

Nepal Earthquake One Year Memorial Build Back Better and Resilience Workshop

April 25, 2016

JICA Project Team

The background features a light blue gradient that transitions from a slightly darker shade at the top to a lighter one at the bottom. At the bottom of the image, there are several wavy, horizontal lines in various shades of blue, creating a sense of movement and depth. The lines are more prominent on the left and right sides, curving towards the center.

Build Back Better Building Resilient Society

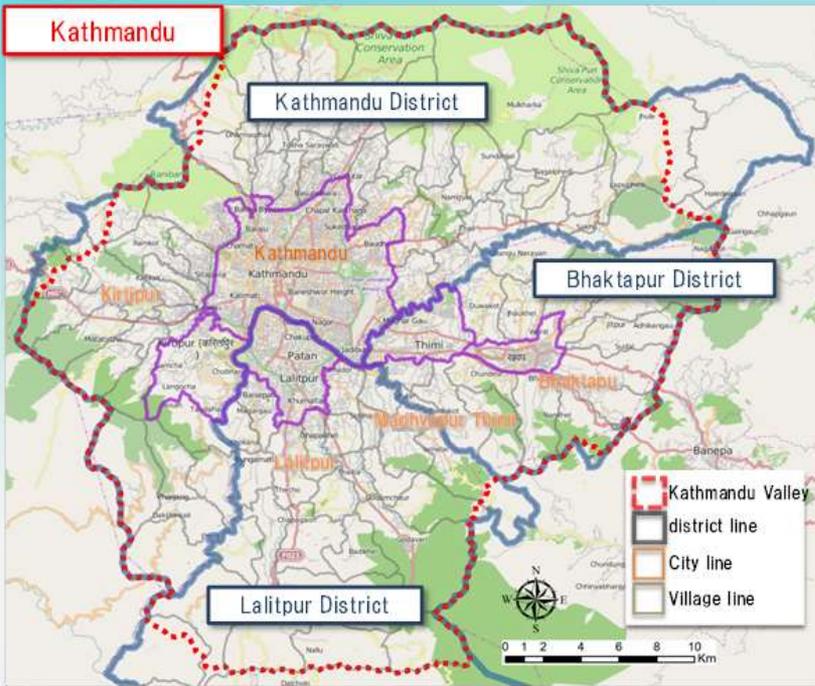
Table of Contents

- 1. Overview of JICA Projects**
- 2. Digital Maps and Hazard Analysis**
- 3. Housing and School Reconstruction**
- 4. Formulation of Plans**
- 5. Reconstruction Projects**

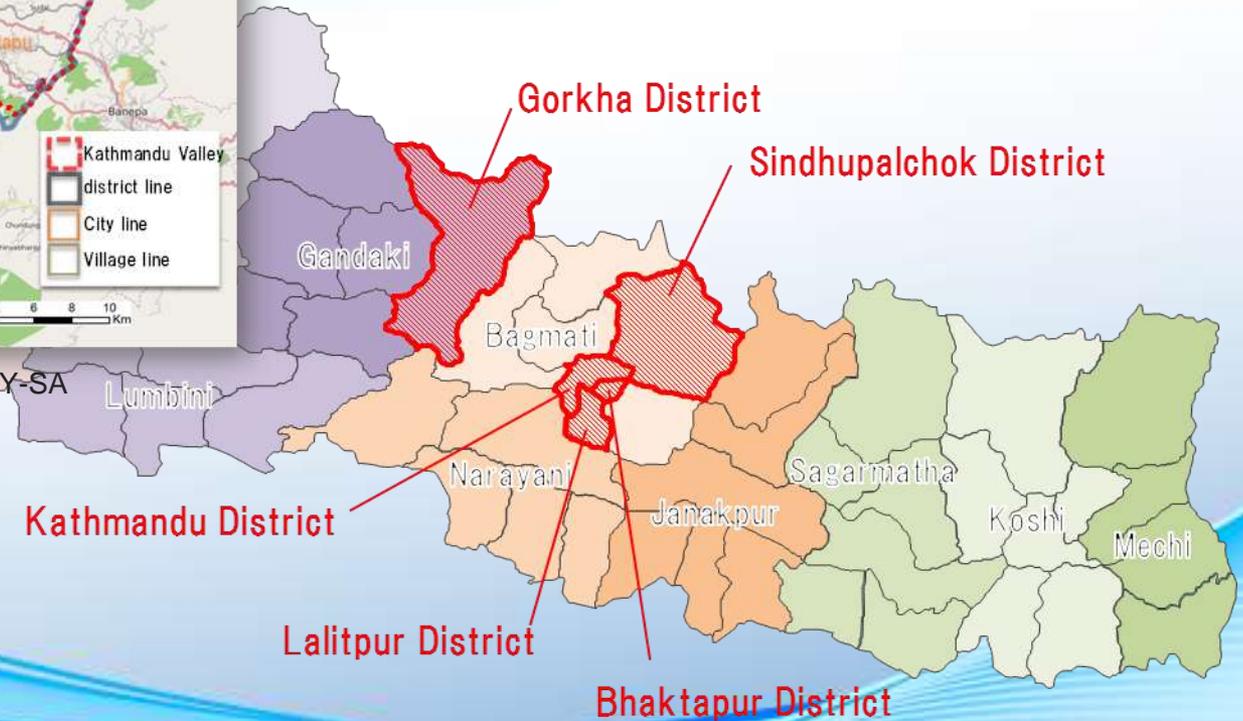
1. Overview of JICA Projects



Location Map of JICA Projects



©OpenStreetMap (and) contributors, CC-BY-SA



Source: Survey Department,
Made by JICA Project Team,

- Three JICA BBB related Projects in Nepal -

ERAKV

The Project for Assessment of Earthquake Disaster Risk for the Kathmandu Valley

RRNE

The Project on Rehabilitation and Recovery from Nepal Earthquake

TPIS-ERP

The Transitional Project Implementation Support for Emergency Reconstruction Projects

BBB (Build Back Better)

1. Understanding of Hazards

Hazard Analysis

- Earthquake and Landslide -

RRNE

ERAKV



2. Risk Governance

Technical Supports for Reconstruction

- Housing : Resilient House Models and Training
- Schools : Resilient School Models and Guideline
- Livelihood : Training for improving the Skill
- Quick Reconstruction of Hospitals, government buildings, and more-

TPIS-ERP

RRNE

Risk Assessment

ERAKV



3. Resilient Society Building

Rehabilitation and Recovery Plan, and Resilience Plan

- Rehabilitation and Recovery Plan -
in 2 Districts (Gorkha District and Sindhupalchok District), and
in 3 Municipalities (Lalitpur Sub Metropolitan City, Bhaktapur Municipality and Budhanilkantha Municipality)
- Resilience Plan -
in Kathmandu Valley

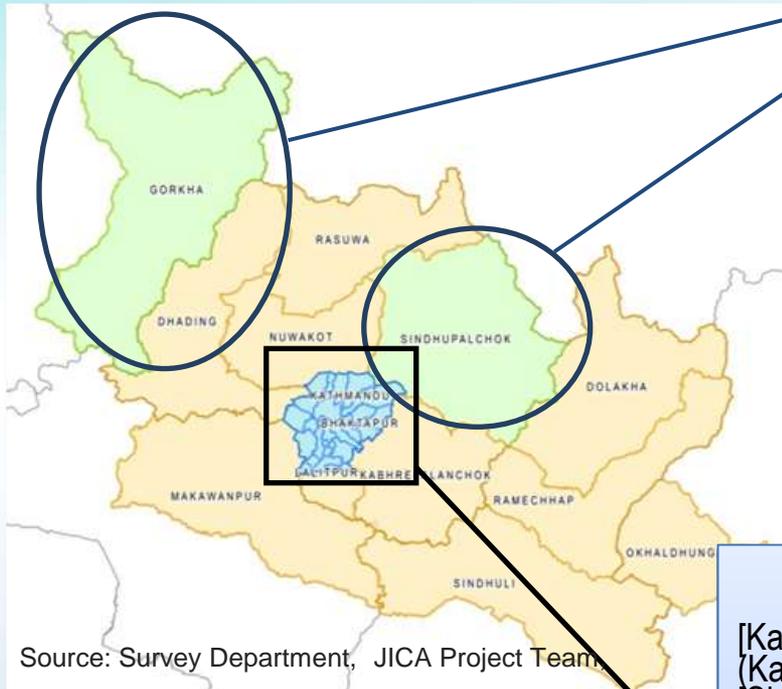
RRNE

ERAKV

2. Digital Maps Hazard Analysis

The slide features a light blue gradient background. At the bottom, there is a decorative graphic consisting of several overlapping, wavy lines in various shades of blue, creating a sense of motion and depth.

Collected Geo-information



[Gorkha, Sindhupalchowk]

- Existing Topographic map data
- Satellite Imagery (After Earthquake/SPOT/1.5mResolution)
 - > Updating Roads/River/Buildings
 - > Landslide Identification
- Satellite Imagery (Before Earthquake/SPOT/1.5mResolution)
 - > Landslide Identification
- Digital Elevation Model (DEM)
 - > Contour line Creation
 - > Grasping Disaster damage on 3D view

[Other Districts]

- Existing Topographic map data
- Satellite Imagery (After Earthquake/SPOT/1.5mResolution)
 - > Updating Roads/River/Buildings
 - > Landslide Identification

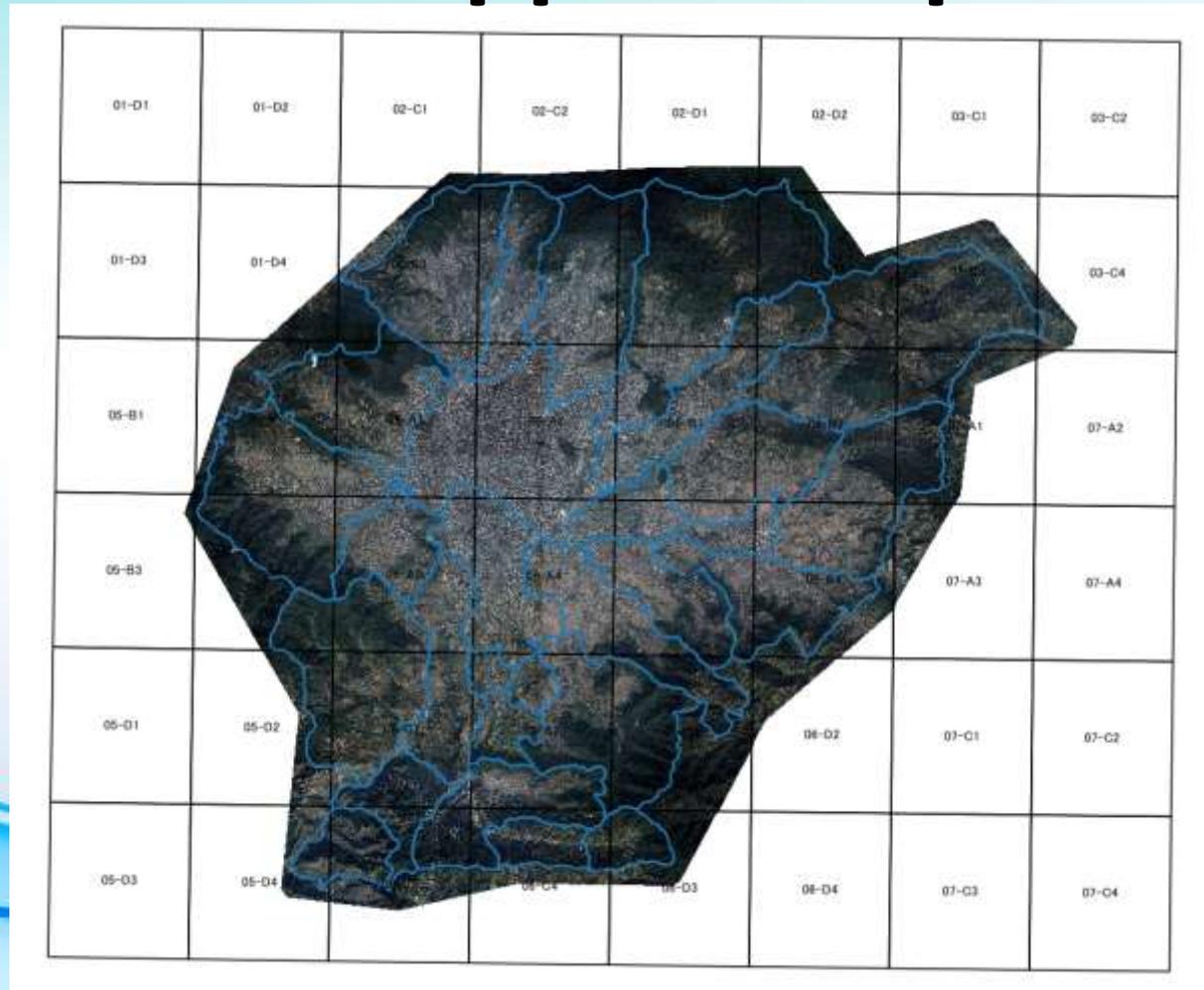
[Kathmandu Valley]

(Kathmandu, Bhaktapur, Part of Lalitpur)

[Sindhupalchowk]

- Existing Topographic map data
- Satellite Imagery (After Earthquake/SPOT/1.5mResolution)
 - > Updating Roads/River
- Satellite Imagery (After Earthquake/Pleiades /0.5mResolution)
 - > 1/10,000, 1/5,000 Reconstruction Support Map

Kathmandu Valley Reconstruction Support Map



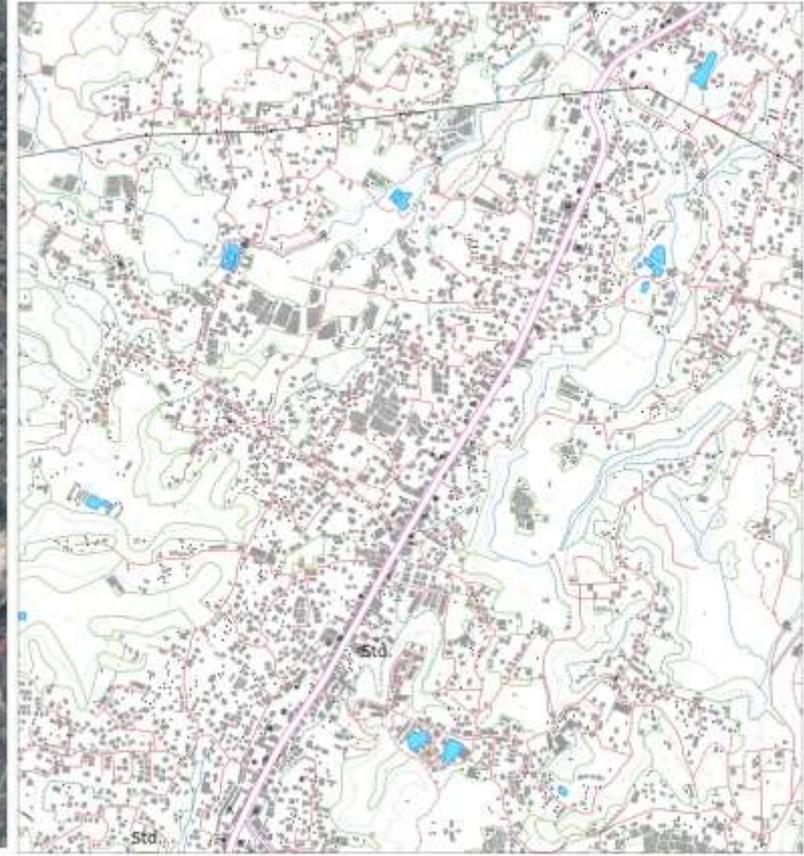
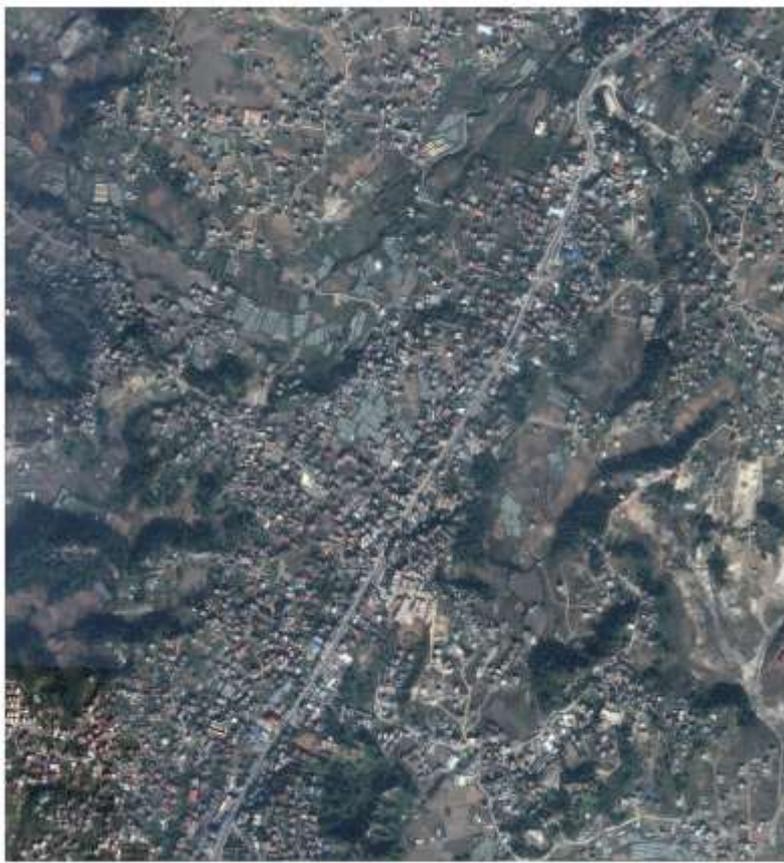
Source: © 2015CNES – Distribution Airbus DS,
made by JICA Study Team

