Provincial workshop on all hazard health emergency risk assessment using Strategic Toolkit for Assessing Risks (STAR)

Report of the workshop in Koshi province
June 5 - 7, 2024

प्रदेश सरकार
स्वास्थ्य मन्त्रालय
स्वास्थ्य निर्देशनालय
कोशी प्रदेश, धनकुटा

निर्देशक

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FOREWORD

Mr. Gyan Bahadur Basnet
Director, Health Directorate Koshi Province

It is with great pleasure that I present this comprehensive report on the Provincial Workshop on All-Hazard Health Emergency Risk Assessment using the Strategic Toolkit for Assessing Risks (STAR) held in Koshi province from June 5 - 7, 2024. This workshop marks a significant milestone in our ongoing efforts to enhance health emergency preparedness and response capabilities within our province.

The diverse and dynamic nature of Koshi province, with its unique geographical, environmental, and societal characteristics, necessitates a robust and adaptive approach to managing health emergencies. The STAR methodology, as employed in this workshop, provides a systematic and evidence-based framework for identifying, assessing, and prioritizing risks. This approach ensures that our preparedness and response strategies are both comprehensive and targeted, addressing the specific needs and vulnerabilities of our communities.

I extend my heartfelt gratitude to all the participants, facilitators, and supporting organizations, including the Ministry of Health and Population, WHO Nepal, and USAID, for their valuable contributions to the success of this workshop. The collaborative spirit and dedication demonstrated by all stakeholders are truly commendable and reflect our collective commitment to safeguarding the health and well-being of our people.

As we move ahead, it is imperative to translate the outcomes of this workshop into a robust provincial action plan. Strengthening intersectoral partnerships and embracing a comprehensive approach to risk management will ensure our readiness to face health emergencies. This report stands as a guiding document for all stakeholders, inspiring us to build a resilient Koshi province.

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PREFACE

In an era of escalating health emergencies, Koshi province is committed to safeguarding the health and well-being of its communities through comprehensive risk management and preparedness. The Provincial Workshop on All-Hazard Health Emergency Risk Assessment, leveraging the Strategic Toolkit for Assessing Risks (STAR), marks a significant milestone in enhancing our capacity to respond effectively to diverse hazards.

This report captures the essence of the workshop, which brough together a broad spectrum of stakeholders to identify and prioritize health hazards unique to Koshi province. By Fostering dialogue and participatory approach, the workshop achieved its key objectives of introducing the STAR methodology, engaging stakeholders, and developing a risk profile tailored to the province's need. The workshop culminated in the identification of 24 hazards, ranging from earthquake, landslides, and fires to emerging threats such as antimicrobial resistance and bird flu. Participants also crafted a seasonal calendar and a prioritization matrix to guide decision-making and resource allocation.

The outcomes are not just data points but actionable insights that underscore the importance of proactive planning and multisectoral collaboration. Examples of proposed actions include strengthening surveillance systems for emerging diseases, enhancing capacity to manage chemical hazards, and integrating mental health support into emergency response plans. Such measures reflect the province's readiness to address both immediate and long-term challenges.

I extend my heartfelt gratitude to the Ministry of Health and Population, WHO Nepal, USAID and every participant who contribute to the success of the workshop. The active participation and commitment demonstrated highlight the power of partnership in building a resilient heath system.

This report is not an endpoint but a starting point, guiding our efforts to protect lives and promote health equity across Koshi province. Together, we can rise to the challenges ahead, building a province that is well equipped to navigate health emergencies and strength and agility, ultimately fostering safer, healthier communities for generations to come.

Contents

Acronyms

AMR	Antimicrobial Resistance
ARI	Acute Respiratory Infections
AWD	Acute Watery Diarrhea
EDCD	Epidemiology and Disease Control Division
EWARS	Early Warning and Reporting Systems
IHR	International Health Regulations
JEE	Joint External Evaluation
MOHP	Ministry of Health and Population
MoSD	Ministry of Social Development
MoU	Memorandum of Understanding
NAPHS	National Action Plans for Health Security
NGO	Non-Governmental Organizations
PHD	Provincial Health Directorate
PHEOC	Provincial Health Emergency Operations Center
SOPs	Standard Operating Procedures
SORMAS	Surveillance Outbreak Response Management and Analysis System
STAR	Strategic Toolkit for Assessing Risks
WHO	World Health Organization

Executive Summary

The Provincial Workshop on All-Hazard Health Emergency Risk Assessment, utilizing the Strategic Toolkit for Assessing Risks (STAR), took place in Koshi Province from June 5 - 7, 2024. This workshop aimed to enhance the province's health emergency preparedness and response capabilities by identifying and prioritizing hazards, developing a seasonal risk calendar, and formulating actionable recommendations.

