

Climate Resilient Housing: An Overview of The Policy Landscape in Pakistan

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EXECUTIVE SUMMARY

This study examines the policy landscape for climate resilient housing in Pakistan. These households are located on the periphery of three of the fastest growing cities in the province of Punjab, namely Rawalpindi, Faisalabad and Multan. Punjab is the largest province with almost sixty percent of Pakistan's population, and Pakistan is the second most populous and fastest urbanizing country in South Asia.

A number of policies exist, however, there remain serious challenges. While the Housing Policy of 2001 addresses the issues of uncontrolled and unplanned urbanization, it does not look at climate resilience. The Energy Conservation, National Conservation and Climate Change policies do look at energy efficiency, use of low polluting materials, and use of local materials etc. Most of these policies focus on energy conservation, but not adaptation. Another common thread among these policies is the lack of implementation mechanisms or instruments. Hence, they remain effective only on paper.

One of the reasons for the government's lack of control over housing construction is that most of these houses are personally financed. A meager 2% of housing is financed from formal mechanisms and another 10–12% through informal loans. The concept of insurance has not taken root in Pakistan, especially with the fastest growing segment of poor peri-urban households.

In the absence of a regulated house-building sector, masons decide how houses are made. They advise the type of structure that can be built within a family's budget, and most of these decisions are based on financial considerations rather than looking at the adaptation options for impending climate change.

This study looks at the climate vulnerabilities and predictions, policies, institutions, agents, and various aspects of the housing sector, including

urbanization and housing finance, in order to provide a background to the economic analysis of heat resilient housing options for growing urban centers in Pakistan.

CLIMATE VULNERABILITIES

CONTEXT

Pakistan is exposed to multiple natural hazards, which include, among others, cyclones, floods, drought, intense rainfall and earthquakes. With 40% of Pakistan's population highly vulnerable (Abbass, 2009), Pakistan is one of the top ten vulnerable countries in terms of adverse climate impacts. The most serious concerns for Pakistan include threats to water, food and energy security as well as the vulnerability of coastal areas and an increased risk of extreme events (TFCC, 2010). The knowledge of risk regarding key hazards and the underlying dynamics and causes is low in Pakistan. While development planning at all levels lacks the necessary risk consciousness, and integration of disaster risk management (DRR) remains at the preliminary stages of design (NDMA, 2012). In order to steer Pakistan towards climate resilient development, there is a dire need to mainstream climate change across socially and economically vulnerable sectors (Federal Flood Commission, 2012).

Recurrent floods in the Indus River and its tributaries continue to cause losses and damages to human lives, infrastructure and livelihoods as an estimated 80-85% of the population is currently concentrated along the Indus Plain (WWF, 2007). During the past 60 years alone, Pakistan experienced 18 major floods with a cumulative financial loss of US\$ 30 billion, approximately 10,000 deaths, 127,375 affected villages and a total affected area of 567,123 km². As for the 2010 floods, in particular, they resulted in a cumulative financial loss of US\$ 10 billion, 2,000 deaths, 17,553 villages damaged or destroyed and a total area of 160,000 km² affected (Federal Flood Commission, 2012). Although the most catastrophic in recent history, Pakistan also experienced floods in 2011 and 2012 concentrated mostly in the southern region

and non-flood prone areas. What remains evident in this recent onslaught of floods, in particular, is the inability of housing infrastructure to provide necessary protection, and the failure of traditional practices to withstand the effects of floods. Given the recurrence of flooding and large-scale destruction of homes, the major emphasis now in terms of strategy, apart from providing adequate shelter to flood affected communities, has been to transfer knowledge on safe construction practices and DRR to build resilience to future disasters (Asian Development Bank & World Bank, 2010; OCHA, 2012).

Moreover, recent decades have highlighted the increased vulnerability of large cities, particularly Karachi, Lahore and Rawalpindi, to flooding attributable to an inadequate storm-water drainage system (NDMA, 2007). The city of Lahore experienced the effects in 1996 and 1997, while Hyderabad city, in Sindh, was affected adversely in 2005. The sewerage got choked and floodwater remained stagnant for ten days, causing deaths and creating an amalgamation of health problems. Islamabad and Rawalpindi, the twin cities, experienced massive flooding in 2001. The cities received 620mm of rain in ten hours, causing 74 deaths and a loss of Rs 30 billion (Mir, 2009).

An increased heat index, as predicated by most climate change literature, also has potentially dire consequences for already vulnerable segments of Pakistan's population. The IPCC noted that in low income countries, particularly, where the capacity to adapt is weak, the projected increase in temperature and changes in rainfall patterns can increase malnutrition, disease and injury due to heat-waves, floods, storms, fires and droughts, along with diarrheal illness and the frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone (Confalonieri et al., 2007).

Potentially fatal diseases find increased temperatures favorable. Pakistan has seen an increase in the occurrences of diseases such as malaria, dengue, typhoid, cholera and encephalitis in the recent years,

which are further projected to rise by 12–27%, and a 31–47% increase in epidemic potential predicted for malaria and dengue respectively (Mustafa, 2011). The effect of increased temperatures will be most experienced by already vulnerable populations including rural, elderly and outdoor workers (Confalonieri et al., 2007). With the cost of health already in excess of US\$ 1 billion and an inadequate capacity to adapt, this has implications for resilience across numerous sectors in Pakistan, a country that already struggles to provide basic services and is lagging behind in the achievement of internationally set development goals (Mustafa, 2011). According to the National Climate Change Policy 2012, rising temperatures resulting in enhanced heat and water stressed conditions is one of the key climate threats to Pakistan.