Satellite Imagery « Pleiades »

Kathmandu Valley Reconstruction Support Map



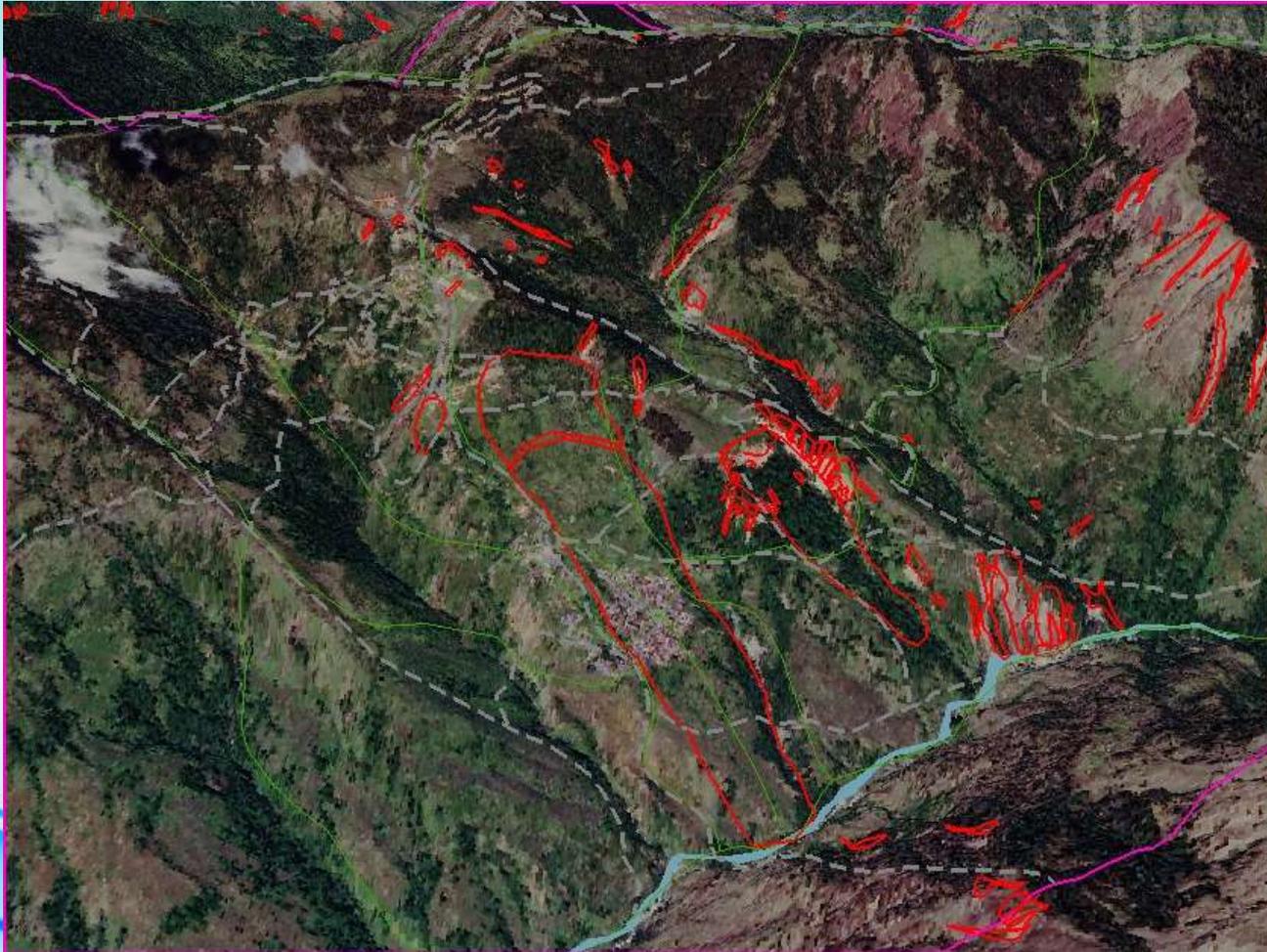
Kathmandu Valley Reconstruction Support Map



Source: © 2015CNES – Distribution Airbus DS,
made by JICA Project Team

Plotted Map 1/10,000 scale

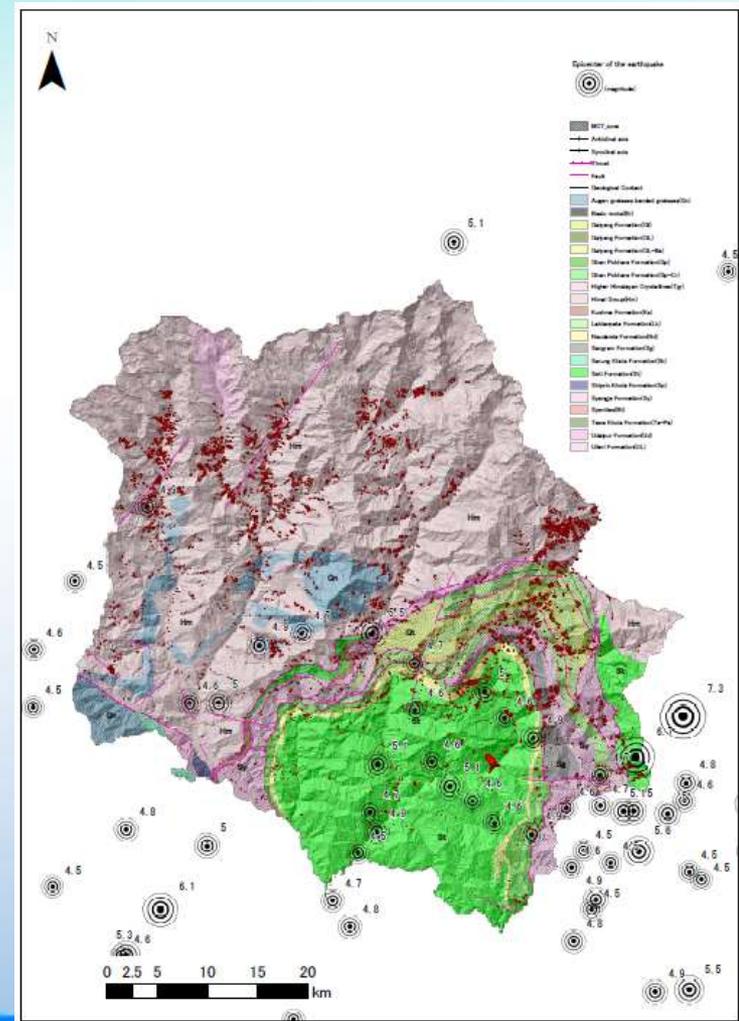
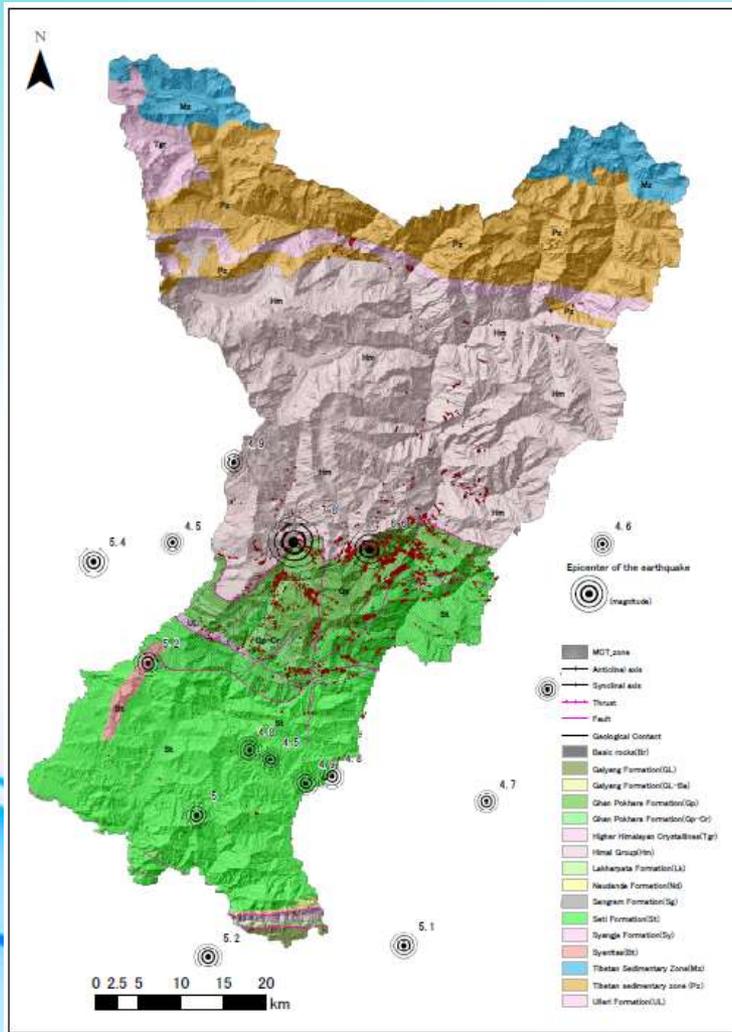
3D Landslide Map



Source: Airbus DS 2015, made by JICA Project Team

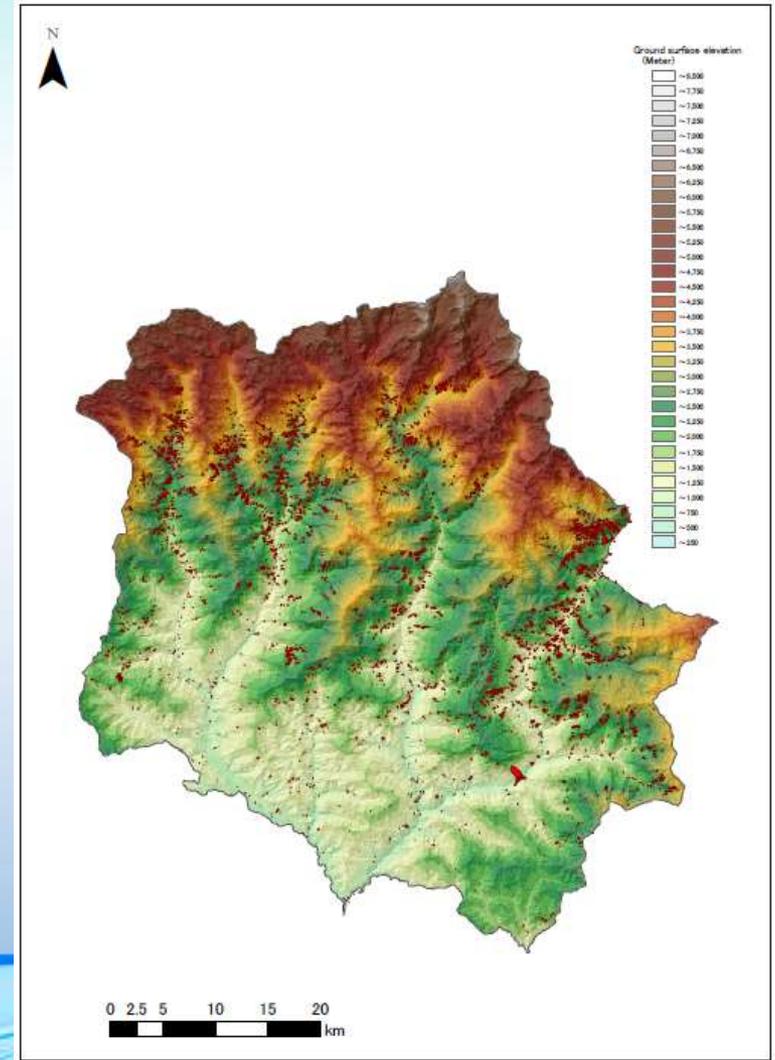
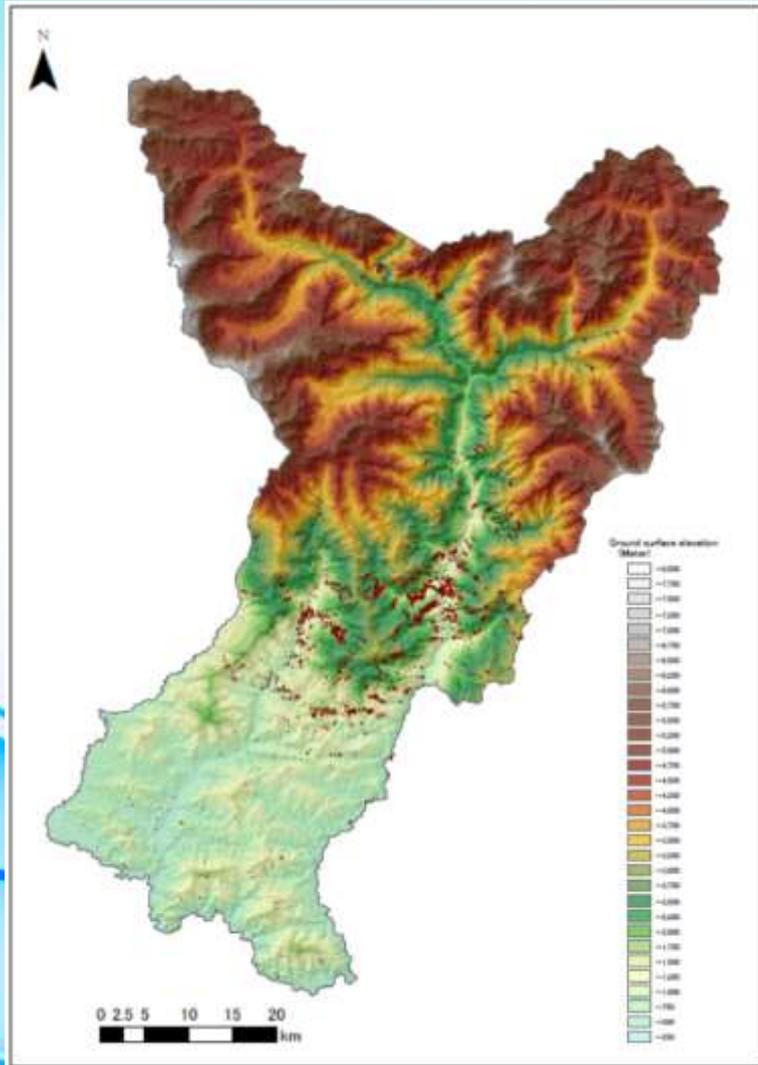
Satellite Imagery « SPOT »

Geological Map



Source: 1:1,000,000 Geological map of Nepal 2004
 ©NTT DATA, RESTEC Included ©JAXA

