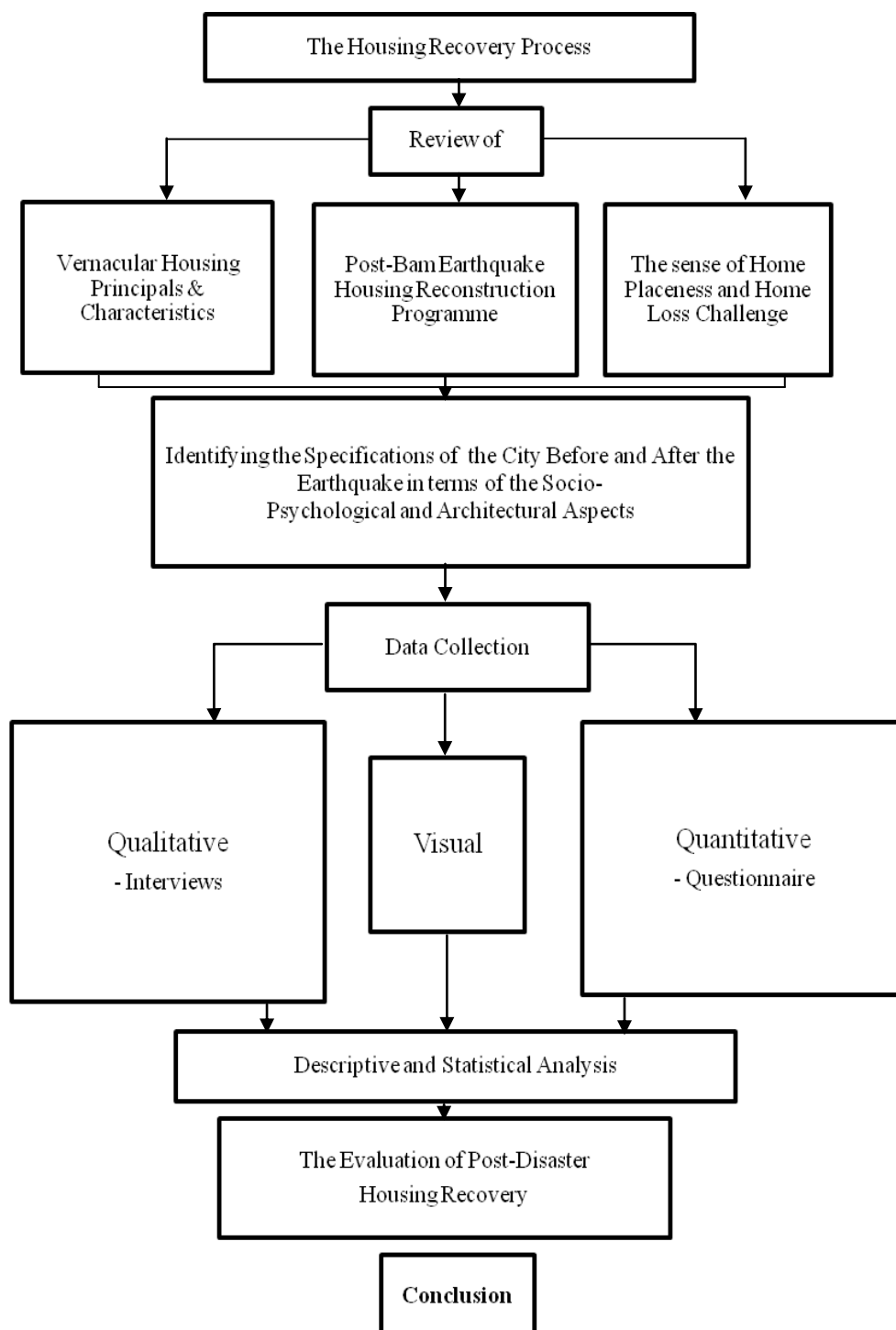


Figure 1.6: Scheme of the research design

Chapter two presents a review of the related literature on post–disaster housing recovery studies considering the significance of home place in this process. Accordingly, home loss is regarded as an important challenge for the survivors of a natural disaster and the role architecture in terms of the housing reconstruction programmes is discussed. In addition, the contributing factors to the housing recovery process are identified.