The Oxfam community based study, meant to record climate adverse impacts on rural populations, is strongly correlated with IPCC projections and the patterns modeled by the GCISC. The respondents in all three districts confirmed changes, among others, including continued sea intrusion, rising temperatures, depleting agricultural outputs, erratic rainfall and deteriorating groundwater in terms of level and quality (Abbass, 2009).

EMERGING HEAT PATTERNS

A Pakistan Meteorological Department (PMD) study calculates the change in the heat index for all regions of Pakistan during the summer season (May–Sept) from 1961 to 2007, with the aim of establishing trends. The summer season analysis, 1961–2007, has found a total increase in heat index of 3°C for this time period in Pakistan overall, and significant increases in temperature in different regions. The study attributed a rise in daytime temperatures and relative humidity, which contributed significantly. The report went on to recognize changes in humidity as playing a significant role in the human health impacts of the heat index, in addition to changes in surface air temperature, (Zahid & Rasul, 2008).

Furthermore, PMD also projects regional climatic changes through downscale modeling, according to which, the northern region of Pakistan may experience an intensive increase in temperature in contrast to the southern region. Additionally, nighttime temperatures are also projected to increase more rapidly than the maximum temperatures, which is compatible with global projections (Cheema, Rasul, Ali, & Kazmi, 2010). Rainfall patterns in north, northwest, west and coastal areas exhibited an overall significant decreasing trend, while the plains and the southwest region of the country experienced no significant trend during the last two decades. The trend observed in rainfall data is found to be consistent with the IPCC 2001 report (Salma, Rehman, & Shah, 2012).

According to The Task Force report, a temperature increase based on the A2 scenario, for Pakistan as a whole, in 2020s, 2050s, and 2080s are respectively 1.31°C, 2.54°C and 4.38°C; and similarly, 1.45 °C, 2.75 °C and 3.87 °C in A1B scenario. For the projected changes in seasonal temperatures in each scenario, the temperature increase in both summer and winter will be higher in northern Pakistan than in southern Pakistan, while the temperature increase in both northern and southern Pakistan will be larger in winter than in summer (TFCC, 2010).

In addition, The Task Force on Climate Change (TFCC) (2010) report synthesized the following trends in terms of temperature, based on GCISC and the PMD climate research:

- The mean annual temperature over Pakistan increased by 0.57°C over the period 1901–2000 (in agreement with the global trend);
- The slope of the mean annual temperature over Pakistan during 1960–2007 was approximately 0.24°C per decade as compared to 0.06°C per decade during 1901–2000, reflecting an increased rate of warming in recent years (in agreement with the global trend)

- During the period 1901–2000, the increase in mean annual temperature in the northern part of Pakistan was higher than that for the country as a whole, 0.8°C versus 0.6°C;
- Summer (April–May) temperatures (both mean and maximum) increased in all parts of Pakistan during 1951–2000;
- During the same period, the Balochistan Plateau became warmer in all seasons;
- Monsoon (July–September) temperatures (both mean and maximum) dropped throughout Pakistan during 1951–2000, except in the Balochistan Plateau;
- During 1951–2000, the greater Himalayan region had a warming trend on an annual basis as well as in all seasons, except the monsoon season.

Karachi, the largest city of Pakistan, home to 11% of the population, exhibited significant trends in rising temperature. There has been a 2.25°C increase in mean temperatures in the last 59 years. Per decade mean temperature rise is 0.38°C, which is ten times more than the global increase in temperature. At this rate, Karachi's temperature is likely to rise up to 3.9°C at the end of the century (Sajjad et al., 2009).

In Lahore, a study aimed at monitoring the spatial, temporal and micro level climatic variations from 1950 to 2010, established that the increase in nighttime temperatures has been a major effect of climate change. Rapid urbanization of the city has led to an increase in housing units, commercial areas, public places, deforestation and vehicular traffic, all of which contribute towards an increase in the overall temperature of Lahore. Concrete, the dominant construction material, absorbs radiation during the daytime and emits heat at night. This, combined with low wind speeds, has the effect of trapping heat radiation in the atmosphere causing increased minimum temperature values (Qureshi, Mahmood, Almas, Irshad, & Rafique, 2012).

POPULATION AND SHELTER

Pakistan, second largest in South Asia, is the fastest urbanizing and the sixth most populous country in the world (Mustafa & Sawas, 2013). Pakistan's total population, according to 1998 Census, was 133.3 million. According to the Task Force on Urban Development's (TFUD) report (2011), the total population of the country as of 2010, reached 173.5 million with the urban population reaching 63.1 million, a 36.3% level of urbanization. With this trend, the urban population is estimated to surpass 121 million by the year 2030, translating to 45.6% level of urbanization, the highest amongst the southeast Asian countries (TFUD, 2011).

According to the 1998 Census, the total number of housing units throughout the country was 19.3 million. Out of the total housing stock, 67.7% were located in rural areas and the remaining 32.3% in urban areas, of which 39%, 40% and 21% are respectively *katcha*, *semi pucca* and *pucca*. In terms of housing type, out of the 13.5 million rural households, 41.5% live in one-room units. The average household size is 6.6 persons, averaging 3.3 persons per room. The predominant roofing material used for such construction is mud, wood and bamboo in combination with straw and thatch. The National Housing Policy 2001 acknowledged that, historically, rural housing has received scant attention due to lack of adequate institutions and diversity in land tenure arrangements, coupled with the non-saleable nature of the land on which houses are built.