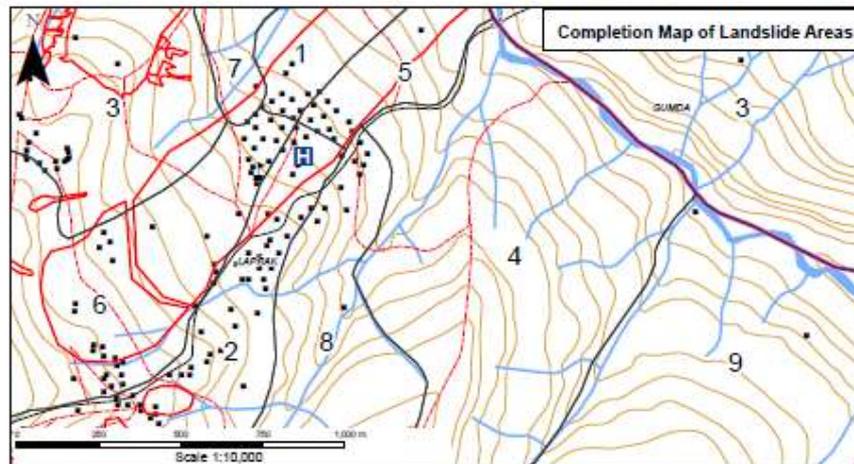
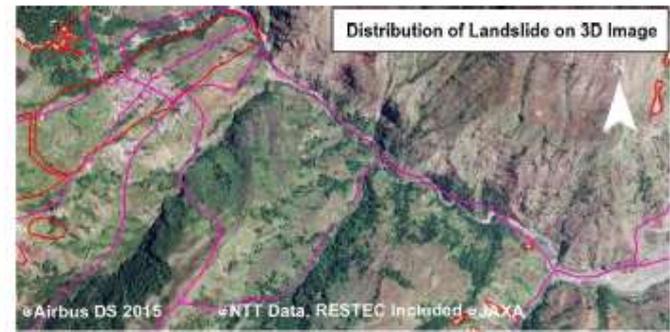
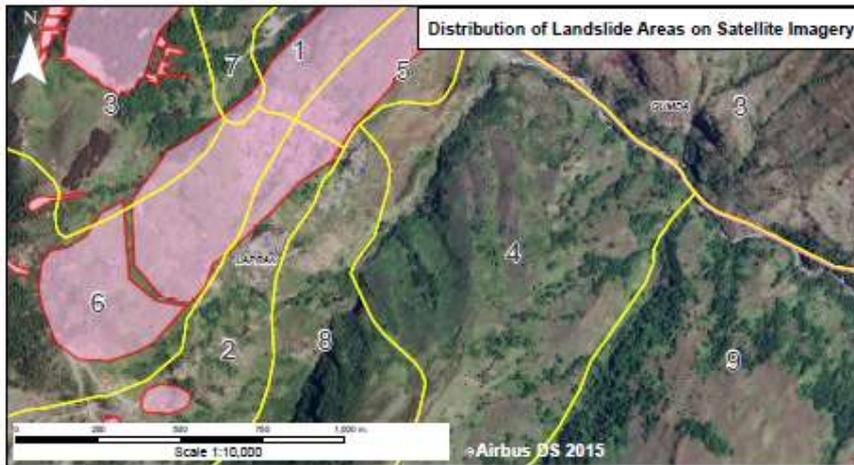
Elevation Classification Diagram and Landslide Distribution



Example of 1:10,000 Hazard Map

LANDSLIDE AREA MAP

BI19



MAP INFORMATION:
Map of lands information of the District of Gorkha is done by using satellite imagery, topographic map & 3D view.

SATTA SOURCE:
Administrative boundaries are from the Survey Department of Nepal. Landlines, roads, water bodies, contours & buildings were extracted from the SPOT satellite images. 3D view of the area was generated from the combination of SPOT satellite imagery and Digital Surface Model (DSM).

COORDINATE SYSTEM:
WGS84/UTM Zone 45 N

- LEGEND:**
- School
 - Public Office
 - ⚕ Health Post, Hospital
 - ⛪ Religion
 - Residential
 - River/Stream
 - ⚡ Highway
 - ⚡ Road/District/Other road
 - ⚡ Cart track
 - ⚡ Trails
 - ⚡ Foot path
 - Index Contour
 - Intermediate Contour
 - ⚡ Ward Boundary
 - ⚡ Village Development Committee
 - ⚡ District Boundary
 - ⚡ Adjacent Districts

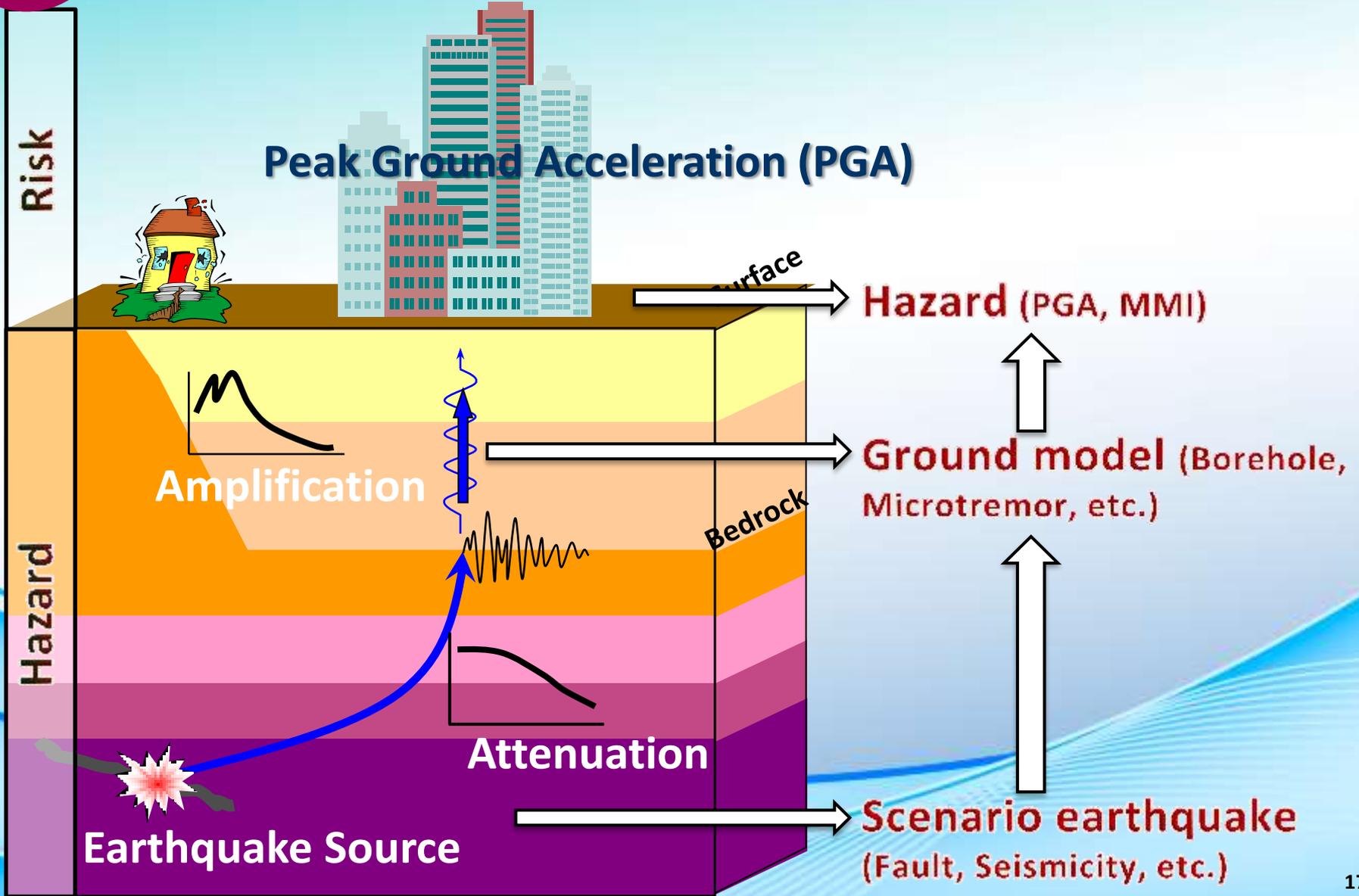
- Landslide Types:** Before EQ, After EQ
- Shallow Landslide
 - Rock Fall
 - Deep Landslide
 - Debris Flow

Index:

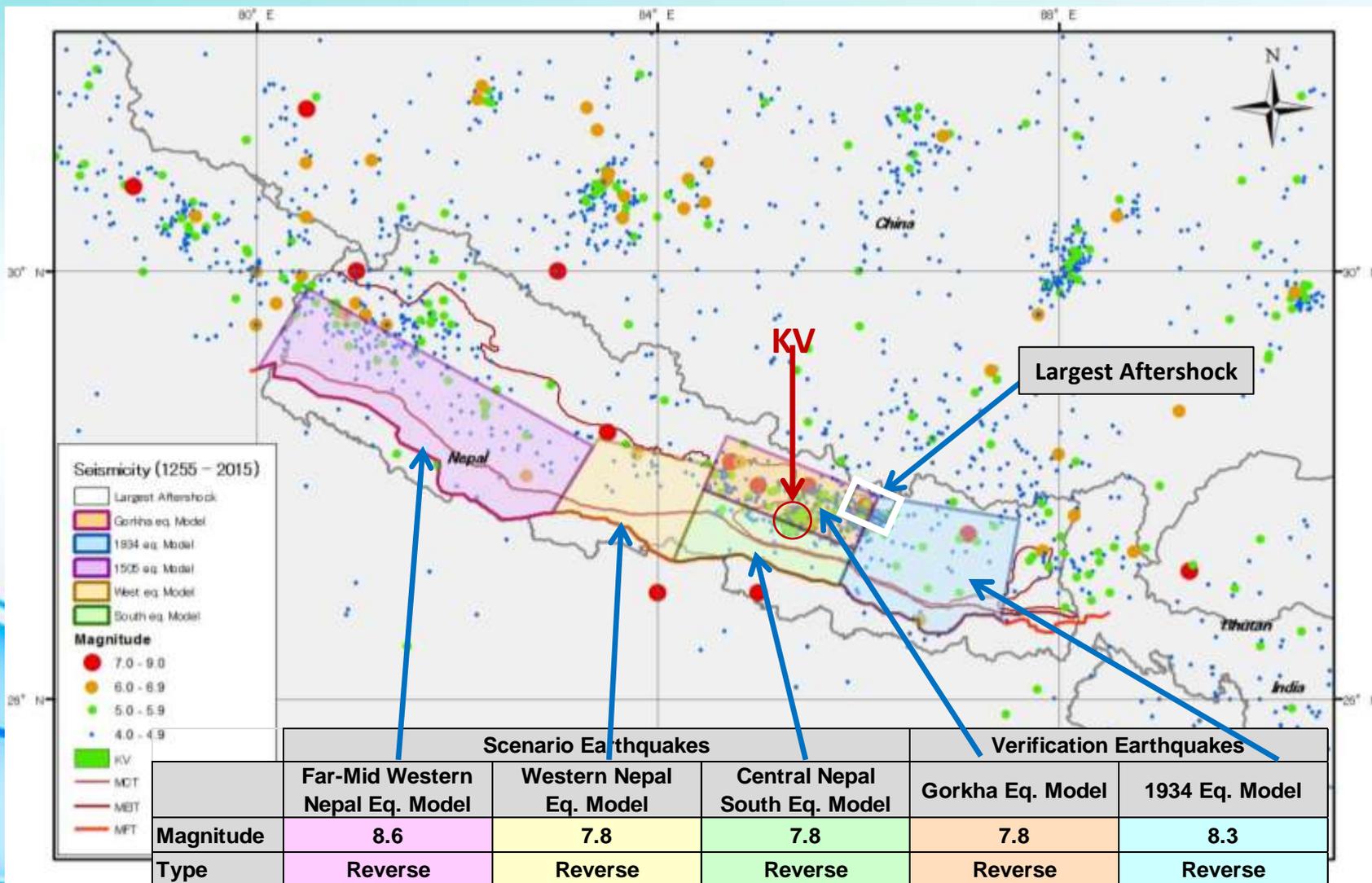
BI15	BI16	BI20
BI15	BI19	BI20
BI16	BI19	BI20

Federal Democratic Republic of Nepal
&
Japan International Cooperation Agency
Earthquake Restoration and Reconstruction Project in Nepal

Approach of Seismic Hazard Analysis

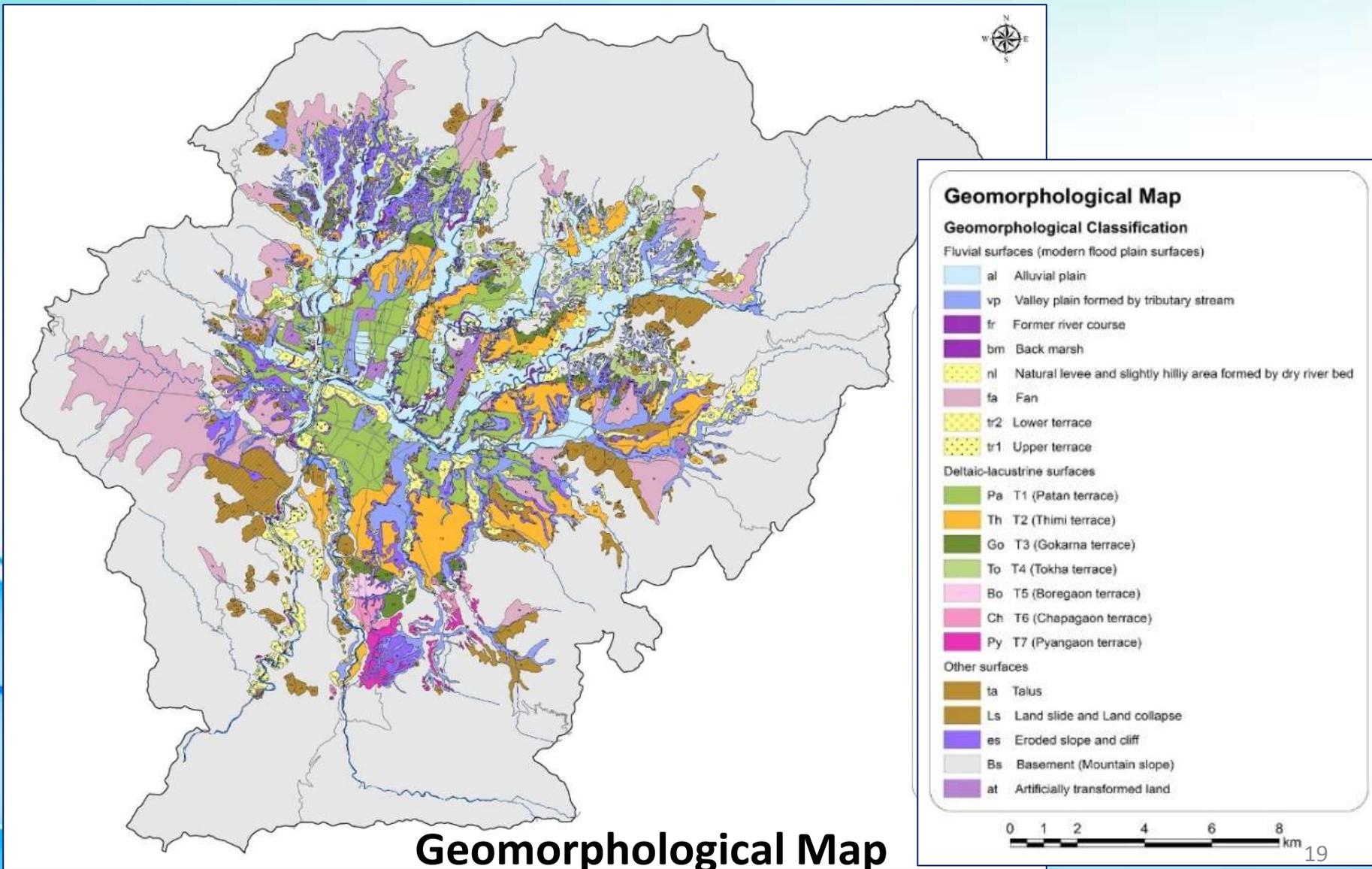


Scenario Earthquakes



Source: Seismicity: ANSS Composite Earthquake Catalogue, USGS and DMG Catalogue, compiled by JICA Project Team