Nepal's vulnerability to various disasters and epidemic-prone diseases necessitates robust emergency preparedness and response strategies. Following the national-level Multi-hazard Risk Assessment workshop in April 2023, the Ministry of Health and Population (MoHP) initiated this process at the provincial-level replicating it across all provinces, including Koshi Province. The workshop aimed to advocate and orient stakeholders on the STAR methodology for risk assessment, engage provincial stakeholders, including non-health partners, in health emergency preparedness, identify and list hazards specific to Koshi Province, develop a province-specific risk profile based on the likelihood and impact of identified hazards, create a risk calendar for all identified hazards, and list key actions for inclusion in provincial contingency plans.

The workshop employed the STAR methodology, a step-by-step process involving hazard identification, likelihood evaluation, impact estimation, risk level determination, and the finalization of recommendations. Participants used the STAR data tool to document and rank hazards. The workshop successfully identified and assessed 24 specific hazards across five main types: Biological, Environmental, Hydro-meteorological, Societal, and Technological. The comprehensive all-hazards approach will enhance Koshi Province's capacity to respond to health emergencies, leading to better health outcomes for its population. The next steps involve implementing the recommendations, regularly updating the risk assessment, and maintaining a multisectoral approach to ensure a thorough and inclusive risk assessment.

The workshop led to the creation of a seasonal risk calendar, a risk prioritization matrix, and a database for prioritizing risks. Key actions and recommendations were developed for each hazard. Applying the results of the STAR workshop is essential for enhancing Koshi Province's health emergency preparedness and response capabilities. The comprehensive all-hazards approach derived from the workshop's findings will bolster the province's ability to respond to health emergencies, ultimately leading to better health outcomes for its residents. The next steps involve implementing the recommendations and regularly updating the risk assessment as new hazards emerge or existing ones evolve. Maintaining a multisectoral approach and involving various provincial departments and ministries is crucial for a thorough and inclusive risk assessment. This report will aid decision-makers in allocating resources to address priority hazards, even with limited resources and competing priorities.

I.Introduction

Nepal is highly susceptible to various disasters and epidemic/pandemic prone diseases, underscoring the need to strengthen emergency response across multiple sectors through comprehensive preparedness and response activities. The urgency for such measures was highlighted during the Joint External Evaluation (JEE) workshop in November 2022, which served as a platform to assess Nepal's preparedness and response mechanisms. The workshop's recommendations emphasized the development of a multisectoral, multi-hazard health emergency management plan, including emergency risk assessments, readiness evaluations, and preparedness and response plans at both national and provincial levels. Thus, profiling the hazards existing in the country is essential for preparing effective contingency and action plans.

Following the national-level workshop on Multi-hazard Risk Assessment held in April 2023, the Ministry of Health and Population (MoHP) recognized the importance of replicating this process at the provincial level. This initiative aims to achieve comprehensive hazard profiling, including seasonality and risk matrices, by involving multiple stakeholders such as government agencies, Non-Governmental Organization (NGOs), and local communities. Utilizing the Strategic Toolkit for Assessing Risk (STAR) methodology, this provincial-level effort will provide localized insights into specific risks and vulnerabilities within different regions of the country.

The Strategic Toolkit for Assessing Risk, developed by the World Health Organization (WHO), is designed to help countries identify hazards and assess their risk levels. This tool supports evidence-based planning, policy development, strategy formulation, decision-making, and prioritization of activities associated with managing all-hazard health emergencies. It enables national, subnational, and local authorities to rapidly conduct strategic and evidence-based assessments of public health risks. Aligned with the International Health Regulations (IHR 2005) Monitoring and Evaluation Framework, STAR calls for countries to develop risk profiles to inform emergency preparedness and response planning.

The STAR methodology emphasizes the following key principles:

- **All-Hazards Approach**: Recognizes that diverse types of hazards pose similar threats to health and management functions, and that developing stand-alone response mechanisms for each unique hazard is neither efficient nor cost-effective.

- **Whole-of-Society Engagement**: Encourages the involvement and coordination of all essential players in health and other sectors at all levels of society.

- **Health System Focus**: Considers hazards and their dangers at all levels of the health system, including primary, secondary, and tertiary care.

- **Risk-Informed Evidence Compilation**: Utilizes primary and secondary data from various sources to inform risk assessments, such as research, surveillance, and reviews of past emergencies.

- **Transparency**: Ensures clear and open communication throughout the risk assessment process.

By adopting a risk-based approach to emergency management, we can minimize health risks and the consequences of various emergencies and disasters. This approach involves identifying, mapping, and describing risks within a given area to prioritize actions that drive planning and strengthen coping capacities. Identifying vulnerable groups is essential to ensure equitable and inclusive resource distribution, helping to mitigate both immediate and long-term impacts on the most affected populations.

The STAR toolkit is relevant to a broad range of stakeholders involved in emergency and disaster response management. It can be applied at all stages of the emergency response cycle and is recommended to be conducted at least every 2-3 years or during major emergency responses. Through this provincial-level initiative, the Epidemiology and Disease Control Division (EDCD) seeks to enhance its capacity to manage health emergencies effectively, fostering a more resilient response to various hazards and emergencies across the nation.

