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Online Appendix 1

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Modality of Selection of Vulnerable Housing to be Retrofitted

Preface

Afghanistan is a prone to disaster risk country in which every year the occurrence of various types of disasters such as earthquake and flood always leads to loss of lives and properties. Occurrence of earthquakes is more probable in locations near existing active faults, where the history of previous earthquakes shows the number of casualties and damages in such areas. Floods happen in regions with heavy rain and snow melting after the winter season. Years of civil war in the country have made the local Afghan community one of the poorest in the world and made them more vulnerable to disaster risks. By increasing urbanization during the recent years after the civil wars, most of the local Afghan communities started construction of their own dwellings with low quality and cheapest materials, generally with mud and brick in regions prone to potential hazards that can easily expose the community to the risk. Yet several national and international donors have implemented projects on reducing people and asset vulnerabilities to disaster risks by limiting their exposure to potential loss of lives and properties, and the threat of disaster still exists in most regions of the country.

Project for City Resilience (PCR), which is funded by government of Japan and implemented by UN-HABITAT, is a program to assist the National Unity Government to make Afghan cities safe, resilient, and sustainable by reducing risk, human and economic losses, and impacts, especially on the lives of women, girls, and vulnerable people.

This guideline has developed a modality for the selection of vulnerable housing in Afghanistan to be retrofitted for earthquake protection. It also contains social and technical criteria to target non-engineered earthen buildings for retrofitting issues that can be used by trainers to train local masons and ordinary people. The process of selection and responsible team members has been explained as well. It is expected that the guideline serves as a reliable source to reflect the necessity of the project for selection of the most priority vulnerable house to be retrofitted, which has an efficient impact on risk reduction.

Guideline Development Team
Kabul, Afghanistan
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1. Introduction

Rapid growing of urbanization in Afghan cities after the civil war (1996-2001) has led to migration of a majority of poor people to urban regions and a dramatic increase in the population in the major cities of Afghanistan. Due to the high cost of accommodation in cities, people started to construct their own dwellings without observing engineering aspects and urban construction rules. Afghanistan has been a vulnerable country to natural disasters such as earthquakes and floods; such irregular urban development exposes the Afghan community to potential risk of disasters. Related research on hazard assessment of Afghanistan indicates that the rupture of major active faults in Afghanistan, especially in the east and northeast of the country, generates moderate to devastating earthquakes that will lead to loss of properties and casualties. It is obvious that by developing the appropriate rule of building construction and retrofitting together with enforcement to the entire country, the risk will be reduced significantly.

This guideline will introduce the process and criteria of prioritized vulnerable buildings to be retrofitted. There are two types of criteria that are applied to assess a building: one is social and the other is technical. The site engineer is responsible for assessing the building structure with technical criteria, and a social organizer in collaboration with the CDC will evaluate the social condition of each building's inhabitants.

This guideline is organized as follows: Section 1 provides an introduction and purpose of guideline and a brief explanation of the criteria; Section 2 explains the details of each type of criteria; Section 3 explains the process of selection, including the role of each member of the team, who will do what responsibilities and who will make the final decision; and Section 4 presents check lists for engineers and social organizers.

2. Criteria

2.1. Social

Total score assigned to social criteria is 30 point out of 100.

2.1.1. Number of Family members and dependency ratio:
The number of family members plays a key role in increasing risk; the greater the number of family members, the more exposure will it have.
Dependency ratio is calculated from the following formula:
Number of family members who are able to work/ Number of members who are not able to work

2.1.2. Average of monthly income:
The average monthly income will be asked directly by social organizers and then compared by a checklist of monthly expenses including rent of the house, food, utility payment, school supplies, doctor visit, transportation, and cellphone credit card. If total amount of monthly expenses exceeds the reported income, then the income is assumed to be total monthly expenses.
Those families with a monthly income lower than 50 USD are at selection target.

2.1.3. Family headed by a woman or child:
The status of such families must be confirmed visually by social organizers.

2.1.4. Families with extremely vulnerable individuals: (how to evaluate the degree of disability; e.g. minor disability, major disability)
The number of extremely vulnerable individuals, including members with physical disabilities, pregnant mothers, and elderly members, must be visually confirmed by social organizers.