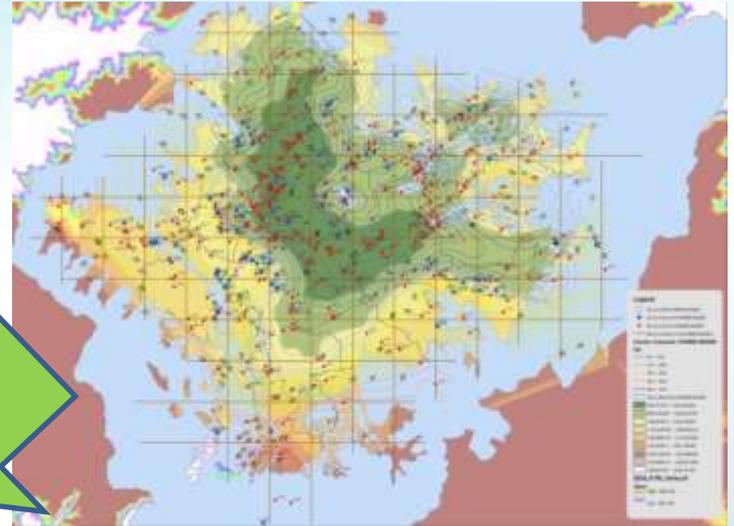
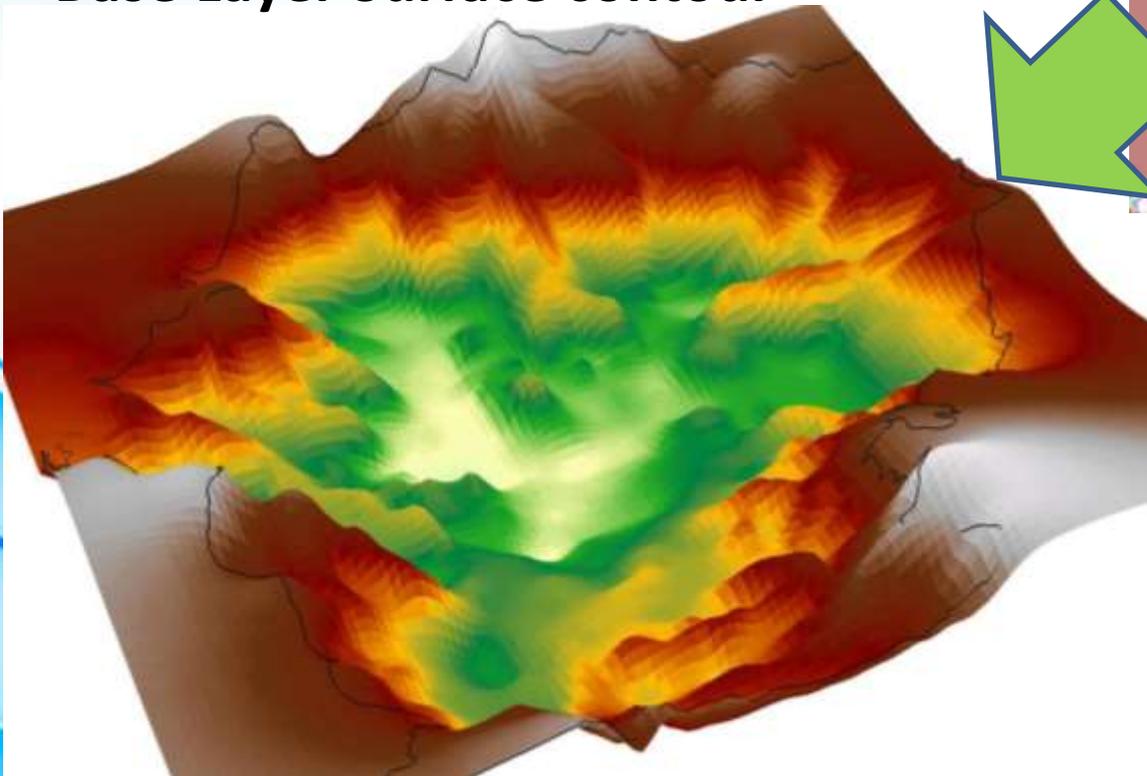
Development of Ground Model



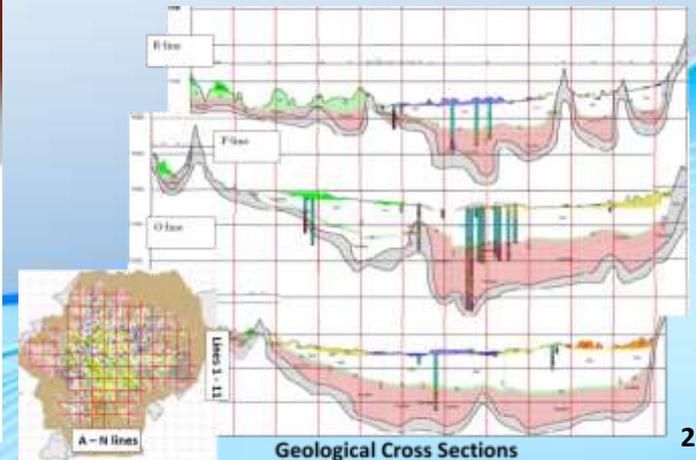
Development of Ground Model

Rock Depth and Base Layer Surface contour

Base Layer Surface contour



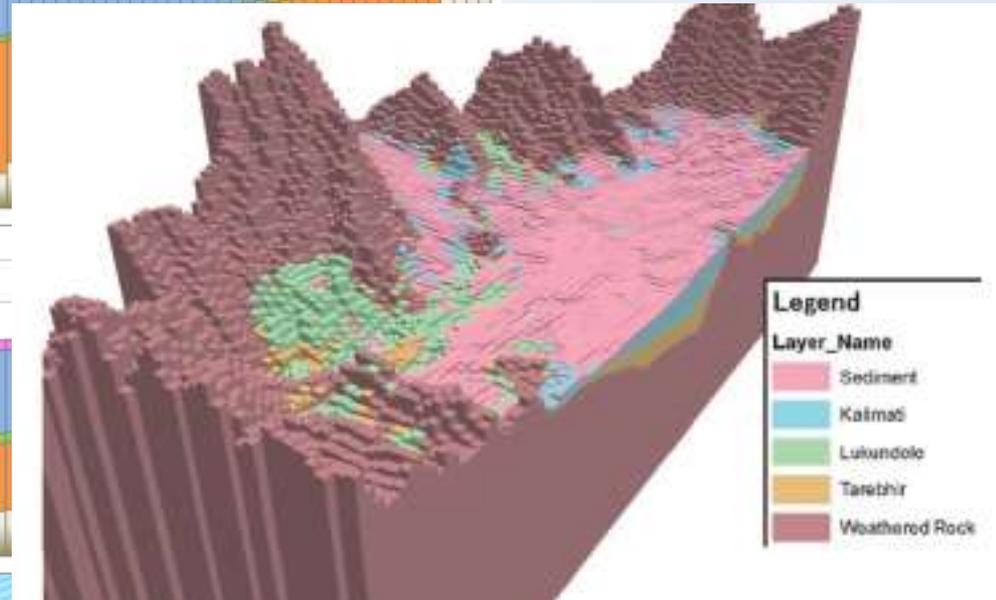
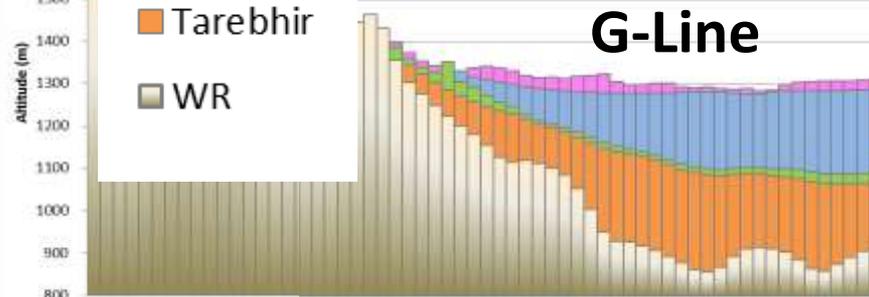
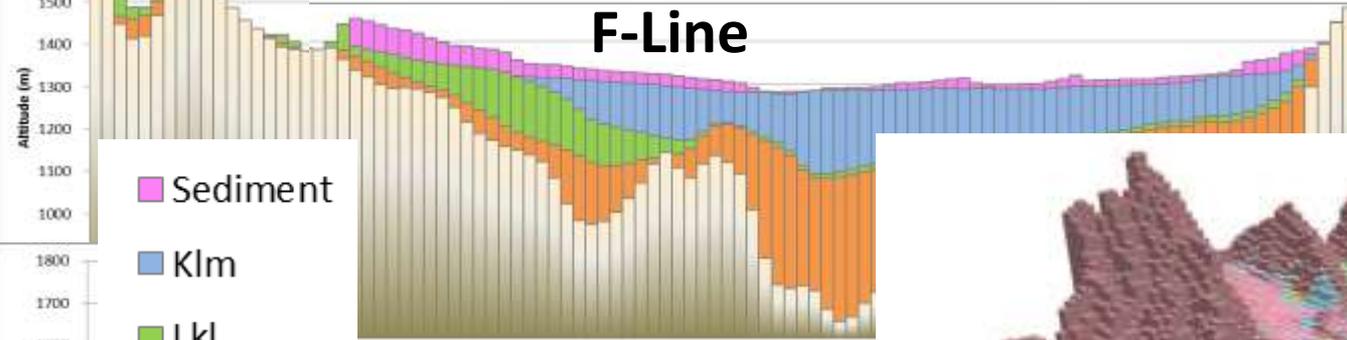
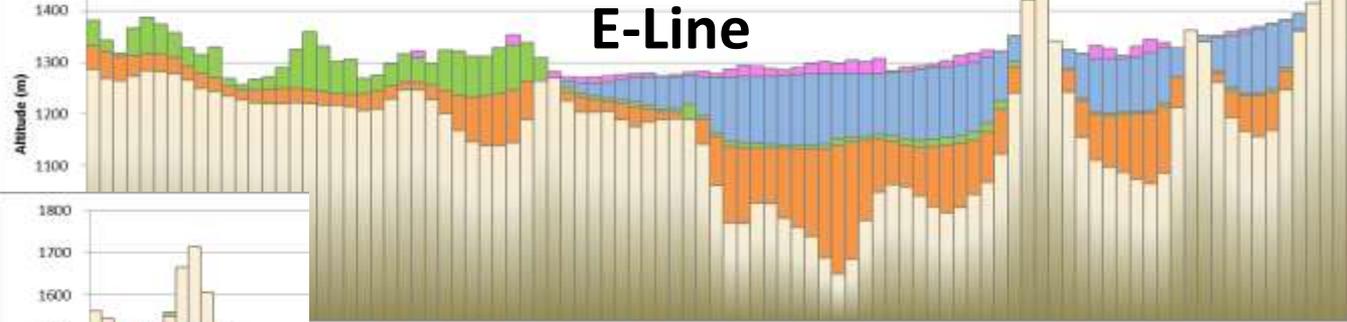
Rock depth contour by gravity anomaly



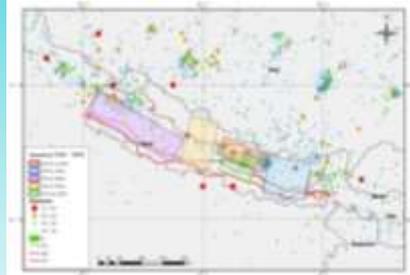
Geological Cross Sections

Development of Ground Model

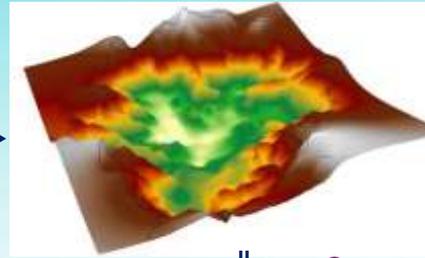
Ground Models for Grid System with 250mx250m