The National Housing Policy 2001 noted that the high population growth, combined with difficulties in governance and inadequate investments in urban development, has resulted in uncontrolled and unplanned growth of cities and towns, deteriorating the urban environment and deficiency in requisite services. As a result, 50% of the population in urban areas is obliged to live in *katchi abadis*, squatter settlements, shantytowns and slums. Low-income groups have been completely marginalized from planned housing stock, particularly. Informal settlements include *katchi abadis* (squatter settlement on state land) and un-serviced

settlements through the informal sub-division of agricultural land. It is difficult to ascertain the percentage of housing units built informally. The creation of informal settlements, however, actually helped meet the supply-demand gap to a great extent. As a result, informal housing units in the urban areas of Pakistan increased from 1.9 million in 1981 to 2.7 million in 2005 (Hasan & Raza, 2009).

The rapid ageing of the existing housing stock is also an issue, 50% of which is estimated to be over 50 years old. The housing backlog, according to 1998 Census, was approximated at 4.3 million units. The annual additional requirement is estimated to be around 5.7 million housing units, however, with an annual production of 300,000 units there is a recurring backlog of 270,000 housing units annually. According to the Vision 2030 document, with half the urban population and the majority of rural population living in *katcha* houses and *katchi abadis* without adequate water, sanitation and drainage services, the backlog has increased to more than 6 million units (Planning Commission, 2007; Planning Commission, 2008). According to some estimates, housing shortages in the country reached 7.57 million units in 2009 with nearly 80% of the shortage attributed to lower and middle-income groups (State Bank of Pakistan, 2010).

Demographic trends show that the country's population continues to urbanize rapidly. The urban population in 1947 was around 15% of Pakistan's total population, which rose to 40% in 2009. Given the trend that 32% of the population inhabited urban areas in 1998, it is projected that this figure will rise to 50% by 2025 (Planning Commission, 2012). Given the definition of 'urban', adapted in 1981, which considers only those areas that have a municipal governance system, the critics of 1998 Census have pointed out that the urban population is much larger, since the huge informal settlements in the peri-urban areas of the cities are often not part of the metropolitan jurisdiction. As a result, over 5,000 settlements are denied an urban status in the 1998 Census. In addition, there is no differentiation made between planned and informal

settlements in the 1998 Census, where most of the poor and migrant households live (Hasan & Raza, 2009). The Planning Commission recently recognized it and observed that, given the definition based on administrative parameters rather than on density, actual urbanization presently is already assessed at 50% (Planning Commission, 2011).

Economic activity in urban areas contributes at least 78% to the GDP of Pakistan, and has the potential of becoming instrumental towards increasing prosperity and per-capita income (Planning Commission, 2011). In terms of contributions towards economic growth, Karachi, for example accounts for 60-70% of the national revenue and 40% of value-added in the manufacturing sector. The challenge, therefore, is to absorb the rising urban population in terms of providing them with shelter, food, employment, healthcare, education, municipal services and facilities (TFUD, 2011). In view of the above, the Framework for Economic Growth and the Vision 2030 policy documents place emphasis on urban development for economic growth and poverty alleviation.

KEY POLICIES

The right to housing or shelter is recognized in Pakistan's Constitution as a basic right. The article 38(D) of the Constitution makes the state responsible for providing basic necessities of life to the citizens without discrimination, including housing. Pakistan also endorses various international agreements, with ensuring adequate and decent housing for all. Also, this is specifically mentioned in the United Nations Vancouver Declaration on Human Settlements.

There are various other policies that directly or indirectly address the housing issues either in terms of DRR aspects, climate compatibility or energy conservation measures. A brief overview of the key policies is given below.

[The National Housing Policy 2001](#) is the only existing housing specific policy. Given the failure of past policies

and measures, the emphasis of the existing housing policy focuses on the fundamental requirements for creating a favorable environment in the country in order to promote and facilitate the housing sector. The policy is intended to evolve, implement and support measures in order to ensure adequate housing to all its citizens. It indirectly references climate resilient housing in terms of long and short-term measures. These include an integrated construction approach coupled with cost effective materials, particularly indigenous ones, as well as the attention to a healthy and livable environment through technical and environmental housing development schemes (Ministry of Housing and Works, 2001). Excluding the enforcement of National Reference Manual on Planning and Infrastructure Standard and the National Building Code of Pakistan, the policy does not include implicit or explicit reference to climate change related measures or hazard resistant construction. While the Ministry of Housing is responsible with implementing the National Housing Policy 2001, it had not done so effectively, as per the evaluation of the State Bank of Pakistan. Since its approval in 2001, policy implementation has not been adequate, and except for some positive measures for house financed by the State Bank, not much progress has been made on policy implementation (State Bank of Pakistan, 2010; Planning Commission, 2008).

Pakistan in the 21st Century: Vision 2030 was launched in 2007 by the Planning Commission. It intended to be a roadmap for achieving sustainable economic development with an emphasis on managing climate change threats in terms of mitigation and adaptation, promotion of renewables and conservation measures across sectors. Regarding housing, Vision 2030 aimed to provide shelter to all, especially the marginalized, by putting policies and programmes, as well as administrative measures, in place to cater to the needs of the poor. Construction of low-income housing was prioritized, with access to essential amenities. In order to cater to the increased housing demand, high-rise mass housing units were also recommended, along with increased institutional financing. The policy,

however, is currently postponed and will be reviewed in 2015 (Kakakhel, 2012).

National Environment Policy 2005 provides an overarching framework for addressing environmental issues, including climate change. These include, among others, air and water pollution, waste management, deforestation, natural disasters, energy efficiency through renewables, etc. By and large, emphasis has been on mitigation measures. With reference to housing and shelter, it includes measures such as the provision of water supply and waste management in notified slums, upgrading living standards in rural dwellings, in addition to the development of master plans for city towns and rural settlements.

