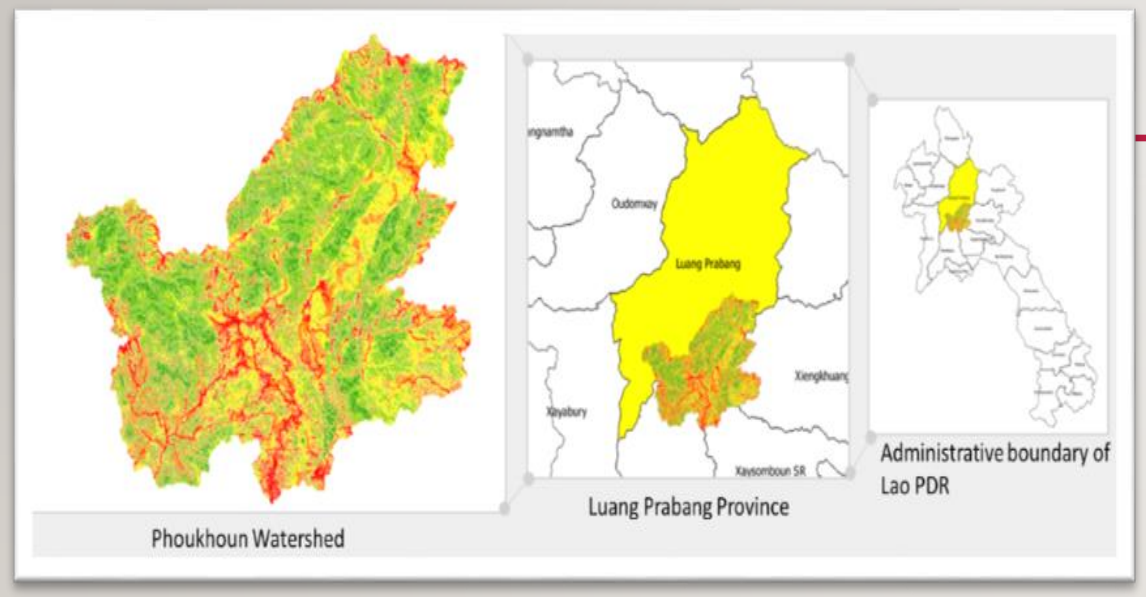
Case Study

Phoukhoun, Lao PDR

Integrating Climate Scenarios into Landslide Risk Assessment & Management

A. BACKGROUND OF THE STUDY AREA



- Phoukhoun District is located in the Luang Prabang province.
- Road N: 7 and13 north, 130 km headline to Luang Prabang province,
- Total area is 1.707 km2
- 90 % mountainous
- The highest mountainous is PHOUKHOUN (1.600 m) and the lowest mountainous is THABORKEO (726 m)
- Phoukhon District consist of 40 village
- Population: 25,189 people (12,251 women, 4,260 families)
- Consist of 3 ethnic groups: Lao loum (5,44 %), Hmong (27,84 %) and Khmou (66,71 %)
- Maximum temperature is 29 c and the mimimum is 0 c
- The average annual rainfall is 1,200 – 1,300 millimeter per year

CONTEXT OF THE PHOUKHOUN DISTRICT

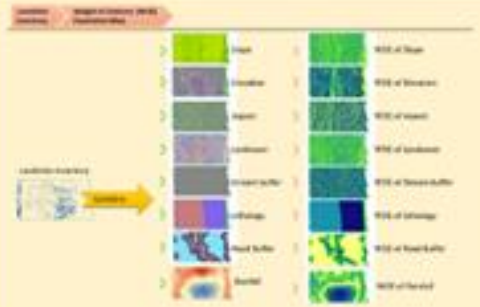
- Landslides are becoming of the major threats and present dangers to humans, infrastructure, lifeline facilities and assets.
- The present level of risk is already high and it can grow and become higher and higher in the near future.
- The prevailing landslide hazard risk observed in the areas, is due to several factors, natural as well as main-made and triggered predominantly due to higher precipitation events (2011, 2015, 2016, 2018).
- The impacts to sectors such as settlement, agriculture, environment and natural resources, forest etc. is moderate to high with damaged houses, crops and blockaded road.