II.Objectives of the STAR workshop

1. To advocate and orient on the methodology for risk assessment (use of STAR tool) at the subnational level.
2. To engage all provincial stakeholders for health emergencies preparedness including non-health partners.
3. To identify and list down hazards specific for the province.
4. To develop a province specific risk profile determining the risk level of the identified hazards based on the likelihood and impact.
5. To develop a risk calendar for all identified hazards.
6. To list down key actions based on identified hazards that provinces need to adopt in their respective contingency plans.

III.Risk profiling Methodology

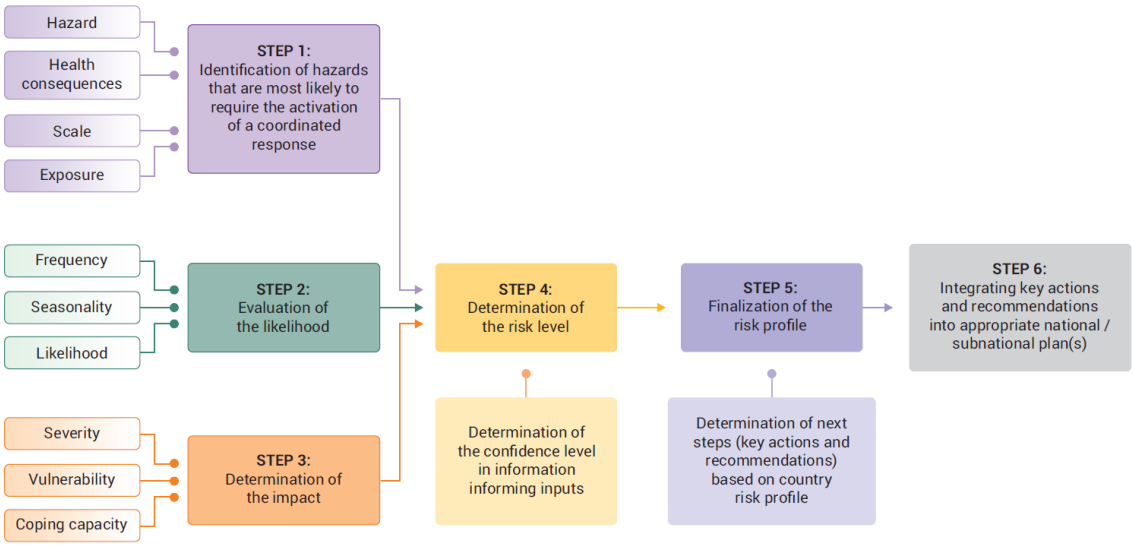
A. General overview of STAR methodology

On June 5 - 7, 2024, a three-day "Provincial Workshop on All Hazard Health Emergency Risk Assessment" was organized in Koshi province by Epidemiology and Disease Control Division (EDCD) and supported by WHO Nepal and USAID. It served as a crucial follow-up to the national workshop on all hazard health emergency risk assessment, utilizing the Strategic Toolkit for Assessing Risks. This province-level workshop aimed at assessing risks using the STAR tool, to formulate a comprehensive risk profile, seasonal calendar and priority actions specifically tailored for Koshi province, ensuring a more resilient and responsive healthcare system required for effective planning, adequate resource allocation, and prompt response mechanisms to mitigate health emergencies effectively within the region.

During the workshop, participants followed a step-by-step method to describe risks in the provincial setting, using a qualitative, participatory, and discussion-based approach to generate consensus amongst the larger group. The key steps in the risk assessment included:

Step 1: Identify hazards and describe the scenario most likely to require the activation of a coordinated response
Step 2: Evaluate likelihood
Step 3: Estimate the impact
Step 4: Determine the risk level
Step 5: Finalize recommendations and workshop report
Step 6: Integrate recommendations and priority actions into provincial action plans for sustainable capacity building (after the workshop).

Figure 1. Summary of strategic risk assessment using STAR



Participants used the STAR data tool, an MS Excel sheet which is a user-friendly data entry component with an automated risk calculation matrix, to document each step of the assessment and facilitate the ranking of hazards.

In the first step in STAR, hazards are selected and the scenario that is most likely to necessitate a provincial coordinated response is detailed. To identify the hazards most likely to necessitate a coordinated response, this requires analyzing previous risk assessments, surveillance reports, capacity assessment reports, and official databases. The scale and magnitude of the dangers should be documented and mapped, along with any negative effects on physical, psychological, social, economic, or environmental health that may emerge from them.

Step 2 involves evaluating the likelihood of the hazards identified in Step 1. This includes defining the frequency and seasonality of each hazard and using these outputs to determine the likelihood of the hazard occurring in the next 12 months. Seasonality is defined by identifying the months of the year during which the hazard is most likely to occur, and this is done on a green-red color scale.