In the third chapter, the methodology designed to evaluate the successfulness of a housing reconstruction program in Bam following the 2003 earthquake is discussed. Furthermore, this chapter presents detailed explanations on the specifications of the context of the study. Besides the construct and conceptual frame work of the study, the data collection process including is presented in chapter three as well. Accordingly a mixed type of method including quantitative, qualitative, and visual is designed for the evaluation purpose of the housing recovery in Bam following the disaster.

Chapter four is organized considering the results of study regarding the three categories of analysis. In this chapter the findings of the research on the basis of the conducted interviews, questionnaires, and the recorded photos are presented. And the fifth chapter includes the discussion on the findings. Finally, chapter six presents a summary of the main findings as well as the implication of the current research and the recommendations for further studies in the field of housing recovery following natural disasters.

REFERENCES

- Akinci, F. (2004). Viewpoint: The aftermath of disaster in urban areas: An evaluation of the 1999 earthquake in Turkey. *Cities*. 21 (6): 527–536.
- Alavi, A. (2006). *Works report of governmental and non-governmental organizations: Bam earthquake*. Kerman, Iran: Sina Press.
- Alexander, D. (1989). Preserving the identity of small settlements during post disaster reconstruction in Italy. *Disasters*. 13: 228–236
- Altman, I. and Wohlwill, J. (1980). *Human behavior and environment*. Plenum Press. New York.
- Amerigo, M. and Aragonés, J.I. (1997). A theoretical and methodological approach to the study of residential satisfaction. *Journal of Environmental Psychology*. 17: 47–57.
- Arbab Jolfaei, A. (2000). *Philosophical and psychological bases of space understanding*. (Manabiye falsafi va ravan shenakhtiye edrake faza). Iran, Isfahan: Khak Publishing.
- Ardalan, N. and Bakhtiar, L. (1975). *The sense of unity: The Sufi tradition in Persian architecture*. United States: Chicago University Press.
- Arie, J. (1997). Motivation in elderly disaster victims during recovery from loss of home. PhD dissertation. Texas A&M University.
- Aysan, Y. and Oliver, P. (1987). *Housing and culture after earthquakes; a guide for future policy making on housing in seismic areas*. Oxford: Oxford Polytechnic.
- Baca, M., and Gorcun, O.F. (2005). *Post-reconstruction in rural and urban areas of Turkey*. The American Planning Association.
- Baradan, B. (2008). Review of Literature for the Concept of Post Disaster Housing in Turkey. *G.U. Journal of Science*. 21(2): 43– 49.
- Barakat, S. (2003). Housing reconstruction after conflict and disaster, *Commissioned and published by The Humanitarian Practice Network at ODI*: 43.