B. APPROACH USED

Baseline Data

Spatial and non-spatial data

- Administrative boundary
- Infrastructure
- Land use/land cover
- Socio-economic data
- Demography
- Post-disaster events
- Disaster events data
- Landslide inventory , DEM (slope, aspect),rainfall data derived from future climate scenarios etc.

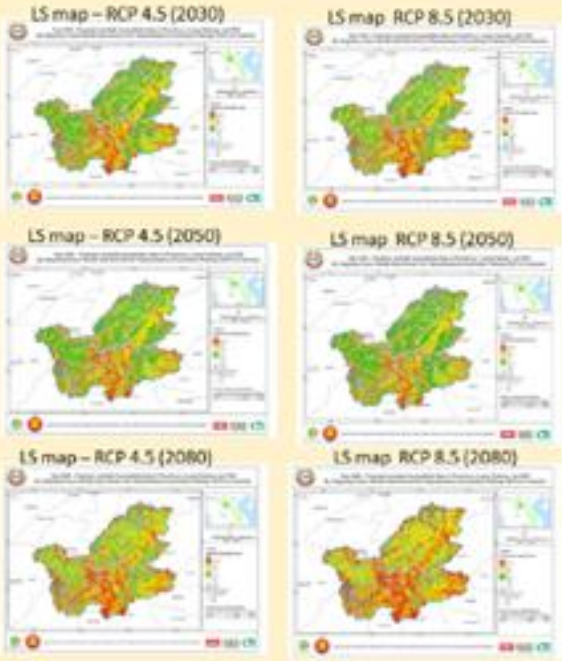


Baseline information and hazard data

Inter-institutional and harmonized standard for data collection preparation simplify combined interpretation of the data in subsequent steps of hazard and risk assessment

Hazards Assessment

Which areas are at-threat



Approach used:

Vulnerability & Capacity Assessment

Identification of condition determined by social, physical, economic and environment, factors that increase the susceptibility of community, assets or system to the impact of hazards

Identification of the strengths and resources available to each individual, households and communities to cope, defend, prevent, prepare, reduce risk, or recover quickly from disaster

Element at-risk (exposure) included :

- Household (population)
- Agriculture
- Critical Infrastructure, such as road etc

Household surveyed

Risk Assessment

Landslide-hazard risk assessment
Who or what could be at risk (s)

- Population, settlement & critical infrastructure
- Economic potential

Generalized Risk
What is the level of risk for each household (and community/village)

- Population at Risk
- Infrastructure at Risk
- Other critical assets at Risk

Recommendation for landslide risk reduction and management strategies which is inline with the Government Development Planning, e.g.:

- Setting up early warning system
- Risk-sensitive land use planning
- Establishment of DRM polices etc

DESCRIPTION THE APPROACH USED

Project implementation activities and results

1. Landslide historical profiles was made available including causes of landslide in Phoukhoun areas
2. Information collection collected and interviews conducted on impacts and landslide risk (207 families in 9 villages interviewed)
3. Village landslide risk reduction plans developed village landslide action plans developed, village landslide risk mapping, village landslide preparedness plans developed including response and rehabilitation based on village potentials
4. Provincial and district RBP team (labor and social welfare, natural resource and environment, agriculture, public works and transportations) trained on landslide risk assessment and reduction
5. Data collection forms developed for risk assessment of household
6. Landslide maps of Phoukhoun district
7. Training on QGIS application

HOUSEHOLDS-LEVEL DATA COLLECTION/FIELD SURVEY :

Questionnaire No:_____ GPS Location Lat: _____Lon:_____
Address (in the order of house no, road name, locality name, village/city name):_____
_____

Household Survey for Landslide Risk Assessment - Lao PDR

This survey is being conducted to assess the landslide risks faced by the local communities to strenghten the local disaster risk reduction mechanisms, no personal information is being collected and the data collected will be strictly used by the local authorities and the study team and will not be shared with a third party.