Step 3 involves estimating the impact of the identified hazard. It includes three sub-steps: (a) assessment of severity, which requires information on transmission potential, negative consequences on the population, disruption to essential services, and effect on the health workforce; (b) assessment of vulnerability, which considers factors such as health status, social determinants of health, presence of vulnerable groups, and environmental factors; and (c) assessment of hazard-specific coping capacity, which measures how people, organizations, and systems use available skills and resources to manage adverse conditions, risks or disasters related to the identified hazard. The workshop participants need to consider the availability and functionality of coping capacity in relation to each identified hazard.

Step 4 involves determining the risk level of the identified hazards. This is done by determining the confidence level of the available data and information and using a risk matrix to rank the hazards based on their level of risk. The risk matrix is automatically populated within the tool based on inputs from the workshop discussions in Steps 1-4. The final output of Step 4 is the provincial emergency risk profile, which includes a display of risk ranking of hazards, visualization of the 5x5 risk matrix table, and qualitative information on the identified hazards.

Step 5 involves finalizing recommendations and the workshop report. In Step 5a, priority recommendations and actions are drafted based on the identified risks, with reference to the risk matrix and seasonal calendar. In Step 5b, a draft report is created based on the evidence compiled prior to the workshop and agreements among participants. In Step 5c, further discussion and validation of actions may be necessary to finalize and validate recommendations and next steps.

Step 6 of the STAR methodology involves integrating the recommendations and priority actions developed in Step 5 into provincial action plans for sustainable capacity building. The workshop report helps decision-makers prioritize and plan readiness activities, mobilize and allocate resources, and strengthen provincial capabilities for mitigation, prevention, detection, response, and recovery. The recommendations should be integrated into relevant emergency response plans to provide a sustainable platform for implementation.

The STAR workshop will aid by producing these following three output:

- Seasonal calendar of Risk
- Risk prioritization, matrix, and database
- Key actions and recommendations

This will support equity-based planning and budgeting, and further strengthen the foundation in updating/developing contingency plans, strategic readiness and response plans, and national/provincial action plans. Data consolidation and further training needs to follow the workshop to ensure effective implementation of the STAR tool's outcomes in Nepal.

B. Provincial Profile: Koshi Context

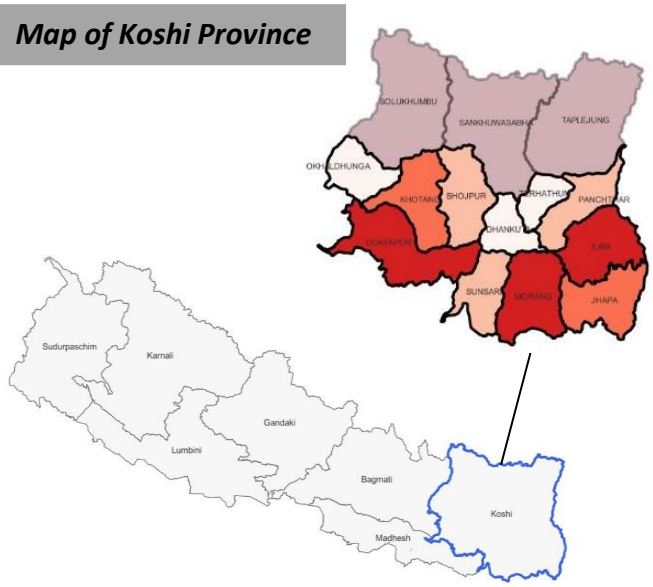
Total Area: 25, 906 Sq. Km (13.27 % of Nepal)

- **Districts:** 14
- **Local Governments**: 136

Metropolitan City: 1
Sub Metropolitan City: 2
Municipalities: 46
Rural Municipalities: 88

- **Wards**: 1157

Map of Koshi Province



Koshi province covers an area of 25,906 square kilometers, which constitutes 13.27% of Nepal's total area. The province is divided into three geographical regions: Terai (26.17%), Hill (33.53%), and Mountain (40.29%). It comprises 14 districts and 136 local governments, including one metropolitan city, two sub-metropolitan cities, 46 municipalities, and 88 rural municipalities, with a total of 1,157 wards. The population of Koshi province is 4,961,412, with a population density of 192 persons per square kilometer. The sex ratio is 95.02 males per 100 females.

Key Health Facts	
Maternal Mortality Ratio (per 100,000 live births)	157
Prevalence of stunting among children under five years of age	20.0 %
Number of FCHVs	8643
LMIS reporting status	98.4
Institutional Deliveries (%)	79
Cases of animal bites (in number)	36027
Cases of snake bites (in number)	1932
Dengue cases (in number)	18067
Kalazhar cases (in number)	51
TB case notification rate (all forms of TB)/100,000 population	94
HIV/AIDS – number of new positive cases	283

Source: Government of Nepal, Ministry of Health and Population, Nepal Heath fact Sheets 2024

The health governance structure in Koshi province includes various provincial-level offices such as the Health Directorate, Provincial Public Health Laboratory, Provincial Health Logistic Management Center, and Provincial Health Training Center. There are 144 hospitals in the province, categorized into basic hospitals (81), general hospitals (41), specialized hospitals (6), super specialty hospitals (2), and academy and teaching hospitals (3). Additionally, there are 2,230 health facilities, including public hospitals, primary healthcare centers, health posts, non-public facilities, and basic health service centers.

