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INCOR Basis-Infrastrukturen und Services einer inklusiven Katastrophenresilienz im Iran. Abschlussbericht der Definitionsphase

INCOR Basic Infrastructures and Services for Enhancing Inclusive Community Disaster Resilience in Iran. Final report of the definition phase

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Alexander Fekete, Asad Asadzadeh, Mahsa Moghadas, Victor Diefenbach

Projekttitel: Basis-Infrastrukturen und Services einer inklusiven Katastrophenresilienz im Iran. - Basic Infrastructures and Services for Enhancing Inclusive Community Disaster Resilience in Iran (INCOR)
Projektkoordination: Prof. Dr. Alexander Fekete. TH Köln
Mitarbeit: Asad Asadzadeh, Mahsa Moghadas, Victor Diefenbach
BMBF Fördermaßnahme "Internationales Katastrophen- und Risikomanagement – IKARIM
Projektdauer: 6 Monate, 2018

1. Aufgabenstellung

Im Oktober 2017 hat das Bundesministerium für Bildung und Forschung (BMBF) die Ausschreibung Internationales Katastrophen- und Risikomanagement (IKARIM) im Rahmen des Programms "Forschung für die zivile Sicherheit" der Bundesregierung (2012-2017) veröffentlicht. Ziel ist der Transfer von Wissen und die Bildung internationaler Partnerschaften im Bereich des Katastrophenrisikomanagements. Der Iran mit seiner Anfälligkeit für zahlreiche Naturkatastrophen war eines der Schwerpunktländer der Ausschreibung, da er für zahlreiche Naturgefahren anfällig ist und mindestens drei Partner seit mehreren Jahren in Katastrophenrisikobewertungs- und Resilienzstudien (Univ. Würzburg, Univ. Bonn IGG und TH Köln) arbeiten. Die Erfahrungen, die durch die jüngsten Studien des Teams zur Antragsentwicklung im Iran (THK und IGG) gewonnen wurden, zeigten, dass ein integratives Rahmenwerk für die angemessene Bewertung, Management und Steuerung der Resilienz der Bevölkerung bei Katastrophen fehlt. In diesem Kontext ist es das Ziel INCORs, Methoden, Prozesse und Instrumente zu etablieren, um die Resilienz gegenüber Naturkatastrophen in iranischen Städten zu erhöhen. INCOR untersucht inhaltliche Risiken für lebenswichtige Infrastrukturen (Wasserversorgung, Energie, Transport- und Straßennetz) bzgl. Naturgefahren, und einen Wechsel weg von einem reaktiven hin zu einem proaktiven Ansatz für die zukünftige Katastrophenvorsorge.

2. Durchführung

Die erste Phase von INCOR war der Aufbau eines Kernteams für das Projekt. Unter der Leitung von Prof. Fekete (TH Köln) haben drei MitarbeiterInnen (Co-AutorInnen dieses Beitrags) an der Entwicklung des vollständigen Antrags, der Organisation von Telefonkonferenzen, Workshops und der Berichterstattung über die erbrachten Arbeiten während der Definitionsphase gearbeitet. Kontakte zu möglichen Partnern im Iran bestanden bereits, auch wurden weitere Partner auf deutscher Seite bzgl. Ihrer bisherigen Kenntnisse über das Land, Inhalt der Aufgabenstellung und Interesse ausgewählt. Durch Vorarbeiten der Konsortialleitung, Vorkenntnisse der Feldarbeit im Iran und die Ansiedlung an der TH Köln als neutraler wissenschaftlich/ akademischer Organisation konnten viele Kontakte, Anbahnungsmaßnahmen und inhaltliche Berichtsstellung erfolgreich geplant und angegangen werden.
In der zweiten Phase bildete INCOR eine Gesprächsplattform mit 18 deutschen und iranischen Wissenschafts, Praxis- und Managementorganisationen, um besser zu verstehen, was wirklich für die adäquate Entwicklung, Messung und Implementierung von Katastrophenresilienz erforderlich ist.

Dementsprechend organisierte das Kernteam im Juni, Juli und August 2018 drei Telefonkonferenzen, um Ideen, Bedürfnisse und Möglichkeiten besser zu teilen, zu erörtern und zu verknüpfen.

Im nächsten Schritt wurden Workshops in Köln, Teheran und Karaj durchgeführt. Rund 15 deutsche und 100 iranische Experten fanden sich zusammen, um sich über das Projekt gemeinsam zu Beraten. Der erste Workshop fand am 6. und 7. September 2018 in Köln statt, der zweite vom 15. bis 17. September in Teheran und der dritte am 18. September in Karaj. Diese Workshops trugen dazu bei, die Kernideen des INCOR-Projekts auszuarbeiten, die Ziele und Visionen der Stakeholder zu definieren und die Ergebnisse aus den frühen Phasen zu verifizieren. Zu den Zielen der Workshops gehörten a) die Identifizierung von Kooperationspartnern und die Aufnahme der Zusammenarbeit, b) die Erörterung und Konsolidierung der Bedürfnisse vor Ort und der Möglichkeiten der DRR, um raumbezogene und konkrete F&E-Lösungen für die zentralen Herausforderungen im Iran zu entwickeln, und c) die Identifizierung und Beratung über die nächsten Schritte zu den spezifischen Arbeiten der einzelnen Partner im Rahmen eines dreijährigen Projekts. Während der Workshops in Teheran und Karaj führten die Partner auch Befragungen und Besuche vor Ort durch, um die bestehenden Lücken und Herausforderungen der Katastrophenrisikoplanung und -umsetzung in den Fallstudiengebieten besser zu erfassen. Die Ergebnisse zeigten, dass Basisinfrastrukturen und -dienste (abgekürzt als BIS) das entscheidende Element sind, das bei der Stärkung der Resilienz der Gemeinschaft bei Katastrophen in den Studiengebieten im Vordergrund stehen muss.

INCOR strebt einen Beitrag zu internationalen Entwicklungsrahmen an, insbesondere zum Sendai Rahmenwerk für Katastrophenvorsorge 2015 - 2030 (SFDRR). Die Absicht ist es, zu verstehen, wie die Ergebnisse von INCOR zur Umsetzung der SFDRR beitragen können. Der entwickelte Bericht zeigt auch, wie INCOR zu anderen globalen Rahmenwerken wie den Zielen für nachhaltige Entwicklung (SDGs) und der Neuen Urbanen Agenda (Habitat III) beitragen kann.

Veröffentlichungen

Moghadas, Mahsa; Asadzadeh, Asad; Vafeidis, Athanasios; Fekete, Alexander, Kötter, Theo (2019). A multi-criteria approach for assessing urban flood resilience in Tehran, Iran. International Journal of Disaster Risk Reduction. Available online 2 February 2019, 101069. https://doi.org/10.1016/j.ijdrr.2019.101069

Moghadas, Mahsa; Fekete, Alexander; Asadzadeh, Asad and Theo Kötter (2018) A theoretical framework for building the risk-resilience of basic infrastructures and services using Open Data. Conference Proceedings – Short Paper. IFoU 2018: Reframing Urban Resilience Implementation: Aligning Sustainability and Resilience. 10/12/2018 – 12/12/2018, Barcelona, Spain:1-5.

1b. Content of the INCOR project

Alexander Fekete, Asad Asadzadeh, Mahsa Moghadas, Victor Diefenbach

Project title: Basic Infrastructures and Services for Enhancing Inclusive Community Disaster Resilience in Iran (INCOR)

Project Coordination: Prof. Dr. Alexander Fekete. TH Köln

Cooperation: Asad Asadzadeh, Mahsa Moghadas, Victor Diefenbach

BMBF Funding Measure "International Disaster and Risk Management - IKARIM

Project duration: 6 months, 2018

1. Task

In October 2017, the Federal Ministry of Education and Research (BMBF) published the call for proposals International Disaster and Risk Management (IKARIM) as part of the Federal Government's "Research for Civil Security" programme (2012-2017). The aim is to transfer knowledge and form international partnerships in the field of disaster risk management. Iran, with its vulnerability to numerous natural disasters, was one of the priority countries in the call for proposals because it is susceptible to numerous natural hazards and at least three partners have been working for several years in disaster risk assessment and resilience studies (Univ. Würzburg, Univ. Bonn IGG and TH Köln). The experience gained from the recent studies of the team on application development in Iran (THK and IGG) showed that an integrative framework for the appropriate assessment, management and control of the resilience of the population in the event of disasters is lacking. In this context, the aim of INCOR is to establish methods, processes and instruments to increase resilience to natural disasters in Iranian cities. INCOR investigates content risks for vital infrastructures (water supply, energy, transport and road networks) regarding natural hazards, and a shift from a reactive to a proactive approach for future disaster preparedness.

2. Implementation

The first phase of INCOR was the creation of a core team for the project. Under the leadership of Prof. Fekete (TH Köln) three staff members (co-authors of this contribution) worked on the development of the complete proposal, the organisation of telephone conferences, workshops and the reporting on the work done during the definition phase. Contacts to possible partners in Iran already existed, also further partners on the German side were selected regarding their previous knowledge about the country, contents of the task and interest. Through the preparatory work of the consortium management, prior knowledge of field work in Iran and the establishment of the TH Köln as a neutral scientific/academic organisation, many contacts, initiation measures and content reporting could be successfully planned and tackled.

In the second phase, INCOR formed a discussion platform with 18 German and Iranian scientific, practical and management organisations in order to better understand what is really necessary for the adequate development, measurement and implementation of disaster resilience. Accordingly, the core team organised three telephone conferences in June, July and August 2018 to better share, discuss and link ideas, needs and opportunities.

The next step was to hold workshops in Cologne, Tehran and Karaj. Around 15 German and 100 Iranian experts met to discuss the project. The first workshop took place on 6 and 7 September 2018 in Cologne, the second from 15 to 17 September in Tehran and the third on 18 September in Karaj. These workshops helped to elaborate the core ideas of the INCOR project, to define the goals and visions of the stakeholders and to verify the results from the early phases. The objectives of the workshops included (a) identifying and starting cooperation partners, (b) discussing and consolidating local needs and DRR capabilities to develop spatial and concrete R&D solutions to key challenges in Iran, and (c) identifying and advising on the next steps in the specific work of each partner in a three-year project. During the workshops in Tehran and Karaj, the partners also conducted interviews and field visits to better understand the existing gaps and challenges in disaster risk planning and implementation in the case study areas. The results showed that basic infrastructure and services (abbreviated as BIS) are the key element to strengthen community resilience to disasters in the study areas.

INCOR aims to contribute to international development frameworks, in particular the Sendai Framework for Disaster Reduction 2015 - 2030 (SFDRR). The intention is to understand how the results of INCOR contribute to the implementation of the SFDRR.

Publications

Moghadas, Mahsa; Asadzadeh, Asad; Vafeidis, Athanasios; Fekete, Alexander, Kötter, Theo (2019). A multi-criteria approach for assessing urban flood resilience in Tehran, Iran. International Journal of Disaster Risk Reduction. Available online 2 February 2019, 101069. https://doi.org/10.1016/j.ijdrr.2019.101069

Moghadas, Mahsa; Fekete, Alexander; Asadzadeh, Asad and Theo Kötter (2018) A theoretical framework for building the risk-resilience of basic infrastructures and services using Open Data. Conference Proceedings – Short Paper. IFoU 2018: Reframing Urban Resilience Implementation: Aligning Sustainability and Resilience. 10/12/2018 – 12/12/2018, Barcelona, Spain:1-5.

2a. Hintergrund und Konzeption des INCOR Projekts - Basis-Infrastrukturen und Services einer inklusiven Katastrophenresilienz im Iran

Alexander Fekete, Asad Asadzadeh, Mahsa Moghadas

I. Einleitung

Kürzlich stattgefundene Erbeben im Iran (Kermanshah Erbeben in 2017 sowie das Bam Erdbeben in 2003) unterstreichen erneut, wie exponiert die Gesellschaft des Irans gegenüber Naturgefahren ist. Diese Erfahrungen zeigen, dass kaskadierende Ausfälle Kritischer Infrastrukturen (hier als Basis-Infrastrukturen und Dienstleistungen - BIS - bezeichnet) dramatische Einflüsse auf die Reaktion und Erholung von betroffenen Gemeinschaften haben können. Zudem ergeben sich Konflikte auch im Alltag, wenn es keinen gerechten Zugang zu BIS für Teile der Bevölkerung, vor allem arme Menschen in urbanen Regionen gibt.

Vor diesem Hintergrund erkennen internationale akademische und politische Kreise den wachsenden Bedarf an integrativen und resilienten Infrastrukturen und Dienstleistungen im Kontext eines verbesserten Katastrophenrisikomanagements. Diese Infrastrukturen bestehen aus drei Hauptbereichen: Assets, Wissen und Institutionen. INCOR untersucht Risiken für lebenswichtige Infrastrukturen (Wasserversorgung, Energie, Transport- und Straßennetz) bzgl. Naturgefahren, und unterstützt damit den Wechsel weg von einem reaktiven hin zu einem proaktiven Ansatz für die zukünftige Katastrophenvorsorge durchzuführen.

Stand der Wissenschaft

Der Iran liegt an einer Hauptverwerfungslinie zwischen der arabischen und eurasischen Platte und hat in der Vergangenheit eine Vielzahl Erdbeben erlebt. Das gravierendste dieses Jahrhunderts ereignete sich 2003, als ein Erdbeben mit einer Magnitude von 6.6 die Stadt Bam traf und circa 30.000 Menschen starben. Im Jahr 2017 starben mindestens 600 Menschen bei einem Erdbeben in Kermanshah (das weltweit gravierendste Erdbeben in diesem Jahr bislang) und es wurden um die 10.000 Menschen verletzt. Mehr als 90% der Städte des Landes befinden sich in Erdbebengebieten, einschließlich der Megastadt Teheran mit rund 13 Millionen Einwohnern [1]. Laut Swiss Re [2] ist Teheran Erdbeben stark ausgesetzt und ist weltweit auf Stufe 6 der gefährdetsten Städte im Hinblick auf die Größe der städtischen Bevölkerung, die von einer oder mehreren Naturgefahren betroffen sein könnte. Eine Million Menschen könnten getötet und 70% der Stadt schwer beschädigt werden, wenn ein Erdbeben wie von Haiti die Stadt erschüttert [3].

Laut dem Global Assessment Report on Disaster Risk Reduction (2015) ist der Iran eines der Länder, das sich einer Finanzierungslücke gegenübersieht und einen Stresstest seiner fiskalischen Resilienz nicht bis zu einem Verlust eines 1-in-100-Jahren Ereignisses bestehen würde, wenn es nicht über Ressourcen verfügt, um sich gegen schwere Katastrophen wie Erdbeben zu puffern[1]. Seismische Wissenschaftler haben vor kurzem gewarnt, dass die Zahl der verheerenden Erdbeben in der ganzen Welt im Jahr 2018 stark ansteigen könnte und offensichtlich ist der Iran einer der potenziellen Kandidaten[2]. Mehr als 90% der Städte des Landes befinden sich in Erdbebengebieten, einschließlich der Megastadt Teheran mit ihren rund 13 Millionen Einwohnern. Laut Swiss Re (2013) ist Teheran stark vom Erdbeben betroffen und wird weltweit als die sechst-

[1] http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf
[2] https://www.theguardian.com/world/2017/nov/18/2018-set-to-be-year-of-big-earthquakes

gefährdetste Stadt eingestuft, in Anbetracht der Größe der städtischen Bevölkerung, die von einer oder mehreren Naturgefahren getroffen werden könnte[3]. Die JICA (Japan International Cooperation Agency) hat im Jahr 2000 vier Szenarien für den Gesamtschaden von Gebäuden und den Todesopfern in Teheran entwickelt und geschätzt, dass im schlimmsten Fall 55% der Gebäude beschädigt und rund 500.000 Menschen getötet werden können[4].