- Barati, N. (2004). Exploring the concept of 'Home' in Persian language and Iranian Culture, (Bazshenasiye mafhoome khane dar zabane farsi va farhange Irani). *Khiyal*. 8: 24–55.
- Barenstein, D.J. and Pittet, D. (2007). Post–disaster housing reconstruction Current trends and sustainable alternatives for tsunami–affected in coastal Tamil Nadu. University of applied science of southern Switzerland.
- Barnes, B., Cao, H., Drab, T. and Pearson, J. (2009). Design of sustainable relief housing in Ethiopia: An implementation of cradle to cradle design in earth bag construction. *American Journal of Environmental Sciences*. 5: 137–144.
- Barnes, J. (2006). Developing disaster survivor resiliency: The home away from home. *Disaster Prevention Management*. 15: 223– 232.
- Bolin, R.C. and Bolton, P.A. (1983). Recovery in Nicaragua and the U.S.A. *International Journal of Mass Emergencies and Disasters*. 1: 125–152.
- Bolin, R. and Stanford, L. (1991). Shelter, housing and recovery: A comparison of U.S. disasters. *Disasters*. 15 (1): 24–34.
- Brown, B., Perkins, D. D. and Brown, G. (2003). Place attachment in a revitalizing neighborhood: Individual and block levels of analysis. *Journal of Environmental Psychology*. 23: 259–271.
- Brown, D., Saito, K., Spence, R. and Chenvidyakarn, T. (2008). Monitoring and Evaluating Post–Disaster Recovery. *Proceedings of the 6th International Workshop on Remote Sensing for Disaster Applications*. September 11–12, 2008. University of Pavia, Italy.
- Brown, G., Brown, B. and Perkins, D. (2004) New Housing as Neighborhood Revitalization: Place Attachment and Confidence among Residents. *Environment and Behavior*. 36: 749–775.
- Carroll, B., Morbey, H., Balogh, R. and Araoz, G. (2009). Flooded homes, broken bonds, the meaning of home, psychological processes and their impact on psychological health in a disaster, *Health & Place*. 15: 540– 547.
- Chang, H.J., Hargrove, R., Long, Y.X. and Osborne, D.J. (2006). Reconstruction after the 2004 tsunami: Ecological and cultural considerations from case studies. *Landscape Ecol. Eng.* 2: 41–51.

- Cashman, K. V. and Cronin, S. J. (2008). Welcoming a monster to the world: Myths, oral tradition, and modern societal response to volcanic disasters. *Journal of Volcanology and Geothermal Research*. 176: 407–418.
- Cockburn, C. and Barakat, S. (1991). Community prosperity through reconstruction management. *Architecture and Design*. Jan–Feb: 60– 65.
- Comerio, M.C. Key elements in a comprehensive theory of disaster recovery. *Proceedings of 1st International Conference of Urban Disaster Reduction*. January 19, 2004. Kobe, Japan.
- Cox, R.S. (2006). *Echoes, transgression and transformations: Identity reorientation and the discourse of disaster recovery*. Ph.D. Thesis, The University of British Columbia.
- Creswell, J. W. (2003). *Research design: Qualitative, Quantitative and Mixed Method Approach*. Thousand Oaks, California: SAGE Publications.
- Cuba, L. and Hummon, D. M. (1993). Constructing a sense of home: Place affiliation and–migration across the life cycle. *Sociological Forum*. 8: 547–572.
- Cuny, F. (1981). Disasters and the small dwelling: The state of the art. In: Davis, I. (ed). *Disasters and small Dwellings*. London, Pergamon press.
- Cuny, F. (1983). *Disasters and development*. Oxford: Oxford University Press.
- Cupchik, G., Ritterfeld, U. and Levin, J. (2003). Incidental learning of features from interior living spaces. *Journal of Environmental Psychology*. 23: 189–197.
- Davidson, C.H., Johnsona, C., Lizarraldea, G., Dikmena, N. and Sliwinskiet, A. (2007). Truths and myths about community participation in post–disaster housing projects. *Habitat International*. 31(1): 100–115.
- Davis, I. (1978). *Shelter after disaster*. Oxford: Polytechnic Press.
- Davis, I. (2006). *Sheltering from Extreme Hazards*. In: Asquith, L. and M. Vellinga (Eds.). *Vernacular Architecture in 21th Century: Theory, Education and Practice*. (145–154). New York: Taylor and Francis.
- Dayaratne, R. and Karajica, L. (2003). Creating reconciling architecture: Learning from Reconstruction programs in Bosnia. *The Journal of the Sri Lanka Institute of Architects*. 104(1): 51–57.
- Dyck, I., Kontos, P., Angus, J. and McKeever, P. (2005). The home as a site for long–term care: meanings and management of bodies and spaces. *Health & Place*. 11: 173–185.