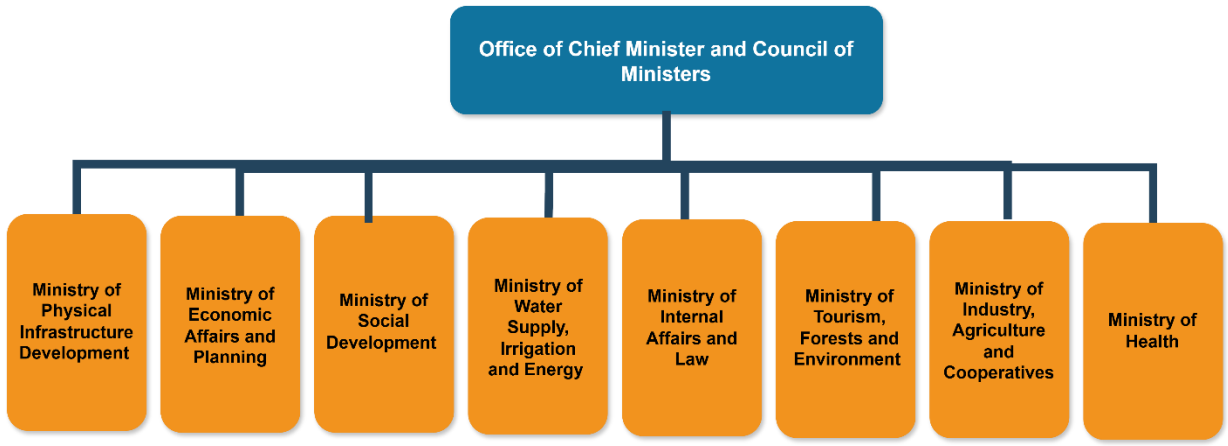


Figure 1. Koshi Province- ministries of province

Ministry of Health Governance Structure	
Provincial level offices	• Health Directorate • Provincial Public Health Laboratory • Provincial Health Logistic Management Center • Provincial Health Training Center
Health Office	• 14 districts
Ayurved Office	• 14 Districts
Hospitals	• Koshi Hospital (hub) • BPKIHS (Hub) • Provincial Hospital Bhadrapur • Katari Hospital (Hub) • Ilam Hospital (Hub) • District hospital Sunsari • District Hospital Dhankuta • District Hospital Tehrathum • District Hospital Sankhuwasabha • District Hospital Bhojpur • District Hospital Khotang • District Hospital Solukhumbu • District Hospital Okhaldhunga • District Hospital Udayapur • Madan Bhandari Hospital and Trauma Center, Urlabari

Koshi province faces numerous hazards, including landslides, floods, forest fires, disease outbreaks, and road traffic accidents. Since 2020, the province has dealt with various disasters such as the COVID-19 outbreak, floods, acute gastroenteritis (AGE) outbreaks, bird flu (H5N1), measles-rubella (MR) outbreaks, dengue, scrub typhus, mumps, chickenpox, and food poisoning incidents. Health incident information is collected through health offices, local health units, the Early Warning and Reporting System (EWARS), the Surveillance Outbreak Response Management and Analysis System (SORMAS), and media monitoring.

To manage these challenges, Koshi province has established emergency response teams at the provincial, district, and municipal levels, including rapid response committees, rapid response teams, emergency medical teams, and the Provincial Health Emergency Operation Center (PHEOC). From 2019 to May 2024, the province experienced various incidents and hazards, resulting in numerous deaths. Major hazards included fire, windstorms, floods, forest fires, high altitude incidents, thunderbolts, animal incidents, landslides, heavy rainfall, and snake bites. Between January and May 2024, the province reported several diseases through EWARS, including AGE, dengue, severe acute respiratory infection (SARI), influenza-like illness, scrub typhus, kala-azar, enteric fever, encephalitis, meningococcal meningitis, and rabies. The PHEOC has been actively involved in rumor verification and response, coordinating with various stakeholders to manage incidents such as road traffic accidents, foodborne diseases, bird flu, floods, and landslides. Based on historical data and spatial flood inundation data, the population likely to be affected by landslides and floods has been identified.