Diese Szenarien verdeutlichen einmal mehr, wie anfällig der Iran im Allgemeinen und insbesondere Teheran für die Erdbebengefahr ist und folglich, wie grundlegend Infrastrukturen und Dienstleistungen (BIS) für die Eindämmung und Erholung eines unerwünschten Ereignisses sind. Aufgrund der Komplexität der BIS und des dynamischen Konzepts der Resilienz- und Einbeziehungsbedingungen werden die Szenarien jedoch in enger Zusammenarbeit mit lokalen Partnern, die an Katastrophenrisikomanagement und -planung beteiligt sind, in der gesamten Antragsperiode ausgeweitet.

Bestehende Lücken und Bedarfe - Anforderungen für dieses Forschungsprojekt

Menschliche Gemeinschaften brauchen ein resilientes System, um sich rechtzeitig auf effektive Weise auf tatsächliche oder potenzielle unerwünschte Ereignisse vorzubereiten, sie zu absorbieren, sich davon zu erholen und sich erfolgreich zu adaptieren (UN 2015: Sendai Framework for Disaster Risk Reduction). Die Systeme, die zur Resilienz einer Gemeinschaft beitragen, sind grundlegende Infrastrukturen und Dienste (z. B. Mobilität, Energie, Wasser, sanitäre Einrichtungen, Gebäudesysteme, Kommunikation usw.). Die Bedeutung und die Nachfrage nach solchen "kritischen Infrastrukturen" während und nach Katastrophen wird auf internationaler Ebene zunehmend unterstrichen (EC 2008, UN 2015, SDGs). Während der Iran bei einigen strukturellen und nicht-strukturellen Vorkehrungen eine führende Rolle spielt (z. B. Standard-Bauvorschriften, Infrastrukturplanung, Risikoinformationen usw.), haben jüngste Erdbeben gezeigt, dass bestehende Systeme nicht ausreichen, um den Auswirkungen von Schocks zu widerstehen, zu reagieren und diese abzuschwächen . Zur gleichen Zeit, wenn die Vorteile von Infrastrukturdiensten nicht umfassend genutzt werden, sind auch Katastrophenmanagement- und Wiederherstellungsaktivitäten weniger nachhaltig, langlebig und widerstandsfähig. Zum Beispiel war die infrastrukturelle Benachteiligung nach dem Kermanshah-Erdbeben im November 2017 eine wesentliche Ursache für ein soziales Vertrauensgefälle zwischen Bevölkerung und Regierung. Daher können Unterbrechungen von Infrastrukturdiensten die Absorptionskapazität oder den Erholungsgrad von Gesellschaften abschwächen und ebenso kann Sozialkapital reduziert oder das Risiko sozialer Konflikte in von Gefahren betroffenen Gemeinden erhöht werden. Stadtplanung und Katastrophenmanagement haben im Iran eine lange Tradition und unsere Projektpartner im Iran haben eine große Nachfrage nach Fortsetzung und Erweiterung der Planungsprozesse – vor dem Hintergrund anhaltender Naturgefahrenrisiken und steigender Bevölkerungskonzentrationen, die möglichen Katastrophen ausgesetzt sind – identifiziert, um auf das nächste "große" Erdbeben um die Hauptstadt Teheran oder ein anderes Gebiet vorbereitet zu sein.

Vor diesem Hintergrund und zum ersten Mal im Iran, wird sich dieses Projekt systematisch und integriert auf die grundlegenden Infrastrukturen und Dienstleistungen für Katastrophenresilienz konzentrieren. Das übergeordnete Ziel besteht darin, ein innovatives Planungssystem für die Infrastruktur und die Stadtplanung zu unterstützen, um Risiken begegnen zu können und so Maßnahmen zur Ausweitung des

[3]http://www.swissre.com/library/expertisepublication/Mind_the_risk_a_global_ranking_of_cities_under_threat_from_natural_disasters.html

[4] http://open_jicareport.jica.go.jp/pdf/11611753_01.pdf

gleichberechtigten Zugangs zu Infrastrukturdiensten zu erforschen und deren Nutzen umfassender und nachhaltiger zu gestalten. Dies entspricht sowohl den nationalen als auch den internationalen Forderungen nach Synergien zwischen nachhaltigen Entwicklungszielen (SGDs) und Disaster Risk Reduction (DRR).

Bestehende Lücken

Trotz der Baugesetze und der flächendeckenden Einführung hoher Standards im Straßen- und Hochbau sind iranische Städte und Siedlungen weiterhin gefährdet. Besonders grundlegende Infrastrukturen und Dienstleistungen (BIS) verwandeln sich in ein Problem, anstatt Teil der Lösung zu sein, wie sie beim jüngsten Kermanshah-Erdbeben beobachtet wurde. Einerseits wurden die grundlegenden Infrastrukturen und Dienste im gegenwärtigen Planungssystem nicht als ein Netzwerksystem betrachtet, und daher wurden die Interdependenzen und die räumlich-zeitlichen Beziehungen von ihnen nicht ausreichend verstanden. Auf der anderen Seite war der gerechte und gleicberechtigte Zugang zu BIS nicht für die gesamte Bevölkerung gewährleistet. Es wird davon ausgegangen, dass Menschen zusammen mit BIS an verschiedenen Phasen des Risikomanagements teilnehmen, einschließlich Vorbereitung, Reaktion und Anpassung. Soziale und infrastrukturelle Ungleichheiten stellen diese Annahmen jedoch in Frage und führen dazu, dass das soziale Vertrauen gebrochen wird, wie es vom Kermanshah-Erdbeben berichtet wurde. Vor diesem Hintergrund und zum ersten Mal im Iran, wird sich dieses Projekt systematisch und integriert auf grundlegende Infrastrukturen und Dienstleistungen (BIS) konzentrieren. Das Gesamtziel besteht darin, die Funktionen und Fehler von BIS in ihren raumzeitlichen Kontexten und Beziehungen zu identifizieren, um ein innovatives Planungssystem zu unterstützen, um aufkommende Risiken zu bewältigen und so Strategien zur Ausweitung des gleichberechtigten Zugangs zu BIS zu entwickeln und deren Nutzen umfassender und nachhaltiger zu gestalten.

Resilienz, integratives Denken und die Verbindung zu grundlegenden Infrastrukturen und Dienstleistungen (BIS): Das Benjamin-Franklin-Axiom, dass "eine Unze Vorbeugung ein Pfund Heilung wert ist", ist heute genauso aktuell wie damals, als Franklin Philadelphias Feuerwehrmänner 1736 beriet [7]. Eine Reihe bedeutender Natur- und technischer Katastrophen legt nahe, dass es dringend notwendig ist, unseren Fokus von einer reaktiven Reaktion auf eine proaktive Milderung zu verlagern [8,9]. Eine solche Verlagerung führt dazu, ein Verständnis davon zu entwickeln, wann und wo grundlegende Infrastrukturen und Dienste (BIS) als Grundpfeiler der Gesellschaft eingerichtet werden müssen und wie sie ausgelegt werden können, um die Auswirkungen von Naturgefahren zu verhindern und zu mildern. 10]. Gleichzeitig sind grundlegende Infrastrukturen und Dienstleistungen (BIS) durch die zunehmende Komplexität und schnelle Veränderungen der Weltdynamik gefährdet (z. B. rasche Urbanisierung in Verbindung mit Städtewachstum, wachsende Kluft zwischen Angebot und Nachfrage, sozialer Konflikt usw.). Solche Herausforderungen verdeutlichen die Notwendigkeit einer optimierten Kapitalallokation und eines gerechten Zugangs zu Ressourcen für alle Bürger, insbesondere für die Armen [10,11]. Vor diesem Hintergrund haben internationale akademische und politische Kreise die Notwendigkeit erkannt, Resilienz und integrative Gemeinschaften zu schaffen [4,12-14]. Während der Begriff "Resilienz" von Risikoforschern Beachtung gefunden hat, ist die „Inklusion“ erst seit kurzem dort zu einem Zielbegriff geworden. Daher muss ein resilientes, integriertes und inklusives BIS für die Planung und das Management von Katastrophenrisiken noch entwickelt werden.

Integrierte Resilienz und inklusive Basisinfrastruktur und -dienstleistungen (BIS): Trotz des zunehmenden internationalen Bewusstseins für den Zusammenhang zwischen Interdependenzen von BIS und Katastrophenresistenz, konzentrieren sich die meisten Forschungsinitiativen weiterhin auf einzelne Systeme oder nur auf die technischen Zusammenhänge [15]. BIS sind jedoch komplexe vernetzte Systeme, die in Gemeinschaften verschiedene räumlich-zeitliche Beziehungen (dynamische Prozesse) manifestieren [16]. Die Einbindung von BIS als komplexes und dynamisches Konzept hilft dabei, besser zu verstehen, wie die inhärente und adaptive Resilienz (z. B. Robustheit, Redundanz, Flexibilität usw.) die Auswirkungen einer Gefährdung abschwächen und eine schnelle Reaktion und Erholung ermöglichen kann [17,18]. Ebenso wichtig ist, dass die zunehmende Kluft zwischen Angebot und Nachfrage von BIS sowie die Unzugänglichkeit und Unerschwinglichkeit von BIS nicht nur die Resilienz von Gesellschaften mindert, sondern auch zu sozialen Konflikten führt [19].

Ziele

Entwicklung von resilienten und integrativen Infrastrukturen und Dienstleistungen: Das Projekt INCOR betrachtet grundlegende Basis-Infrastrukturen und Dienstleistungen (BIS) als Hebel, um eine multi-sektorale und interdisziplinäre Zusammenarbeit zwischen Deutschland und Iran über gemeinsame transdisziplinäre Forschung zu fördern. Auf praktischer Ebene erfolgt eine Verbindung zwischen Wissenschaft, Stadtplanern und Entscheidungsträgern im Iran durch gemeinsame Workshops, die ein Co-Design für resiliente und inklusive Basis-Infrastrukturen und Dienstleistungen ermöglicht. Konzeptionell integriert INCOR Basis-Infrastrukturen und Dienstleistungen (BIS), Resilienz und Inklusion, um daraus Synergien für das Katastrophenmanagement und die Minimierung von sozialen Konflikten gestalten zu können.

BIS als das Rückgrat urbaner Gemeinschaften bieten nicht nur Funktionen während nicht-krisenhaften Zeiten, sondern auch Flexibilität während und nach Katastrophen. Sie sind hochgradig kontext-abhängig von den räumlichen und zeitlichen Charakteristika ihrer Gesellschaft und reflektieren multiple räumliche und zeitliche Interaktionen [20]. Darüber hinaus sind sie komplexe Systeme und bestehen nicht nur aus physischen Attributen, sondern auch aus den drei wichtigen Bereichen, Assets, Wissen und Institutionen. Daher wird die Integration von BIS mit Resilienz und inklusivem Denken zu einem **Wechsel von einem reaktiven zu einem proaktiven Ansatz** (Antizipation und Bewältigung zukünftiger Shocks) und, aufgrund eines gleichberechtigten Zugangs zu BIS, zu einer Reduktion von sozialen Unterschieden führen. Das Ziel ist ein **Beitrag zum Sendai Prozess** der Katastrophenvorsorge (Sendai Ziele A1-D1, und G1) sowie **zu den SDGs** (insbesondere die Ziele 4, 6, 8, 10, 11, und 16), die auch in Übereinkunft mit der neuen **urbanen Agenda (Habitat III)** stehen, und die einen gleichberechtigen Zugang zu BIS, insbesondere für arme Bevölkerungsgruppen betont. Einen holistischen Ansatz für inklusiv-resiliente BIS erfordert auch den Fokus auf Interdependenzen zwischen Sektoren und generiert damit einen Dialog zwischen lokalen und internationalen Akteuren. Die erzielten Ergebnisse sind sowohl konzeptionelle als auch praktischen Lösungen die bedarfsorientiert und schadens-zentriert sind und einen langzeitlichen Anspruch sowie inklusive Prozesse für BIS Planungen im Kontext von Naturgefahren umfassen.

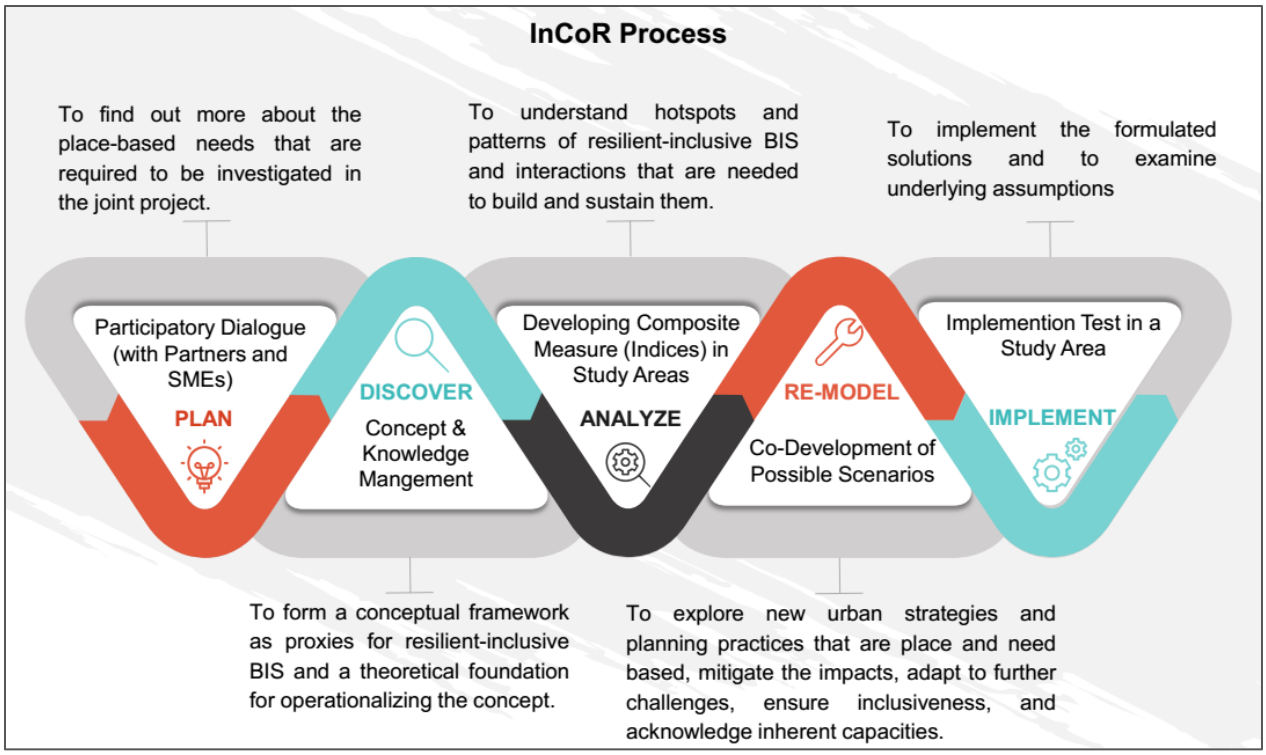

Abbildung 1: Erstellung und Implementierung der integrativ-resilienten Basisinfrastrukturen und –dienstleisungen: Synergien zwischen Basisinfrastrukturen, Resilienz und integrativer Ansätze

Die folgende Abbildung zeigt die konzeptionellen Rahmenbedingungen des Projekts mit den wichtigsten Wechselwirkungen und der Verknüpfung von Skaleneffekten: von Naturgefahren bis hin zu anfälligen Stadtgemeinschaften im Iran, die Funktionen von BIS und damit verbundene Herausforderungen, die sie bislang unfähig machen, auf unerwünschte Ereignisse zu reagieren.