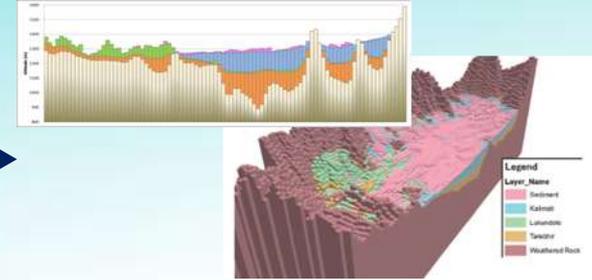
Outputs of Seismic Hazard Assessment



New Scenario EQ



Base Layer Surface

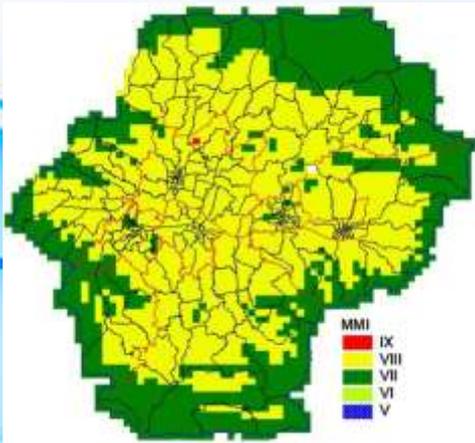


Ground Model

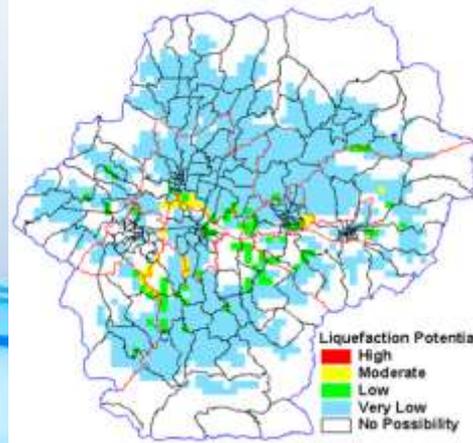


Calculation Unit
250m*250m

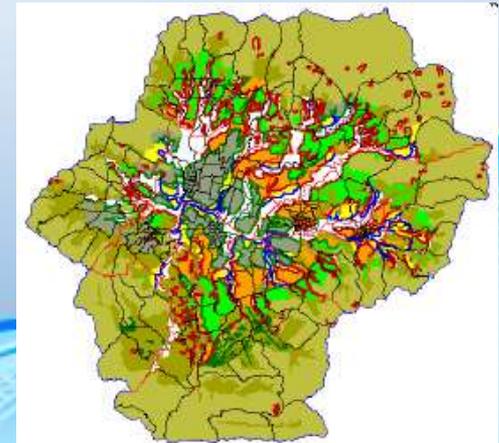
Hazard Map



Intensity Map



Liquefaction Hazard Map



Landslide Hazard Map

Basic Concept and Key Principle of RRP

Basic Concept: Comprehensive and Long-term Plan

Key Principle: Build Back Better



Source: JICA Project Team, 2015

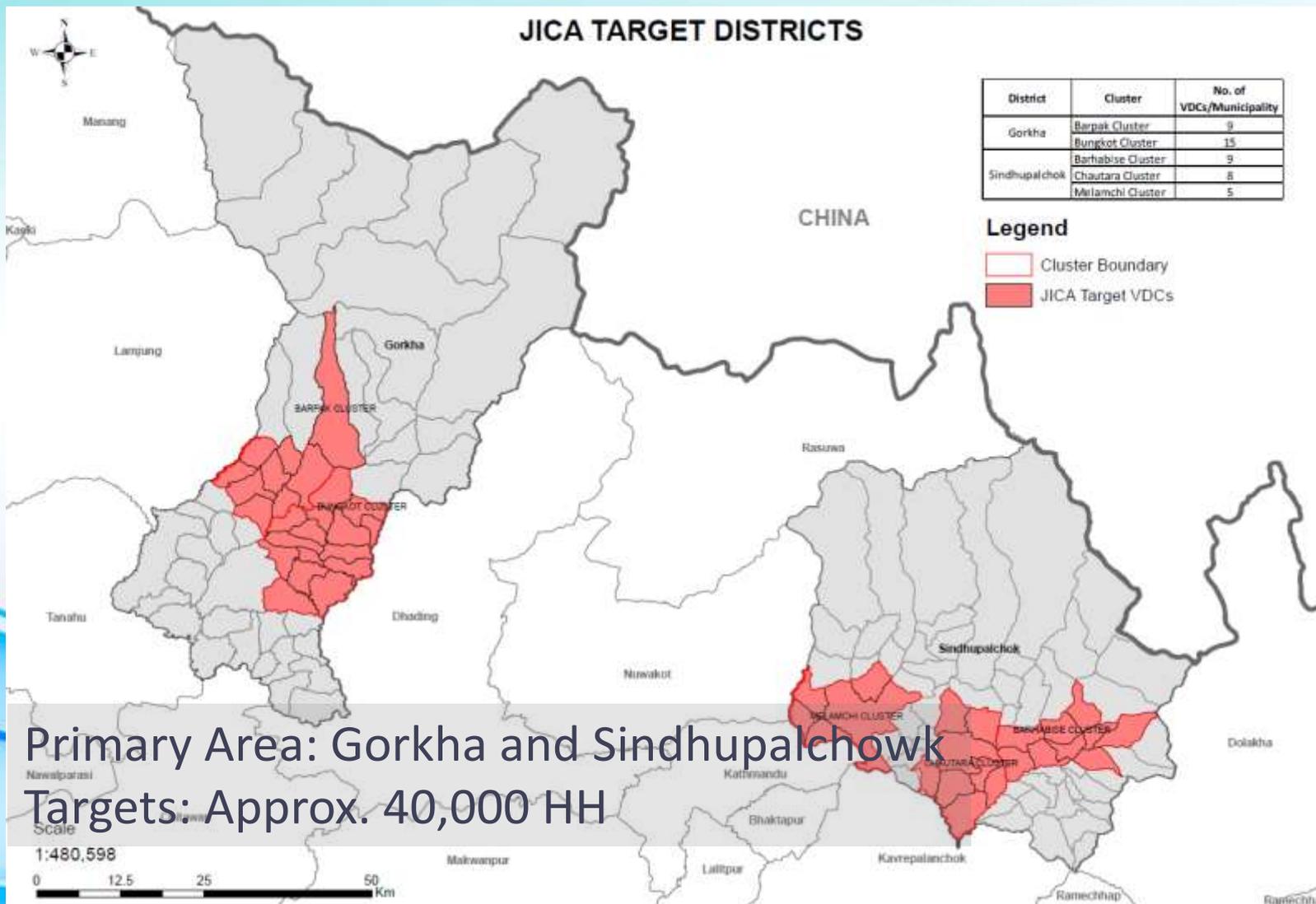
3. Housing and School Reconstruction



Emergency Housing Reconstruction Project

- Project Name: Emergency Housing Reconstruction Project (EHRP)
- Objective: Reconstruct the collapsed housing through housing grant
- Location: 14 affected districts
- Priority Districts: Sindhupalchowk and Gorkha districts
- Cost: 12,000 million JPY (JICA's eligible portion)
(Equivalent to 10,000 million NPR)
- Executing Agencies: NRA
- Implementing Agencies: MOFALD and MOUD
- Loan Agreement signed on December 21st, 2015
- Schedule: August 2015 – December 2020

Emergency Housing Reconstruction Project



Structural Calculation and Analysis

- In Nepal, MRT (Mandatory Rules of Thumb) in NBC was not based on structural calculation, guidelines were based on the experiences from past earthquakes.
- Therefore, a structural analysis of prototypes by NBC105 as seismic design was conducted.

The design for earthquake actions shall be in accordance with either:

- The working stress method (elastic method),
or
- The limit state method

Two methods which are static structural calculation and structural analysis using FEM. were conducted.

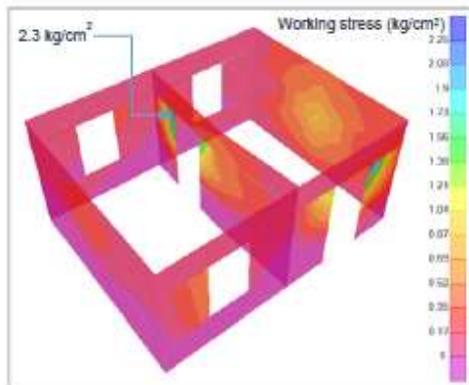
STRUCTURAL DESIGN REPORT
FOR
STONE MASONRY IN MUD MORTAR
ONE-STOREY
[SMM-JICA]

Mar, 2016

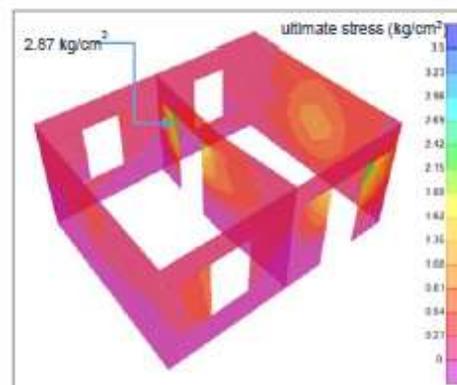
Component 2, RRNE

Source: JICA Project Team

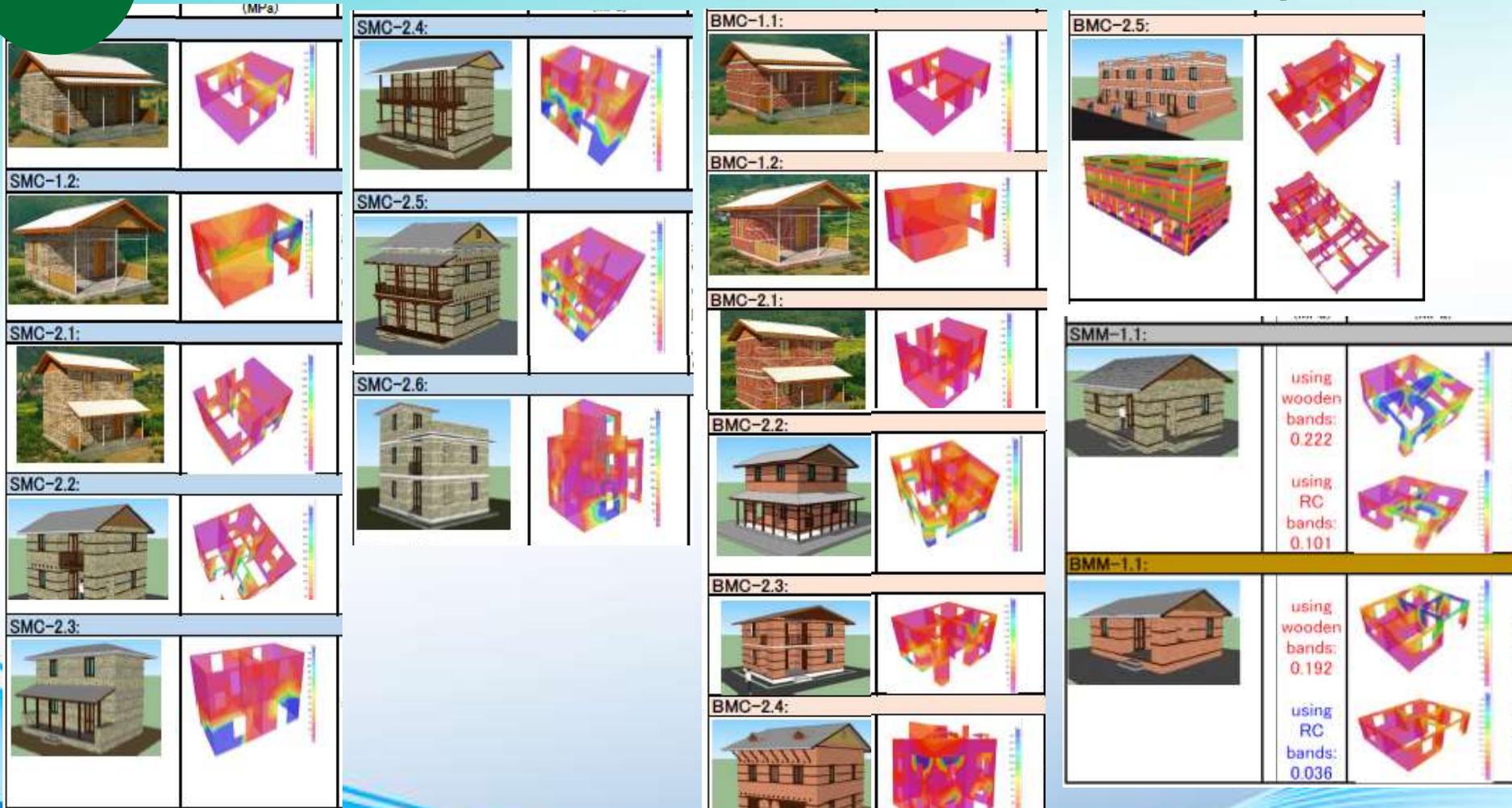
■ Maximum stress of Working Stress Method



■ Maximum stress of Limit State Method



Structural Calculation and Analysis



According to structural calculations, Cement mortar models satisfy the NBC105 seismic requirement. The tensile stress and shear stress were below the limit.

On the other hand, Mud mortar (SMM-1.1) with a timber band, stress was exceeded. This stone masonry mode in mud mortar with wooden band with attic has the possibility of out-of-plane failure during earthquake. The shear strength of stone masonry in mud mortar was below the limit.

Source: JICA Project Team

Design Catalogue

reconstruction of earthquake resistant houses

The designs provided in the catalogue cover four broad categories of building materials and typology:

- SMC: Stone masonry in cement mortar
 - BMC: Brick masonry in cement mortar
 - SMM: Stone masonry in mud mortar
 - BMM: Brick masonry in mud mortar
- } JICA Model

DESIGN CATALOGUE FOR RECONSTRUCTION OF EARTHQUAKE RESISTANT HOUSES

Volume I



Source: DUDBC

October, 2015 (Aswin, 2072)



Nepal Housing
Reconstruction Programme

Government of Nepal
Ministry of Urban Development
Department of Urban Development and Building Construction
Babarmahal, Kathmandu

Structural Type	No. of Floor	Model No.	Designed by	
Stone masonry in cement mortar, P5- SMC	1	SMC-1.1	JICA	
	1	SMC-1.2	JICA	
	2	SMC-2.1	JICA	
	2	SMC-2.2	DUDBC	
	2	SMC-2.3	DUDBC	
	2	SMC-2.4	DUDBC	
	2+ATTIC	SMC-2.5	DUDBC	
	2+TERRACE	SMC-2.6	DUDBC	
	Technical details			
	Flexible design			
Brick masonry in cement mortar P71- BMC	1	BMC-1.1	JICA	
	1	BMC-1.2	JICA	
	2	BMC-2.1	JICA	
	2	BMC-2.2	DUDBC	
	2	BMC-2.3	DUDBC	
	2	BMC-2.4	DUDBC	
	2+ATTIC	BMC-2.5	DUDBC	
	2+TERRACE	BMC-2.5	DUDBC	
Technical details				
Flexible design				
Stone masonry in mud mortar, P129- SMM	1	SMM-1.1	DUDBC	
	Technical details			
Brick masonry in mud mortar, P147- BMM	1	BMM-1.1	DUDBC	
	Technical details			
Flexible design				

The JICA Study Team was supported the preparation of the catalogue in DUDBC, then it was published in November, 2015 by DUDBC.

Design Catalogue

reconstruction of earthquake resistant houses

JICA concept has already been discussed in the Nepal Reconstruction plan through the co-organization of the “Build Back Better Reconstruction Seminar for Nepal” which was held on 25th May, 2015 with the government of Nepal.



JICA study team proposed six prototypes. The designs focus on earthquake resistant construction using locally available construction materials. The design concept, and the objective of the design is to contribute to resilient models for improving safety in future earthquakes.

Source: JICA Project Team

Minimum Requirements

Minimum Requirements for building construction with Stone Masonry in Cement Mortar for Residential Building																
No.	Category															
1	Site selection	It shall be done to minimize risk against natural hazards. A building shall not be constructed if any of the following conditions exist. <input type="checkbox"/> Geological fault or Ruptured Area <input type="checkbox"/> Landslide susceptible Area <input type="checkbox"/> Rock-fall Area <input type="checkbox"/> Filled Area														
2	Shape/Size of building	<table border="1"> <tr> <td>No. of storey</td> <td>No</td> </tr> <tr> <td>Clear span of room</td> <td>No</td> </tr> <tr> <td>Size of room</td> <td>No</td> </tr> <tr> <td>Height of wall</td> <td>Flg In 1.8</td> </tr> <tr> <td>Proportion</td> <td>Sin Thi Avi</td> </tr> </table>	No. of storey	No	Clear span of room	No	Size of room	No	Height of wall	Flg In 1.8	Proportion	Sin Thi Avi				
No. of storey	No															
Clear span of room	No															
Size of room	No															
Height of wall	Flg In 1.8															
Proportion	Sin Thi Avi															
3	Materials	<table border="1"> <tr> <td>Stone</td> <td>Avi stc nor</td> </tr> <tr> <td>Mortar</td> <td>Ce by</td> </tr> <tr> <td>Concrete</td> <td>It s (1)</td> </tr> <tr> <td>Rebar</td> <td>Hig</td> </tr> <tr> <td>Timber</td> <td>We Tin prt</td> </tr> <tr> <td>General</td> <td>It s thr + j exp</td> </tr> <tr> <td>Depth of found. below GL</td> <td>It s</td> </tr> </table>	Stone	Avi stc nor	Mortar	Ce by	Concrete	It s (1)	Rebar	Hig	Timber	We Tin prt	General	It s thr + j exp	Depth of found. below GL	It s
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General	It s thr + j exp															
Depth of found. below GL	It s															

Minimum Requirements for building construction with Stone Masonry in Mud Mortar for Residential Building												
No.	Category											
1	Site selection	It shall be done to minimize risk against natural hazards. A building shall not be constructed if any of the following conditions exist. <input type="checkbox"/> Geological fault or Ruptured Area <input type="checkbox"/> Landslide susceptible Area <input type="checkbox"/> Rock-fall Area <input type="checkbox"/> Filled Area										
2	Shape/Size of building	<table border="1"> <tr> <td>No. of storey</td> <td>RC band</td> </tr> <tr> <td>Clear span of wall</td> <td>Timber band</td> </tr> <tr> <td>Size of room</td> <td>Not more than</td> </tr> <tr> <td>Height of wall</td> <td>Floor height sh In case of attic 1.8m and maxi</td> </tr> <tr> <td>Proportion</td> <td>Simple and reg The length of h Avoid setbacks</td> </tr> </table>	No. of storey	RC band	Clear span of wall	Timber band	Size of room	Not more than	Height of wall	Floor height sh In case of attic 1.8m and maxi	Proportion	Simple and reg The length of h Avoid setbacks
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Clear span of wall	Timber band											
Size of room	Not more than											
Height of wall	Floor height sh In case of attic 1.8m and maxi											
Proportion	Simple and reg The length of h Avoid setbacks											
3	Materials	<table border="1"> <tr> <td>Stone</td> <td>Avoid use of rc stones in its na Size of stone sh length or breac</td> </tr> <tr> <td>Mortar</td> <td>Mud mortar</td> </tr> <tr> <td>Mortar</td> <td>Cement mortar</td> </tr> <tr> <td>Concrete</td> <td>It shall not be li (1 part cement</td> </tr> <tr> <td>Rebar</td> <td>High strength</td> </tr> </table>	Stone	Avoid use of rc stones in its na Size of stone sh length or breac	Mortar	Mud mortar	Mortar	Cement mortar	Concrete	It shall not be li (1 part cement	Rebar	High strength
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Mortar	Mud mortar											
Mortar	Cement mortar											
Concrete	It shall not be li (1 part cement											
Rebar	High strength											

Minimum Requirements for building construction with Brick Masonry in Cement Mortar for Residential Building												
No.	Category											
1	Site selection	It shall be done to minimize risk against natural hazards. A building shall not be constructed if any of the following conditions exist. <input type="checkbox"/> Geological fault or Ruptured Area <input type="checkbox"/> Landslide susceptible Area <input type="checkbox"/> Rock-fall Area <input type="checkbox"/> Filled Area										
2	Shape/Size of building	<table border="1"> <tr> <td>No. of storey</td> <td>RC band</td> </tr> <tr> <td>Clear span of wall</td> <td>Timber band</td> </tr> <tr> <td>Size of room</td> <td>Not more than</td> </tr> <tr> <td>Height of wall</td> <td>Floor height sh In case of attic 1.8m and maxi</td> </tr> <tr> <td>Proportion</td> <td>Simple and regular shaped as square and rectangular. The length of room shall be not more than 2 times of its width.</td> </tr> </table>	No. of storey	RC band	Clear span of wall	Timber band	Size of room	Not more than	Height of wall	Floor height sh In case of attic 1.8m and maxi	Proportion	Simple and regular shaped as square and rectangular. The length of room shall be not more than 2 times of its width.
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3	Materials	<table border="1"> <tr> <td>Brick</td> <td></td> </tr> <tr> <td>Morta</td> <td></td> </tr> <tr> <td>Concr</td> <td></td> </tr> <tr> <td>Rebar</td> <td></td> </tr> <tr> <td>Timbe</td> <td></td> </tr> </table>	Brick		Morta		Concr		Rebar		Timbe	
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Morta												
Concr												
Rebar												
Timbe												

Minimum Requirements for building construction with Brick Masonry in Mud Mortar for Residential Building												
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2	Shape/Size of building	<table border="1"> <tr> <td>No. of storey</td> <td>RC band</td> </tr> <tr> <td>Clear span of wall</td> <td>Timber band</td> </tr> <tr> <td>Size of room</td> <td>Not more than 13.5sq.m.</td> </tr> <tr> <td>Height of wall</td> <td>Floor height shall not be more than 3.0m. In case of attic floor, maximum height from floor level to ridge level shall be 1.8m and maximum height from floor level to eave level shall be 1.0m.</td> </tr> <tr> <td>Proportion</td> <td>Simple and regular shaped as square and rectangular. The length of room shall be not more than 2 times of its width.</td> </tr> </table>	No. of storey	RC band	Clear span of wall	Timber band	Size of room	Not more than 13.5sq.m.	Height of wall	Floor height shall not be more than 3.0m. In case of attic floor, maximum height from floor level to ridge level shall be 1.8m and maximum height from floor level to eave level shall be 1.0m.	Proportion	Simple and regular shaped as square and rectangular. The length of room shall be not more than 2 times of its width.
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Proportion	Simple and regular shaped as square and rectangular. The length of room shall be not more than 2 times of its width.											
3	Materials	<table border="1"> <tr> <td>Brick</td> <td></td> </tr> <tr> <td>Morta</td> <td></td> </tr> <tr> <td>Concr</td> <td></td> </tr> <tr> <td>Rebar</td> <td></td> </tr> <tr> <td>Timbe</td> <td></td> </tr> </table>	Brick		Morta		Concr		Rebar		Timbe	
Brick												
Morta												
Concr												
Rebar												
Timbe												

Source: DUDBC

NRA organized the TSC (Technical Standardization Committee) in the end of February. In this committee, it was discussed whether NBC105 should be applied to residential buildings in the reconstruction programme as the seismic requirement.