The National Energy Conservation Policy 2005 provides guidelines and actionable points to enhance end use efficiency across the sectors. Some key measures, both short and long term, for buildings and the household sector include energy audits, energy efficiency at the household level, insulation of buildings suitable for different climate zones, and enforcement of the Building Energy Code. In order to implement the Energy Conservation Policy 2005, a bill was drafted to establish the National Authority on Energy Conservation and is currently under discussion in parliament. Policy and functions of ENERCON focus on mitigation measures. However, the conservation of energy through adaptation measures is not addressed (ENERCON, 2007).

The National Climate Change Policy 2012, which is the existing overarching policy on climate change, does provide proper land use/town planning and building systems in order to address climate change impacts, particularly for the rural housing reconstruction so they may be climate resilient in the wake of flood disasters. It also highlights that for urban areas, town planning should integrate principles based on efforts to reduce carbon footprints. In terms of adaptation, improvement in energy efficient buildings is recommended, which includes standardizing building and construction codes as well as legislation and creation of incentives for retrofitting, maximum use of natural lights, better

insulation, use of energy efficient lights, boilers, appliances and groundwater pumping units (Planning Commission, 2012). In order to implement the Climate Change Policy, which includes adaptation measures, the Climate Change Division (formerly Ministry of Climate Change) is in the process of devising the national adaptation plan as well as a national mitigation plan.

In view of an urbanized population density, the [Framework for Economic Growth](#), made public in 2011, seeks to promote and develop cities as engines of growth. This includes, among others services and utilities, the promotion of investments in construction, especially with dense high-rise buildings. The framework also aspires to address the shortfall of housing units for the poor and middle class families, while simultaneously creating jobs. Based on the Framework for Growth policy, the annual development plan 2012–2013 earmarked Rs 25 billion in federal private sector development programs (PSDPs) to implement various initiatives to foster urban development. These include, among others, the formulation of city development strategies and city business plans; preparation of national DRR policies, one million housing units for low-income groups, legal and regulatory reforms for improved pro-poor housing markets and slum improvements, and improved water supply and sewage in urban areas. Excluding research and development in low-cost energy efficient construction techniques, the framework does not address climate resilient housing in terms of the adverse impacts of climate change. Under the jurisdiction of the Planning Commission, the policy received criticism for a number of reasons, including not being innovative toward achieving its goal, for being overly simplistic and failing to outline a proper methodology, for being elitist and generating economic rents, and for failing to recognize the need for institutional reform (Hussain, 2011).

The [Task Force On Urban Development Report 2011](#) was established by the Planning Commission in order to review existing urban conditions and establish broad principles for formulating a national urban policy. The

Task Force submitted its report in 2011. The report analyzed various challenges confronted by the cities and made recommendations for environment management plans and disaster risk reduction for cities and towns. Recommendations were also made for energy efficient buildings and use of renewables to meet energy needs. The report, however, does not make reference to climate concerns in terms of climate resilient housing or climate compatible development.

The report of the [Task Force on Climate Change 2010](#) does discuss rising temperature, heat stresses, precipitation and extreme events in detail, but places more emphasis on the impact to agriculture, water, health, ecosystem and energy security. The emphasis, in general, remains on mitigation measures vis-à-vis rising temperature. Climate resilient housing, however, does not find salience anywhere in the document. The Task Force on Climate Change was launched in 2008 by the government so as to take stock of climate change impacts in Pakistan and proposing measures for inspection. Based on this report, Climate Change Policy 2012 was formulated.

The [National Framework for Disaster Risk Management \(NDMRF\) 2007](#), a key policy document aiming to address DRR, was formulated by the National Disaster Management Authority. The framework intends to provide direction and guidelines to all national, provincial and local stakeholders for vulnerability reduction measures and capacity building of key institutions and communities. The NDMRF acknowledges the issues related to the vulnerabilities of housing and infrastructure from hazards such as earthquakes, floods and landslides. It particularly emphasizes the plight of rural housing, which is predominantly adobe, and also addresses the situation of urban housing infrastructure, which currently suffers from a lack of implementation of building codes resulting in the mushrooming of slums and urban poverty, leading to further unsafe construction practices. The framework placed emphasis on integrating risk assessment in the planning and design stages of all new infrastructure and one of the nine

priorities areas in the framework is mainstreaming disaster risk reduction in planning processes (NDMA, 2007).

The [National Disaster Risk Reduction Policy 2012](#) provides an overall guiding framework for addressing the prevailing high level of disaster risks, both natural and human induced. The policy seeks to promote priority measures for dealing with the existing vulnerabilities to hazards and to further programmes that strengthen resilience, and ensuring DRR is systematically integrated into recovery and reconstruction programming. The policy considers it crucial to integrate DRR effectively into development processes and capacity building at all levels and across sectors based on a multi-hazard approach (NDMA, 2012). Given the rapid urbanization and population growth, the policy emphasizes promotion of DRR through land use planning, enforcement of building codes, building by-laws and retrofitting approaches towards decrepit structures. For the urban poor living in vulnerable areas, the policy seeks to design a holistic solution that can effectively lower existing risks while at the same time taking into account social, economic and physical aspects. For rural areas, which are characterized by non-engineered buildings with different land use patterns and needs, interventions should promote safer building techniques based on lessons learnt from earlier risk conscious recovery and reconstruction. District development plans, based on a holistic approach, need to address settlements in unsafe areas by deploying the 'living with hazards' models (NDMA, 2012). The NDMA, being the custodian of this policy, is yet to translate the policy into programmes for mainstreaming and interventions.