- El-Masri, S. and Kellett, P. (2001). Post-war Reconstruction. Participatory approaches to rebuilding the damaged villages of Lebanon: a case study of al-Burjain. *Habitat International*. 25: 535–557.
- Emmison, M. (2004). The Conceptualization and Analysis of Visual Data. In: Silverman, D. (ed). *Qualitative Research: Theory, Method and Practice*. London: Sage Publication Ltd.
- Everstine, D. and Everstine, L. (2006). *Strategic interventions for people in crises, trauma, and disaster*. New York: Routledge.
- Feldman, R. M. (1990). Settlement–identity: psychological bonds with home places in a mobile society. *Environment & Behavior*. 22(2): 183–229.
- Francescato, G. (1993). *Meaning and use: A conceptual basis*. In: Arias, E. (1993) (Ed). *The meaning and use of housing*. (35– 49). England: Avebury, Ashgate publishing limited.
- Francis, S. (2002). The architecture of health buildings Providing care– can architects help?. *The British Journal of General Practice*. March.
- Fried, M. (1976). Grieving for a lost home. In: Moos, R. (ed). *Human adaptation: Coping with life crises*. Massachusetts: D. C. Heath and company, Lexington. 192–199.
- Fried, M. (2000). Continuities and discontinuities of place. *Journal of Environmental Psychology*. 20: 193–205.
- Gaillard, J.C. (2006). Traditional Societies in the Face of Natural Hazards: The 1991 Mt. Pinatubo Eruption and the Aetas of the Philippines. *International Journal of Mass Emergencies and Disasters*. 24 (1): 5–43.
- Ganapati, N. and Ganapati, S. (2009). Enabling Participatory Planning After Disasters: A Case Study of the World Bank’s Housing Reconstruction in Turkey. *Journal of the American Planning Association*. 75(1): 41–59.
- Geipel, R. (1991). *Long-term consequences of disasters: The reconstruction of Friuli, Italy, in its international context, 1976–1988*. Springer-Verlag, New York.
- Ghafory-Ashtiany, M. and Hosseini, M. (2008). Post-Bam earthquake: recovery and reconstruction. *Natural Hazards*. 44: 229–241.

- Golpayegani, A. and Einifar, A. (2008). *Typology and design guide for housing in Bam*. Ministry of Housing and Urban Development. Tehran, Iran: Office of Architecture and Urban Planning.
- Gillham, B. (2008). *Small-Scale Social Survey Methods: Real World Research*. New York: Continuum International Publishing Group.
- Groat, L. and Wang, D. (2002). *Architectural Research Methods*. New York: John Wiley and Sons, Inc.
- Gustafson, P. (2001a). Roots and routes: Exploring the relationship between place attachment and mobility. *Environment and Behavior*. 33: 667– 686.
- Gustafson P. (2001) Meanings of place: Every day experience and theoretical conceptualization. *Journal of Environmental Psychology*. 21: 5–16.
- Gutman, R. and Westergaard, B. (1974). Building evaluation, user satisfaction, and design. In: Lang, J., Burnette, C., Moleski, W. and Vachon, D. (eds). *Designing for human behavior: Architecture and the behavior science*. Pennsylvania: Dowden, Hutchinson & Ross Inc.
- Hass, J., Kates, R. and Bowden, M. (1977). *Reconstruction following disasters*. The MIT press, United States.
- Hay, R (1998). Sense of place in developmental context. *Journal of Environmental Psychology*. 18: 5– 29.
- Helmets, M. (2006). *The elements of visual analysis*. USA: Pearson education, Inc.
- Hidalgo, M. C. and Hernandez, B. (2001). Place attachment: conceptual and empirical questions. *Journal of Environmental Psychology*. 21: 273–281.
- Iranian Studies Group (ISG) at MIT. Earthquake Management in Iran: A compilation of literature on earthquake Management. United States, MIT. January 6, 2004.
- Israel, T. (2003). *Some place like home: Using design psychology to create ideal places*. Wiley. England.
- Johnson, C. (2007). Impacts of prefabricated temporary housing after disasters: 1999 earthquakes in Turkey. *Habitat International*. 31 (1): 36–52.
- Kamani-Fard, A., Ahmad, M. H. and Ossen, D.R. (2010a). Facing home loss after disasters: A review. *Proceedings of 2nd International Postgraduate Conference on Infrastructure and Environment*. June 1–2. The Hong Kong Polytechnic University, Hong Kong, China. 1: 495–502. ISBN: 978–988–17311–3–5.