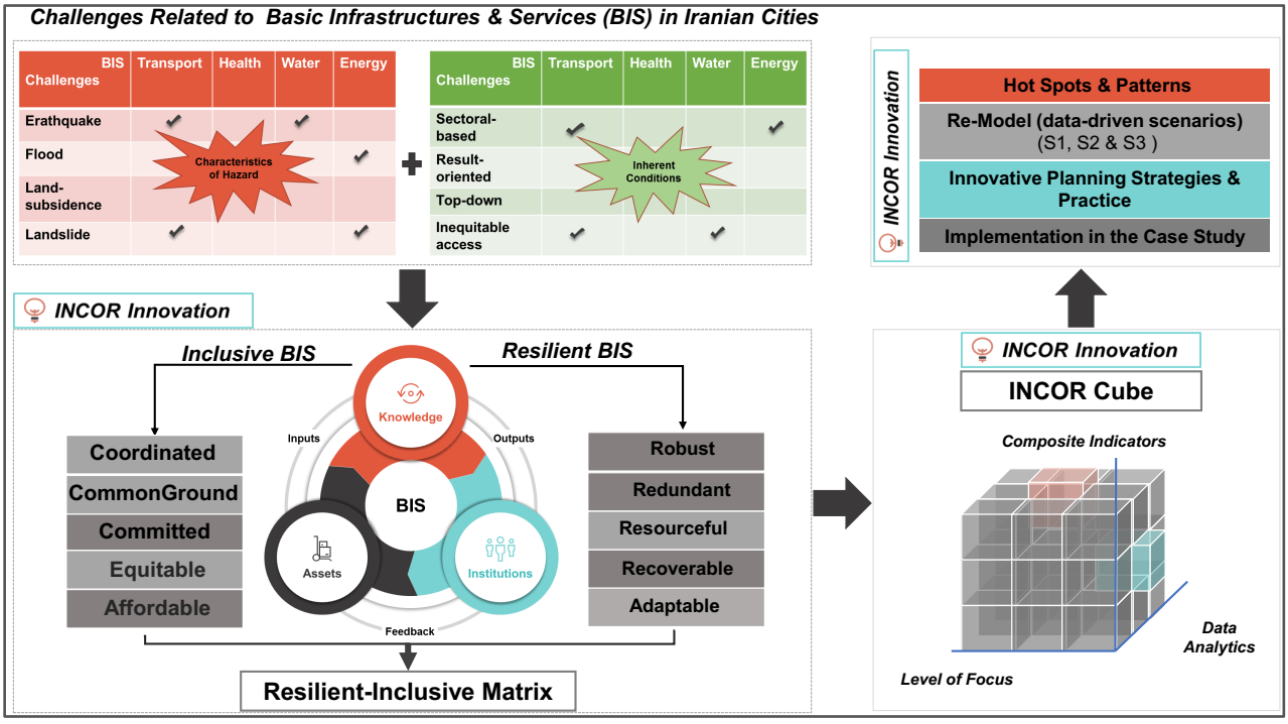

Abbildung 2: Analytischer Entwicklungsprozess von INCOR

Konzeptionell betrachtet INCOR Resilienz und Inklusion als 2 Hauptcharakteristiken von Basisinfrastrukturen und grundlegenden Dienstleistungen (BIS) in der Risikoplanung/ -management und wird dabei helfen, ein integriertes resilient-inklusives Framework für BIS, und damit eine innovative Strategie und Planungspraxis für die weitere Planung zu entwickeln. **Methodisch** wird in INCOR ein hybrider (qualitativer und quantitativer) Ansatz für die Operationalisierung des integrierten Konzeptes von resilient-inklusiven BIS Anwendung entstehen. Dabei wird auf sich gegenseitig beeinflussenden Basisinfrastrukturen und Dienstleistungen fokussiert, um deren Interdependenzen (räumlich-zeitlich) durch ortsbasierte Geo-Informationssysteme (GIS) und Geodateninfrastrukturen zu ermitteln. Anschließend werden soziale und wirtschaftliche Faktoren von BIS durch Experteninterviews mit Planern, Stakeholder, etc. ermittelt, um Faktoren für verbesserte Nutzung und Zugänglichkeit (Inklusion) von BIS zu ermitteln.

Erwartete Ergebnisse sind ein ganzheitlich theoretisches Framework für ein resilient-inklusives BIS-System, Analysen und Indikatoren für die Resilienz gegenüber Naturgefahren, und innovative Planungspraktiken für die Stadt- und Regionalplanung.

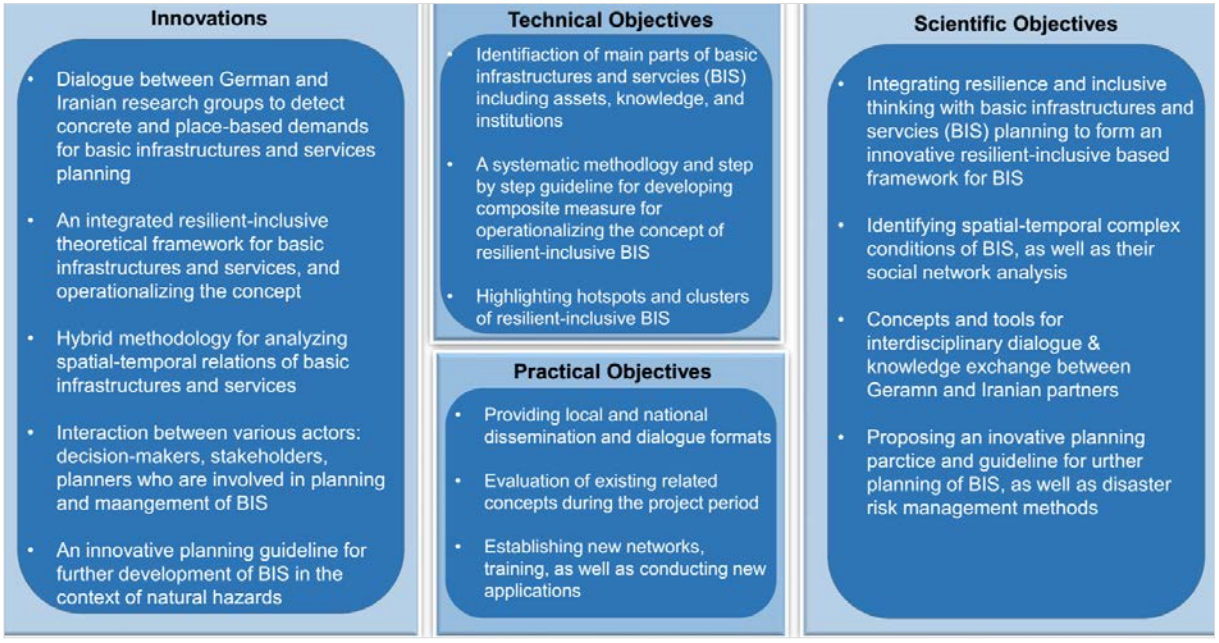

Abbildung 3: Ziele und Innovationen des Projektes

Thematischer Bezug zur vorliegenden Förderrichtlinie: INCOR trägt zu IKARIM gesellschaftlich und technisch bei - durch den Fokus auf Versorgungskonzepte für die Bevölkerung, die durch Versorgungsinfrastrukturen wie Wasser, Straßen und Energie, geleistet werden. Durch den inklusiven modernen Ansatz trägt es auch Konzepte für besonders schutzbedürftige Bevölkerungsgruppen bei, und erwirkt gleichzeitig durch eine Schaffung von Risikobewusstsein gegenüber Infrastrukturausfällen und Handlungsmöglichkeiten auch eine Erhöhung der Resilienz der Bevölkerung. Insgesamt liegt der stärkste Bezug zu IKARIM im Punkt Schutz und Erhöhung der Resilienz kritischer Infrastrukturen, und Priorisierung kritischer Dienstleistungen durch die Integration in eine (räumliche) Risikoanalyse.

Allgemeine Rahmenbedingungen, bisherige Kontakte und Kooperationen im Iran, Stakeholdereinbindung in der Definitionsphase

INCOR wird in enger Zusammenarbeit mit allen Partnern, im Co-Design entwickelt und durchgeführt. Dazu wurden langjährige Kontakte im Iran genutzt und als Partner oder im Beratergremium eingebunden. U.a. sind das Kontakte der Universität Würzburg, die seit den 1980ern im Iran tätig ist. Der Projektkoordinators hat seine Diplomarbeit im Iran gemacht und seitdem Kontakte durch gemeinsame Buchpublikationen oder Betreuung von Abschlussarbeiten und Doktoranden, Expertenworkshops seit 2002 aufrechtgehalten. Auch sind iranische Wissenschaftler, die in Deutschland oder Europa forschen, aktiv in dieses Projekt eingebunden und haben durch Ihre Kontakte aber auch Verständnis beider Kulturen zur erfolgreichen Antragserstellung erheblich beigetragen. INCOR wird in der Definitionsphase zwei Workshops austragen, in nur 6 Monaten, um intensive Einblicke beider Seiten in die Situationen vor Ort, Katastrophenmanagementanforderungen und Verknüpfungen zu weiteren Netzwerken zu ermöglichen. Damit soll ein erfolgreicher und effektiver Folgeantrag erstellt werden, bei dem bereits Vertrauen und inhaltliche Fokussierung durch die Definitionsphase aufgebaut wird. Das folgende Diagramm verdeutlich zudem den integrativen Charakter von INCOR; es vereint Praxisperspektiven aus der Stadt- mit der Infrastrukturplanung und zieht daraus, aber auch aus der Verbindung zweier noch wenig verbundener Forschungsfelder, Resilienz und Inklusion wichtige Innovationen für das bekannte Themenfeld Kritischer Infrastrukturen für IKARIM.

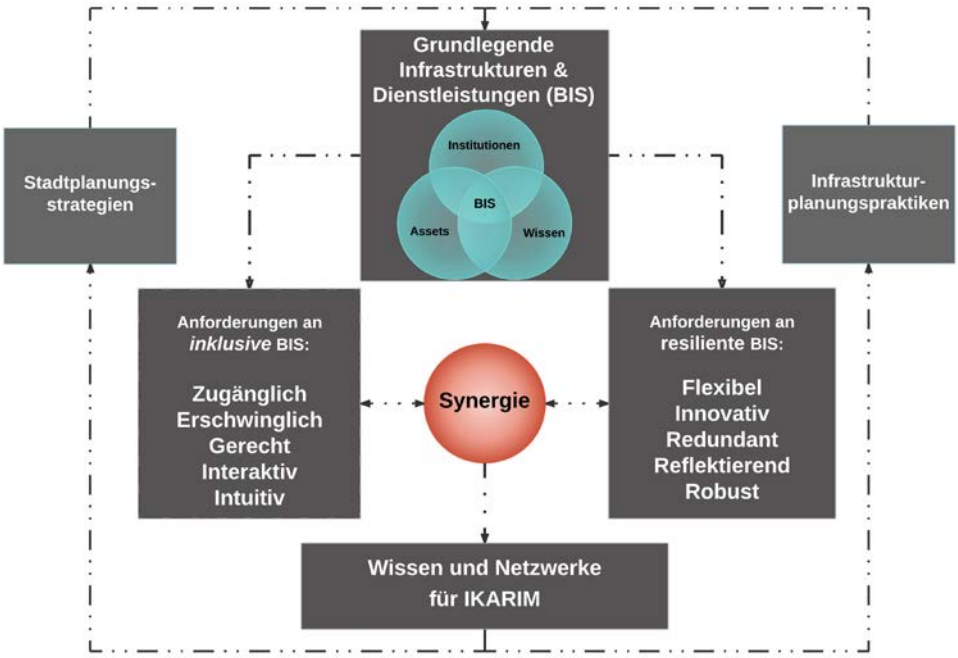

Abbildung 4: Integrativer Ansatz von INCOR und Synergien für IKARIM

Einbettung in eine Vor-Analyse zur Länderauswahl

In einer Länderanalyse zum Katastrophen- und Risikomanagement LAKARI (u.a. THK-IRG, UNU-EHS,. Univ Wuppertal und Univ. Stuttgart, BMBF gefördert) wurden FuE-institutionen in Asien und auch im Iran hinsichtlich ihrer Fähigkeiten für eine Kooperation im Themenfeld Risiko- und Sicherheitsforschung untersucht und mittels Indikatorensystemen internationaler Hochschulrankings und Wettbewerbsindizes (u.a. Welt Bank) systematisch untersucht.

Der Iran hat sich darin bezüglich Forschungsstandards, internationaler Wettbewerbsfähigkeit, Ausstrahlungsbedeutung und Hebelwirkung innerhalb der Region, aber auch insbesondere durch die hohe Anzahl und Bedeutung von Naturgefahren und entsprechender Erfahrung damit für künftige Kooperationen als besonders geeignet herausgestellt.

Partner

THK-IRG: Institut für Rettungsingenieurwesen und Gefahrenabwehr der Technischen Hochschule Köln: Dieses Institut ist Forschungspartner und Leiter des Projektkonsortiums. Mit dem Know-how in der Forschung zu kritischen Infrastruktursystemen, Risikobewertung, Analyse von Vulnerabilität und Resilienz sowie partizipativen Ansätzen in Risk Governance im internationalen Kontext sichert dieser Partner den Dialog zwischen allen Partnern und übernimmt die wissenschaftliche Führung in den Multi-Risk-Ansätzen. Prof. Fekete hat mehrere Projekte (u.a. BMBF) bereits koordiniert arbeitet seit 2002 über den Iran.
UB-IGG: Institut für Geodäsie und Geoinformation an der Universität Bonn hat einen starken Hintergrund in Stadt- und Regionalplanung, urbaner Resilienz, urbanen Risiken, kommunaler Katastrophenresilienz, sowie der Entwicklung theoretischer Rahmenbedingungen als Basis für die Operationalisierung des Konzepts urbaner Resilienz durch Verbundmaßnahmen im Kontext multipler Risiken (Deutschland) und im Zusammenhang mit der Erdbebengefahr (Teheran, Iran). Das Institut wird mit seinem starken Fokus auf urbane Gemeinschaften und seinem Know-how bei der Entwicklung eines integrierten konzeptionellen Rahmens für resilienz-integrative BIS und der Operationalisierung des Konzepts in den Untersuchungsgebieten zu dem Projekt beitragen.
UW - Universität Würzburg - Institut für Geographie und Geologie hat eine lange Tradition und Erfahrung mit Arbeiten im Iran, u.a. in Bereichen wie Geomorphologie, Klima, Bodenkunde, Fernerkundung und Naturgefahren wie Dürren, Überschwemmungen, Erdrutschen, aber auch Urbanität und Raumplanung. Für INCOR wird die UW wichtiges Know-how zu Naturgefahren verursachenden Prozessen, Landnutzung und Erosion, aber auch Maßnahmen zur Minderung solcher Prozesse beisteuern. Physische und anthropogene Faktoren werden integriert, um den INCOR-Ansatz umfassender zu gestalten. Räumliche Beobachtungs- und Bewertungsmethoden unter Verwendung von GIS, aber auch von Fernerkundungsdaten werden eingesetzt - zunächst in der Definitionsphase, um Fallstudienspezifika zu identifizieren und später Daten für die Analysen bereitzustellen. Ein Hauptkapital der UW ist die langjährige Erfahrung im Iran mit Feldarbeit und lokalen Kontakten, die nicht nur die Grundlagenarbeit im Projekt fördern, sondern auch helfen, eine langfristige Zusammenarbeit aufzubauen.
United Nations University – Institute for Environment and Human Security (UNU-EHS) ist weltweit führend in der Risiko-, Vulnerabilitäts- und Anpassungsforschung im Kontext globaler Veränderungen. Die Abteilung für Schwachstellenanalysen, Risikomanagement und adaptive Planung (VARMAP) wird mit ihrem Fokus auf städtische Gebiete und ländlich-städtische Verknüpfungen und Expertise bei der Bewertung gesellschaftlicher Verwundbarkeit und Anpassungsfähigkeiten beitragen.
empirica ag – Research and Consulting ist eine unabhängige Beratungsfirma für Wirtschaft und Sozialwissenschaften und arbeitet an der Schnittstelle zwischen Forschung, Politik und Investment. Kunden sind öffentliche und private Einrichtungen in den Bereichen Demographie, Wohnungsmarkt, Städte und Regionen, benachteiligte Stadtteile und sozioökonmische Auswirkungen von Infrastrukturen.