AGENTS AND INSTITUTIONS

Various agents, at the federal, provincial and local level, deal with the physical planning and housing issues dictated by their respective mandates. Housing is a provincial subject and, following the 18th Constitutional Amendment, is largely managed by the provincial governments taking the lead in implementing the

environmental, climate and other relevant policies within their provinces. At the federal level, the Planning Commission is the apex body dealing with planning and development in the country. It provides policy guidance to all sectors including housing, through policy documents such as Vision 2030, Mid-Term Development Framework and the Annual Development Plan. The Commission is responsible for reviewing and approving all development projects submitted by the ministries (both federal and provincial) and their attached agencies. The Federal Ministry of Housing and Works has a number of responsibilities regarding housing and shelter, mostly related to federal government employees, buildings or implementation of housing projects in provinces on a matching grant basis. The Ministry has departments and autonomous bodies, among which include: the National Housing Authority (NHA), Pakistan Housing Authority (PHA), Pakistan Public Works Department, National Construction Company (NCC), Estate Office Management (EOM) and the Federal Government Employees Housing Foundation (FGEHF).

At the provincial level, the Planning and Development Departments, counterparts of the federal Planning Commission, look after the physical planning and housing subject with reference to resource allocation and provide direction and guidelines. Provincial ministries are also involved in the housing sector. The Department of Physical Planning and Housing, in collaboration with agencies and other departments including development authorities, improvement trusts, public health engineering, town planning, etc., is responsible for implementing policies and projects.

The focus of the most relevant institutions at the federal or provincial level is primarily on the provision of housing, which lack considerations for climate related measures. On the other hand, the institutions dealing with disaster risk management or climate change do refer to integration of disaster risks within the development planning.

The [Council for Works and Housing Research \(CWHR\)](#) is a research-based organization under the Ministry of Science and Technology. The main aim of the organization is to research and provide guidance on civil engineering works, with special focus on affordable housing. Given the mandate, the CWHR aims to initiate, promote and guide scientific research related to all types of civil engineering structures and to carry out research involving the evaluation of appropriate construction materials, technologies and construction systems for low-cost housing. In addition, they aim to study and develop simplified methods for building design and construction through indigenous material and techniques, and feasibility surveys for development and demonstration of energy efficient, environmentally friendly and thermally insulated low-cost houses in different regions of Pakistan. However, against the objectives, particularly with reference to construction materials for low income and/or energy efficient housing designs, the CWHR developed designs and built demonstration units sporadically, but these failed to be replicated/adopted on a mass scale (Mansoor, Ali, & Arshad, 2008).

The [Pakistan Council of Architects and Town Planners \(PCATP\)](#), established under the Ordinance of 1983, is a statutory body for recognition and protection of architect and town planning professionals. In addition, the council offers assistance to the government and relevant institutions by reviewing and advising on issues related to professionalism and the education of architects and town planners.

The [Provincial Cooperative Departments](#) are intended to promote, control and regulate cooperative societies in their respective provinces/regions and across sectors, such as agriculture, housing, livestock, trade, etc. According to an ICA study, as of 2009, there were 2,609 housing cooperative societies in Pakistan and these cooperative societies have built approximately 13 million housing units over time. The respective governments facilitate these societies by making land available at subsidized rates, but do not provide any financing for the development of the housing scheme (ICA Housing, 2009).

The Government of Sindh established the [People's Housing Cell \(PHC\)](#) in order to provide housing assistance to the poor. Their major objectives include the provision of 100,000 affordable housing units, and establishment of an autonomous and permanent institutional mechanism to provide decent and affordable housing for low-income groups. In order to implement the PHC's objectives, a draft policy paper was prepared. The PHC, together with the federal government and in collaboration with the UNDP, plans to build 500 low cost, environmental friendly, disaster resistant houses, namely Benazir Housing Technology, in the disaster hit coastal belt of Sindh. The houses are built with compressed earth block, and equipped with solar energy technologies. A single housing unit, resistant to water-salinity, earthquakes and cyclones, is completed within seven days and the cost for each unit is US\$3,900 (UNDP, 2009; People's Housing Cell, 2013).

The [National Disaster Management Authority \(NDMA\)](#), with its provincial counterpart, the PDMA, operates under the National Disaster Management Act 2010 and is the apex body dealing with the entire spectrum of disaster risk management including prevention, preparedness, relief, recovery and reconstruction. The NDMA, however, has yet to exercise the reconstruction component of its mandate, which includes housing reconstruction. During the 2010 floods, the Flood Reconstruction Unit was established within the Planning Commission to deal with reconstruction (NDMA, 2011b).

The [Earthquake Reconstruction and Rehabilitation Authority \(ERRA\)](#) was established in 2005 for the reconstruction and rehabilitation of nine districts in Khyber-Pakhtunkhwa (aka NWFP) and Azad Jammu and Kashmir (AJK), which were affected by the devastating earthquake in 2005. Recently, the ERRA mandate and scope was expanded to the national level. The earthquake killed 73,338 people and injured 128,309 people in the affected districts. The earthquake damaged or destroyed more than 600,000 houses, some 84 percent of the total housing stock was damaged or destroyed in AJK and 36 percent was damaged or

destroyed in NWFP (North-West Frontier Province). Ninety percent of the destroyed or damaged houses are located in rural areas. The housing reconstruction was owner-driven, which apart from cash grants, included technical and monitoring services. Local masons were involved and training was imparted on earthquake resistant construction. In order to ensure that cash grants are used specifically for housing reconstruction and in accordance with the laid down guidelines, mandatory monitoring visits at different stages of the construction were made and tied with the release of the next cash grant. By June 2013, 96 percent of the housing reconstruction was complete (ERRA, 2013).