1. Household details

1. Information on individuals and families

Residents	Age	Gender	Education	Occupation	Distance to workplace (Km)	Mode of transport to work	Differently abled (Yes / No)
Family 1							
Head							
Family 2							
Head							
Family 3							
Head							
Temporary residents (if any)							
Head							

Education	Occupation	Mode of transport
1. Currently Schooling	1. Government	Infrastructure:
2. Primary school	2. Private sector job	1. Gravel road
3. Secondary scool	3. Self employed – trade & business	2. Paved road (concrete/bitumen)
4. Graduate	4. Self employed - Agriculture	3. Unpaved/mud road
5. Post graduate	5. House wife	Vehicle:
6. Diploma	6.Retired	a. Car
7. No formal education	7. Labour	b. Bike
	8. Unemployed	c. Bicycle
		d. Bus
		e. Train

5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

tc)

5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

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letails

e built-up area

land in which the building is situated _____ (Wa/Rai/ngan/Hectares) area of
t: ..... (Wa/Rai/ngan/Hectares) (or % of the total built up area
___%)
e (Wa/ngan/Rai) .....
of the land in which the house is built
☐ Lease ☐ Illegle settlement ☐ Other.....
or a singlestoried house)
se ☐ Multi-family house ☐ Commercial (shop) ☐ Commercial (Workshop)
☐ School ☐ Hospital ☐ Other.....
ulistoried flat)
2nd Floor ..... 3rd floor .....4th floor..... Other floors.....

tation for filling the blanks above: 1. All floors residential 2. Dwelling
) 4. Commercial (Workshop) 5. Office/s 6. School
Other.....

details of the house/building

tion ☐ 1 – 10, ☐ 11 – 20, ☐ 21 – 30, ☐ 31 – 40, ☐ 41 – 50,
☐ 61 – 70 ☐ 71 – 80, ☐ 81 – 90, ☐ 91 – 100, ☐ >100 years ago

ased on engineering, architectural, technical assistance to construct the house
Don't know
e house? ☐ Architect / Draftsman ☐ Head of the house ☐ Mason ☐ By a
cy (Specify: .....), ☐ Construction firm (Please specify.....
.....) ☐ Others (Please specify: .....)
e construction of this house? ☐ No formal approval, ☐ Ministry of Public Works and Transport
overnment, ☐ Authorized construction company (Please specify:_____
_____) ☐ Others (please specify).....
es at the house

Services	Yes	No
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
	☐	☐
l	☐	☐
_____	☐	☐

Questionnaire for household surveyed

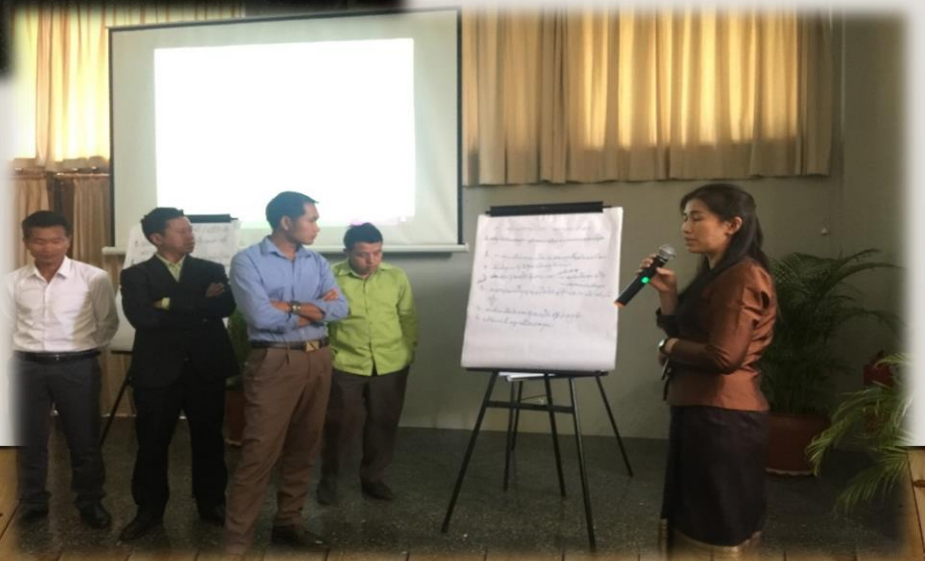
COMMUNITY-BASED LANDSLIDE-DRRM ACTION PLAN :