CoFA – Hochschule für Bildende Künste an der Universität Teheran: Diese Universität ist die älteste und renommierteste Universität im Iran und Hochschule für Stadtplanung ist als Exzellenzzentrum für Stadtplanung und nachhaltige Stadtentwicklung (CEUPSUD) bekannt. Mit einem beträchtlichen Hintergrund in den Bereichen soziale Vulnerabilität und städtische Lebensqualität (nationale und lokale Ebene) wird dieser Partner zu sozialen Faktoren beitragen, die für die inklusive Planung im Projekt berücksichtigt werden können.
TDMMO - Teheran Disaster Mitigation und Management Organisation: TDMMO ist in Zusammenarbeit mit der Zentralregierung in Teheran für das städtische Risikomanagement zuständig. Dieses Institut ist das verantwortliche Zentrum für die Vorbereitung und Durchführung von Katastrophenrisikoprojekten und hat verschiedene Projekte mit internationalen Institutionen wie JICA, UNDP und der Weltbank durchgeführt. Dieser Partner wird dazu beitragen, den tatsächlichen Bedarf in der Definitionsphase zu ermitteln und die verschiedenen BIS-Bereiche während des gemeinsamen Projekts zu koordinieren.
IIEES – International Institute of Earthquake Engineering and Seismology: beinhaltet die Abteilungen Seismology, Geotechnical Engineering, Structural Engineering, Risk Management, Graduate Studies, Information Technology, und International Relations. IIEES engagiert sich bei der Implementierung national und internationaler Projekte bei effektiven Maßnahmen zum Schutz von Leben und Gütern gegenüber Naturrisiken. Hauptziele von IIEES sind die Förderung von Forschung, Technologien und Bildung in allen Aspekten der Seismologie und praxisrelevante Maßnahmen um Erdbebenrisiken zu reduzieren sowie die Entwicklung einer Sicherheitskultur im Umgang mit Erdbeben,

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2b. Background and Conception of INCOR Project - Basic Infrastructures and Services for Enhancing Inclusive Community Disaster Resilience in Iran

Alexander Fekete, Asad Asadzadeh, Mahsa Moghadas

Introduction

Recent earthquakes in Iran (Kermanshah earthquake in 2017, as well as the Bam earthquake in 2003) highlighted once again how susceptible many communities in Iran are to natural hazards. The experience gained revealed that cascading failures of critical infrastructures (termed here basic infrastructures and services - BIS) in both inherent and adaptive capacities can dramatically affect response and recovery levels of affected communities. Additionally, there is a widespread perception that social capital and trust can be declined when there is no equitable access to BIS for all citizens, especially for urban poor.

With this background, international academic and policy circles acknowledge the increasing need for an integrated resilient-inclusive basic infrastructures and services (BIS) for better disaster risk management and social conflict reduction. BIS represent both antecedent (inherent) and adaptive capacities and are made up of three major parts of assets, knowledge and institutions. While the antecedent condition or static state of BIS are often analyzed in disaster studies, the adaptive or dynamic process of BIS are neglected. To tackle this challenge, INCOR will focus on interacting BIS to find out the interdependencies in their spatiality and temporality to shift from a reactive model to a proactive approach in order to preparing for future crises. Equally important, the Kermanshah example showed that existing BIS planning and management systems do not provide equitable and fair access to all citizens.

This project therefore, will consider resilience and inclusion as the two major characteristics of basic infrastructures and services (BIS) in disaster risk planning and management. Since resilience and inclusion are abstract concepts, translating them into BIS requires an interdisciplinary and a multi-sectoral attitude on three levels: first, by focusing on conceptualizing three key interlinked concepts of basic information and services (BIS), resilience, and inclusion. Second, by focusing on interacting basic infrastructures and services to find out the spatiotemporal relations of them, and third, by socializing the concept of basic infrastructure and services as a common research object.

State of the art

Iran sits on a major fault line between the Arabian and Eurasian plates and has experienced a number of deadliest earthquakes in the past. The deadliest this century occurred in 2003 when a magnitude 6.6 earthquake struck the city of Bam, killing some 30,000 people. In 2017, an earthquake in Kermanshah (the world's deadliest earthquake so far this year) killed at least 600 people and injured around 10,000 people. More than 90% of country's cities are located on earthquake faults including the Megacity of Tehran with around 13 million inhabitants [1]. According to Swiss Re [2], Tehran is highly exposed to earthquake and is ranked as the sixth vulnerable city to earthquake worldwide with regard to the size of urban population that could be hit by one or more natural hazards. One million people may be killed and 70% of the city can be heavily damaged if an earthquake like Haiti shakes the city [3].

According to Global Assessment Report on Disaster Risk Reduction (2015), Iran is one of the countries face a financing gap and would not pass a stress test of its fiscal resilience to a 1-in-100-years loss, if does not have the resources to buffer against sever disaster losses such as earthquakes[5]. Seismic scientist have recently warned there could be a big increase in numbers of devastating earthquakes around the world for 2018 and obviously Iran is one of the potential candidate[6]. More than 90% of country's cities are located on earthquake faults including the Megacity of Tehran with around 13 million inhabitants. According to Swiss Re (2013), Tehran is highly exposed to earthquake and is ranked as the sixth vulnerable city to earthquake worldwide with regard to the size of urban population that could be hit by one or more natural hazards[7]. JICA (Japan International Cooperation Agency) in 2000 has developed four scenarios for total building damage and human fatality in Tehran and estimated that in the worst scenario, 55% of building damage and around 500,000 human casualties can be happened[8].

These scenarios highlight one again how susceptible is Iran in general, and in particular, Tehran to earthquake hazard, and consequently, how are basic infrastructures and services (BIS) critical for mitigation and recovery in time of an adverse event. However, due to complexity of BIS, and dynamic concept of both resilience and inclusion terms, the scenarios will be expanded in full proposal period, in close cooperation with local partners who are involved in disaster risk management and planning.

Existing gaps and demand

Human communities need a resilient system in order to prepare for, absorb, recover from, and more successfully adapt to actual or potential adverse events in timely and efficient manner (UN 2015: Sendai Framework for Disaster Risk Reduction). The systems that contribute to resilience of a community are basic infrastructures and services (e.g. mobility, energy, water, sanitation, building systems, communication; etc.). The importance and demand for such 'critical infrastructure' to be maintained during and after disasters is increasingly underlined at international level (EC 2008, UN 2015, SDGs). While Iran is a leading nation in some structural and non-structural preparedness (e.g. standard building codes, infrastructural planning, risk information, etc.), recent earthquakes highlighted that existing systems are not sufficient yet to resist, respond and mitigate the effects of shocks. At the same time, when the benefits of infrastructure services are not shared broadly, also disaster management and recovery activities are less sustainable, durable, and resilient. For instance, infrastructural deprivation was a significant cause of a social trust gap between population and government after the Kermanshah earthquake in November 2017. Therefore, interruptions of infrastructure services can attenuate the absorptive capacity or the recovery degree of communities, and equally important, can reduce social capital or increase social conflicts at hazard-affected communities. Urban planning and disaster management has a long tradition in Iran and our project partners in Iran have identified a great demand to continue and expand the planning processes on the backdrop on continued natural hazard risks and increasing population concentrations exposed to potential disasters, such as the next "big one" earthquake to strike the capital, Tehran or another area.

[5] http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf
[6] https://www.theguardian.com/world/2017/nov/18/2018-set-to-be-year-of-big-earthquakes
[7] http://www.swissre.com/library/expertisepublication/Mind_the_risk_a_global_ranking_of_cities_under_threat_from_natural_disasters.html
[8] http://open_jicareport.jica.go.jp/pdf/11611753_01.pdf

Against this backdrop, and for the first time in Iran, this project will focus on basic infrastructures and services disaster resilience in systematically and integrated way. The overall goal is to underpin an innovative planning system for infrastructure and urban planning to face risks, and as such, to explore policies for expanding equitable access to infrastructure services and making the benefits more inclusive and sustainable. This meets national as well as international demands for creating synergies between sustainable development goals (SGDs) and Disaster Risk Reduction (DRR).

Despite structural building codes and land-wide adoption of high standards in road and building construction, Iranian cities and settlements remain at risk. Especially basic infrastructures and services (BIS) are transforming to be part of problem instead of being part of the solution as experienced in recent Kermanshah earthquake. On the one hand, basic infrastructures and services have not been seen as a network system in current planning system and thus, the interdependencies and the spatial-temporal relations of them were not enough understood. On the other hand, the fair and equitable access to BIS was not guaranteed for all population. It is assume that people along with BIS participate in different phases of risk management including preparedness, response, and adaptation. However, social and infrastructural inequalities put these assumptions in doubt and cause to break social trust as reported from Kermanshah earthquake. Against this background and for the first time in Iran, this project will focus on basic infrastructures and services (BIS) in systematically and integrated way**.** The overall goal is to identify the functions and failures of BIS in their spatiotemporal contexts and relations in order to underpin an innovative planning system to face upcoming risks, and as such, to explore policies for expanding equitable access to BIS and making the benefits more inclusive and sustainable.

Resilience and inclusive thinking and link to basic infrastructures and services (BIS): The Benjamin Franklin axiom that “an ounce of prevention is worth a pound of cure” is as true today as when Franklin advised Philadelphia's fire-fighters in 1736 [7]. A series of prominent natural and technical disasters suggest that there is a vital need to shift our focus from a reactive response to a proactive mitigation [8,9]. Such shift predisposes us to develop our understanding of what, when, and where basic infrastructures and services (BIS), as backbone of communities, need to be put in place and how they can be addressed to prevent and mitigate the effects of natural hazards [10]. At the same time, basic infrastructures and services (BIS) are challenged by increased complexity and rapid changes in world dynamics (e.g. rapid urbanization along with growing urban informality, growing gap between demand and supply, social conflict, etc.). Such challenges highlight the need for optimizing capital allocation and providing equitable access to resources for all citizens, especially the poor [10,11]. With this background, international academic and policy circles have acknowledged the need to create resilience and inclusive communities [4,12–14]. While the term resilience has received attention from hazard scholars, inclusion has only recently become a popular aspirational term in development discourse. Therefore, an integrated resilience-inclusive BIS is yet to be developed for disaster risk planning and management.

Integrated resilience and inclusive basic infrastructure and services (BIS): Despite the increasing international awareness of the link between interdependencies of BIS and disaster resilience, most of research initiatives continue to focus on individual systems or the technical interrelations (static results) of BIS [15]. Rather, BIS are complex networked systems that manifest various spatial-temporal relations

(dynamic processes) in communities [16]. Embracing BIS as a complex and dynamic concept helps for better understanding of how the inherent and adaptive resilience (e.g. robustness, redundancy, flexibility, etc.) of them can attenuate the impacts of a hazard and provide rapid response and recovery [17,18]. Equally important, the increasing gap between demand and supply of BIS, as well as the inaccessibility, and unaffordability of them attenuate not only the resilience degree of societies but also leads to social conflict [19]. Integrated resilient-inclusive BIS can therefore be a comprehensive approach for realization of human security and rights in the context of natural and technical hazards (see Figure 2, next page). To perform this task, INCOR will integrate innovations stemming from resilience concepts currently burgeoning in the field of disaster risk management with the field of infrastructure, which combines both paramount disaster-related recovery capabilities as well as everyday living conditions for modern civilisations. Community resilience then finally adds also the perspectives of the people, their conditions and perceptions of natural hazard risks and their dependence on basic infrastructure. In order to enable such conceptual integration, it is co-designed and carried out in close collaboration with all partners especially, those that are involving in disaster risk management in Iran.

Goals

Developing integrated resilient & inclusive basic infrastructures and services: INCOR argues that basic infrastructures and services (BIS) need a multi-sectoral approach and an interdisciplinary collaboration, and therefore, will help to build and boost existing collaboration between German and Iran through joint transdisciplinary research, integrating academic, administrative and private sector. Practically, urban planners and decision makers from Iran will be linked to technological key solutions (e.g. seminars, workshops, etc.) developed by German enterprises that allow the co-design of resilient-inclusive basic infrastructures and services. Conceptually, INCOR aims at centring on three key interlinked concepts of basic infrastructures and services (BIS), resilience, and inclusion to understand how their integration can be addressed to meet both disaster risk management and social conflict reduction.

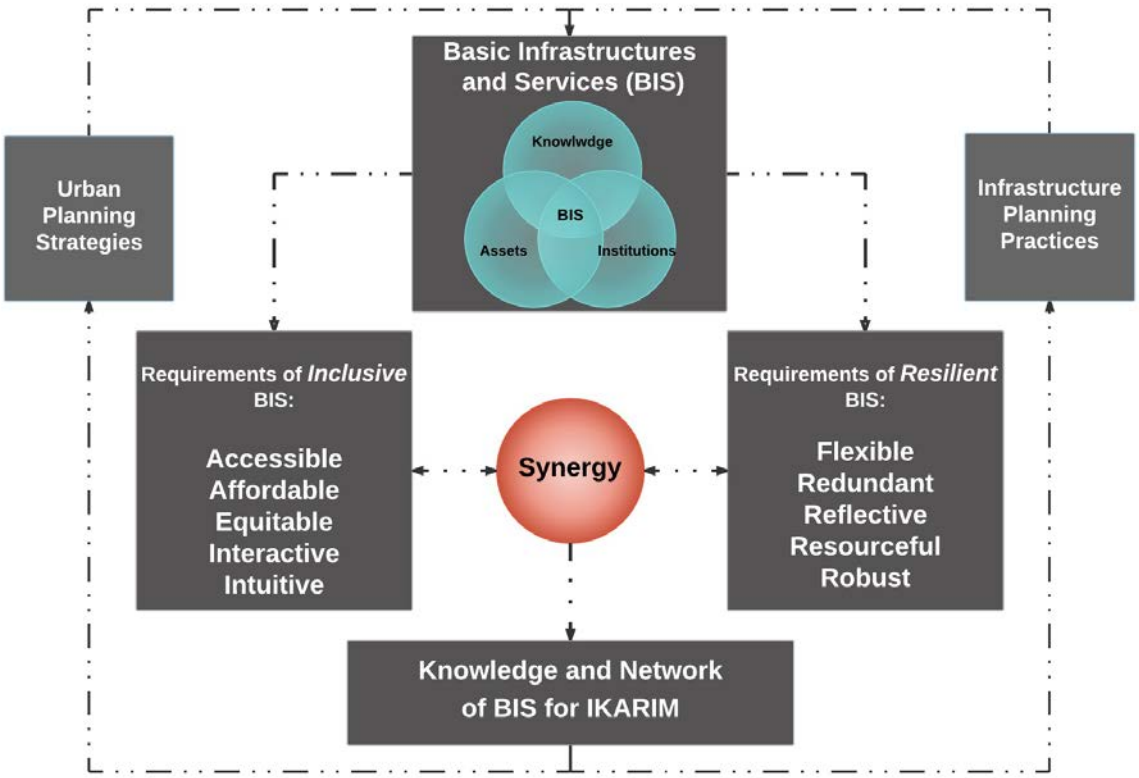

Fig. 1: Creation and implementation of the inclusive-resilient BIS: synergies between basic infrastructure, resilience and inclusive approaches

BIS, as the backbone of urban communities, provide not only functions well during non-crisis periods, but also prepare flexibility in response during, and adaptability after disasters. They are highly context-dependent (temporal and spatial) characteristics in communities and reflect multiple spatial-temporal interactions. Furthermore, they are complex systems and made up not only physical or assets, but also consist of three major parts of assets, knowledge, and institutions. Therefore, integrating BIS with resilience and inclusive thinking can be addressed to shift from a reactive action to a proactive approach (anticipate and cope with future shocks), and to attenuate the social gaps induced by inequitable access to BIS. The goal is to contribute to the Sendai Process in DRR (Sendai Targets A1-D1, and G1) as well as to the SDGs (especially Goals 4, 6, 8, 10, 11, and 16), with also being accordance with the New Urban Agenda (Habitat III) that emphasises on equitable access to BIS, especially for the poor. A holistic approach toward inclusive-resilient BIS also necessitates the focus on interdependencies between sectors and thereby generate dialogue between local and international actors. The obtained results are conceptual and practical solutions that are need-based and mitigation-centered and encompass long-term attitude, and inclusive process for BIS planning in the context of natural hazards.