OTHER PUBLIC SECTOR ENTITIES

Various other initiatives were undertaken and entities established by the provincial and federal governments in order to deal with housing and associated matters. Pakistan Housing Authority (PHA) and the National Housing Authority (NHA), subsidiaries of the Ministry of Housing and Works, deal with implementing housing projects for the government and general public. PHA is implementing 18 housing projects that consist of 4,476 housing units in major cities. NHA is entrusted with the construction of one million housing units for government employees, media persons and the general public. In Punjab, these include the Punjab Housing and Town Planning Agency (PHATA) for town planning and the provision of serviced plots. Punjab Land Company Limited (PLDC) was established in order to implement the Ashiana Housing Project, which provides housing units to low-income groups. Development authorities and improvement trusts also exist, along with the Directorate of Katchi Abadis. The development authorities are primarily involved in planning and developing housing colonies, while the Directorate's mandate is to regularize and upgrade city slums. Similarly, the governments of both Sindh and Punjab have development and Katchi Abadi authorities as well as a Cooperative Housing Authority and People's Housing Cell. The Government of KPK, in addition to development authorities, has established the Khyber Pakhtunkhwa Housing Authority.

LAND USE PLANNING, BUILDING CODES AND ENFORCEMENT

Urban development is primarily a provincial issue and urban planning lies with the local governments. Under the respective law of local governance in each province, district governments are responsible for spatial planning, housing, building control, construction permits and other associated functions. These include, among others, the following:

- Approve master plans, zoning, and land use plans, including classification, reclassification of land, environment control, urban design, urban renewal and ecological balance;
- Review implementation of rules and by-laws governing land use, housing, markets, zoning, environment, roads, traffic, tax, infrastructure and public utilities; and,
- Review development of integrated systems of water reservoirs, water sources, treatment plants, drainage, liquid and solid waste disposal, sanitation and other municipal services.

Tehsil (Town) Municipal Administration (TMA), the second tier of the district government, is responsible for implementing the spatial planning, building bylaws and development planning. However, by and large, there is lack of expertise and qualified professionals for dealing with these responsibilities, in addition to multiple jurisdictions of various agencies within a district, particularly in larger districts (World Bank & International Finance Corporation, 2010).

Regarding the town planning and master plan for cities, the State Bank observed that national and local master plans for town planning and housing facilities are either inadequate or poorly enforced, which lead to inefficient allocation of land and uncontrolled urban development. In addition, over-restrictive building codes and laws at the sub-division level limit efficient use of urban lands and increase costs (State Bank of Pakistan, 2012).

The Task Force on Urban Development noted that “in smaller towns there is no expertise with the TMAs, no maps, no modern surveying equipment, and no future vision for the town. The TMA has to be strengthened and the expertise for it has to be created/acquired” (TFUD, 2011).

Under building codes and regulations, namely Pakistan’s Building Code *Seismic Provisions 2007*, all new buildings including residential, commercial, industrial and particularly high-rises, are required to incorporate seismic measures. The revised building code provides detailed requirements, specifications, guidelines and procedures and contains recommendations about designs of various types of buildings in different geological and soil conditions, choice and selection of material as well as requirements for testing and inspection (Shabbir & Ilyas, 2008; Ahmad, Mayo, Aziz, Rahman, & Hussain, 2013). Given the capacity and expertise available with the relevant local government institutions and respective development authorities, enforcement of the building codes, in general, remains ineffective.

Building codes, however, are specifically implemented for seismic provision and do not cater to the structural requirements needed for adopting a multi-hazard approach to cope with other disasters such as floods or temperature variability. In order to address this gap, the NDMA in 2011, in view of the frequency and intensity of recent floods, initiated a process to formulate region-based building codes for engineered, non-engineered, semi-engineered structures in flood prone areas, along with seismic safeguards (NDMA, 2011b). The NDMA has not been able to put together the revised comprehensive building codes as of yet.

INTERNATIONAL INSTITUTIONS

Apart from the World Bank and the Asian Development Bank, relevant UN agencies along with national and international NGOs in Pakistan, assist the government in housing/shelter interventions in technical and financial measures, particularly after disasters and

through subsequent phases, which include relief, recovery and reconstruction. Among the UN bodies working in Pakistan, [UN-Habitat](#) has the key mandate to deal with issues of shelter and housing. UN-Habitat assistance includes research, policy development advice, technical assistance and capacity building on issues relating to housing and shelter. The [United Nations Development Programme](#) (UNDP) is the lead UN agency that assists the government in emergency relief and recovery. The agency’s interventions include emergency shelter, transitional shelter, restoration of community infrastructure, and flood resistant and energy efficient housing. The UNDP led the early recovery process in 2010 floods (UNDP, 2009).

PRIVATE SECTOR

In the private sector, numerous agents with formal and informal establishments are active in the housing sectors, catering to the needs of clients that belong to different economic groups. According to Planning Commission, high-income groups, which constitute 20 percent of the total population, are being served by both private and public sector, while the shortage of housing for the remaining 80 percent is attributed to middle and low income groups (State Bank of Pakistan, 2012). The following is a brief overview of these agents.

[The Association of Builders and Developers \(ABAD\)](#), with 600 leading construction companies as its members, is the national level representative organization of builders and developers. Apart from highlighting and resolving issues and problems confronted by the housing industry in Pakistan, ABAD contributed towards the formulation of the Housing Policy 2001 and enhancing the role of HBFC with reference to housing finance. Apart from ABAD, numerous developers and builders such as Bahria Town and Defense Housing Schemes cater to high-income groups with serviced plots or finished housing units.