Community-based landside-DRRM Action Plan exercises were conducted for the villages identified as high prone to landslide to:

- Understand the landslide risk perception of the community living in the high prone areas of landslide;
- Develop landslide risk reduction and management, including preparedness and mitigation action plan at community level (based on the potential and capacity owned by the communities/villages, for example: identified potential shelter that can be used during disaster etc)

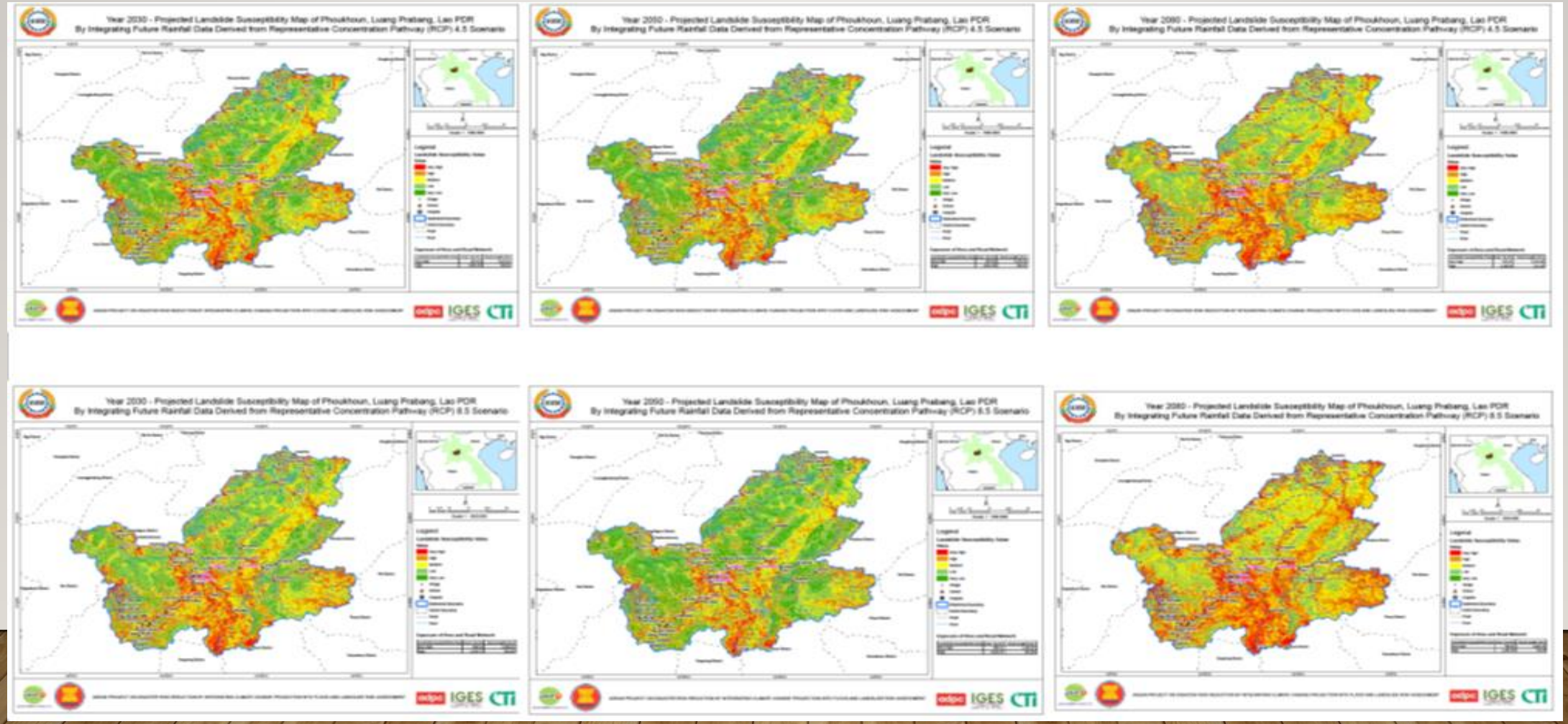
TRAININGS /CAPACITY BUILDING

(TRANSFERRING AND SHARING KNOWLEDGE AMONG RBP AND OTHER ASEAN MEMBER STATES) :