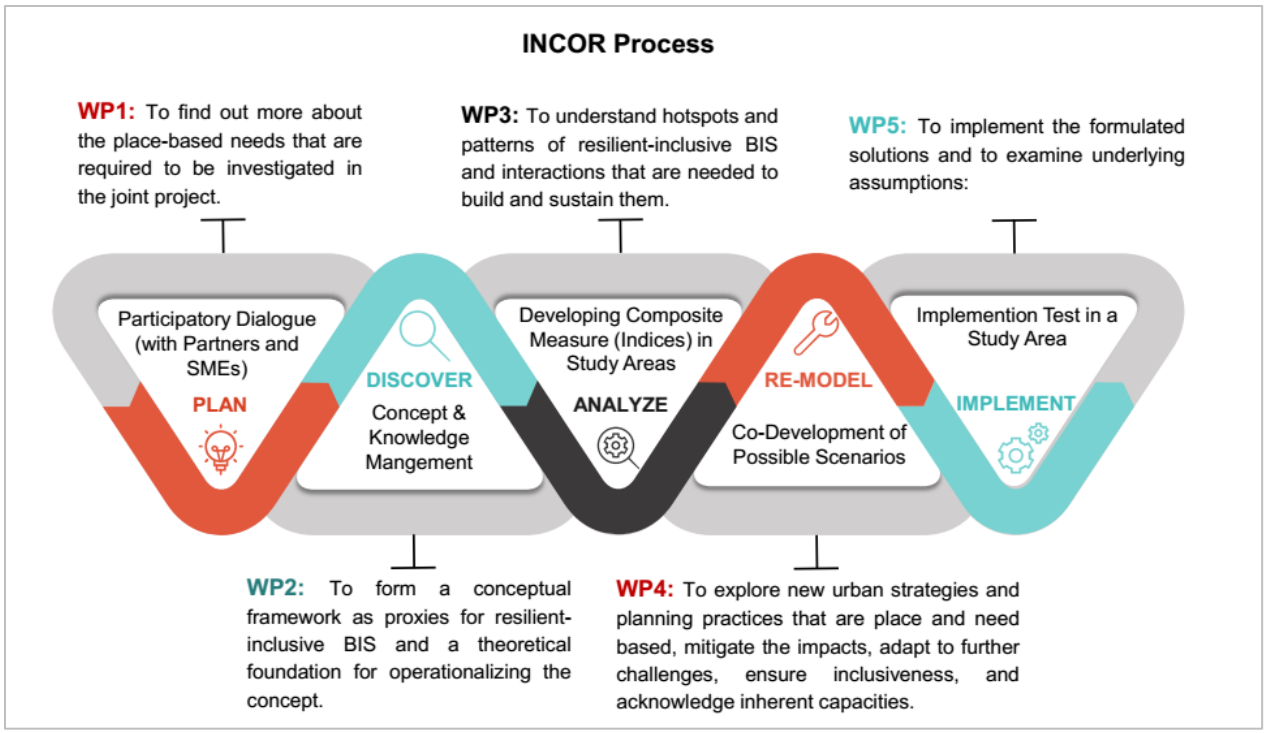

Fig. 2: Analytical development process of INCOR

The following figure shows the methodology of resilient-inclusive BIS: From conceptualizing to operationalizing the concept and identifying hotspots (deficits, issues, and problems).

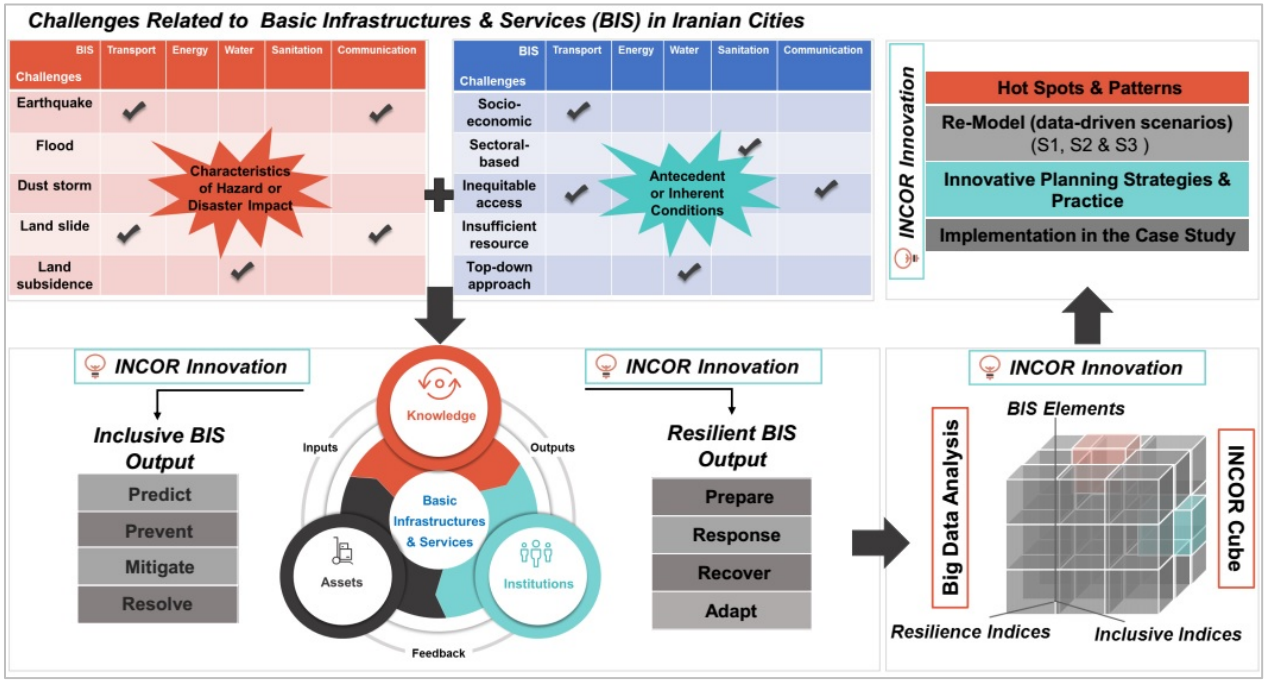

Fig. 3: Categories and conceptual components

Specifically, INCOR intends to address the main goal of the Sendai Framework (disaster prevention and reduction through inclusive inherent and adaptive capacities to increase preparedness, recovery, and thus strengthen community resilience). It also touches the six out of 17 targets of the 2030 Agenda for SDGs (creating inclusive, safe, resilient, and sustainable communities), as well as the one of the most important targets of Habitat III (equitable and fair access to BIS for all). **Conceptually**, INCOR views resilience and inclusion as two major characteristics of basic infrastructures and services (BIS) in risk planning and management and will help to develop an integrated resilient-inclusive BIS framework, and as such, an innovative strategy and planning practice for further planning and development of BIS. **Methodologically**, INCOR will apply a hybrid (qualitative and quantitative) approach for operationalizing the integrated concept of resilient-inclusive BIS. It will focus on interacting basic infrastructures and services to find out the interdependencies (spatial-temporal) of them through location-based or geospatial information systems (GIS) and spatial data infrastructure (SDI). Then, the focus will be placed on understanding the linkage between equitability, affordability, and accessibility of BIS (using in-depth interviews with planners, stakeholders, etc.) for the realization of inclusive factors for BIS.

Expected **outcomes** will be a holistic theoretical framework as proxies for resilient-inclusive BIS systems, a composite measure (indices) to understand an empirical evidence of what increases or inhibits community resilience, and innovative planning practices for both urban and regional planning.

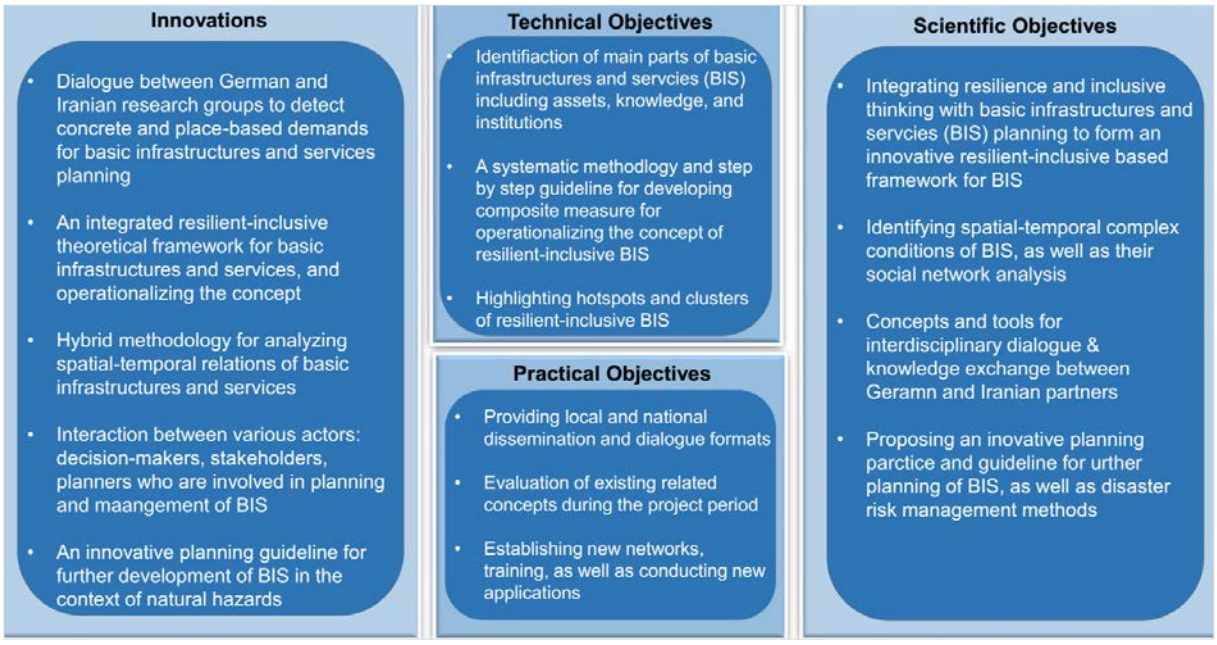

Fig. 4: Objectives and innovations of the project

Partners

Institute name and short description
IRG – Institute of Rescue Engineering and Civil Protection at TH Köln - University of Applied Sciences: This institute is research partner and lead of the project consortium. Holding expertise in research on Critical Infrastructure systems, risk assessment, analysis of vulnerability and resilience as well as participatory approaches in risk governance in an international context, this partner will assure dialogue between all partners and take the scientific lead in multi-risk approaches of this project.
IGG – Institute of Geodesy and Geoinformation at University of Bonn has a strong background in urban and regional planning, urban resilience, urban risks, community disaster resilience, as well as developing theoretical frameworks as basis for operationalization the concept of urban resilience through composite measures in the context of multiple risks (Germany), and in the context of earthquake hazard (Tehran, Iran). The institute will contribute to the project with its strong focus on urban communities and its expertise in developing an integrated conceptual framework for resilient-inclusive BIS, and operationalizing the concept in the study areas.
UW - University of Würzburg – Institute of Geography and Geology has a long tradition and experience with working in Iran on areas such as geomorphology, climate, soil science, remote sensing and natural hazards such as droughts, floods, landslides, but also urbanity and spatial planning. For INCOR, UW will add important expertise on natural hazard originating processes. land-use, erosion, but also measures to be developed in mitigating such processes. Physical as well as anthropogenic factors will be integrated to make INCOR more comprehensive. Spatial observation and assessment methods using GIS but also remote sensing data will be deployed – first in the definition phase to identify case study specifics, and later on to provide data for the analyses. A main asset of UW is the long experience in Iran with field work and local contacts, which will foster not only ground truthing work in the project but also help establish long-term cooperation (Prof. Birgit. Terhorst, Dr. Christian. Büdel, Dr. Tobias. Ullmann).
United Nations University – Institute for Environment and Human Security (UNU-EHS) is a global leader in risk, vulnerability and adaptation research in the context of global change. The Vulnerability Assessment, Risk Management & Adaptive Planning Section (VARMAP) will contribute to the project with its strong focus on urban areas and rural-urban linkages and its expertise in assessing societal vulnerability and adaptive capacities in the context of wider cultural, economic, demographic and political transformation.
empiric ag – Research and Consulting is an independent economic and social science consultancy and works at the intersection of research, politics and property investment. It provides services to public and private clients in various different sectors (e.g. demography, housing markets and policy, social and economic research, cities and regions, deprived neighborhoods, socioeconomic impacts of infrastructure).
CoFA – Collage of Fine Arts at University of Tehran: This university is the oldest and the most prestigious university in Iran and its School of Urban Planning is known as the Centre of Excellence in Urban Planning and Sustainable Urban Development (CEUPSUD). With a substantial background in social vulnerability and urban quality of life fields (national and local levels), this partner will contribute to social factors that can be addressed for inclusive planning in the project.
TDMMO - Tehran Disaster Mitigation and Management Organization: TDMMO has responsibilities for urban risk management in cooperation with the central government in Tehran. This institute is the responsible center for preparing and implementing disaster risk projects, and has had various projects with international institutions such as JICA, UNDP, and World Bank. This partner will contribute to identification of actual needs in

definition phase, as well as coordination among different sectors of BIS during the joint project.
IIEES – International Institute of Earthquake Engineering and Seismology: is composed of different research departments, including Seismology, Geotechnical Engineering, Structural Engineering, Risk Management, Graduate Studies, Information Technology, and International Relations. IIEES is engaged in implementation of national and international projects and will take effective steps in protecting the lives and properties of human being against the activities of nature thanks to all its responsible and qualified researchers. The main goals of IIEES are investigation, technology and education in all aspects pertinent to seismology, earthquake engineering, earthquake hazard, and suggesting practical approaches and supporting their implementation to reduce the risks of earthquakes, and develop the security culture against earthquakes in this country and in the region.
TUPRC.-.Tehran Urban Planning & Research Center: This organization has the responsibility for applying results of research and professional projects in the activities of Tehran Municipality. It is also responsible for preparing of Master Plan for Tehran, coordination, monitoring, and evaluating of it, as well as establishing relationship and interaction between Tehran Municipality and other organization and institution especially in term of knowledge based companies. This partner will contribute to implementation of the proposed planning guidelines, coordinating, and monitoring.

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3. Synergy between resilience and inclusive thinking in basic infrastructures and services (BIS) planning

Asad Asadzadeh

INCOR argues that a series of prominent natural and technical hazards, as well as increased complexity and rapid changes in world dynamics require a holistic approach for basic infrastructures and services (BIS) that is resilient (mitigation-centered) and inclusive (ensures inclusiveness). Resilience, especially the concept of community resilience encompasses the way in which communities face the increased natural and technical disasters and includes inherent and adaptive capacities of communities to respond, adapt, and grow no matter what kind of risks they experience [1,2]. A resilient community consist of proactive systems such as basic infrastructures and services (BIS) that anticipate possible disaster scenarios, absorb their impacts, recover from disruptions caused by them, and adapt to the changes [3]. Therefore, the development of resilient BIS is essential for those communities that are highly susceptible to natural hazards and has been the topic of two priorities actions (priorities 3 and 4) of the Sendai Framework [4].

However, the question of how to engage all relevant stakeholders and actors in the development of resilient BIS and share the obtained advantages with all community residents remains in agenda. Against this background, international policy discourses such as the New Urban Agenda [5], and the SDGs [6] have acknowledged the need for linking the concept of resilience to other aspects and sectors of development such as inclusive development [7,8]. Inclusion is now a hot topic in international academic and policy circles and carries similar influence within environmental/social equality to the weight carried by term resilience in environmental changes during 2005 - 2015, as well as sustainability in environmental planning during 1980s and 1990s. Although the term inclusion has been recently coined and poorly defined, it bears most of the weight of social aspirations and emphasises the principles of enhancing access, equity and, as a result, social inclusion for all [9]. In the domain of basic infrastructures and services (BIS), inclusion will be characterized by understanding the linkage between equitability, affordability, and accessibility of BIS with the aim to support a resilient and inclusive development that provides either effective disaster management (response, recovery, and adaptation) or social conflict reduction (prevention, mitigation, and resolving) in time an adverse event.