- Kamani–Fard, A., Ahmad, M. H. and Ossen, D.R. (2010b). Cultural consequences with respects to housing reconstruction strategies following natural disasters. *Proceeding of ICoHSE: Second International Conference on the Roles of the Humanities and Social Sciences in Engineering*. November 12–14. Universiti Malaysia Perlis (UniMAP), Malaysia, 401–407.
- Kamani–Fard, A., Ahmad, M. H. and Ossen, D.R. (2010c). The methodologies used to evaluate post–disaster housing reconstruction projects. MiCRA: Management in Construction Researchers Association 9th Annual Conference and Meeting. December 1–2. Universiti Teknologi MARA, UiTM Shah Alam, Malaysia, 123–130. ISBN: 978–967–0171–02–9.
- Kamani–Fard, A., Ahmad, M. H. and Ossen, D.R. (2010d). Cultural identity expressions through visual analysis in post– disaster housing. *American Journal of Applied Sciences*. 7 (10): 1412– 1419.
- Kamani–Fard, A., Ahmad, M. H. and Ossen, D.R. (2012). The Sense of Place in the New Homes of Post–Bam Earthquake Reconstruction. *International Journal of Disaster Resilience in the Built Environment*. 3(3): 220–236.
- Kamani–Fard, A., Ahmad, M. H. and Ossen, D.R. Sense of home place in participatory post–disaster reconstruction. (2013). *Journal of Environmental Assessment Policy and Management*. 15(1): 1350005–21.
- Kamel, N. M. (2004). The reproduction of uneven urban development: The case study of residential recovery in Los Angeles following the Northridge earthquake. PhD Dissertation. University of California.
- Kerman’s Cultural Heritage Organization [KCHO]. (2008), *Bam: At the peak forever* (Bam: bame zaman). Kerman, Iran: Rozhan Press.
- Khazai, B. Bam Earthquake Reconstruction and Recovery. NWFP UET Earthquake Engineering Seminar. November, 2005. Islamabad, Pakistan.
- Knez, I. (2005). Attachment and identity as related to a place and its perceived climate. *Journal of Environmental Psychology*. 25: 207– 218.
- Kuwata, Y., Takada, S. and Bastami, M. (2005). Building damage and human casualties during the Bam–Iran earthquake. *Asian Journal of Civil Engineering. (Build. Hous.)*. 6: 1–19.

- Kyle, G. T., Mowen, A. J. and Tarrant, M. (2004). Linking place preferences with place meaning: An examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology*. 24: 439–454.
- Ladewig, H. and McCann, G. C. (1980). Community satisfaction: Theory and measurement. *Rural Sociology*. 45(1): 110–131.
- Lang, J.T. (1974). Fundamental processes of environmental behavior. In: Lang, J.T. Burnette, C. Moleski, W. Vachon, D. (eds). *Designing for human behavior: Architecture and the behavior science*. Pennsylvania: Dowden, Hutchinson and Ross Inc.
- Lang, J.T (1993). Methodological issues and approaches: A critical analysis. In: Arias, E. *The meaning and use of housing*. England: Avebury, Ashgate publishing limited.
- Lawrence, R.J (1993a). The meaning and use of home: It's interior. In: Arias, E. *The meaning and use of housing*. England: Avebury, Ashgate publishing limited.
- Lawrence, R.J. (1993b). Housing and homes: Agenda for future research. In: Bulos, M. and Teymur, N. (eds). *Housing: design, research, education*. England: Aldershot, Hants: Avebury.
- Lawrence, R.J. (2006). Learning from the vernacular: basic principles for sustaining human habitats. In: Asquith, L., and Vellinga, M. (eds). *Vernacular Architecture in 21st Century*. New York: Taylor & Francis.
- Lewicka, L. (2008). Place attachment, place identity, and place memory: Restoring the forgotten city past. *Journal of Environmental Psychology*. 28: 209– 231.
- Lindell, M. and Perry, R. (2000). Household adjustment to earthquake hazard. *Environment & Behavior*. 32(4): 461– 501.
- Lizarralde, G. (2000). Reconstruction management and post-disaster low-cost housing; the case for social reconstruction. M.Sc Report on Thesis. McGill University, Montreal.
- Low, S. M. and Altman, I. (1992). *Place attachment: A conceptual inquiry*. In I. Altman, and S. M. Low (eds.), *Place attachment*.1–12. New York and London: Plenum Press.
- Lyons, M. (2009). Building back better: The large-scale impact of small-scale approaches to reconstruction. *World Development*. 37: 385–398.