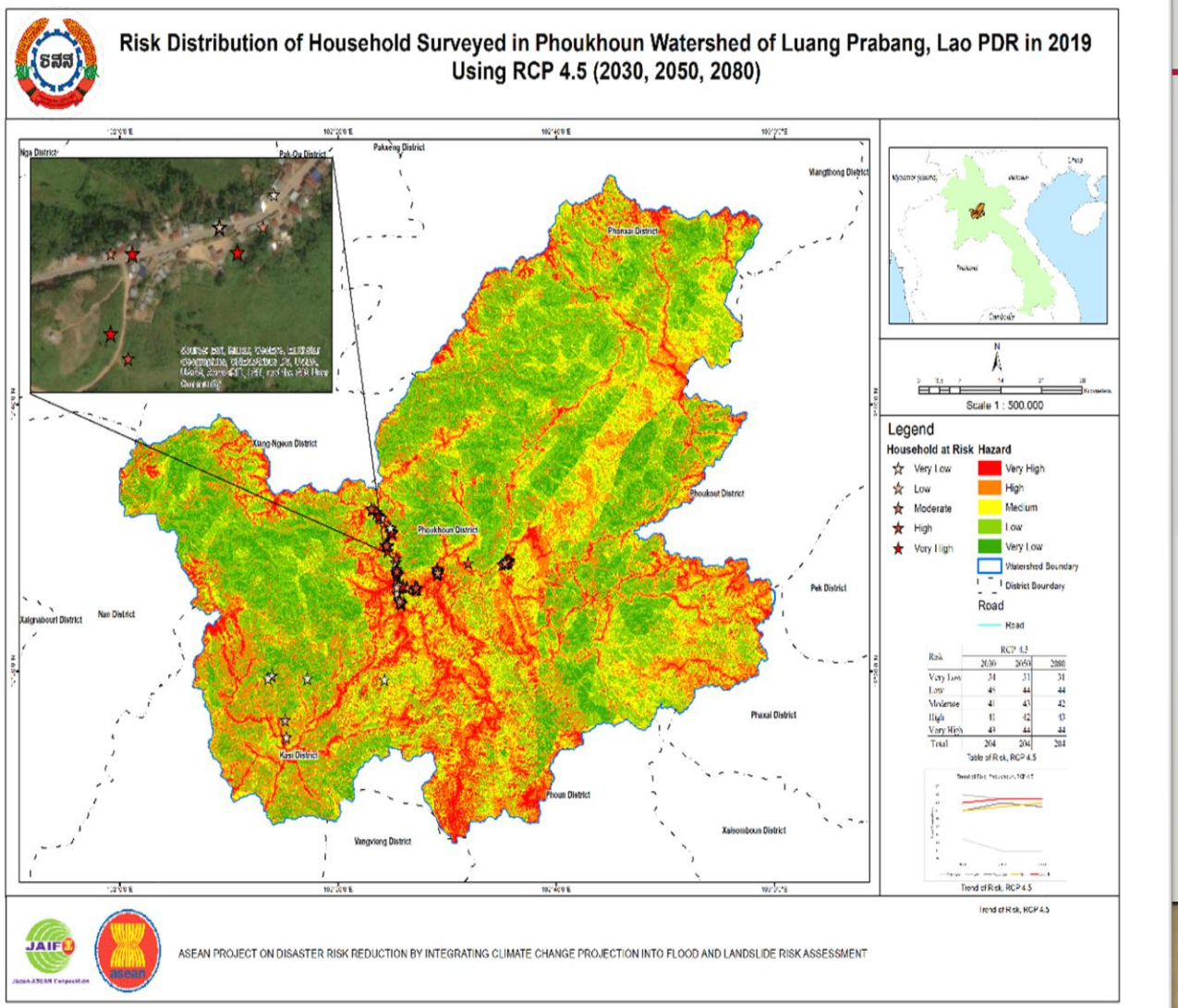
C. FINDINGS FROM THE CASE STUDY (I)