2.1.5. Income: Total family's monthly income with monthly expenses is confirmed by social organizers. The detail is explained in income questionnaire.

2.2. Technical criteria for seismic evaluation of a house

The safety index-cum-performance rating method is proposed for a technical evaluation of a house before occurrence of an earthquake to understand its resistance. Generally, there is an ideal form in each of these criteria in detail, which is shown in the technical criteria table. The ideal house will have a cumulative performance rating of zero points, meaning it has excellent earthquake resistant characteristics, while the lowest earthquake-resistant house will receive maximum 70 points (30 points belong to the social criteria). In case of absence of ideal forms in which the site engineer is not satisfied, a specific score is given to that criteria and None-performance Rating Value (NPRV) for each sub-total is calculated. The maximum Non-performance Rating Value is prescribed for each of the following technical criteria.

2.2.1. Site Conditions, Soil and Foundation System (Max 20 points)
2.2.2. Architectural Conditions (Max 20 points)
2.2.3. Material and Structural Conditions (Max 30 points)

3. Process of Selection

3.1. Agree with Municipality and (Afghanistan National Disaster Management Authority) ANDMA on target Gas

Municipality and ANDMA must officially endorse the selected target Gozars for each city.

3.2. Establishment of CDCs

The Social Organizers establish CDCs for each Gozar. A Gozar Assembly contains 5 CDCs. Each CDC contains 10 clusters, and there are 20-25 households in each cluster. Therefore, each CDC contains 200-250 households, and one Gozar Assembly contains 1,000-1,250 households.

3.3. Focus Group Discussion for each GA

There will be a meeting for each GA in which from each cluster one representative will participate in the meeting. This means that there will be 10 persons from each CDC, and GA meeting contains approximately 50 members. The head of Gozar (Wakil Gozar) also joins the meeting. Team Leader will introduce the project to the GA meeting members. The scope and objective of project for retrofitting a number of houses are explained. The fund of retrofitting will remain as secret among the office team, and CDCs would be better not to know about budget of retrofitting.

3.3.1 Present selection criteria with score (both in social and technical):

Team Leader then explains the criteria and considered score for the meeting members and asks GA to nominate maximum 10 houses from each CDC to apply. GA meeting members are also advised to nominate the most vulnerable houses (such as adobe or weak masonry) that are inhabited by poor people and headed by women or children in priority.

3.3.2. Preparing schedule:

After collecting detailed information on nominated houses, the list is prepared by Social Organizer. Then, the schedule of house visits is prepared with confirmation of Wakil Gozar and head of nominated houses. It would be better to arrange the schedule to visit at least 10 houses nominated by each CDC in one day (5 houses in the morning and 5 houses in the afternoon).

3.3.3 House Visit

At the day of house visit the following people will attend:

- Social Organizers
- Site Engineer
- Head of GA
- Head of CDC
- Representative from Municipality.

First, the criteria listed from 2.1.1 to 2.1.5 are checked via social questionnaire checklist (Section 4) by head of CDC supported by Social Organizers to identify targeted vulnerable households (women led, unemployed); refer to criteria for land allocation to IDPs (HLP task force). Then, technical criteria listed from 2.2.1 to 2.2.5 are checked and evaluated by representative from Municipality supported by Site Engineers

3.4 Verification process by Kabul HQ team

The collected data in the field are discussed in the office with advice from representatives from KM, MUDH, and ANDMA. Each criterion has a different score. The higher the score, the more vulnerable will it be. At the end of assessment, the households with the highest score will be short-listed for house retrofitting. Shortlisting of houses with the highest score for up to 15 to 17 houses are carried out for each GA.

3.5 Approval by Municipalities/Deputy Ministry of Municipalities (DMM):

The list of houses to be retrofitted is shared with municipalities/DMM for their approval.