- Mahmoodi, A. (2005), A review on the dimensions of porch in traditional housing: Case study Bam (Baznegariye ahamiyate eyvan dar khanehayeh sonati: Ba negahe vije be Bam). *Honarhaye ziba*. 22: 53–62.
- Manzo, L. (2005). For better or worse: Exploring multiple dimensions of place meaning. *Journal of Environmental Psychology*. 25: 67–86.
- Mehrain, M. and Naeim, F. (2004). *Adobe House*. World Housing Encyclopedia. Report # 104. <http://www.world-housing.net/whereport1view.php?ID=100130>.
- Mesch, G. S. and Manor, O. (1998). Social ties, environmental perception, and local attachment. *Environment and Behavior*. 30(4): 504–519.
- Miller, L.B. (2007). *Housing and Dwelling: Perspectives on Modern Domestic Architecture*. Routledge.
- Mitty, E. and Flores, S. (2009). There's No Place Like Home. *Geriatric Nursing*. 30 (2): 126–129.
- Montazeri, A., Baradaran, H., Omidvari, S., Azin, A., Ebadi, M., Garmaroudi, G., Harirchi, A. and Shariati, M. (2005). *Psychological distress among Bam earthquake survivors in Iran: a population-based study*. <http://www.biomedcentral.com/1471-2458/5/4>.
- Moos, R. (1976). *Human adaptation: Coping with life crises*. Lexington, Massachusetts, D. C. Heath and company.
- Moskowitz, J.T. (2001). Emotions and coping. In: Mayne, T. and Bonanno, G. (eds). *Emotions: Current issues and future directions*. New York: The Guilford Press.
- Mubarak, K. (2007). Analyzing post-tsunami livelihoods recovery: The case of masons in Polhena Village, Sri Lanka. *SSEE*. <http://www.pasi.unimelb.edu.au/research/papers/SSEE-papers/rp-02-tsunami.pdf>.
- National Cartographic of Iran (NCCI). (2004). Map of damage level of Bam buildings.
- Oliver, P. (1981). The cultural context of shelter provision. In: Davis, I. (ed). *Disasters and small Dwellings*. London, Pergamon press.
- Oliver, P. (2006). *Built to meet needs: Cultural issues in vernacular architecture*. UK, Elsevier Ltd.
- Olshansky, R., Johnson, L. and Topping, K. *Post-disaster redevelopment: lessons from Kobe and Northridge*. Final Report, NSF Award No. CMS-9730137, July 11 2003.

