

Title:**Application of Land Readjustment in Post-Disaster Reconstruction Planning: A Case of Bhuj, India****Authors:**

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Key words:

Post-Disaster Reconstruction Planning, Land Readjustment, Town Planning Schemes, Bhuj

Abstract:

The objective of this paper is to present a detailed analysis of the application of the use of land readjustment mechanism specifically in post-disaster reconstruction situation. While a disaster such as an earthquake or a tsunami causes large scale devastation and destruction, these events have sometimes been used by planners for large scale reconstitution of land holdings through application of planning tools such as land readjustment (or land pooling). Land readjustment is a process of reconstitution of land holdings or lots into rational and regular shaped lots, adding public infrastructure such as public roads and parks, the land for which is contributed equitably by all landowners, as a percentage of their land holdings. Several examples are available from around the world where local governments and policy makers have used such an approach while rebuilding lost housing and infrastructure.

While land readjustment is commonly used for urban development and particularly for converting irregular shaped agricultural lands to lots suitable for urban developments with street access and infrastructure, there are few instances where it has been creatively applied in a post disaster reconstruction process. The paper will examine some of these cases where land readjustment has been carried out specifically in the context of post disaster reconstruction planning. For instance, the Hyogo Prefecture and the City of Kobe applied land readjustment projects in conjunction with urban redevelopment and restoration to ensure that reconstructed areas were built more resilient with wide streets, public open spaces for evacuation, and consolidated old and dense housing (Preuss 2000). Chile also has limited experience with the same in Santiago (Hong and Brain 2012).

A successful example comes from the historic city of Bhuj, India where more than 50% of buildings in the city were destroyed in a 2001 earthquake measuring 6.9 (Richter scale) that claimed approximately 18,000 lives in Gujarat, India. One of the reasons for this heavy loss of life was because that many low-quality building fell onto the narrow streets in the walled city, and the rubble blocked egress and prevented emergency vehicles to come in. The state government embarked on a large scale reconstruction planning process which used land readjustment as a key tool for inner city areas. More than a decade after implementation, it is considered a successful and shining example of reconstruction planning.

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The people of Bhuj did not want to accept the government's relocation policy and were not willing to move away from their 500-year-old city to a safer, less-congested area, the government decided to reconstruct the inner city. The comprehensive plan included several elements such as land use zoning, road network and infrastructure planning, and inclusion of seismic safety regulations. A grid of interconnected streets was laid out using the land cleared from collapsed buildings to ensure emergency access to the inner congested city. The land needed to create this wider road network was assembled by the use of land readjustment mechanism, known as town planning schemes (TP schemes). A proportionate amount of land was deducted from each land owner to create wider public roads and increase access, and the remainder was readjusted and redistributed to the original owners. Particularly notable is that all of this was done using the existing provisions in the state's town planning legislation.

Our paper will examine the case study of Bhuj in detail in the context of its successes and challenges, and provide critical insights on this land readjustment implementation in a post disaster situation. Despite Bhuj's success, such reconstruction tools depend greatly on the existing legal and political systems and may be difficult to replicate in post-disaster reconstruction in other vulnerable urban areas around the world. This paper is of value for planners and policy makers who are interested in disaster planning and building back better. It is also of interest for land use planners interested in understanding the application of land readjustment as a versatile tool for planning and land reconstitution, infrastructure provision, and building resiliency.

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