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4. Co-Designing German Iranian Partnerships: Basic Infrastructures and Services for Inclusive Community Disaster Resilience in Iran (INCOR Project). Iranian-German Expert Workshops Series

Alexander Fekete, Asad Asadzadeh, Mahsa Moghadas

Executive Summary

The second workshops series on Basic Infrastructures and Services for Inclusive Community Disaster Resilience in Iran (INCOR) funded by German Federal Ministry of Education (BMBF) took place in Tehran and Karaj, Iran, from 15-18 September 2018 in partnership with German and Iranian organizations and institutions. The purpose of these workshops was to hold an interactive discussion at international level where disaster management stakeholders could jointly discuss and brainstorm innovative and application oriented ideas and solutions in the fields of disaster prevention, management and restoration. These workshops is also part of a definition phase project, aiming at identifying topics and partners from Iranian and German sides for a partnership and application for joint grants within the frame of the International Disaster and Risk Management (IKARIM) initiative. IKARIM grant aims to transfer knowledge and to form international partnerships for disaster risk management. The focus is on innovative, application-oriented co-operation projects that contribute to population protection, disaster prevention and the protection of critical infrastructures as well as the development of early warning systems in selected countries.

Another goal of these workshops and INCOR project is to contribute to the Sendai Framework for Disaster Risk Reduction (SFDRR) for saving human lives and reducing number of affected people, the contribution of critical infrastructures and basic services (BIS) in strengthening the resilience of communities against natural hazards including earthquake, floods and landslides in Iranian cities. With regard to the Sustainable Development Goals (SDGs) and the New Urban Agenda (Habitat III), the inclusiveness and equitable access to BIS had been taken into the consideration. All in all, participants explored the needs and gaps, architecture of the project research, planning strategies, new procedures for operation and management, and capital/infrastructure improvements that increase resilience level of communities to disruptive events. This report contains background information that was presented to participants, summarizes workshops discussions and catalogs potential improvement options of disaster and risk management and the identified next steps by workshops participants.

1 Workshops Overview

The general layout and ambition of the workshops series were to conduct a co-design approach, where German and Iranian partners from the relevant institutions could co-create the project. This internationally accepted approach and its overall design are described in the following sections.

1.1 Background and Objectives

The German and Iranian experts and stakeholders gathered in the second INCOR workshops to discuss the core ideas and underlying assumptions of the project, as well as complete the shared findings of the first workshops (6-7th Sept. 2018) in Cologne. The overarching topic of these workshops was to find out how basic infrastructures and services (BIS), as the backbone of urban communities, can contribute to increase the disaster resilience level of the cities to natural hazards.

According to UNISDR (2017) resilience has been defined as "The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management". Likewise, critical infrastructure refers to "The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society. In addition, UN Habitat III highlighted that "infrastructure has evolved to a more increasingly system based understanding which consists of networks of assets, knowledge and institutions".

A key consideration in addressing the challenges associated with natural hazards in Iran is how cities cope with and shift from short-term emergency response to a long-term adaptation and transformation. Thus, the question of whether resilience thinking can engage multiple stakeholders and create a common ground for action still needs to be investigated. INCOR project argues that integrating basic infrastructures and services (BIS) planning with disaster and risk management, as well as urban planning and development can play a critical role in shaping cities facing unexpected shocks. The integrated form of planning needs to focus on proactive and future-oriented solutions and creates common ground for action and implementation.

In addition, efficient disaster risk management is the function of working across various levels and trust-based partnership between stakeholders and decision-makers. Therefore, there is a vital need to foster international dialogue and cooperation. In this regard, due to the differences and similarities between Germany and Iran in the experience, hazard context and planning system for disaster risk reduction (DRR), Research and development (R & D) cooperation leads to learning from and with each other that will result in jointly develop and implement solutions for disaster prevention, management and recovery.

With the intention of contribution to the Sendai Framework, the SDGs and the Habitat III the outcome of this workshops and the first one in Cologne is the full project proposal. The Proposal has been drafted based on the local needs and beyond the current state of the science and implemented projects in Iran by proposing a common ground framework and from planning to action. The general goal is to contribute to the Sendai Framework the SDGs Habitat III. The objectives of the workshops included:

- Identification of cooperation partners and collaboration set up
- Discussing and consolidating the local needs and opportunities for DRR in order to develop region-specific and concrete R & D solutions to the key challenges in Iran
- Identifying and discussing the next steps about the specific work of each partner in 3-year project

1.2 Workshops Materials

Several documents were developed to conduct the workshops.

- **Workshops Agendas**: The workshops agendas are included in Appendix A.
- **Participant Lists**: The list of all workshops participants are included in Appendix B.
- **Workshops Presentations and Handouts**: The workshops presentations and handouts provided information on IKARIM funding program by BMBF, INCOR content (before and after the workshops) and the participants' expertise and their potential contribution to INCOR. The presentations and handouts used in the workshops are sent to all participants.

1.3 INCOR: Underlying Assumption

To frame the discussions, workshops participants were presented with information on INCOR in general and BIS in particular. Then the component of the resilience framework was presented based on the outcomes of Cologne workshops.

- **INCOR**: Creation and implementation of inclusive-resilient BIS. Why resilience and why inclusive planning?
- **BIS**: BIS consist of "delivery of safe water, sanitation, waste management, social welfare, transport and communication facilities, energy, health and emergency services, schools, public safety, and the management of open spaces" (Habitat II).
- **The outcome of Cologne workshops:**
    - Multi hazard approach: earthquake, flooding, landslide and hazardous facilities
    - Scenarios: worst case and low disruptive event as well as cascading effects
    - The analysis components with regard to their dependencies on infrastructure:
        - **City level**: (emergency management institutions, urban planning institutions and infrastructure operators);
        - **Buildings/sites level** (fire departments, emergency operation centers, schools, hospitals, public buildings, evacuation areas and open spaces;
        - **People** (residential, mobile commuters, etc.)
    - Resilience model: based on the improvement of existing definitions and disaster risk studies based on a participatory approach
    - Case studies: Tehran (D1, D10 or D22) and Karaj city as well as the daily flux of commuters between the two cities
    - Added value: Information dissemination and participation: modeling, toolbox or application for identified end users (decision makers or people)
    - Monitoring: A mechanism system for what to do, how and by whom (demonstrations of early success)

Figure 1: Group photo of the first workshops series in Cologne; photo credit: Ms. Zohreh Mousavian

2 Workshops Discussions

This section summarizes the discussions of the five-day workshops with the five Iranian partners. The following sections were developed using participant inputs, discussions and recorded notes. By design, several workshops at different institutions were held, in order to enable the inclusion of as many experts as possible, and in order to gather different institutional perspectives, existing capabilities and needs.

2.1 International Institute of Earthquake Engineering and Seismology (IIEES)

After introductory part and given presentation by IIEES experts about their works and projects contributing to DRR, first, a model was proposed: "Basic elements and algorithms for resilience modeling to develop a decision support tool in INCOR". The proposed model includes type of hazards, resilience factors, estimation of resilience, improvement measures, and elements under analysis (physical, social, economic, organizational and capacity). For detailed content, please refer to the specific presentation.

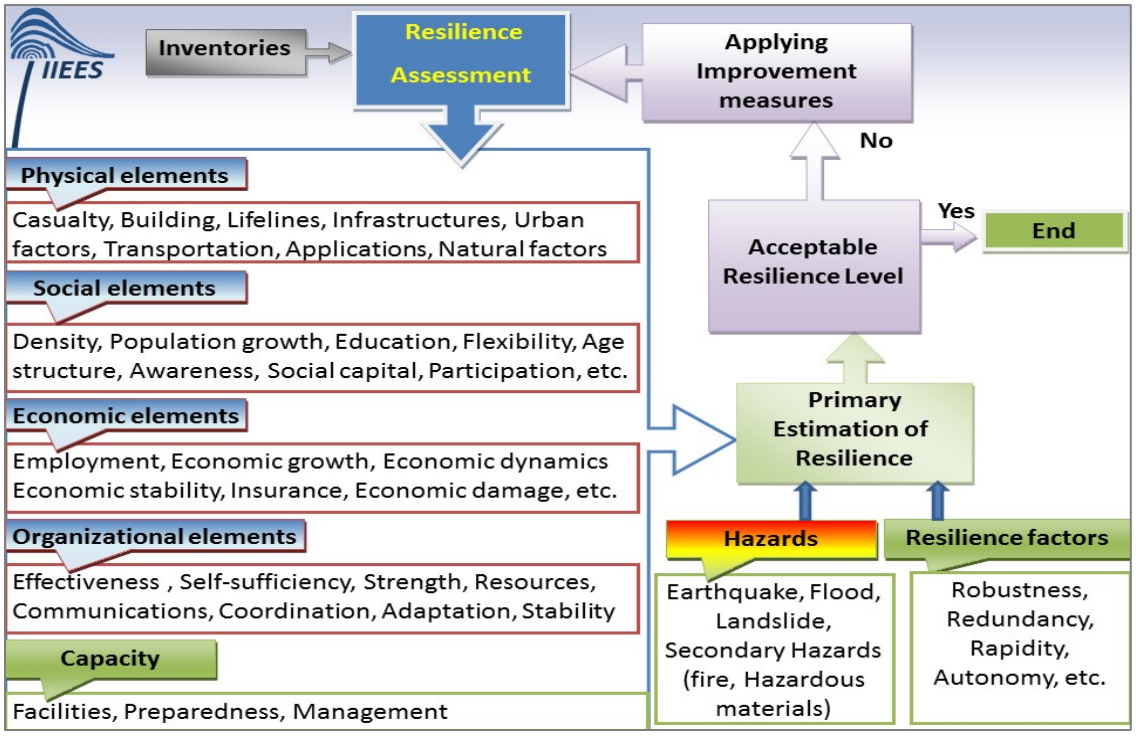

Figure 2: The proposed resilience model by IIEES

Next, participants involved in developing and designing of a primary model for a resilience toolbox as the outcome of the INCOR project. The development of model as well as the toolbox has been based on the combination of exciting knowledge on risk assessment in Iran. The added-value of resilience assessment in INCOR will be co-designed and assessed by participation of all stakeholders and experts. For detailed content, please refer to the given handout and the specific presentation.

Architecture of Resilience Toolbox	Excising Risk Approach				Next Step
	Hazards (primary & secondary)	**Exposures** (physical & socio-economical)	**Vulnerability Model**	**Risk Analysis**	**Resilience** (engineering & socio-economic approaches)
	1. Earthquake 2. Flood 3. Dust Storm 4. Hazardous facilities (Bio-Chemical) 5. Geotechnical 6. Fire 7. Landslide 8. Subsidence 9. Cascading effects between people & assets	1. Buildings (Residential & public) 2. Lifelines & transportation networks (Power, water, waste water, gas lines, road network, critical facilities)	Improve the exciting developed models with considering the interdependencies of elements	Using available models (network & system analysis approach)	1. Agreeing on a common definition 2. Resilience of what 3. Index building, modeling and computational tool designing (inclusive, risk-based, performing, participatory) 4. Measurement & improve resilience (play and plug) 5. Implementation (application-oriented, cost & benefit analysis for decision makers)

Figure 3: Architecture of the resilience toolbox

Then, all participants discussed about the roles and responsibilities in INCOR based on IIEES idea as follows:

- **Project core members**
  - Planning
  - Coordination and supervision of the progress
  - Integration of the results
  - Sharing information and results to all partners
- **Academic institutions**
  - Assessment the contribution of different elements
  - Developing models (different components by different institution)
  - Preparing necessary algorithms
- **Local authorities**
  - Providing information about their requirements
  - Implementation the model
  - Applying the results and providing feedbacks
- **Assisting Companies**
  - Developing software
  - Providing appropriate technologies
  - Data gathering and process

Figure 4: Group photo at the IIEES in Tehran; photo credit: Ulf Siefker

2.2 School of Urban Planning, College of Fine Arts, University of Tehran (CoFA)

After introductory part and given presentation by CoFAs' professors about different type of plans at different level of development, urban planning system in different scales, and land policies in Iran the gaps and the needs of disaster resilience thinking into planning were discussed. Integrating of resilient-inclusive thinking into urban planning can play a critical role in shaping cities facing unexpected shocks and conflicts induced by natural disasters, and forming a new planning system that is mitigation-centered and future-oriented (resilient), and grounded in the values (inclusive). The summary of the discussion is as below:

- **Need for transformation**: Although seismic hazard micro zoning map of Iran has been developed for not only the provinces but also some metropolitan areas and cities such as Tehran and Tabriz, existing planning system in different levels (spatial plan, master plan, detailed plan, action plan and revitalization plan) are not hazard based, future oriented and designed based on prevention strategies.
- **Need for an integrated approach**: The lack of cooperation and integration between the responsible organizations for formulation of planning strategies and policy making in the field of DRR, urban planning and environmental studies leads to formulation of planning strategies and policy making in the context of urban and environmental studies, cause conflict, duplication or inactivity among stakeholders and existing plans.
- **Need for participatory approach**: Public participation and community-based approach should take into consideration to guarantee a successful implementation phase. This can be done by investigation of the possible incentives (pull and push factors) and proper way of communications (value of lost) to engage people from the beginning.
- **Need for concrete definitions**: There is no unified conceptual discourse or definition on disaster resilience and inclusive city in Iran. Moreover, there is no national definition or specific elements for Critical Infrastructures and Services. In this regard, there are just some information about CIs in the Passive Defensive (Padafand gheyreh amel) strategies, which is not particular and clear. Therefore, CIs definition should be clarify based on international definitions and in the context of the project.

Figure 5: Photos at the CoFA in Tehran; photo credit: Ulf Siefker

2.3 Tehran Disaster Mitigation and Management Organization (TDMMO)

After introductory part and given presentation by TDMMO experts about their projects and activities on identifying Tehran expected natural hazards, vulnerability assessments, enhancing urban resilience, activities for risk assessment and development of mitigation plan, gaps and expectations were discussed. The following general recommendations were made by TDMMO on how to effectively develop the project proposal:

- Multi-Hazard approach
- Hazard zonation
- Improving exposures identification and modeling
- Precision and updating of vulnerability assessments
- Capacity assessment
- Promoting existing and ongoing risk modeling
- Measuring Tehran resiliency
- Benchmarking and evaluation the effects of DRR measures

The details of the discussion as well as the gaps and needs are highlighted in figure 6.

	Research					Development
	Hazards (primary & secondary)	**Exposures** (physical & socio-economical)	**Vulnerability Model**	**Capacity**	**Risk Modeling & Assessment**	**Desired Outcomes**
Gaps and Expectations	1. Earthquake 2. Flood 3. Landslide 4. Subsidence 5. Post earthquake fire	1. Establishing a Model for Social & Economical Aspects 2. Improving Models for Buildings Damage & Loss 3. Adjusting Models for Lifelines 4. Developing Tehran Risk Assessment Model 5. Calibrating the Model 6. Water, gas, electricity, communication & road networks	1. People (loss, social, economical) 2. Building (direct damage, recovery) 3. Lifeline (direct damage, indirect damage, Restoration time, recovery) 4. Road network (direct damage, indirect damage, recovery)	1. DRR measures 2. Built up or retrofitting facilities 3. Community & public awareness 4. Institutional Aspects	1. Establishing a model for social & economical aspects 2. Improving models for buildings damage & loss 3. Adjusting models for lifelines 4. Developing Tehran risk assessment model 5. Calibrating the model	1. Developing Tehran infrastructure disaster resilience assessment & monitoring system 2. Developing Tehran flood risk map & plan 3. Developing Tehran rain forecast & flood warning system 4. Developing Tehran landslide risk map & plan 5. Measurement of Tehran subsidence (Remote Sensing & field study) & Develop a mitigation plan 6. Developing a toolbox for identification of policies & DRR measures 7. Developing cost-benefit toolbox 8. Developing a toolbox for benchmarking & evaluation the effects of measures

Figure 6: The gaps and expectations defined by TDMMO

Moreover, the necessity of developing a flood risk map for Tehran was highlighted, in which the flash flood experience in Germany, models and methods can be compared with Iranian ones as well as the needed costs and resources.