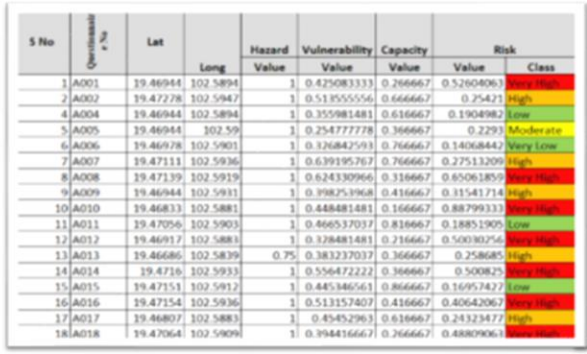
Identified areas prone to landslide within the study area of Phoukhoun River Basin



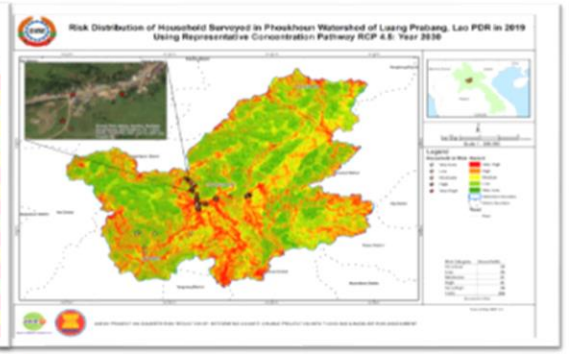
C. FINDINGS FROM THE CASE STUDY (2)

c. ภาบค้ับพับ





S No	Lat	Long	Hazard Value	Vulnerability Value	Capacity Value	Risk Value	Risk Class
1	A001	19.46944	102.5894	1	0.425083333	0.266667	0.52604063	Very High
2	A002	19.47278	102.5947	1	0.513555556	0.666667	0.25421	High
4	A004	19.46944	102.5894	1	0.355981481	0.616667	0.1904982	Low
5	A005	19.46944	102.59	1	0.254777778	0.366667	0.2293	Moderate
6	A006	19.46978	102.5901	1	0.326842593	0.766667	0.14068442	Very Low
7	A007	19.47111	102.5936	1	0.639195767	0.766667	0.27513209	High
8	A008	19.47139	102.5919	1	0.624330966	0.316667	0.65061859	Very High
9	A009	19.46944	102.5931	1	0.398253968	0.416667	0.31541714	High
10	A010	19.46833	102.5881	1	0.448481481	0.166667	0.88799333	Very High
11	A011	19.47056	102.5903	1	0.466537037	0.816667	0.18851905	Low
12	A012	19.46917	102.5883	1	0.328481481	0.216667	0.50030256	Very High
13	A013	19.46686	102.5839	0.75	0.383237037	0.366667	0.258685	High
14	A014	19.4716	102.5933	1	0.556472222	0.366667	0.500825	Very High
15	A015	19.47151	102.5912	1	0.445346561	0.866667	0.16957427	Low
16	A016	19.47154	102.5936	1	0.513157407	0.416667	0.40642067	Very High
17	A017	19.46807	102.5883	1	0.45452963	0.616667	0.24323477	High
18	A018	19.47064	102.5909	1	0.394416667	0.266667	0.48809063	Very High



Potential RISK = (total number of *vulnerable* HH exposed to *high* and *very high* landslide hazard zone)

X

(cost of basic needs *such as water and food* per HH during emergency)

Findings samples:

- Identified households that are high risk to landslide. Finding shows that most of the surveyed households are in the high risk of landslide.
- The results can be used as a reference in the development of landslide DRRM action plan.

PROJECT OUTPUTS & LESSONS LEARNED

1. Landslide hazard and risk maps of Phoukhoun River Basin based on 2 different RCPs scenarios (RCP 4.5 and RCP 8.5) at 3 different time periods (2030, 2050 and 2080)
2. Landslide risk guidelines that can be used to guide for the replication in other areas prone to landslide
3. Datasets used for analysis.
4. Focal point established for implementation of risk reduction activities
5. Good cooperation with local communities in project areas.

DESCRIPTION POTENTIAL APPLICATIONS

1. Application of landslide maps of Phoukhoun district in future development planning.
2. Lessons learnt from project activities to be applied in other communities living in areas prone to landslide risk.
3. Landslide risk guidelines can be communicated and applied to other locations.
4. Application of village landslides risk action plan, in particular in the areas of preparedness, response and recovery.