4. Check list

4.1. Social (معیارات اجتماعی)

Interview date (تاریخ مصاحبه): Name of family head (نام سرپرست فامیل):

ID (Tazkera) number (شماره تذکره): Gender (جندر):

District (ناحیه): Gozar (گذر):

1. Dependency Ratio (ضریب وابستگی) a. What is the total number of members in your Family Unit (**ALL MEMBERS ARE TO BE VISUALLY VERIFIED BY SURVEYORS**) تعداد اعضای فامیل شما به طور مجموع چند نفر است؟ (تمامی اعضا توسط سرویر اجتماعی مشاهده گردد) b. How many Family Unit members are **not able to work?** (for example the elderly, disabled, women who for cultural reasons do not work, children <15 years of age etc.) چه تعداد از اعضای فامیل شما نمی توانند کار کنند؟ (بطور مثال افراد ریش سفید، ناتوان یا معیوب، زنان و اطفال زیر 15 سال) c. How many Family Unit members **are able to work?** (for example able bodied men, women who are able to work, children >15 years of age etc.) چه تعداد از اعضای فامیل شما می توانند کار کنند؟ (بطور مثال مردان، در بعضی موارد زنان، و بچه های بالای 15 سال) **CALCULATION: (B/A)/(C/A) = dependency ratio** **EXAMPLE:** Proportion of Dependent Family Unit members / Proportion of productive Family Unit members: ضریب وابستگی برابر است با نسبت اعضای وابسته که کار نمیکنند به افرادی که کار میکنند For example, if a Family Unit has 10 members; 2 adults who have the capacity to work and 8 adolescents who are dependent, 8/10 = 0.8, 2/10=0.2, 0.8/0.2 = a Dependency Ratio of 4 بطور مثال اگر در یک فامیل 10 نفره 2 نفر بزرگسال که توانایی کار کردن داشته باشند و 8 نفر دیگر نان خور داشته باشد ضریب وابستگی برابر 4 میباشد. If another Family Unit has 7 members; 1 adult who has the capacity to work and 6 adolescents who are dependent, 6/7 = 0.86, 1/7=0.14, 0.86/0.14 = a Dependency Ratio of 6.14 اگر در خانواده ای دیگر با 7 نفر اعضا، 1 نفر بزرگسال توانایی کار کردن را داشته باشد و 6 نفر دیگر نان خور داشته باشد ضریب وابستگی برابر با 6 می باشد. Thus the second Family Unit is considered more vulnerable بناً خانواده دوم آسیب پذیرتر است	A B C	**Dependency Ratio:** **DR≤1** **1<DR≤3** **3<DR≤5** **5<DR≤7** **7<DR≤9** **9<DR≤11** **11<DR≤13** **13<DR**	**Score** **0** **1** **1.5** **2** **2.5** **3** **3.5** **4**
2. Woman or Child Headed Family Unit **(خانواده هایی که توسط زنان و اطفال سرپرستی میگردند)** Is the head of the Family Unit a Woman without male offspring who could potentially work (>15 years of age) آیا سرپرست خانواده زن بدون شوهر یا نفر زیر هجده سال است؟ or Is the head of the Family Unit a child less than 18 years of age.	Y/N?	**Y=10** **N=0**	
3. Extremely Vulnerable Individual (EVI) Headed Family Unit **(خانواده هایی که توسط اشخاص بسیار آسیب پذیر سرپرستی میگردد)** **(EVI FAMILY UNIT HEAD MUST BE VISUALLY VERIFIED BY SURVEYOR)** خانواده هایی که توسط افراد فوق العاده آسیب پذیر سرپرستی میگردد توسط سرویر مشاهده و تصدیق گردد Is the head of the Family Unit an Extremely Vulnerable Individual (includes elderly person (i.e. 60+), a pregnant or lactating mother, a person with a disability and/or chronic illness, a teenage mother (i.e. < 18) آیا سرپرست خانواده شخص فوق العاده آسیب پذیر است؟ (افراد بالای 60 سال، مادران باردار یا شیرده، شخصی با بیماری کهنه، نوجوان زیر 18 سال)	Y/N?	**Y=5** **N=0**	
4. **Family Unit includes** an EVI خانواده هایی که افراد فوق العاده آسیب پذیر دارند		**(Maximum score for this criteria is 4)**	