Then, the minimum requirements for residential building in reconstruction programme were developed.

Posters for Minimum Requirements

ढुङ्गाको गारोमा सिमेन्ट मसलाको जोडाई-न्यूनतम मापदण्ड

नेपालको राष्ट्रिय भवन संहिता (NBC 202) मा आधारित

नेपाल सरकार

राष्ट्रिय पुननिर्माण प्राधिकरण



१. सिमेन्ट मसलाको जोडाई

- सिमेन्ट मसलाको गुणवत्ता राम्रो हुनुपर्नेछ।
- सिमेन्ट मसलाको रंग राम्रो हुनुपर्नेछ।

२. ढुङ्गाको काटण

- ढुङ्गाको काटण राम्रो हुनुपर्नेछ।

३. ढाँचाको विन्यास

४. ढाँचाको विन्यास

५. ढाँचा

ढाँचा	ढाँचा	ढाँचा	ढाँचा
१. १००	१००	१००	१००
१. १००	१००	१००	१००
१. १००	१००	१००	१००
१. १००	१००	१००	१००

६. ढाँचाको विन्यास

७. ढाँचाको विन्यास

८. ढाँचाको विन्यास

९. ढाँचाको विन्यास

१०. ढाँचाको विन्यास

ढुङ्गाको गारोमा सिमेन्ट मसलाको जोडाई

निर्माण प्रक्रिया

राष्ट्रिय भवन संहिता (NBC 202) मा आधारित



नेपाल सरकार
राष्ट्रिय पुननिर्माण प्राधिकरण

आवश्यक सामग्री

सामग्री	माप	माप	माप
१. १००	१००	१००	१००
१. १००	१००	१००	१००
१. १००	१००	१००	१००
१. १००	१००	१००	१००

ढाँचा

सामग्री

ढाँचा

ढाँचा

ढाँचाको विन्यास

ढाँचाको विन्यास

Source: NRA

Emergency Housing Reconstruction Project

As of 24th April 2016

- **Mason Trainings**
 - 497 masons were trained, further target is 2,310
 - Special attentions are paid to minimum requirements and practical skills
- **Awareness Raising to the House owners**
 - 1,156 house owners participated, further target is 6,160
 - Theatrical performance is extended with the “Earthquake-Resistant Performing Character”
- **Commencement of the Enrolment Camp**
 - Hansapur VDC , Gorkha (Apr. 10-19): 764 Participation Agreement (81%) were signed out of 944 eligible house owners
 - Barpak VDC, Gorkha (Apr. 24-)
 - Chautara Municipality, Sindhupalchok (Apr. 24-)

Emergency Housing Reconstruction Project



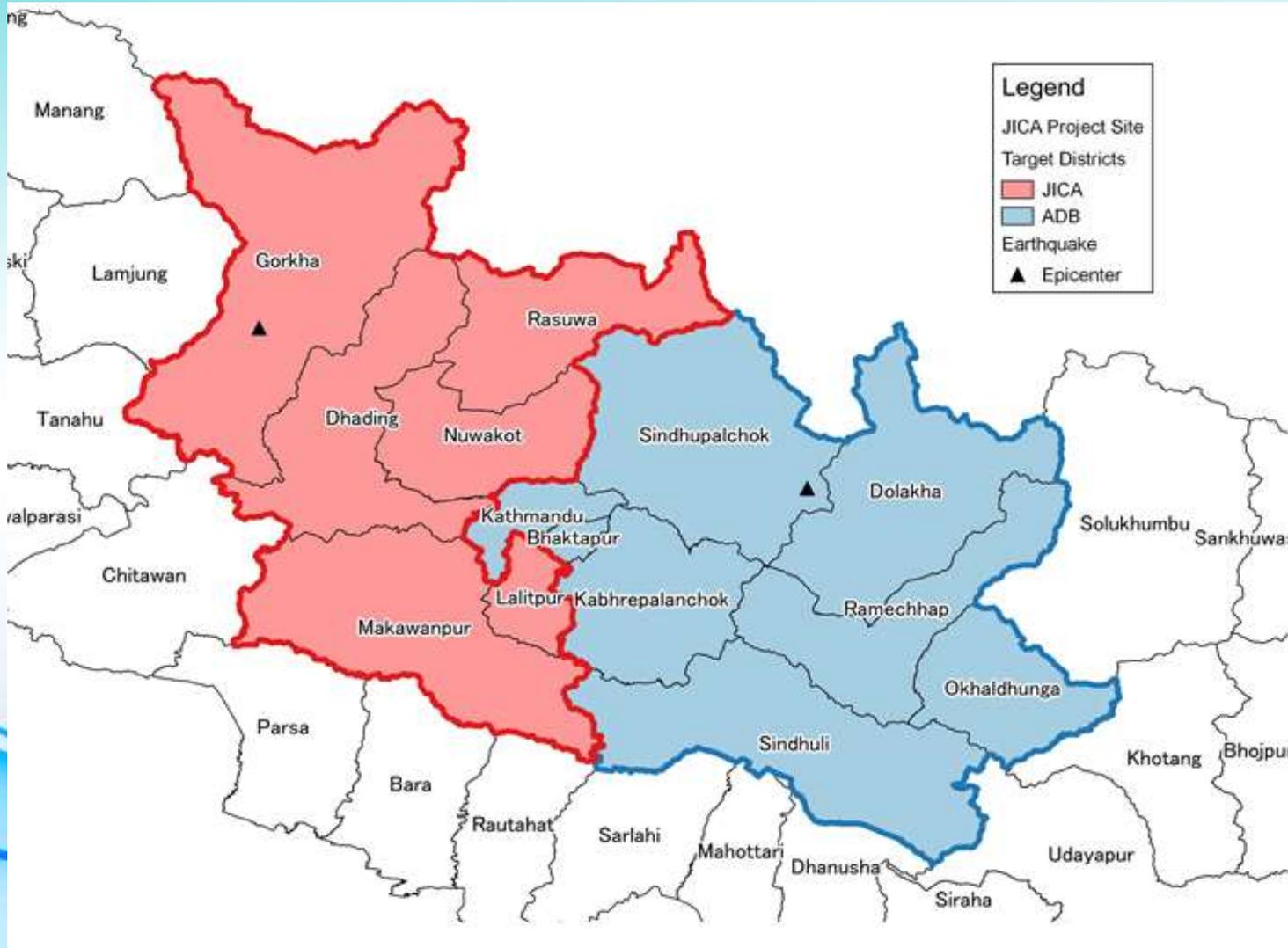
Source: JICA Project Team

Mason Training

Emergency School Reconstruction Project

- Project Name: Emergency School Reconstruction Project (ESRP)
- Objective: rebuild and retrofit schools in the districts affected by the earthquake
- Location: Gorkha, Dhading, Nuwakot, Rasuwa, Makwanpur and Lalitpur districts
- Cost: (JICA) 14,000 million JPY, (GON) 2,522mil JPY
- Co-Financer: ADB (200mil USD for rebuilding and restoring schools, roads, and public buildings)
- Executing Agencies: Nepal Reconstruction Authority
- Implementing Agencies: DOE (Department of Education)
- Scope: i) civil works, ii) consulting services
- Loan Agreement signed on December 21st, 2015
- Schedule: August 2015 – August 2019

Emergency School Reconstruction Project

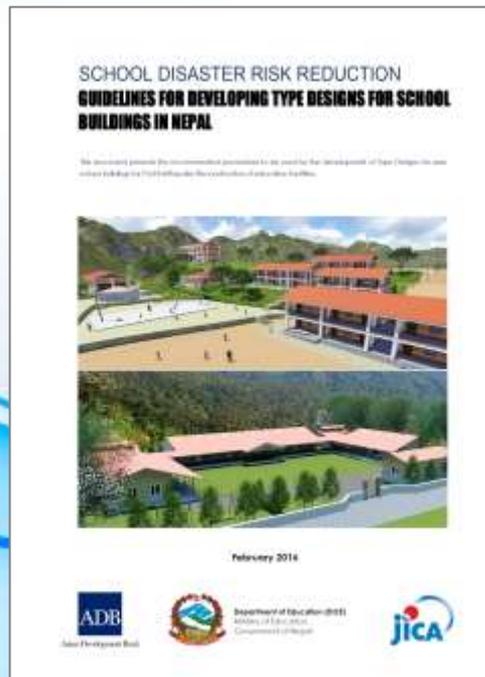


Seismic Resistant Building Guidelines of School

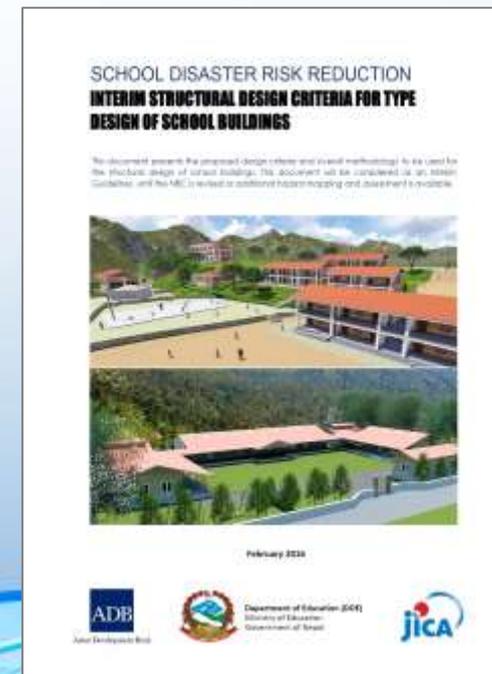
The project for the reconstruction of schools is being carried out by JICA and ADB together with DOE.

The guideline consists of two volumes.

1. **GUIDELINES FOR DEVELOPING TYPE DESIGNS FOR SCHOOL BUILDINGS IN NEPAL**
2. **INTERIM STRUCTURAL DESIGN CRITERIA FOR TYPE DESIGN OF SCHOOL BUILDINGS**



Volume 1 focuses on architectural, mechanical and electrical criteria



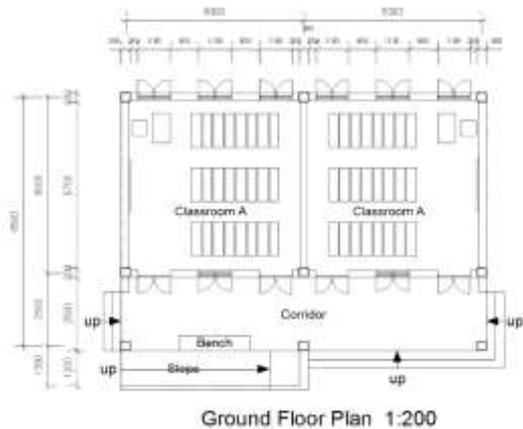
Volume 2 mentions structural criteria

Source : Prepared by JICA and ADB for DOE

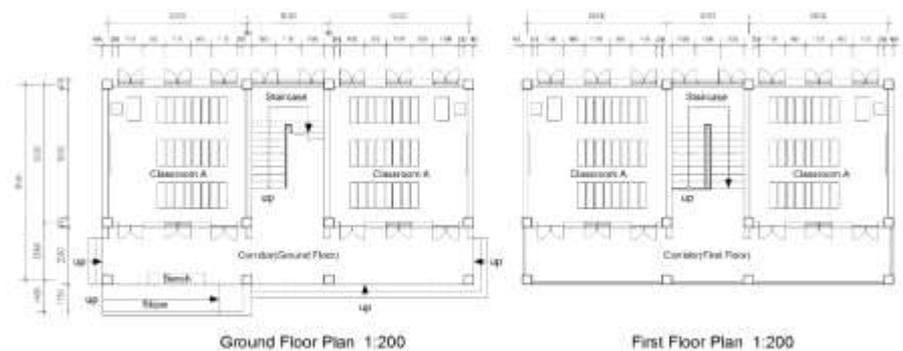
Design of New School Prototypes

Some new prototypes were designed at the beginning and after that the number was included based on the demands.

A total of 37 new prototypes were designed in order to cover kindergartens, primary schools, lower secondary schools, secondary schools, and higher secondary schools.



Single story



Two stories

Emergency School Reconstruction Project (Type design)



Academic Block,3-6C(S)



Academic Block,2-6C(S)



Toilet Combine Block



Practical Block,2-
LALIEM



Multipurpose Hall

Build Back Better

- New School Guideline
- Environment friendly multi-hazard resilient structures
- Child , Gender and Disable (CGD) friendly

Emergency School Reconstruction Project

- **Selection of First Batch Schools**
 - The target schools for the first batch were selected based on the selection criteria which was approved by DOE.
- **School Standard Design**
 - The earthquake resistant structural design and type design of schools were developed with due consideration to the building code and earthquake probability simulation.
- **Commencement of the Project**
 - The first batch of the school construction to be started very soon, covering 5 schools in Lalitpur Dist.
 - School Reconstruction Plan for each schools (first batch) were formulated.

Emergency School Reconstruction Project



**SHREE KALIDEVI HIGHER SECONDARY
SCHOOL**

PYUTAR, LALITPUR

**EXISTING
CONDITION**

Emergency School Reconstruction Project



**EXISTING
CONDITION**

**HIMALAYAN HIGHER SECONDARY
SCHOOL**

BARPAK, GORKHA

Source: JICA Project Team

4. Formulation of Plans



Formulation of Plans

- **Kathmandu Valley Resilience Plan(KVRP)**
 - Kathmandu Valley
- **Rehabilitation and Reconstruction Plan(RRP)**
 - Gorkha and Sindhupalchowk Districts
 - Lalitpur Sub-metropolitan City
 - Bhaktapur Municipality
 - Budhanilkantha Municipality

Basic Principles of “Resilience Plan”

4 Basic principles of the KV resilience plan:

i. Prevent human loss by any means.

iii. Mitigate damage to property of the citizenry and public facilities.

Building land and society resilient to large scale natural disasters under the concept of BBB.