Road Map

Landslide Disaster Risk Reduction & Management Lao PDR

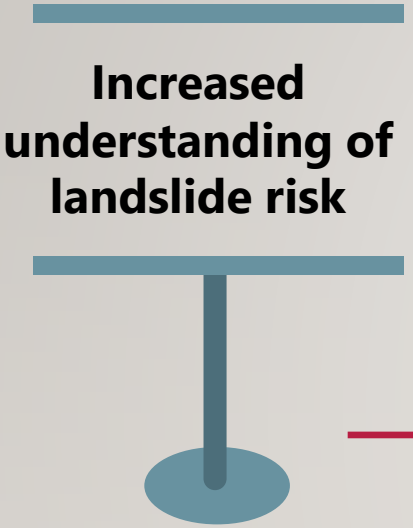
RATIONALE:

The roadmap is being drafted linking to the four Sendai Framework Priorities :

- *Priority 1* : Understanding disaster risk;
- *Priority 2* : Strengthening disaster risk governance to manage disaster risk;
- *Priority 3*: Investing in DRR for resilience;
- *Priority 4*: Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction

Priority -1

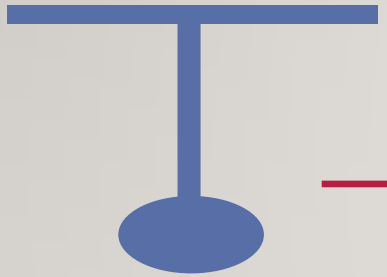
Prioritize actions/strategies related to Priority-1
(hazard and risk identification, analysis and evaluation) :



1. Initiate/encourage the formation of a technical working group on landslide DRRM which comprises cross-sectoral agencies such as NDMO, DMH,MPWT, Academia, etc. Letter of Agreement on technical cooperation and data sharing among organization can be initiated.
2. Adapt the gained knowledge to identify and map the landslide risk in other part of the Lao PRD which are prone to landslide (using the guideline and the case study developed under the ASEAN DRR-CCA project)
3. Initiate/encourage more detail mapping on the areas identified as high and very high landslide susceptible.
4. Recording disaster risks data from difference source (initiate landslide inventory database by collecting data from different sources and agencies)
5. Encourage community-based landslide risk mapping especially for the community that are identified /located in high and very high prone to landslide.
6. Disseminate information to all parties on risk issues

Priority -2

Strengthened disaster risk governance to manage disaster risk;

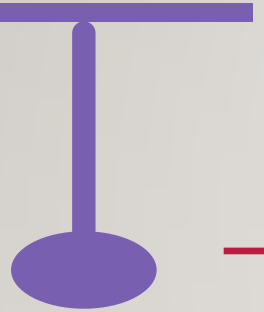


Prioritize actions/strategies related to Priority-2 (engagement of NDMO, DMH, DOR Academia and other relevant agencies in landslide DRR governance at different levels):

- Develop approach from disaster risk responsive to preventive approach
- Strengthens the early warning system
- Formulate legal framework and build the DRM legal policy
- Develop guideline for disaster resilience
- All task of DRM will be led by MLSW
- Organization for disaster risk management and recovering

Priority-3

Invest in DRR for resilience



Prioritize actions/strategies related to Priority-3 (prevention and mitigation to reduce risks in sectors through structural and nonstructural measures) :

1. Prioritize the investment project and monitoring use of the fund effectively
2. Strictly apply standard code for construction

Infrastructure development project may be created a new risk

- Avoid to create a new risk from the infrastructure development projects
- Increase the capacity building for evaluation and assessment staffs

Financial constrain for investment

Prioritize the investment project and monitoring use of the fund effectively

Priority-4

Enhanced disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction

Prioritize actions/strategies related to Priority-4 (Preparedness for effective response and recovery through Landslide Early Warning System/LEWS) :

1. Initiate the establishment of community-based early warning system prioritizing for the community located in high and very high prone to landslide,
2. Improve notification process to fast track and reached people in report area,
3. Expanding network to cover all site, including remote areas.
4. Improve the process of allocate the fund for disaster recovery,

THANK YOU