(ALL EVI'S MUST BE SIGHTED & VISUALLY VERIFIED BY SURVEYOR) تمامی افراد فوق العاده آسیب پذیر باید به شکل حضوری توسط سرویر مشاهده و تصدیق گردند		حداکثر نمره برای این معیار 4 میباشد **FOR EACH EVI:** برای هرکدام از افراد فوق العاده آسیب پذیر درصورتی که جواب مثبت باشد 0.5 نمره داده شود
a. How many people does the Family Unit include that are elderly (i.e. 60+), چه تعداد از اعضای فامیل افراد پیر و ریش سفید هستند (بالای 60 سال)	A: Y/N?	**Y=0.5**
b. How many people does the Family Unit include that are pregnant or lactating mothers چه تعداد از اعضای فامیل افراد باردار یا مادران شیرده هستند؟	B: Y/N?	**Y=0.5**
c. How many people does the Family Unit include that have a disability and/or chronic illness چه تعداد از اعضای فامیل افراد معیوب یا دارای بیماری مزمن (کهنه) هستند؟	C: Y/N?	**Y=0.5**

Income questionnaire (سؤال نامه سطح معاش)

1. What is your job? (وظیفه شما چیست؟) ……
   (If there are more than one person working, list their jobs).
   درصورتی که بیشتر از یک نفر کار میکنند وظیفه هر یک را لیست نمایید

2. How much is your monthly income? (مقدار معاش ماهانه شما چقدر است؟) …… Afs
   (If there are more than one person working, write the total amount).
   درصورتی که بیشتر از یک نفر کار میکنند مقدار کلی معاش را بنویسید

3. Are there any persons who financially support your family from outside?
   آیا شخص دیگری وجود دارد که فامیل شما را حمایت مالی نماید؟ (ماهانه چقدر؟)
   Yes (How much monthly …… Afs)
   No

4. Do you have a car? (آیا موتر دارید؟)
   Yes
   No

5. Do you use public transportation (آیا از ترانسپورت عمومی استفاده میکنید؟)?
   Yes
   No

6. Describe your monthly expenses (هزینه های ماهانه)

Items موارد	Approximate monthly amount (Afs) هزینه تقریبی ماهانه
House rent کرایه خانه (در صورتی که خانه کرایی باشد)	
Utilities payment (Electricity, water, gas, coal), coal Note: If the payment varies in summer and winter then the average is considered هزینه های اوسط مصرف انرژی (آب، برق، گاز، ذغال سنگ)	
Credit card for cellphone and internet کردیت کارت موبایل	
Food خوراک و غذا	
Clothing Note: If the family pays for clothing i.e. once a year then the total amount is divided by 12 لباس (در صورتی که یک بار در سال خریداری می شود، مقدار هزینه تقسیم بر 12 میشود)	
Expenses for private car (including fuel, repair expenses by auto mechanics, tire and …) Note: If such expenses are paid i.e. once a year then total amount is divided by 12 هزینه های موتر شخصی	
Transportation ترانسپورت	
Cleaning supplies (Shampoo, Soap, washing powder...) مواد شوینده (شامپو، صابون، مایع ظرفشویی و لباس شویی)	
Expenses for children's education (Private school monthly fees, stationary, and …) هزینه های تحصیل اطفال	
Doctor visit and medicine هزینه های ویزیت داکتر و دوا	

If the monthly expenses exceed the total income, up to 1500 Afghani tolerance is permitted, otherwise the applicant will not receive score in this criteria. (Because applicant reported wrong income information)
اگر هزینه ماهانه از درامد بیشتر شود تا 1500 افغانی تفاوت قابل قبول است. در غیر این صورت متقاضی نمره این معیار را نمیگیرد.
مقدار کل درآمد بر حسب دالر با نرخ 68 محاسبه گردد و در جدول ذیل مقایسه گردد.