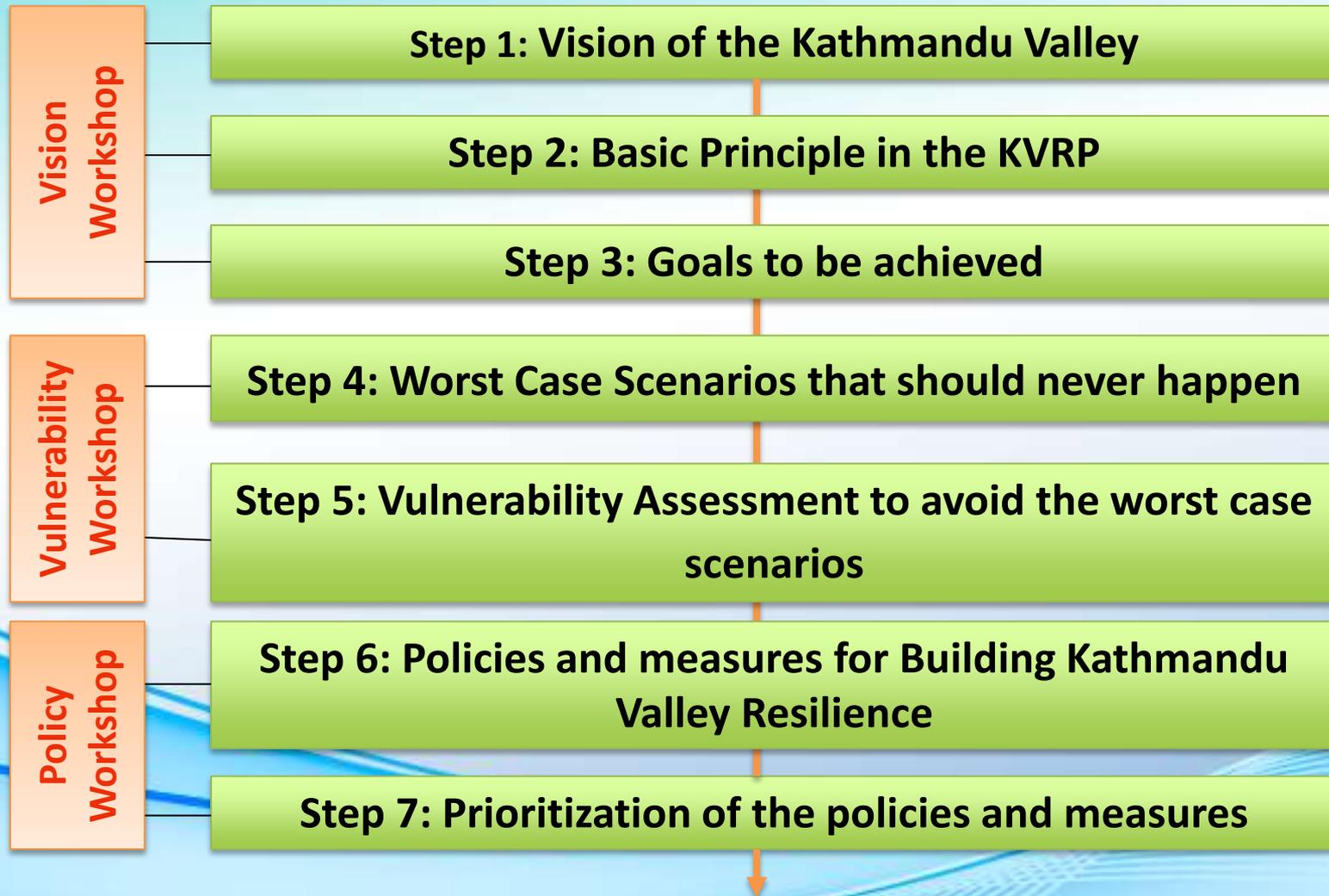
ii. Avoid fatal damage to important functions for maintaining administration, social and economic systems

iv. Achieve swift recovery and reconstruction.

Key Principle of Resilience Plan: “Build Back Better”

- One of the most significant lessons learned from disasters is that **rebuilding of affected communities to pre-disaster standards will recreate the vulnerabilities** that existed earlier.
- Recovery is defined as the restoration and improvement of **not only infrastructure and facilities**, but also **livelihoods, economy and living conditions** of disaster affected communities.
- Reconstruction from disaster is **an opportunity** to “build back better”.
- The concept of “build back better” approach was accepted in **the Third UN World Conference in 2015** as one of the priority areas in disaster risk reduction.

Preparation Process of the KVRP

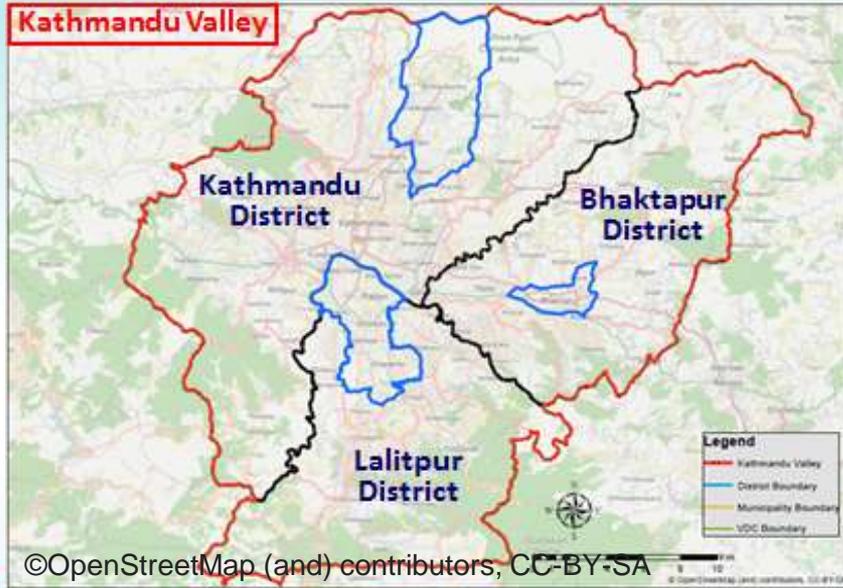


ERAKV

RRNE

Areas of Formulating the RRP

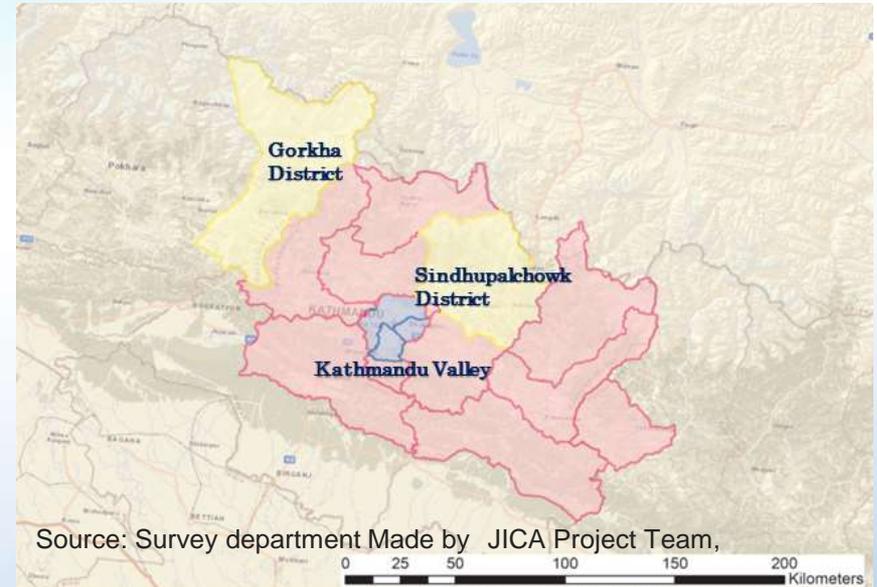
ERAKV Project



Three Pilot Municipalities:

1. Lalitpur Sub-metropolitan City
2. Bhaktapur Municipality
3. Budhanilkantha Municipality

RRNE Project



Two Pilot Districts:

1. Gorkha District
2. Sindhupalchowk District

Basic Concept and Key Principle of RRP

Basic Concept: Comprehensive and Long-term Plan

Key Principle: Build Back Better



ERAKV

RRNE

Contents of the RRP

ERAKV Project

RRP for Target Municipalities working with municipality stakeholders as a pilot activity

Vision

- Key Principle

Basic Policy

- Basic Policy

Action Plan

- Action Plan
- Priority Projects
- Monitoring and Evaluation

RRNE Project

RRP as a part of Periodic District Development Plan (PDDP) in Target Districts

Damage situation

- Damage analysis

Vision

- Vision of Reconstruction

Challenges and Issues

- Issues for Reconstruction

Policy for RRP

- Basic Policy
- Program and Project by Sector

5. Reconstruction Projects (Grant Aid and QIPs)



List of Grant Aid Projects

- **Date of E/N : December 21, 2015**
- **Date of G/A : February 17, 2016**

Name of the Projects	Specification	Contract Date
Reconstruction of Paropakar Maternity and Women's Hospital with related Equipment	RC Structure 3 stories / 5,322m ²	April 5, 2016
Reconstruction of Bir Hospital with related Equipment	RC Structure 3 stories / 2,700m ²	April 5, 2016
Rehabilitation of Water Transmission System in Chautara	Ductile Pipe app. 20km length Chamber 8 number	April 12, 2016
Construction of Bridges along Barahkilo – Barpak Road	5 Bridges length from 30m~150m. PC Hollow / PC I-Girder	April 6, 2016

Reconstruction of Paropakar Maternity and Women's Hospital

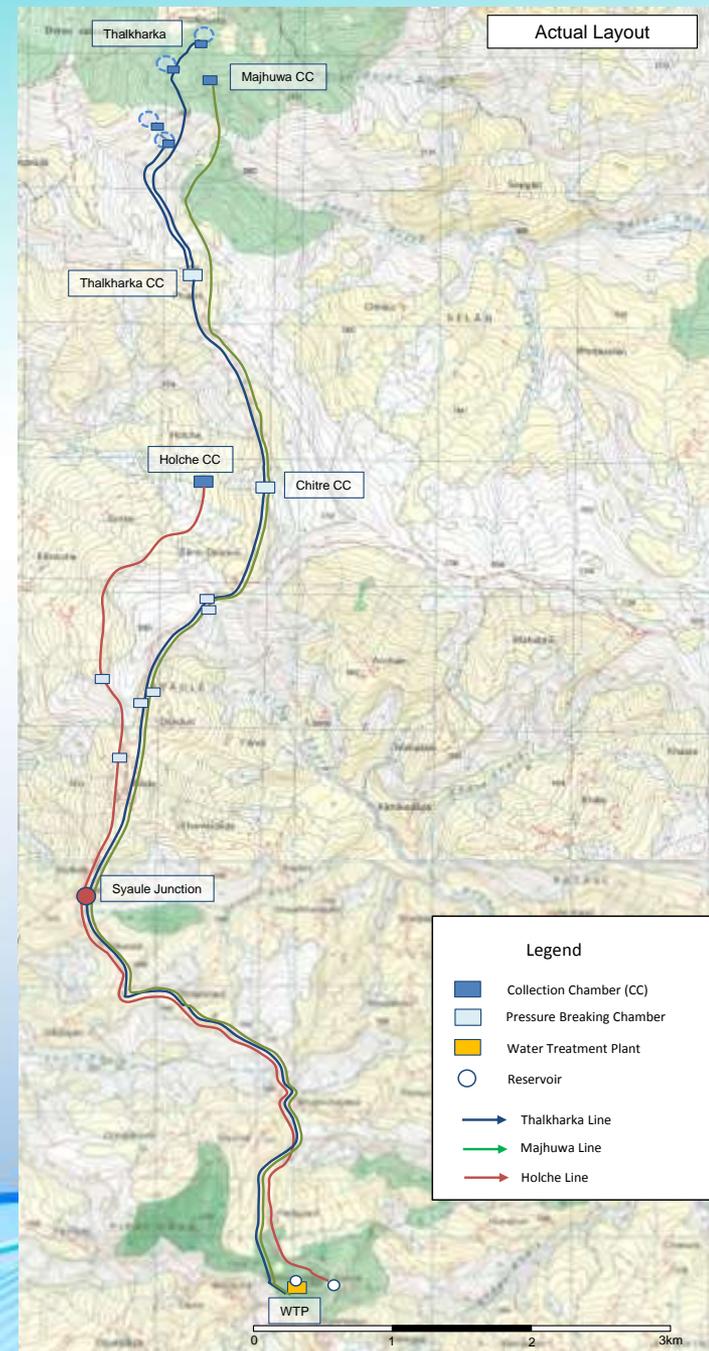


Source: JICA Project Team

Reconstruction of Bir Hospital

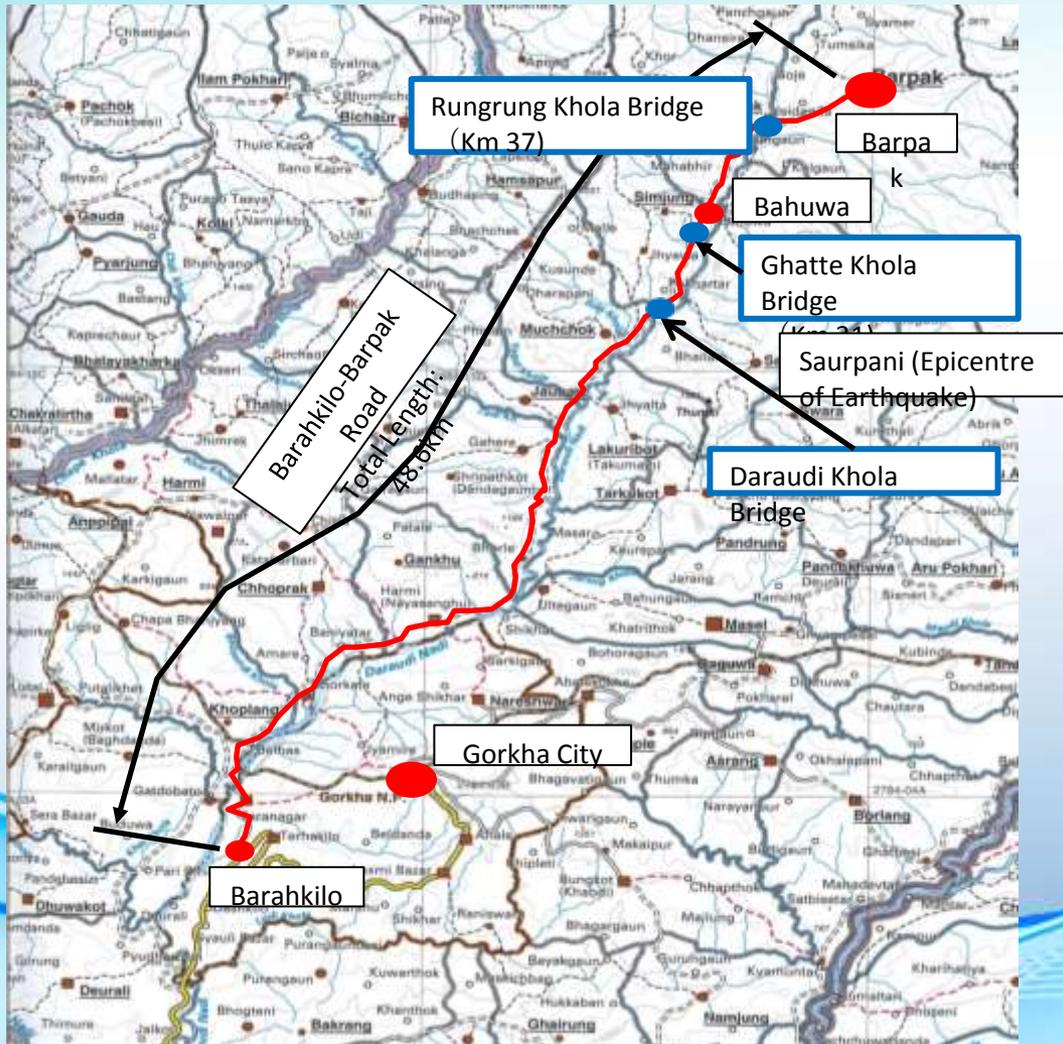


Site Location of Rehabilitation of Water Transmission System in Chautara

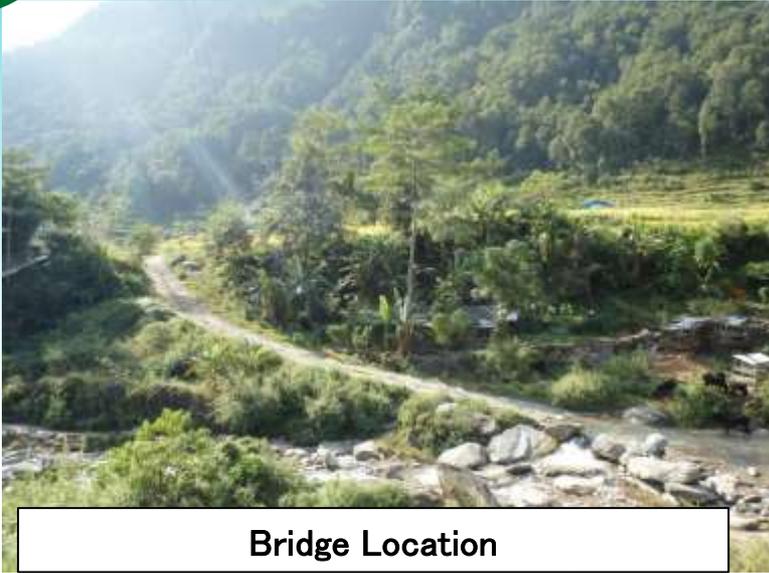


Source: Government of Nepal, Survey Department Map produced by the Survey Department, Government of Nepal in cooperation with the Government of Finland