- Olshansky, R. B. (2006). Planning after Hurricane Katrina. *Journal of the American Planning Association*. 72 (2): 147–153.
- Passerini, E. (2007). Disasters as agents of social change in recovery and reconstruction. *Natural Hazards Review*. 1: 67–72.
- Patterson, A.H. (1974). Unobtrusive measures: Their nature and utility for architects. In: Lang, J. Burnette, C. Moleski, W. Vachon, D. (eds). *Designing for human behavior: Architecture and the behavior science*. Pennsylvania: Dowden, Hutchinson and Ross Inc.
- Peacock, W.G., Dash, N. and Zhang. Y. (2007). *Sheltering and Housing Recovery Following Disaster*. In: Rodriguez, H., Quarantelli, E. and Dynes, R. *Handbooks of Sociology and Social Research*. Chapter 15: 258–274. New York: Springer.
- Perry, R. W. and Quarantelli, E.L. (2005). *What is disaster? New answers to old questions*, International Research Committee on Disasters.
- Pirniya, M. (1998). *Introduction to Iranian Islamic Architecture* (Ashenae ba Memariye Eslamiye Iran). Tehran, Iran: Iran Science and Technology University Press.
- Poyatos, F. (1976). Analysis of a culture through its culturemes: Theory and method. In: Rapoport, A. (ed). *The mutual interaction of people and their built environment: A cross-cultural perspective*. Paris: Mouton, The Hague.
- Quarantelli, E.L. (1995). Patterns of sheltering and housing in US disasters. *Disaster Prevention Management*. 4: 43–53.
- Quarantelli, E.L. (1999). *The disaster recovery process: what we know and do not know from research*. Preliminary Paper #286. University of Delaware. Disaster Research Center.
- Rapoport, A. (1969). *House form and culture*. N.J. Prentice–Hall, Englewood Cliffs.
- Rapoport, A. (1976). Sociocultural aspects of man–environment studies. In: Rapoport, A. (ed). *The mutual interaction of people and their built environment: A cross-cultural perspective*. Paris: Mouton, The Hague.
- Rapoport, A. (1981). Identity and Environment: A Cross–Cultural Perspective. In: Duncan, J.S. (ed). *Housing and Identity: Cross-cultural Perspectives*. London: Law Book Co of Australasia.
- Rapoport, A. (1982). *The meaning of the built environment: A nonverbal communication approach*. California: Sage publication, Inc.

- Rapoport, A. (1984). Culture and the urban order. In: Agnew, J. mercer, J. Sopher, D. (eds). *The city in cultural context*. Winchester, Mass: Allen & Unwin Inc
- Rapoport, A. (2001). Theory, Culture and Housing. *Housing Theory and Society*. 17: 145–165.
- Reddy, S. D. S. (1992). A study of long–term recovery of three communities in the aftermath of Hurricane Hugo. PhD Dissertation, Texas A & M University.
- Relph, E. C. (1976). *Place and Placelessness*. Routledge and Kegan Paul, London.
- Rokeach, M. (1970). *Beliefs, attitudes, and values: A theory of organization and change*. San Francisco: Josey–Bass.
- Rubin, C. B., Saperstein, M. D. and Barbee, D. G. (1985). *Community Recovery from a Major Natural Disaster*. Monograph No. 41, Program on Environment and Behavior, Institute of Behavioral Science, University of Colorado, Boulder.
- Rubin, C.B. (1985). The community recovery process in the United States after a major natural disaster. *International Journal of Mass Emergencies and Disasters*. 3: 9–28.
- Sadler, H.D. (2004). *Disaster's Wake: Role of architecture in Trauma recovery*. M.A Thesis, University of Cincinnati.
- Saeng–Ngam, A., Chantachon, S. and Ritthidet, P. (2009). The organization of cultural tourism by the community people in the region of Toong Kula Rong Hai. *Journal of Social Sciences*. 5: 342–347.
- Saame, R. (2005). Bases of redefining cityscape identity through general concepts of Bam reconstruction. (Mabaniye bazshenasi va ehraze mojadade hoviyat dar simaye shahr, ba takye bar masadighe koli nesbat be bazsaziye Bam). *Maskan va Enghelab*. 110: 4–15.
- Scholz, R. W. and Tietje, O. (2002). *Embedded case study methods: integrating quantitative and qualitative knowledge*. Thousand Oaks, California: SAGE Publications.
- Schwab, J., Topping, K.C., Eadie, C. C., Deyle, R. E. and Smith, R. A. (1998). *Planning for post–disaster recovery and reconstruction*. Chicago,IL: American Planning Association.
- Shamai, S. and Ilatov, Z. (2005). Measuring sense of place: methodological aspects. *Tijdschrift voor Economische en Sociale Geografie*. 96 (5): 467–476.