Income < 50 USD	50 USD ≤ Income < 100 USD	100 USD ≤ Income < 150 USD	150 USD < Income
Score = 7	Score = 5	Score = 2	Score = 0

4.2. Technical criteria معیارهای تخنیکی

Identify the typology of house: (نوعیت خانه)

1. Masonry with burned brick and vaulted roof (خشت پخته با سقف طاق ضربی)
2. Masonry with sun-dried brick and wooden roof (خشت خام با سقف تیر چوبی یا گنبدی)

S. No شماره	Economic loss inducing factor عامل وقوع خسارت اقتصادی	Ideal condition شرایط قابل قبول	Satisfaction of each criteria (If answer is No then give score) برآورده شدن هر یک از معیارات (در صورتی که جواب "نخیر" باشد نمره داده شود)		Score نمره
	1. Site Condition, Soil and Foundation Systems وضعیت ساحه، خاک و سیستم تهداب				
1.1	Siting ساحه	1. Entire house is on flat ground, at a single level تمام خانه بر روی یک سطح هموار بدون اختلاف سطح واقع شده باشد.	Yes	No	3
		2. House does not have connection with hillside, but is separated from slope by a clear gap خانه با تپه ارتباط نداشته و از شیب های موجود در ساحه فاصله داشته باشد.	Yes	No	3
		3. House is far enough from river bank. خانه به اندازه کافی از مسیر سیلاب دور باشد	Yes	No	1
		4. House is far enough from big trees. خانه به اندازه کافی از درختان کلان دور باشد	Yes	No	2
		5. House is far enough from geologic fault خانه به اندازه کافی از گسل ها دور باشد	Yes	No	2
1.2	Suitability of soil type مناسب بودن نوع خاک	1. House is constructed on compacted soil with Hard/broken rock خانه بر روی خاک متراکم متشکل از سنگ شکسته شده اعمار شده باشد	Yes	No	1
		2. Strong soil with no moisture خاک فاقد رطوبت باشد	Yes	No	1
1.3	Foundation تهداب	1. House must have Strip foundation made of stone masonry or concrete on a uniform hard base underneath خانه بر روی تحداب مقاوم از مواد سنگی یا کانکریتی ساخته شده باشد	Yes	No	4
		2. There is a plinth خشت کاری و یا سنگ کاری در حد فاصل تحداب و قسمت تحتانی دیوارها موجود باشد	Yes	No	3
Maximum Non-Performance Rating Value					**20**
	2. Architectural Conditions وضعیت مهندسی ساختمان				
2.1	Plan shape شکل پلان	1. Small room sizes (i.e. maximum wall length < 10 times wall thickness) اتاق ها کوچک باشند. (به طور مثال حداکثر طول دیوار کمتر از 10 برابر ضخامت دیوار باشد)	Yes	No	2
		2. Symmetrical plan (i.e. walls from regular grid in 2 orthogonal directions in plan) پلان متقارن باشد. (مثلاً دیوارها در دو جهت عمود برهم در پلان منظم باشند)	Yes	No	1
		3. Length of plan ≤ Width of plan × 2 or 25 m طول پلان کمتر از دو برابر عرض پلان و یا 25 متر باشد	Yes	No	1
		4. Rectangular overall plan پلان به شکل مربع مستطیل باشد	Yes	No	2
2.2	Elevation profile پروفایل ارتفاعی	1. Balanced structure with low center of gravity – Wider base dimension & narrower top dimension	Yes	No	1