Site Location of Bridge Construction along Barhakilo-Barpak Road



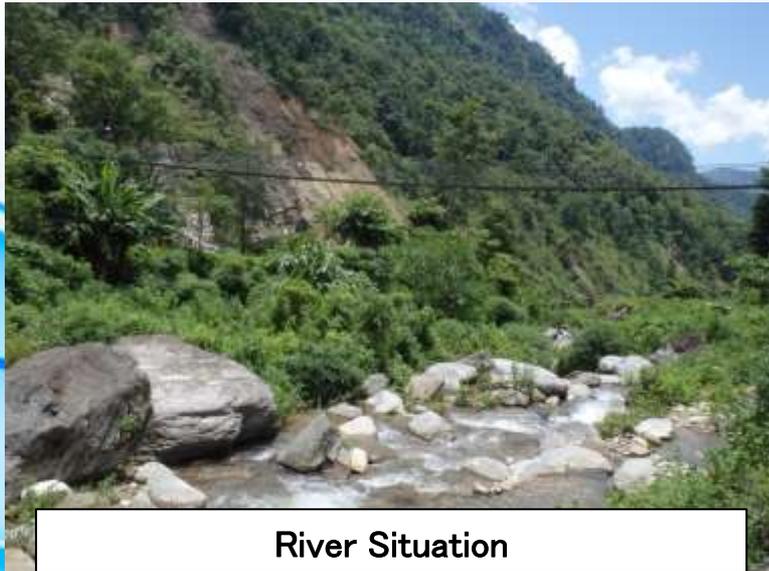
Ghatte Khola Bridge



Bridge Location



Start Point

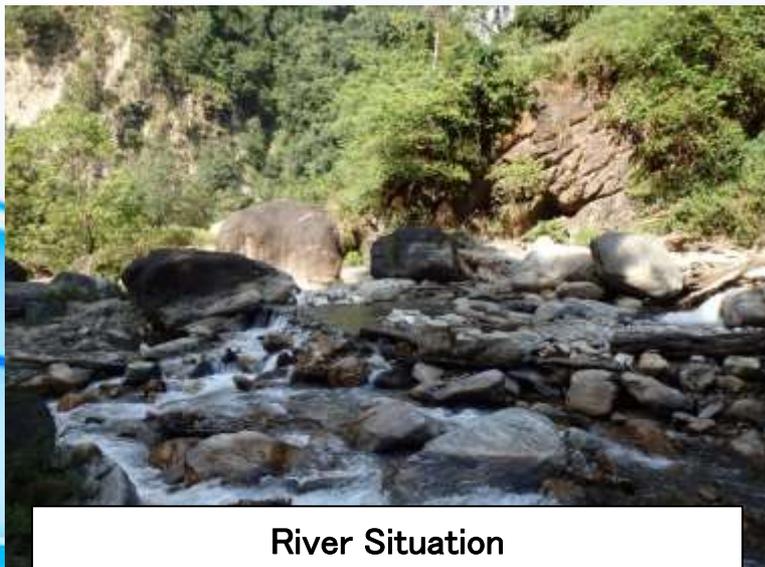
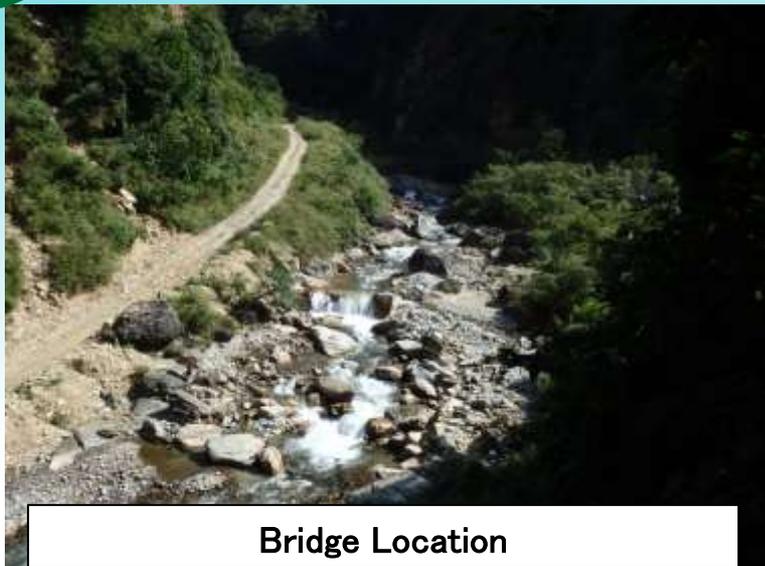


River Situation

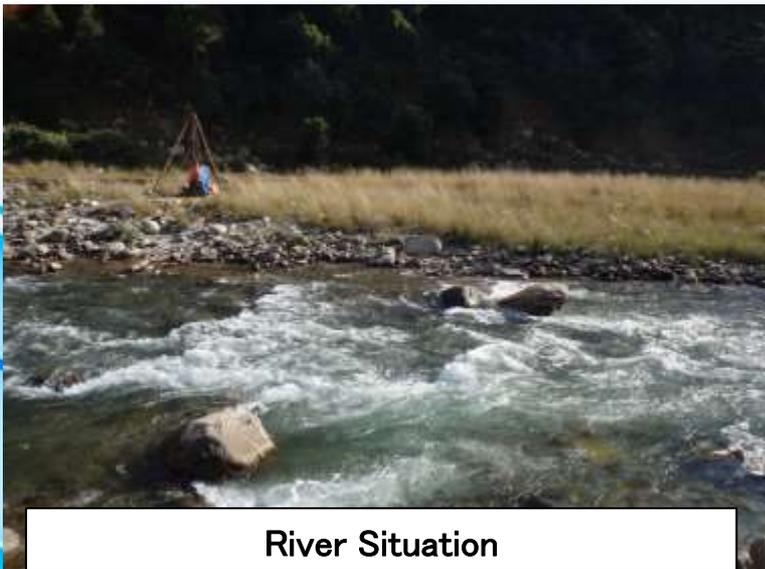
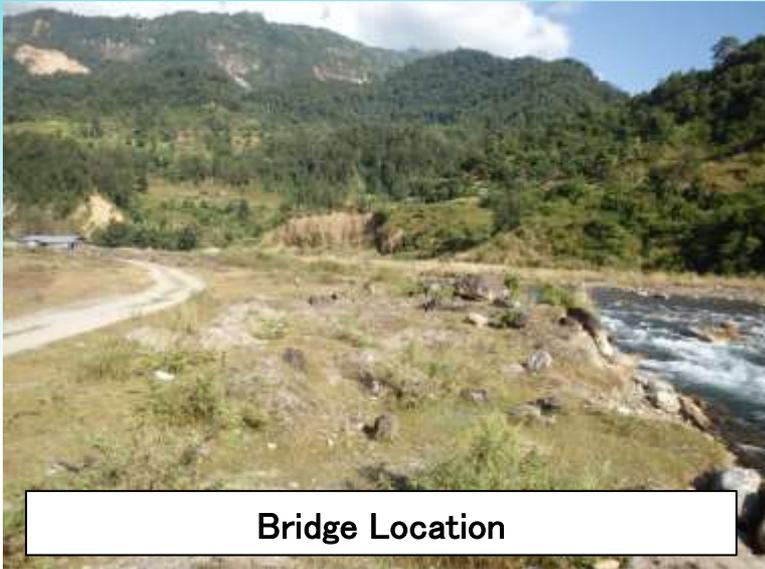


End Point

Rungrung Khola Bridge



Daraudi Khole Bridge



QIPs: Quick Impact Projects

Small-scale projects contributing to local recovery and reconstruction through:

- ✓ **Linking Japanese Experience and Technology with Recovery and Reconstruction**
- ✓ **Contribution to the Recovery of the Vulnerable**
- ✓ **Contribute to strengthening Government Capacity for Disaster Risk Reduction in Public Facilities**



Aiming at “Build Back Better”

Planned QIPs

26 projects planned for implementation
 (■ 15 public buildings, ■ 2 water supply,
 ■ 1 road / 2 bridges, ■ 6 livelihood projects)

No.	Major Project Contents
QIP-01	Construction of Models for Disaster Resilient Construction Technology
QIP-02	Construction of WCO facility in Chautara Municipality
QIP-03	Reconstruction of Ampipal Hospital in Palungtar Municipality
QIP-04	Reconstruction of Palungtar Area Police Office buildings
QIP-05	Reconstruction of Thokarpa VDC office building
QIP-06	Reconstruction of DADO building in Chautara Municipality
QIP-07	Reconstruction of Agriculture Collection Center in Bhotechaur VDC
QIP-08	Construction of Water supply system in Tipeni area
QIP-09	Improvement of Road facilities in Bhotechaur / Melamchi
QIP-10	Reconstruction of Health Post building in Barbarise VDC

Planned QIPs

No.	Project Name
QIP-11	Reconstruction of Barbarise Area Police Office buildings
QIP-12	Reconstruction of Barpak VDC office building
QIP-13	Reconstruction of Barpak Women Community Centre
QIP-14	Reconstruction of Health Post in Barpak VDC
QIP-15	Reconstruction of Police Post in Barpak VDC
QIP-16	Reconstruction of Sarupani VDC office building
QIP-17	Reconstruction of Maneshwra VDC office building
QIP-18	Establishment /enhancement of Women's Cooperative in Barpak
QIP-19	Goat farming for women's groups in Barpak
QIP-20	Improvement of vegetable farming practices for women's groups
QIP-21	Improvement of maize farming practices for poor famers
QIP-22	Improvement of the production of quality seed
QIP-23	Promotion of Safety measures for Housing Workers
QIP-24	Improvement of Majhuwa Water Supply Headrace
QIP-25	Construction of Khahare Khola Bridge
QIP-26	Construction of Jhyalla Khola Bridge

Location of Planned QIPs

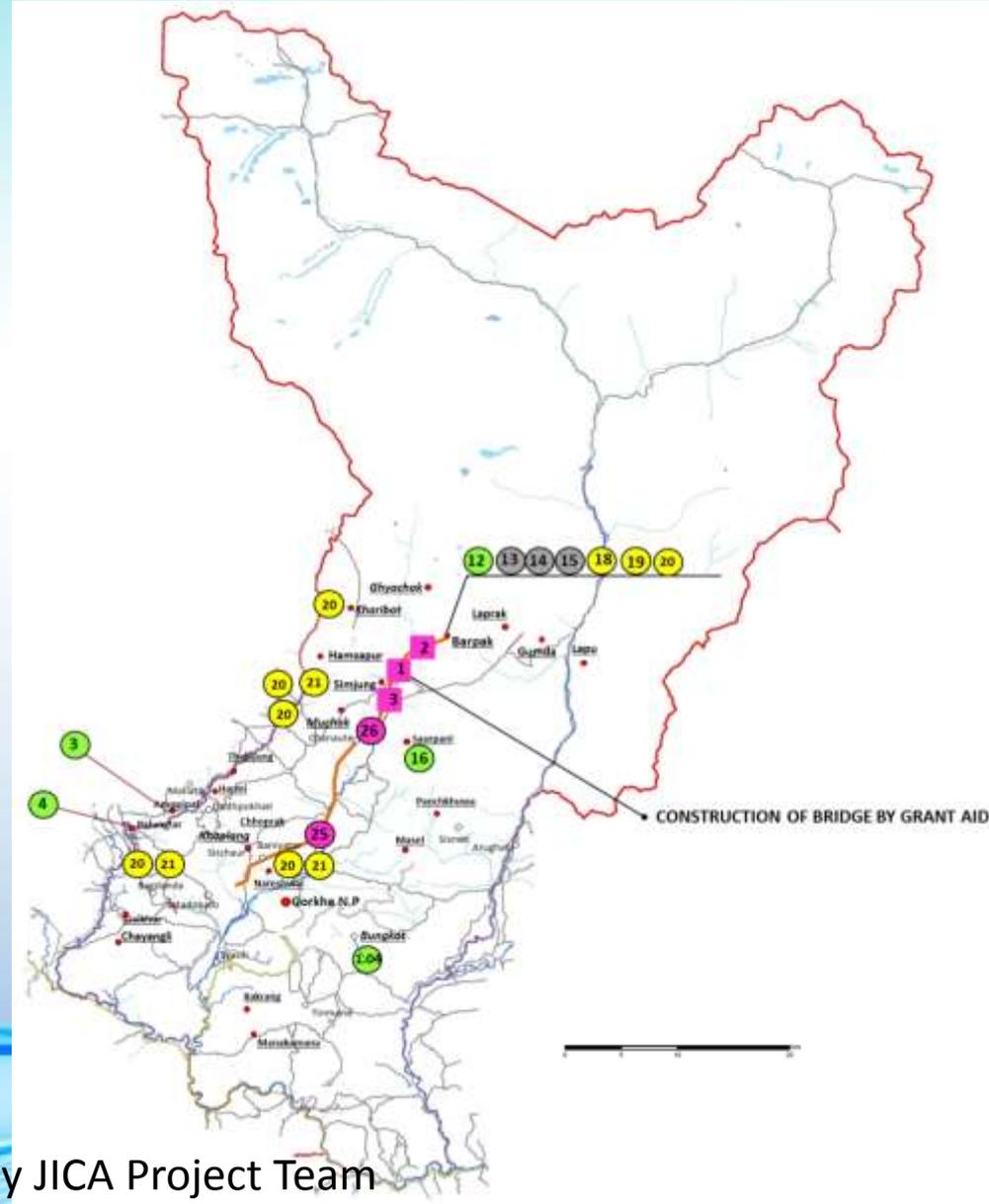
Gorkha

QIP'S

- 1.04
3
4
12
BUILDING
- 16
BRIDGE
- 25
26
BRIDGE
- 18
19
20
21
LIVELIHOOD PROJECTS
- 13
14
15
BUILDING (SITE UNDECIDED)

GRANT AID

- 1
2
3
BRIDGE



Progress of QIPs Implementation

- As of date, implementation started for: 3 projects for reconstruction of public facilities and 3 projects for livelihood



THOKARPA VDC OFFICE

Location: Thokarpa, Sindhupalchok

Specification: 1 Story, 123sqm

Period of Construction: Apr - Oct 2016

WOMEN TRAINING CENTER

Location: Chautara, Sindhupalchok

Specification: 2 Story Office, 139sqm

Period of Construction: Mar - Dec 2016



PALUNG TAR AREA POLICE OFFICE

Location: Palungtar, Gorkha

Specification: 2 Story, 663spm

Construction Period: Apr 2016-May 2017



Progress of QIPs Implementation

IMPROVEMENT OF VEGETABLE FARMING

Locations: 11 VDCs of Sindhupalchok and Gorkha

Major Contents: Input and training to local women's groups to improve productivity in home gardens

Period : Apr 2016 – Mar 2017



IMPROVEMENT OF MAIZE FARMING

Locations: 8 VDCs of Sindhupalchowk and Gorkha

Major Contents: Input and training to marginal farmers to improve productivity of major grain crop

Period: Apr – Oct 2016



IMPROVEMENT OF QUALITY SEED PRODUCTION

Location: 5 VDCs of Sindhupalchowk

Major Contents: Input and training for improvement of certified seed production

Period: Apr 2016 – Mar 2017



Source: JICA Project Team

Thank You Very Much !

The bottom of the slide features decorative blue wavy lines. On the left, there are three thick, curved lines in shades of blue. On the right, there is a series of thin, parallel lines that curve upwards and to the right, creating a sense of motion and depth.