[Institute of Architects, Pakistan \(IAP\)](#) is a representative forum of architects, established in the effort to promote architecture and town planning. The IAP looks after the

professional interests of architects, as well as assists governments at different levels in terms of revision of byelaws and networking with relevant international organizations.

The cooperative housing societies have become one of the major sources for providing housing units in Pakistan. As of 2009, 2,609 housing cooperative societies exist in Pakistan and these cooperative societies have built close to 13 million housing units over time. The cooperative societies are dealt under the Cooperative Societies Act 1925 and the Cooperative Societies Rules 1927 (ICA Housing, 2009).

Architects are important agents in the housing sector with reference to design and construction, as they can play a critical role in incorporating elements of climate resilience and sustainable housing. However, by and large, the designs that are conducive to the climate and provide hazard resistance find little salience. The study noted, "Instead of advising and guiding their clients towards more practical domestic plans, there is a worrying trend of architects catering to their clients' every whim, wish and demand, even if these are not environmentally-friendly measures" (Abbasi, 2013; Siddiqi & Siddiqi, 2009).

Within the informal housing enterprises and entities, masons and local small-scale contractors are major stakeholders in terms of catering to 80 percent of the population, i.e. middle and low-income groups. Masons usually work on daily rates, while local small scale contractors provide finished housing unit on a fixed contract basis. They essentially play the role of architect in that they advise and guide the client on design and construction material within a specific budget. Generally, these agents are not aware of hazard resistant measures, such as recurrent flood, let alone consider climate concerns while building a housing unit. During the housing reconstruction in earthquake-affected areas, the masons, in view of their critical role, were included as a main target audience by the ERRA. In each area, groups of masons were trained as master trainers for seismic resistant housing reconstruction (ERRA, 2013).

HOUSE FINANCING

The formal financial sector caters to only 1-2% of all housing transactions in Pakistan, whereas informal lending takes care of 10-12%. The lack of formal financing is primarily a supply-side problem with the majority of house financing is arranged through personal sources. Currently, the House Building Finance Corporation (HBFC), 27 commercial banks, a Development Financial Institution (DFI) and two micro-finance banks provide housing finance products (State Bank of Pakistan, 2012).

The House Building Finance Corporation (HBFC) is the only specialized bank in Pakistan that provides house-financing services to the public since 1952. It covers 80 cities and towns across Pakistan and aims to expand its operations to include 150 in total. In spite of a drastically reduced share in total house financing, from 55% in 2004 to 21% in 2009, the HBFC remains the only institution that continues to cater to the needs of lower-middle and middle-income groups. Public sector housing programmes have also exhibited a downward trend with a decrease from 10.9% in the 1960s to 5.9% in the 1990s. Private banks, on the other hand, although gradually expanding services in house financing, have only met the needs of middle or higher income groups.

The Planning Commission observed that there is limited institutional finance availability for housing construction and maintenance of old dilapidated housing stock. Nearly 80 percent of the total population is unable to afford the financing terms offered by the house-financing institutions (State Bank of Pakistan, 2012). As a result, the construction of low-income housing is much slower in comparison to the increasing housing needs. According to the 8th Five-year plan, over 70% of the incremental housing demand is of low-income groups, who find it difficult to secure developed plots and construct houses (State Bank of Pakistan, 2012; Planning Commission, 2012). Aiming to enhance the access to financing for low-income groups, the State Bank amended the prudential regulations for micro-finance banks, which now allow Rs 500,000 to a single borrower (State Bank of Pakistan, 2012).

SUCCESSFUL MODELS OF LOW-INCOME HOUSING

Various solutions have been tried in Pakistan to resolve the issue of housing for low-income groups, which include serviced plots, slum clearance and resettlement of squatters. Given the scale and complexity of the problem, particularly for the urban poor, these projects have had little success (Tirmizi, 2006). The Housing Policy 2001 also acknowledges the failure of state, private sector and non-government entities in that they have not been able to implement cost-effective and commercially viable housing solutions. The ongoing initiatives, considered to be successful models for housing, focus on the provision of housing and do not necessarily consider climate concerns. An overview of some of the representative initiatives are given below:

Saiban Pakistan is an NGO involved in incremental housing programmes for poor segments of society through Khuda ki Bastis (KKBs). The mechanisms adopted for Khuda-Ki-Basti include a one-window operation for all formalities at the site. In order to establish authenticity and avoid speculation, as a prerequisite, the homeless family must stay in the reception area for 7 to 14 days. Immediately following possession of plots, the allotted is required to establish some kind of shelter as soon as possible; no building by-laws are imposed when constructing houses, and technical support with small loans and recovery in easy installments are provided. The plots, non-transferable, are provided on a no-loss, no profit basis to low-income families earning Rs 5,000 to Rs 15,000 a month. An estimated 30,000 people have so far benefited from KKB schemes. Currently, Saiban is implementing its fourth project in Lahore city, providing 500 housing units (Tirmizi, 2006; State Bank of Pakistan, 2010).

The Orangi Pilot Project (OPP), an NGO based in Karachi (Sindh) that began work in 1980, provides low-cost sanitation, housing, health, education and credit for micro-enterprise. The OPP approach is to encourage and strengthen community initiatives and partners with the government for development of local resources. The methodology involves action research. OPP's low-cost sanitation programme became a huge success

and recognized internationally. OPP initiated a Low Cost Housing Programme, which is intended to bring improvements in building components and construction techniques as well as provision of credit and technical guidance to building component manufacturers. The OPP provides housing support services to communities and technical training to youths and masons to become community architects. Each year, 2,500 houses benefit from the OPP housing programme. Apart from that, 439 low cost demonstrations of housing units have been completed under the programmes (Orangi Pilot Project, 2012).