		استراکچر بیلانس با مرکز وزنی پایین، ابعاد تحتانی کلان تر و ابعاد فوقانی خردتر			
		2. For masonry houses maximum number of storeys without basement is 2 and maximum total height is limited to 8m. (If distance between roof of basement and average ground level is more than 1.5m then basement is considered as a storey.) در خانه های خشتی حداکثر تعداد طبقات بدون درنظر داشت تهکوی، 2 منزل و حداکثر ارتفاع به 8 متر محدود می شود. (اگر فاصله میان سقف تهکوی و سطح زمین بیشتر از 1.5 متر باشد، تهکوی به عنوان یک منزل در نظر گرفته می شود)	Yes	No	1
		3. Uniform storey heights ارتفاع طبقات یکنواخت باشد	Yes	No	1
		4. Symmetrically placed staircase در صورت وجود راه زینه، موقعیت آن در پلان، متقارن باشد.	Yes	No	1
2.3	Door and window openings in walls محل درب و کلکین در دیوار	1. All openings far away from wall corners. Distance between 1st opening and edge of wall > 2/3 of height of opening or 75cm تمام بازشوها به اندازه کافی از کنج دیوارها فاصله داشته باشند. فاصله بین اولین بازشو و لبه دیوار بیشتر از دو سوم ارتفاع بازشو یا 75 سانتیمتر باشد (هرکدام که بیشتر باشد)	Yes	No	2
		2. Small area of door and window openings (Total area of openings < one third of area of wall) مساحت دروازه و کلکین روی سطح دیوار از حد مجاز بیشتر نشود. (مساحت کلی بازشوها روی دیوار کمتر از یک سوم سطح دیوار باشد)	Yes	No	2
		3. Total length of opening < half of total length of the wall طول کلی بازشوها کمتر از نصف طول دیوار باشد	Yes	No	1
		4. Horizontal distance between 2 openings > 2/3 of height of smaller opening and 1/6 total length of both openings فاصله افقی بین دو بازشو بیشتر از دو سوم ارتفاع بازشو کوچکتر و یک ششم طول کلی هر دو بازشو باشد	Yes	No	2
		5. Dimension of opening must not exceed 2.5m هیچکدام از ابعاد بازشو بیشتر از 2.5 متر نباشد	Yes	No	2
		6. There is lintel on each opening with at least 20 cm excessive length on each side روی هر کدام از بازشوها تیر نعل درگاه (سرطاق) با اضافه طول حداقل 20 سانتیمتر در هر دو طرف موجود باشد	Yes	No	1
Maximum Non-Performance Rating Value					**20**
	3. Material and Structural Conditions وضعیت مواد ساختمانی و استراکچر				
3.1	Quality کیفیت	1. Cement mortar used for construction of bearing walls have good quality برای اعمار دیوارهای وزن بردار از ملات ریگ و سمنت با کیفیت خوب استفاده شده باشد.	Yes	No	2
		2. Bricks used for construction of bearing walls have good quality خشت های استفاده شده برای اعمار دیوار وزن بردار کیفیت خوب داشته باشد	Yes	No	2
		3. There are no cracks appearing on the wall inside the rooms	Yes	No	2

		دیوارهای داخل اتاق فاقد درز باشند			
		4. There are no cracks in the wooden beams تیرهای چوبی (در صورتی که سقف تیر چوبی باشد) فاقد درز باشد	Yes	No	2
		5. Gaps between the bricks of bearing wall and gaps between stone masonry of plinth are filled with mortar تمام فواصل افقی و عمودی بین خشت های دیوار وزن بردار و سنگ کاری تراز تحتانی ساختمان با ملات سمنتی پُر شده باشد.	Yes	No	2
3.2.	Walls دیوار	1. Walls are integrated دیوارها به شکل یک جسم یکپارچه و متحد ساخته شده باشد	Yes	No	2
		2. Walls symmetrically distributed throughout the plan of the house توزیع دیوارها در پلان ساختمان متقارن باشد	Yes	No	1
		3. Brick work in the wall is on wider dimension خشت کاری دیوار روی بُعد پهن تر خشت باشد	Yes	No	2
		4. There are vertical tie beams for wall to wall connections ستون های عمودی در محل تقاطع دیوار ها موجود باشد	Yes	No	3
		5. There are horizontal tie beam کمربند افقی برای اتصال دیوارها به یکدیگر موجود باشد	Yes	No	3
3.3	Roof سقف	1. Roof is integrated سقف به شکل یک جسم یکپارچه و متحد ساخته شده باشد	Yes	No	2
		2. Roof has small weight سقف سنگین نباشد	Yes	No	2
		3. There are no opening in the roof بازشو در سقف وجود نداشته باشد	Yes	No	1
		4. Roof has good connection with walls اتصال سقف با دیوارها به خوبی تأمین شده باشد	Yes	No	4
Maximum Non-Performance Rating Value					**30**