Figure 7: Photos at the TDMMO in Tehran; photo credit: TDMMO

2.4 Karaj Municipality and Tehran Research and Planning Center (TRPC)

2.4.1 Karaj Municipality

After introductory part and given presentation by experts at the Karaj municipality about their projects and activities, main concerns and gaps were discussed as follows:

- Karaj has the highest urban growth rate during the recent decades resulting in high pressure on CIs. The city is prone to earthquake, flooding, dust storms, landslide and land subsidence. The municipality wants to integrate DRM maps into urban planning.
- Since there are many immigrants in the city, the cultural and economic differences need to be considered in DRM and future regional strategies.
- Imbalanced growth and expansion of urban areas in the city as well as marginal settlements close to the city increased gap between current and expected level of basic services and infrastructures.
- The interdependency of water systems, transportation networks and the flux of commuters (day and night time) between Tehran and Karaj are potential sources of problems and solutions and is vital to consider that in the future plans to have functional cities, particularly at the time of any destructive event in each city.
- The information on built environment as well as potential hazards and risk in Karaj has been updated recently and will be available to the project. Additionally, the results of the project can be implemented and verified in the city at different scale, due to commitment of the all deputies of the Karaj municipality in the project.

Figure 8: Group photo at the Karaj Municipality in Karaj; photo credit: Ulf Siefker

2.4.1 TRPC

After introductory part and given presentation by TPRC experts about the existing and under development plans, the discussion conducted as follows:

Q: Resilience is a new term in urban planning which contextualizing and fitting that in planning can arise conflicts. Why resilience and not sustainable development? What are their differences?

A: Cities are facing the increasing number of hazards and disaster. These two concepts are not contradictory in urban development process but resilience is future oriented based on risk analysis, lessons learned and experience. Inclusiveness is also focuses on participatory planning.

Q: What are the problems in developing countries for conducting such projects?

A: For instance in Jakarta, Indonesia, we had a project on flood vulnerability assessment. The target group was fishermen and low income class. The government wanted to have a strategy for relocating those people from the flood prone zones to the built community housing out of the flood zone, which can provide them better quality of life. Since this strategy was not formulated with the participation of that community, after a while they went back to their former type of housing next to the coast. Another example in Indonesia, is "the last mile problem" which is a term used for how to inform people and institutions for rescue and relief. Therefore, based on these two experiences we need to organize workshops for public participation and different canonizations from the beginning.

Q: We have learned that there are many high quality studies on DRR in Tehran. How we can use them in master plan? What are the limitations and problems? How we can contribute?

A: There are different plans, but the problem is the enforcement for implementation. The fragmentation in decision-making process as well as existing corruption and lobby-ism in skipping the regulations make those plans unsuccessful.

Q: In implementation phase, land policies and tenure are important for developing CIs. Are these policies clear?

A: since land policies are fundamental, the Ministry of Road and Urban Development is revising them for two different type of cities (new towns and cities under development) based on crisis management and an integrated approach.

Figure 9: Photos at the TRPC in Tehran; photo credit: TRPC

3 Side Events & Field Trips Highlights

The side events and field works gave German partners the opportunity to visit some parts of Tehran and Karaj in order to get familiar with the case studies, potential threats, challenges and existing strengths. The list of events and their outcome is briefly shown in Table 1.

Table 1: The side events in the 2nd INCOR workshops, Tehran, 15-18 Sep 2018

Side Events & Field Trips	Highlights	Organizer
Saturday, 15th September 2018		
Tehran flash flood prone zone (Tajrish, D1)	The mountainous topography of the northern part of Tehran shaped a river that caused a catastrophic flash flood in 1987. Flood protection walls exist but non-structural measures such as flood warning systems, floodplain delineation as well as flood zoning maps are needed.	IIEES
Sunday, 16th September 2018		
German Embassy	The embassy acknowledged the Germany commitment to support such scientific and applicable project. Elaborating on scientific exchanges on the international level, they said the project could be an opportunity for increasing the cooperation in future based on the existing capacities of all partners.	INCOR
Tehran Grand Bazaar (D12)	Tehran grand bazaar is the economic and commercial heart of the city and plays an important role in its socio-cultural status. The structural design and construction (urban timeworn textures), as well as the quality of infrastructures make the bazaar vulnerable to any kind of natural or man-made hazards. Any disruption in the bazaar can affect the functionality of the city's system and consequently the country's overall economic situation.	INCOR
Monday, 17th September 2018		
Tehran Observatory Center & Milad Tower (D2)	Tehran observatory site is a Spatial Data Infrastructure center (SDI) of the municipality. The primary aim of an observatory is to monitor and analyze what is happening in the city in terms of different physical, social, and functional aspects at different times. There is a 3D model of the city for real time and location-based monitoring.	TDMMO
Tuesday, 18th September 2018		
Karaj city	Urban structure and timeworn urban districts Flood prone zones Vulnerable building types	Karaj Municipality & IIEES
Landslide zones (Kan-Sologhan, D5 & D22)	One of the main road networks to the northern part of Iran is located in this landslide prone area. Very interesting case for more investigation for DRR	IIEES

4 Added Values Generated by the Workshops – New partners, Needs and Gaps for the Joint Cooperation

Workshops series in Cologne and Tehran were organized and run successfully because the expectations of both sides were met. In details, around 15 partners (45 persons) with high levels of proficiency met and showed their professional competencies in the field of DRR.

All partners expressed their motivation and readiness for kicking off the INCOR project, so that their eagerness and their level of contribution during the workshop days led into establishing new contacts with three new partners, namely TRPC, UN HABITAT and Tehran Electricity Distribution Company. Moreover, by working on the proposal content details based on the gaps and needs, all partners noted that having more workshops would be an opportunity for data and knowledge exchange leading to evaluate the existing risk plans and conduct a reliable research.

The key benefits generated from interacting with the partners and holding workshops are as follows:

- Participatory approach and co-design of the project, which will increase chances of real cooperation and implementation.
- Building mutual trust and understanding
- Expanding networks
- Time to go in-depth
- Concrete task planning
- Field visits for German partners and insights into existing institutional capacities: crisis rooms, labs, city layout, 3D model of Tehran, governance institutions etc…

Figure 10: Photos at the IIEES, CoFA, TDMMO, Karaj Municipality and TRPC during the workshops; photos credit: Ulf Siefker

Appendix A.1: Agenda (Tehran)

Agenda of the 2nd INCOR workshops, Tehran, 15-18 Sep 2018		Speaker/ Participant
Saturday, 15th September 2018		
8:15-8:30	Briefing before leaving the hotel	German partners
8:30-9:00	Transfer to IIEES	German partners
9:00-10:00	Welcome and introduction of IIEES main activities and interests in the project	IIEES
10:00-11:00	Core concept and objectives of the project	INCOR
11:00-12:00	Activities and interests of each partner (1 slide =2 minutes presentation) for each partner	All participants
12:00-13:15	Lunch /pray break	
13:15-14:45	Joint discussion and work on the proposal	All participants
14:45-15:00	Coffee/tea break	
15:00-17:00	Field visit	All participants
19:00-21:00	Joint dinner	
Sunday, 16th September 2018		
7:00-8:00	Transfer to the embassy	German partners
8:00-9:00	German Embassy	German partners
9:00-9:30	Transfer to University of Tehran	German partners
9:30-10:30	Welcome and introduction of COFA main activities and interests in the project	COFA
10:30-12:00	Discussion of the proposal	All participants
12:00-13:15	Lunch /pray break	
13:15-14:45	Bilateral meetings with other research groups of University of Tehran	All participants
14:45-15:00	Coffee/tea break	
15:00-17:00	Field visit (Tehran Grand Bazaar)	All participants
19:00-21:00	Joint Dinner by INCOR	
Monday, 17th September 2018		
8:15-8:30	Briefing before leaving the hotel	German partners
8:30-9:30	Transfer to TDMMO	
9:30-10:30	Welcome and introduction of TDMMO main activities and interests in the project	TDMMO
10:30-12:00	Discussion of the proposal	INCOR
12:00-13:15	Lunch /pray break	
13:15-14:45	Joint discussion and work on the proposal	All participants
14:45-15:00	Coffee/tea break	
15:00-17:00	Field visit (Tehran Urban Management Observatory)	All participants
19:00-21:00	Joint dinner	

Tuesday, 18th September 2018		
7:45-8:00	Briefing before leaving the hotel	German partners
8:00-12:00	Karaj Municipality (Field visit in Karaj city)	INCOR- IIEES- Karaj Municipality
12:00-13:15	Lunch /pray break	
13:15-14:15	Return to Tehran	
15:00-17:00	Meeting at TRPC	German Partners

Appendix A.3: Agenda (Cologne)

Agenda of the 1st INCOR workshop series Cologne, 6-7 Sep 2018		Speaker/ participants
Thursday, 6th September 2018		
9:30-9:40	Welcoming speech	Prof. Fekete
9:40-9:50	Vice president of TH Cologne welcoming speech	Prof. Becker
9:50-10:35	Introductory slides and Introduction of participants and brief statements of their interests	All participants
10:35-11:30	Topic 1: Core idea of INCOR	INCOR
11:30-11:45	Coffee break	
11:45-12:30	Open discussion regarding the core concept of INCOR	All participants
12:30-13:45	Lunch/pray break	
13:45-15:15	Topic 2: Disaster Risk assessment and modeling	IIEES, UW, IGG, CoFA
15:15-15:45	Coffee break	
15:45-17:15	Topic 3: Disaster and emergency management	EHS, TDMMO, Empirica
17:15-18:00	Wrap-up of input for the proposal	INCOR
18:30	Joint Dinner	
Friday, 7th September 2018		
9:30-10:00	Summary of Thursday	INCOR
10:00-11:30	Topic 4: Integrating inclusive-resilient thinking into urban planning	CoFA, IGG
11:30-11:45	Coffee break	
11:45-12:15	Roadmap of Next Activities and Closing Statements	INCOR
12:15-12:30	Closure- Group photo	All participants
12:30-13:45	Lunch and farewell	

Appendix B.1: Participant List in Tehran (Main)

Surname, Name	Email	Affiliation
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Appendix B.2: Iranian Participants in Tehran Workshops (Daily)

1st day at the IIEES

Prof Mohsen Ashtinay, Advisor, Earthquake Eng. Research Center, IIEES

Dr Kambod Amini Hosseini, Risk Management Research Center, RMRC, IIEES

Mr Ali Bakhtiari: National Disaster Management Organization, NDMO

Dr Navab Merikhi: UN HABITAT

Dr Laya Abbasi: UN HABITAT

Dr Yasamin Izadkhah: RMRC, IIEES

Dr Babak mansouri: Emergency Management Dept., RMRC, IIEES

Dr Hooman Motamed: RMRC, IIEES

Prof Mohammad Reza Ghayamghamian, RMRC, IIEES

Dr Morteza Bastami: Earthquake Eng. Research Center, IIEES

Dr Anooshirvan Ansari: Seismology Research Center, IIEES

Dr Ebrahim Haghshenas: Vice president, IIEES

Dr Mahmoud Hosseini: Earthquake Eng. Research Center, IIEES

Mr Farokh Parsizadeh: RMRC, IIEES

Dr Solmaz Hosseinioon: Resilience Expert

Mrs Naimeh Govahi: IIEES

Mr Amir Chavoshy: Ph.D. candidate, IIEES

Dr Mohammad Sasani: Karaj Municipality

Dr Vahid Bahadoran: Karaj Municipality

Dr Mohsen Mojezi: TDMMO

Mr Hesam Shamshiri: TDMMO

Ms Sara Keshani: TDMMO

Dr. Alireza Noori: TPRC

Dr. Maysam Basirat: TPRC

Dr. Manafee: TPRC

2nd day at the CoFA

Prof Ahmadi: Urban design

Prof Kermanshahi: Transportation

Prof Aminzadeh: Urban design

Prof Parsi: Social studies and urban geography

Prof Noorain: GIS

Prof Azizi: Land policy and management, housing and infrastructure

Dr Arefi: Engineering faculty, RS

Sara Keshani: TDMMO

Vahid Bahadoran: Karaj Municipality

3rd day at the TDMMO

Prof. Khankeh: Ministry of Health and Medical Education

Hesam Shamshiri: Hazard and crisis manager, TDMMO

Fatemeh Saleh: Head of disaster mitigation and risk reduction deputy, TDMMO

Sarah Keshni: Disaster risk reduction, TDMMO

Rahim Norouzi: Early warning system, geologist, geophysicist, TDMMO

Nima Navadegan: Civil engineer, structural engineering, TDMMO

Mohsen Mojezi: Civil engineering, EQ, TDMMO

Gudarz Goodarznia: Head of ICT, TDMMO

Sakineh Mohammadi: Information manager, TDMMO

Ms Sadeghi: GIS, TDMMO

Shaboo Vazirpour: Head of preparedness management, TDMMO

Azizilah Salimitari: Spatial disaster management, TDMMO

4th day at the Karaj Municipality

Mr Ahmadi Pargoo: Deputy of Urban Planning, Karaj Municipality

Mr Khodabandehloo: Urban Planning Dept., Karaj Municipality

Mr Javaheri: Technical Office, Urban Planning Dept.

Mr Bayat: Urban Regulation and Codes Dept., Karaj Municipality

Mr Bahadoran: Head of Risk Management Project, Karaj Municipality

Dr. Sasani: Urban Planning Dept., Karaj Municipality

Dr. Arash Malekian, University of Tehran

Dr Amini Hosseini: IIEES

Prof Ghayamgahmian: IIEES

Dr Haghshenas: IIEES

Ms Rakhshandeh: IIEES

4th day at the TRPC

Amin Shafiei: Social studies

Hashem Aram: Social and cultural planning

Mahmoud Abyaneh: Public policy, CIs, master plan

Noosha Dabiri Mehr: Media, social studies

Mahdieh Omidi: Urban planner

Bijan Abrishami: ICT manager

Attieh Talebi: Technical consultant for civil protection

Abdolreza Karbasi: Environmental studies

Amir Reza Rafiei: Urban design and planning

Fereshte Sheibani: Infrastructure management and urban development

Appendix B.3: Participant List in Cologne

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5. Opportunities for Strengthening the German Contributions to the Sendai Framework, the SDGs, and the New Urban Agenda. Report from the German-Iranian Partnership – Project INCOR

Alexander Fekete, Asad Asadzadeh

Introduction

In an era that the risks and vulnerabilities induced by natural hazards are globally rising and human communities are experiencing a multitude of high impact disasters, there is a greater need than ever before for resilience to ensure that our communities are able to anticipate, absorb, recover, and learn quickly from adverse events. Resilience is all about dealing with change, adapting and transforming in response to change, and has been the central focus of international policy discourses on disaster risk reduction and management over the past decade (Simonsen et al. 2014; Cutter 2016). Whether it is the Sendai Framework for Disaster Risk Reduction (UNISDR 2015), the Sustainable Development Goals (UNSDG 2015), the Addis Ababa Action Agenda (United Nations 2015), the Paris Agreement (UNFCCC 2015) or the New Urban Agenda (UN-Habitat III 2016), resilience is a common construct in all frameworks. This convergence presents unprecedented opportunities toward tackling the ongoing or emerging challenges in all countries and emphasizes the importance of resilience thinking and shifting away from managing crises to proactively reducing risks (IRDR 2017; United Nations 2017). Furthermore, resilience thinking has the unprecedented capacity to attract a wide variety of global, regional and local stakeholders to engage in disaster risk reduction and management (Rockefeller Foundation 2018; ICLEI 2018; Resileince Alliance 2018). While discourses and discussions on resilience are ongoing and evolving, these global resilience actors highlight and call for the integrated, multi-level, multi-stakeholder, dynamic, and adaptive approach for resilience at the global, national, and local levels (UN Habitat 2017).

For instance, the IKARIM - International Disaster and Risk Management – call, announced by the German Federal Ministry of Education and Research (BMBF), aims at co-developing and implementation of innovative and action-oriented solutions in the fields of disaster prevention, disaster management and restoration in order to strengthen the resilience within selected African and Asian countries (BMBF 2017). While one goal is to strengthen Germany´s contribution to achieve the Sendai goals in DRR, it also intends to bridge the gap between civil security program solutions and international insights on disaster risk reduction and management.