- Shaw, R. (2006). Indian Ocean tsunami and aftermath: Need for environment–disaster synergy in the reconstruction process. *Disaster Prevention and Management*. 15(1): 5–20.
- Silove, D., Steel, Z. and Psychol, M. (2006). Understanding community psychological needs after disasters: Implications for mental health services. *Journal of Post graduate Medicine*. 52 (2): 121–125. Downloaded from <http://www.jpgmonline.com> on Friday, January 30, 2009.
- Silverman, D. (ed). (2004). *Qualitative Research: Theory, Method and Practice*. London: SAGE Publication.
- Smith, S. G. (1994). The essential qualities of a home. *Journal of Environmental Psychology*. 14: 31–46.
- Snarr, D.N. and Brown, E.L. (1978). Post–disaster housing in Honduras after hurricane Fifi: An assessment of some objectives. *Mass emergencies*. 3: 239–250.
- Snarr, D.N. and Brown, L. (1982). Attrition and housing improvements: A study of post–disaster housing after three years. *Disasters*. 6 (2): 125–13.
- Snarr, D.N. and Brown, E.L. (1994). Post–disaster housing reconstruction: A longitudinal study of resident satisfaction. *Disasters*. 18(1): 76–80.
- Stedman, R. (2002). Toward a Social Psychology of Place: Predicting Behavior from Place–Based Cognitions, Attitude, and Identity. *Environment and Behavior*. 34 (5): 561–581.
- Steele, F. (1981). *The sense of place*. Massachusetts: CBI Publishing company, Inc.
- Steinberg, F. (2007). Housing reconstruction and rehabilitation in Aceh and Nias, Indonesia– Rebuilding lives. *Habitat International*. 31: 150–166.
- Steinfeld, E. (1981). The place of old age: the meaning of housing for old people. In: In: Davis, I. (ed). *Disasters and small Dwellings*. London, Pergamon press.
- Stokols, D. and Shumaker, S. (1981). *People in places: A transactional view of settings*. In: J. Harvey (ed.) *Cognition, Social Behavior, and the Environment*. 441–488. Hillsdale, NJ: Lawrence Erlbaum.
- Tas, N., Cosgunb, N. and Tas, M. (2007). A qualitative evaluation of the after earthquake permanent housings in Turkey in terms of user satisfaction–Kocaeli, Gundogdu Permanent Housing model. *Building and Environment*. 42: 3418–3431.

- Tierney, K., Khazai, B., Tobin, L. and Krimgold, F. (2005). Social and Public Policy Issues Following the 2003 Bam, Iran, Earthquake. *Earthquake Spectra*. 21(1): 513–534.
- Tognoli, J. (1987). Residential environments. In: Stokols, D. and Altman, I. (eds). *Handbook of Environmental Psychology*. New York: Wiley Inter science.
- Twigger–Ross, C.I. and Uzzell, D.I. (1996). Place and identity processes. *Journal of environmental psychology*. 16: 205–220.
- Wilson, R.C. (1991). The Loma Prieta quake: What one city learned. Washington D.C.: International City Management Association.
- Wu, J. (2003). A Comparative study of housing reconstruction after two major earthquakes: The 1994 Northridge earthquake in the United States and the 1999 Chi–Chi earthquake in Taiwan. PhD Dissertation. Texas A&M University.
- Zhang, Y. (2006). Modeling single family housing recovery after hurricane Andrew in Miami–Dade country, FL. PhD Dissertation. Texas A&M University.
- Zeisel, J. (2006). *Inquiry by design: environment/behaviour/neuro–science architecture, interiors, landscape, and planning*. New York: W.W. Norton and Company, Inc.