C. Provincial workshop

Day 1: Inauguration and Technical Sessions

The workshop began with an inaugural session designed to set the stage for three days of collaborative learning and practical application. Mr. Bhola Adhikari welcomed the dignitaries and participants, followed by the introduction of the dignitaries on the dais. Key stakeholders from the Ministry of Health and Population (MoHP), the World Health Organization (WHO), provincial authorities, and other sectors participated in the session, with approximately 50 participants. Distinguished guests included Dr. Tanka Prasad Barakoti, Additional Secretary, MoHP, Mr. Gyan Bahadur Basnet, Director of Health Directorate, Koshi province, Dr Guna Nidhi Sharma, Section Chief, Epidemiology and outbreak management section, EDCD, and Dr Suresh Mehta, Chief, Policy Planning and Public Health.

Welcome Remarks and Keynote Speeches

The inaugural remarks underscored the growing challenges posed by natural and man-made hazards in Koshi province. Dr. Tanka Prasad Barakoti, Additional Secretary at MoHP, stressed the importance of evaluating health hazards and disaster risks to enhance response strategies. He highlighted the collaborative nature of the workshop, which aims to bring together expertise from various sectors to develop comprehensive plans.

Mr. Gyan Bahadur Basnet, Director of the Health Directorate in Koshi province, noted that while the data in the database might not fully reflect the actual risks, the tools and expertise from different sectors would help identify these risks more accurately. He emphasized that this approach would aid in better planning and budgeting for future actions. He expressed his expectation for a more refined risk profile to emerge from the workshop.

The workshop's primary objective is to prioritize hazards in Koshi province and develop a roadmap for addressing these emergencies. Dr. Guna Nidhi Sharma, Section Chief of the Epidemiology and outbreak management section at EDCD, underscored the importance of multisectoral engagement, stating that significant improvements in health outcomes require close collaboration among all actors from various sectors. He assured that the support from the MoHP would always be available to help the province take the necessary steps in developing and implementing the plans identified during the workshop.

The session concluded with a call for proactive collaboration among stakeholders to enhance response mechanisms, ensuring rapid and efficient action during emergencies. Dr. Suresh Mehta, Chief of Policy Planning and Public Health in Koshi province, emphasized that the workshop aims to produce a well-coordinated plan that will significantly improve the province's ability to implement these plans effectively when needed. Through collaborative efforts, the workshop seeks to create a robust framework that ensures Koshi province can act swiftly and efficiently in times of crisis.

Workshop Overview and Objectives

Dr. Guna Nidhi Sharma, Epidemiology and Disease Control Division, Section Chief, delivered a comprehensive overview of the workshop's goals, methodologies, and anticipated outcomes. The workshop aimed to equip participants with the skills to conduct strategic risk assessments, identify and prioritize hazards, and develop actionable recommendations aligned with global frameworks such as the International Health Regulations (IHR) and the Sendai Framework for Disaster Risk Reduction.

The specific objectives were to:

1. Orient stakeholders to the STAR methodology, focusing on risk identification, assessment, and prioritization.
2. Enhancing collaboration across sectors, integrating non-health stakeholders into health emergency preparedness efforts.

3. Develop critical outputs, including a seasonal risk calendar and a risk prioritization matrix.

Dr. Sharma began the session by setting the scene for understanding emergency and disaster risk management. He emphasized the importance of recognizing the key components: hazards, exposure, vulnerabilities, and coping capacities. This foundational knowledge is crucial for developing effective strategies to manage and mitigate risks.

He then introduced the concept of Strategic Risk Assessment, explaining its primary purpose. The STAR approach is designed to develop a comprehensive risk profile that enables national and subnational governments to prioritize preparedness and readiness actions based on evidence. This method supports strategic and operational planning by linking to International Health Regulations tools such as SPAR, JEE, and IHR-MEF. Dr. Sharma highlighted that the STAR toolkit is adaptable and flexible, making it suitable for various local contexts and focus areas. It employs a multi-sectoral, whole-of-society approach and relies on participatory methods and available data from all sectors.

Dr. Sharma discussed the application of the provincial risk profile, tailored to meet specific objectives and needs. This profile helps prioritize National Action Plans for Health Security (NAPHS) and capacity-building for health emergencies. It also enhances surge capacity mechanisms, addresses concurrent emergency risks, and aids in developing or revising policies and legislation. Identifying gaps in knowledge and needs for further assessment is another critical aspect of this process.

Dr. Sharma detailed the steps involved in conducting strategic risk assessments:

1. Identifying hazards likely to trigger a provincial response.
2. Evaluating the likelihood of these hazards.
3. Determining the potential impact.
4. Assessing the overall risk level.
5. Finalizing the risk profile.
6. Integrating key actions into appropriate plans and operations.

He presented the outputs of the STAR process, which include provincial risk profiles, seasonal calendars of risk, key actions and recommendations, and risk prioritization matrices. These tools help visualize risks in terms of likelihood and impact, facilitating better preparedness and response planning.