Within the IKARIM call, **INCOR** – **Basic Infrastructures and Services for Enhancing Inclusive Community Disaster Resilience** – project focuses on the role of basic infrastructures and services (BIS) in advancing and supporting community disaster resilience in Iran. The importance of basic infrastructures and services for disaster risk reduction and resilience has been acknowledged in the Sendai Framework, SDGs, and the New Urban Agenda (Bhatia 2017). Therefore, the overall goal of INCOR is to contribute to the post – 2015 development frameworks, especially to the Sendai Framework. This report will indicate how INCOR can contribute to the Sendai Framework for Disaster Risk Reduction and other global resilience frameworks. The first section details the contribution of INCOR'S idea for implementing the Sendai Framework.

The second section examines how INCOR can contribute to implementing other resilience frameworks, namely the Sustainable Development Goals and the New Urban Agenda, and the third section concludes.

Section 1: INCOR's Contribution to the Sendai Framework for Disaster Risk reduction (SFDRR)

The Sendai Framework for Disaster Risk Reduction (2015-2030) is the first global policy framework of the United Nations' post – 2015 agenda and the most relevant international commitment toward DRR (Aitsi-Selmi et al. 2015). It is the main guiding framework for facilitating international strategies for disaster risk reduction and resilience, as well as linking successful national strategies on disaster and risk reduction to international challenges and opportunities of DRR (Jovanović et al. 2016). The framework builds on its processor, the Hyogo Framework for Action (2005-2015), and includes a strong emphasis on disaster risk management (DRM), as opposed to disaster management (Henstra & Thistlethwaite 2017). In the reduction of disaster risk as an expected outcome, a goal focused on preventing new disaster risk, reducing existing risk, and strengthening resilience, as well as including primary responsibility for preventing and reducing disaster risk with all-of-society and all-of-state institutions engagement (UNISDR 2018a).

The Sendai Framework's central goal is "the substantial reduction of disaster risk and losses in lives, livelihoods and health in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries". Underpinning this, the Framework includes seven global targets and four Priorities of Action for member states (see tables 1 and 2). Global progress on the implementation of the Sendai Framework is measured through an online monitoring system, which was launched in March 2018 in Bonn, Germany and provides an online platform for Member States to report on progress against the seven global targets and 38 indicators (UNISDR 2018b).

INCOR Alignment with the Sendai Framework

As noted, the overall goal of INCOR is to contribute the Sendai Framework for Disaster Risk Reduction (SFDRR - Sendai Targets A-F, especially to **Goal D** on **infrastructure**). The target D aims at "substantially reduce disaster damage to critical infrastructure and disruption of basic services, and increasing and developing their resilience by 2030" (UNISDR 2015). The Sendai Framework refers to critical infrastructure in Priority for Action 4 as accounting for "water, transportation and telecommunications infrastructure, educational facilities, hospitals, and other health facilities". Furthermore, critical infrastructures are defined as "the physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society" (UNISDR 2017). They are increasingly considered as the fundamental enabling force and delivery vehicle of resilient urban areas (UN-Habitat 2015), which guarantee the preparedness and recovery level of urban communities in time of an adverse event (Serafinelli et al. 2017; Woitsch et al. 2018; Fekete 2018). Therefore, INCOR will focus on basic infrastructures and services (BIS) as an instrument to support and advance community disaster resilience in the context of natural hazards and contribute to the Sendai Framework through delivering insights from the case studies in Iran, namely megacities of Tehran and Karaj. Table 1 demonstrates how INCOR finds its visions and missions in alignment with the Sendai Framework Global Targets.

Table 1: INCOR Contributions to the Sendai Global Targets and its main Indicators - Overview

Sendai Framework Global Targets	Potential Indicators (INCOR Portfolio)
Target A: Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 com- pared with 2005-2015	Number of deaths caused by different hazard scenarios (high, medium, low earthquake and flood scenarios) Number of deaths based on age, sex, disability, etc. Number of deaths based on location of residence (urban districts, neighborhoods) Number of deaths caused by disruption of critical infrastructures and their services
Target B: Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared with 2005-2015.	Number of injured or disable population based on different hazard scenarios and place of residence Total number of people that need to be evacuated and relocated in each hazard scenarios as well as the place of residence Number of residential building that can be destroyed, damaged Number of people that can be affected due to disruption of basic infrastructures and services Number of population that would need emergency needs based on each hazard scenarios and place of residence
Target C: Reduce direct disaster economic loss in relation to global GDP by 2030	Total economic losses caused by damage to physical assets such as housing, educational facilities, health, energy, power lines, telecommunication, transportation in each hazard scenarios and place of residence
Target D: Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and education- al facilities, including through developing their resilience by 2030.	Spatial analysis of exposure to hazards for basic infrastructures (including health, educational, transportation, water, and power line) Vulnerability analysis of basic infrastructures as well as their interdependencies, cascading, Analyzing opportunities and limits of advancing analysis by including Volunteered Geographic Information (VGI)
Target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.	Developing place-based solutions for basic infrastructure and services that is mitigation-centered and ensures inclusiveness, as well as implementation of findings in two Iranian megacities Analyzing the opportunities and limitation of Integrating resilience thinking into existing urban planning process (master and detailed plan) Conducting gap analysis of existing disaster risk models and resilience in the case study areas to avoid duplication and having added values

Sendai Framework Global Targets	Potential Indicators (INCOR Portfolio)
Target F: Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	Co-operation with German-Iranian partnership, joint workshops (twice a year), staff exchange, joint paper resulted from different work-packages of INCOR, holding the 8th international conference on seismology and earthquake (SEE) by IIEES, from 11-13 November 2019 in Tehran.
Target G: Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030.	Strengthening context-specific risk assessments, information, which are open access and easy to communicate with all end users.

To encourage the adaptation of DRR principles, the Sendai Framework proposes a set of four priorities for action that pave the way to the successful implementation of disaster risk reduction and management. Table 2 indicates these priorities, existing challenges, and how INCOR will contribute to meeting the Sendai Framework for Disaster Risk Reduction in Iran.

Table 2: Sendai Framework Priorities for Action and INCOR's Alignments

Sendai Framework Priorities for Action	INCOR Alignment and Contributions
Priority 1: Understanding disaster risk	Challenges: Different type and sources of risk information including exposure, hazard characteristics, and vulnerability data Lack of open risk information and communication (e.g., lack of digitalization and collaborative platform for advancing risk analytics for performance optimization, monitoring, cost-benefit analysis as well as vulnerabilities assessment) Lack of standardized assessment frameworks for risk measurement Opportunities: Strengthening evidence-based and context-specific risk assessments, information, and communication that are up to dated and open data for all end-users (the high capacity of IIEES) Developing integrated, standardized (hybrid), multi-hazard and scale (urban-rural), collaborative (Iran-Germany), and technically proficient (geospatial-based) risk assessment framework. Providing a deeper understanding of social and environmental vulnerability, as well as cascading effects of BIS Providing deep understanding of where disaster risk is currently exists, where it is being created, and how it can be changed because of increasing complexities and rapid changes in world dynamics (addressing root causes).

Sendai Framework Priorities for Action	INCOR Alignment and Contributions
Priority 2: Strengthening disaster risk governance to manage disaster risk	Challenges: Lack of coordinated disaster risk governance and coordination of responsibility across the stages of disaster risk reduction and management Lack of shared and common visions for disaster risk reduction and resilience Lack of integrated disaster resilience approach where the knowledge and insights of all important actors are heard and acknowledged Opportunities: Coordinating responsibility across the stages of disaster risk reduction and management process (e.g. awareness, preparedness, recovery, adaptation) with different stakeholders, expertise and levels of government. Enhancing the systematic inclusion and full engagement of all actors/stakeholders has been the focus of INCOR during its definition phase, from risk assessment and modeling actors (IIEES, risklayer...) to local government level for preparedness and application (TDMMO, Karaj city), and future-oriented adaptive planning actor (TPRC), as the provider of urban development and infrastructure planning. Co-devolving goals and visions that are grounded in values (inclusive), knowledge-based (from multiple actors), and action-oriented (linking theory to practice). The partnership arrangements formed in the definition phase, will predispose INCOR to transit from conceptual understanding of resilient BIS to an empirical evidence of factors that contribute to resilience and interventions that are needed more.
Priority 3: Investing in disaster risk reduction for resilience	Challenges: Lack of structural (physical assets) and non-structural (standards, lows) investments in basic infrastructures and services Lack of prioritizing mechanisms for investment and implementation of BIS Lack of risk-based and resilience-based diction-making and planning of BIS Opportunities: Leveraging the INCOR consortium science and technological basis for developing and implementation of place-based disaster risk reduction strategies and policies. Sharing the costs of disaster risk reduction and resilience building through promoting risk-sensitive investment and increasing public-private partnerships (incentives for disaster resilience such as insurance system, tax exemption, etc.).
Priority 4: Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction	Challenges: Lack of public awareness and full engagement of multiple stakeholders on disaster risk reduction and management Lack of having shared and common visions of disaster resilience, its critical components as well as future needs of urban planning to deal with emerging and ongoing stresses

	Reactive static plans rather than proactive strategies in both urban and infrastructure planning Sectoral urban planning and infrastructure development Opportunities Conducting a systematic engagement of all stakeholders in the development of applicable strategic, operational, and tactical approaches to address those defined goals that link disaster risk management to post disaster recovery and adaptation. Developing coordinated, and actionable information to the whole community through consistent, accessible, and appropriate (place-based) methods (apps..) regarding any natural hazard or risk Establishing decentralized yet comprehensive and coordinated operational structure and process that integrate multiple actors and acknowledge their capacities in recovery, rehabilitation, and reconstruction of BIS elements as well as housing (standards, design, maintenance, etc.). Integrating resilience thinking into urban planning and development process in order to form a new planning system that is mitigation-centered and action-oriented.

Section 2: Beyond the Sendai Framework: INCOR Contributions to the SDGs and the New Urban Agenda (NUA).

Disaster risk reduction and resilience building is used as an organizing principle to frame scientific and political discourses on cities in both the 2030 Agenda for Sustainable Development and the New Urban Agenda (Sharifi & Yamagata 2018). Within both frameworks, resilience is seen as a key goal as well as means for sustainable cities and human settlements (Garschagen et al. 2018), and characterized by strong leadership, multi-actor participation, and an inclusive multi-sectoral approach (UN Habitat 2017).

INCOR Alignment with the Sustainable Development Goals (SDGs)

SDGs highlight that the visions set out in all post - 2015 development frameworks will inevitably fail if disasters and their consequences are not addressed (Bahadur et al. 2015). Therefore, focusing on resilience and strengthening it must be at the core of sustainable development strategies to ensure that communities have capacities to better reduce, prevent, anticipate, absorb and adapt to a range of shocks, stresses, risks and uncertainties (UNISDR 2018a). SDGs encompass 17 goals and 169 underlying targets in order to reduce poverty, increase peace, and protect the planet. Unlike the SDG's predecessor, the Millennial Development Goals (United Nation 2000), disaster risk reduction and resilience have been the focus of the 10 goals. Table 3 displays targets on disaster risk reduction and resilience in the Sustainable Development Goals.

Table 3: Disaster resileince and Inclusive thinking in SDGs

Sustainable Development Goals	Targets on resilience and inclusive thinking
Goal 1: Ending poverty in all its forms everywhere	Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
Goal 3: Ensure healthy lives and promote well-being for all at all ages	Target 3d: Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Target 4a: Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
Goal 6 Water:	Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all
Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation	Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
Goal 10. Reduced Inequalities within and among countries	Target 10.2: Empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status Target 10.3: Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Target 11.5: By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations Target 11.b: substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency,

	mitigation and adaptation to climate change, resilience to disasters, develop and implement, in line with the Sendai Framework for Disaster Risk Reduction, holistic disaster risk management at all levels.
Goal 13: Take urgent action to combat climate change and its impacts	Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

INCOR views its missions in alignment with the Goals 9 ,10 and 11, and will contribute to the implementation of the SDGs through developing an integrated and comprehensive resilience framework that is multi-hazard, interdisciplinary, and inclusive.

INCOR Alignment with the New Urban Agenda (NUA)

The New Urban Agenda adopted by the UN General Assembly in late 2016, is centered on sustainability and equity and focused on implementation and localization of the 2030 Agenda for Sustainable Development in an integrated manner (UN Habitat 2017; Bene 2017). The NUA especially tackles the Goal 11 of making cities and human settlements inclusive, safe, resilient and sustainable. Beyond sustainability and equity, the NUA highlights the role of urban planning in shaping our future and calls for a substantial paradigm shift in urban planning and development to benefit the advantages provided by urbanization and confront the associated challenges such as increasing complexities and rapid changes in world dynamics (Birkmann et al. 2016). Therefore, it argues that Integrating resilience thinking into urban planning and design is essential for building urban sustainability (Caprotti et al. 2017). Furthermore, the NUA shows a proactive attitude to address a broader set of urban challenges and stresses such as social conflicts and inequalities (UN Habitat 2017), and has a strong focus on incorporating inclusive thinking in urban planning and development (Garschagen et al. 2018). Table 4 indicates the five key principles of the New Urban Agenda as well as INCOR's contributions to implementation of them.

Table 4: Key Guidelines of the NUA and INCOR's Alignments

NUA's Key Guiding Principles	INCOR Alignment and Contributions
ensuring that the new urbanization model includes mechanisms and procedures that protect and promote human rights and ensure inclusive growth	INCOR puts emphasis on inclusive thinking in the urban resilience planning processes where experience and aspirations across multiple stakeholders and decision-makers are heard, and acknowledged. This way of integrating discourses pave the way to have a shared vision of future as well as an equitable implementation and distribution of the positive advantages of both planning and actions
ensuring disaster risk reduction and resilience as a key goal and means for sustainable cities	INCOR highlights the vital need for resilience thinking in urban and infrastructure planning in Iran. It will focus on developing a multi-disciplinary, multi-sectors, and operable concept of resilience offering all encompassing, integrated approaches to planning for, responding to and recovering from natural disasters that can be implemented by the basic infrastructures and services (BIS).
empowering the governance organizations at local level as well as expanding participation and collaboration	The coordination and coherence across multiple actors of INCOR will contribute to strengthen the existing risk and resilience frameworks and to develop a dynamic, local, preventive, and adaptive urban governance to work across levels and sectors in a decentralized yet comprehensive way.
rethinking on existing planning systems and shifting to adaptive urban planning	INCOR views resilience as a dynamic concept that puts emphasis on the ideas of adaptation and transformation processes. Through a detailed work package, INCOR will contribute to translate resilience thinking in the planning and implementation stages, as well as adopting those policies and practices that reflect this paradigm shift in urban planning
promoting innovations that facilitate implementing and financing, learning and sharing of knowledge	Through full engagement of all stakeholders, decision-makers, and end-users in the agenda, INCOR intends to constitute a framework of corporation and get strong commitments from local actors, especially private companies or sectors.

As noted, INCOR calls for a new mode of thinking (vision) in urban planning in Iran that mitigates risks and stresses rather than merely to respond (proactive-oriented) and bridges the positive urban visions to the grounded transitions and transformations (action-oriented).

Section 3: Conclusion:

The adoption of landmark UN agendas of the Sendai Framework for Disaster Risk reduction, Sustainable Development Goals, and the New Urban Agenda is seen as an opportunity to enhance coherence and coordination between them to reduce disaster risks and build resilience. While they highlight the importance of innovative thinking, knowledge transfer, leadership, coordination and partnerships in the process of disaster risk reduction and management, the need for communication and engagement among policy-makers, stakeholders at all levels and sectors, as well as synergies between policies, institutions, and practices is increasingly acknowledged as a condition for successful disaster risk management and resilience. However, implementation of these frameworks is still lacking and a great number of countries around the world have

not reported their progress toward the post 2015 development frameworks in general and, in particular, the Sendai Framework for Disaster Risk reduction. Iran is one these countries that has not reported to SFDRR yet (UNISDR 2018b). Therefore, INCOR will contribute to bridging the gap between the local based solutions and international insights on disaster risk reduction and management, as well as translating findings from two case studies into the Sendai Framework.

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