RECENT FLOODS AND HOUSING RECONSTRUCTION

Recurrent floods of different scales are a regular phenomenon in Pakistan. Lately, Pakistan experienced consecutive floods in 2010, 2011, 2012 and 2013, even in non-flood prone areas, with considerable damage to housing stock. Given the scale and damage, the 2010 floods were unprecedented. In terms of destruction of houses, according to the DNA report carried out by the World Bank and the Asian Development Bank, the floods caused complete or partial damage to more than 1.6 million houses units across the affected areas. An estimated 913,307 houses were completely destroyed and another 694,878 suffered partial damage. The DNA report noted that virtually none of the houses in the affected areas were designed to be flood resistant, while a portion of the affected area was also located in a high seismic zone. Pucca houses, however, in general, performed better. Aggregately, 13% of the total housing stock in the flood-affected areas was impacted and the cost of damages suffered by the housing sector was estimated to be US\$ 1,588 million, 16% of the total damages (Asian Development Bank & World Bank, 2010).

The 2011 floods affected 23 districts in Sindh and Balochistan. Altogether 9.2 million people were affected, with 520 deaths, 1,180 injuries and 1.5 million houses were partially or completely damaged. Total damage cost estimated to be US\$ 3,730 million, out

of which the housing sector suffered US\$ 982 million (NDMA, 2011a).

Massive flooding and inundation in 2012 affected more than five million people in three provinces, Balochistan, Sindh and Punjab, with some of the districts inundated by floodwater for three consecutive years. With 451 deaths and 2,884 injuries, there was a widespread damage and loss of homes, livelihoods, destruction of standing crops and damage to infrastructure. According to the UN, altogether 387,172 houses were damaged or destroyed. At least 172,172 families, 50 percent of all affected families, were considered to be in dire need of early recovery shelter assistance, with an estimated cost of US\$87 million (OCHA, 2012).

During the current monsoon of 2013, there were floods in eastern rivers that caused massive losses and displacement. According to NDMA, floods affected over 1.4 million with 76,450 housing units damaged as of 5 September 2013 (NDMA, 2013).

HOUSING EARLY RECOVERY AND RECONSTRUCTION

As observed by the World Bank, housing, in general, is not designed to be flood resistant and cost billions in terms of recovery and reconstruction. As a result, in the wake of floods, shelter has always been a key sector in the recovery and reconstruction plans.

After the 2010 floods, one-room shelters were provided for recovery and Rs 40,000 for housing reconstruction. The Early Recovery Strategy did contain measures for flood resistance. These measures were expensive given the scale of caseload, and therefore, not successful. As a result, alternative solutions were implemented, however, these solutions did not adequately considering risks in future events (Polastro, Nagrah, Steen, & Zafar, 2011; Azad & McElhinney, 2011).

In view of the re-occurrence of floods from 2010 to 2012, the humanitarian community in Pakistan generally recommends longer term reconstruction and flood prevention needs. Priority needs include development

and rehabilitation of drainage systems, recovery and maintenance of embankments, homestead raisings, and rehabilitation of roads and irrigation networks. The main strategy for housing recovery is beneficiary driven, providing low cost shelter support in ways that can improve resilience through catalyzing self help efforts and transfer of knowledge on disaster risk reduction (Hollema, Vhurumuku, & Haq, 2011; OCHA, 2012).

HOUSING RECONSTRUCTION

The DNA used three strategies for addressing housing reconstruction after the 2010 floods, involving one time cash grant based on owners driven reconstruction. These included: build as before, build back better, and build back better/safer with an estimated cost of each option being, respectively, US\$ 1,483, 1,690, and 2,206. Of the three recommended options, the government chose the cheapest (build as before), with arrangements to ensure flood resistant and environmental friendly housing reconstruction through monitoring and awareness.

In addition, numerous other actors implemented housing reconstruction, including the armed forces, foreign governments, NGOs, INGOs, individual philanthropists and charities. The actors involved in re-building houses in flood-affected areas had their own designs and funding limits. The resulting disparity in the value of housing interventions, ranged from US\$300 to US\$2,500 (Azad & McElhinney, 2011).

The provincial governments, Punjab and Sindh, also undertook a model village approach to reconstruction in the flood-affected areas, amounting to 89 villages in Punjab and 1,000 in Sindh (Azad & McElhinney, 2011). In Punjab, apart from the 11,000 basic one-room constructions under the UN's early recovery intervention, around 3,000 houses were made with funding from Turkey, Iran and Qatar, and an additional 4,000 houses were made with private donations (Khan, 2013). The Pakistan armed forces also reportedly initiated construction of housing units after the relief phase was over and the Pakistan Navy launched a

model village projects in Sindh, with each village comprising of 100 housing units. Similarly, the Pakistan Air Force also launched a housing reconstruction project of 600 units in various flood-affected areas primarily near the airbases, while the Pakistan Army also supported various housing projects. The Pakistan Heritage Foundation, an NGO, launched a housing project in Sindh called 'Green Karwan Ghar', which uses indigenous techniques and local materials. The aim was to build low-cost and low carbon-footprint houses for flood affected families (Heritage Foundation, 2011).

In the province of Punjab, which was devastated by the 2010 floods, the Climate and Development Knowledge Network (CDKN) is providing technical assistance to the Provincial Disaster Management Authority (PDMA) with developing locally appropriate guidelines for housing and infrastructure in rural areas, which can potentially withstand disasters and climate pressures. The climate compatible guidelines, still at draft stage, are being tested in one of the districts of Punjab, Mianwali, where a housing colony is being constructed. After the pilot testing, the guidelines on climate compatible development will be reviewed and finalized (Khan, 2013).

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