Dr. Sharma provided examples of priority actions based on the risk profile. These actions include reviewing and updating contingency plans, developing Standard Operating Procedures (SOPs) and Memorandums of Understanding (MOUs), increasing social awareness, and reviewing early warning systems and health infrastructure. These steps are essential for ensuring continuity of essential health services and mitigating risks effectively. He emphasized the importance of gathering relevant data in advance to support the STAR exercise. This data includes health information, non-health information, and population dynamics. Collecting this data helps create a comprehensive risk profile and supports informed decision-making.

Dr. Sharma concluded the session by highlighting key considerations for the effective implementation of the STAR tool. Drawing from past experiences, he stressed the importance of a participatory approach, the use of available data, and the need for flexibility and adaptability in applying the toolkit.

Identification of hazard that will trigger provincially coordinated emergency response

The session commenced with a presentation on the identification of hazards that could necessitate a provincially coordinated emergency response. During the technical discussion, participants were introduced to the concept of a hazard, which refers to a process, phenomenon, or human activity that may result in loss of life, injury, property damage, social and economic disruption, or environmental degradation (UNGA 2016, WHO 2009). The session also covered various types of hazards, including biological, geophysical, weather-related, societal, environmental, hydro-meteorological, and technological hazards.

Group Work: Hazard Identification

Participants worked in groups to identify hazards relevant to Koshi province, guided by STAR's structured criteria followed by an interactive exercise in plenary for selection of hazards. Participants were provided with a long list of reference for all-hazard types, including biological, geophysical, hydro-meteorological, technological, societal, environmental, and extra-terrestrial hazards and encouraged to select only the hazards that would likely result in activation of a provincial coordinated response mechanism. Participants were provided with key points to consider, which included whether the hazard had recently been experienced in the province, whether it was experienced within the last 5-10 years, whether risk assessments (all-hazards or hazard-specific/vertical) or risk models available had been reviewed, whether there were potential cross-border risks or risks from neighboring province/countries, and whether the hazard would likely trigger a provincial response mechanism. A total of 24 hazards were identified, during the hazard identification exercise (See annex 1). Participants were then divided into five thematic groups based on specific hazard types.

Through the discussion, it was noted that hazards that have similar or the same consequences can be grouped together. Some hazards, such as HIV/AIDs, Cyber-attack, Animal attack, deforestation, anthrax was removed from the list after the discussions as participants stated it does not require a provincial coordinated response. The exercise helped in active collaboration among participants, highlighting the importance of diverse perspectives in comprehensively assessing provincial risks.

Session on describing the Health Consequences, Scale and Exposure

This session focused on equipping participants with the skills to describe the health consequences, scale, and exposure associated with identified hazards. After which the session moved on to group work where the focus was on the utilization of the STAR tool, the tool was provided to all the groups, it was ensured every group had one laptop with them. The group worked on the tool by working on it with their own knowledge, experience and online data source, the participants were able to assess the scale of each hazard and identify potential risks more accurately.

Overall, the exercise highlighted the need for improved surveillance in health sectors and provincial level response readiness due to the nature of the hazards.

Day 2: Technical Sessions and Group Work Continuation

The second day commenced with a recap of Day 1, reinforcing the key takeaways, and ensuring alignment among participants and emphasizing the need for continuity and thoroughness in the discussions.

Session on describing seasonality, frequency and likelihood

During the session, participants concentrated on the potential occurrence of specific hazards that would necessitate a provincial-level response, with a particular focus on Koshi province. They utilized a variety of data sources, including hazard-specific information, meteorological reports, early warning data, historical emergencies, and vaccine uptake rates or interruptions in regular immunization services, along with their expert judgment.

They evaluated the scenario by comparing it with historical data and existing models to estimate the frequency of the hazard. They also considered the seasonality of the hazard, identifying the months when it is most likely to occur based on past patterns. Using the available data, participants assessed the likelihood of the hazard occurring within the next 12 months, which would require a coordinated provincial response.

During the working group session, members made informed judgments based on all relevant hazard-specific data and their collective expertise. By identifying the seasonality of hazards, especially in Koshi province, professionals can better plan for surge capacity, prioritize actions, and deploy timely and appropriate risk-reduction measures.

Session on describing Severity, Vulnerability, and Coping Capacity

The day's second session introduced participants to the third step of the STAR methodology: assessing the severity, vulnerability, and coping capacity of identified hazards. Facilitators from WHO explained these concepts in detail, providing practical frameworks for analysis:

1. **Severity Assessment:**

The process began with assessing severity using the severity algorithm, which is crucial for prioritizing resources, implementing mitigation measures, and managing potential health crises effectively. This involved evaluating the gravity of health outcomes resulting from exposure to identified hazards, including the severity and duration of illnesses, potential mortality rates, and long-term health implications. For biological hazards, it also included assessing the ease and speed of transmission within the population. Additionally, the assessment considered the disruption to essential health services.

Participants evaluated the health consequences of each hazard, focusing on morbidity, mortality, and the disruption of essential services. Factors such as transmission potential and the hazard's impact on vulnerable populations were also discussed. The working group concluded the severity of the 24 hazards are as follows: *Very high: 2, High: 6, Moderate: 8, and Low: 8*.

2. **Vulnerability Analysis:**

Next, the presentation discussed describing vulnerability, which refers to the characteristics and circumstances that make individuals, communities, systems, or assets susceptible to the damaging effects of a hazard. Vulnerability factors include age, gender, health status, socioeconomic status, disability, and access to resources and support networks. The assessment categorized vulnerability into individual, community, system, and infrastructure levels. Socioeconomic factors like poverty, employment status, and literacy levels, as well as environmental factors such as climate change and environmental degradation, were also considered. The Cochrane Methods Equity Progress-Plus Model was highlighted as a framework for analyzing health equity and identifying health inequities.

Using the Progress Plus model, participants examined socio-economic determinants, geographic disparities, and marginalized groups' exposure to risks.

3. **Coping Capacity Evaluation**:

Finally, the presentation covered assessing coping capacity, which measures how people, organizations, and systems use available skills and resources to manage adverse conditions, risks, or disasters. This included evaluating governance and coordination, health sector capacities, non-health sector capacities, and community capacities. Governance and coordination involved existing plans, legal frameworks, multisectoral coordination, and political will. Health sector capacities included the functionality of health services, health workforce readiness, surveillance systems, and supply chain functionality. Non-health sector capacities encompassed socio-economic support, private sector engagement, telecommunications, and logistics capacities. Community capacities involved knowledge, attitudes, practices, social support mechanisms, and community health worker programs.

Participants assessed the readiness of governance systems, healthcare infrastructure, and community networks to manage and mitigate the impacts of each hazard. They considered factors such as early warning systems, resource availability, and community resilience.

In the latter part of the day, participants began drafting actionable recommendations for hazards allotted to each group. This involved outlining responsibilities, setting timelines, and identifying resource requirements. With this, day 2 was wrapped up with concluding the session.

Day 3: Final Discussions and Outputs

The third day focused on consolidating the insights and outputs generated during the workshop. The morning session began with a review of the previous day's work, followed by discussions aimed at refining the drafted priority actions.

Refinement of Risk Assessments

Participants revisited their risk assessments, incorporating feedback from facilitators and peers. Adjustments were made to ensure that risk levels accurately reflected the province's context.

Plenary Presentations and Stakeholder Feedback

In the plenary session, each group presented their finalized priority actions, receiving constructive feedback from participants. Recommendations focused on enhancing the feasibility and alignment of proposed actions with provincial capacities. Examples included:

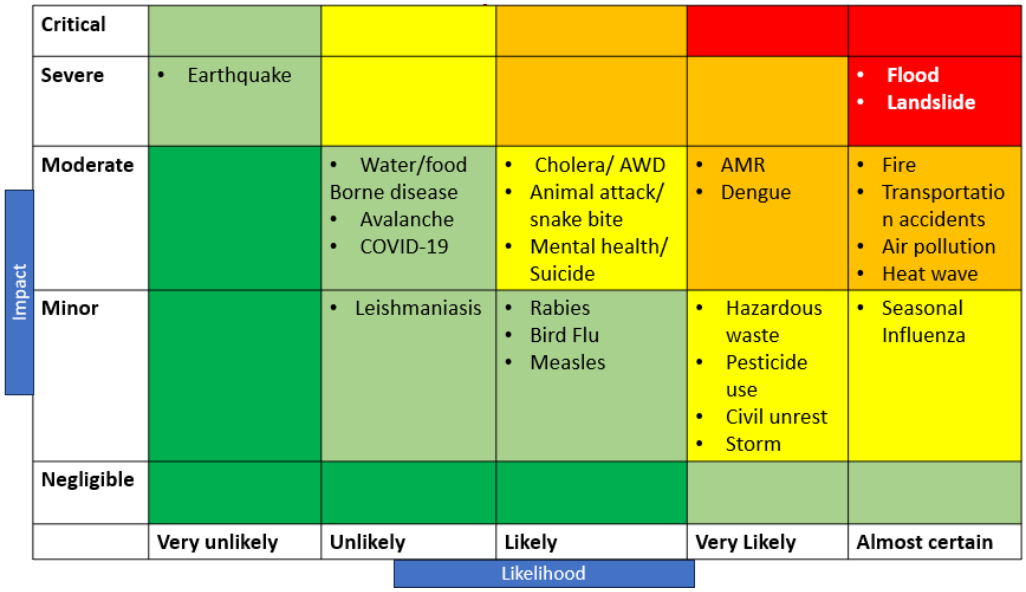
- Landslide risk assessment and mitigation work, including bioengineering and protection measures, are essential to reduce landslide risks.
- The Public Health Service Act should be enforced to prevent haphazard antibiotic use.

Key Outputs

1. **Seasonal Risk Calendar:** A detailed timeline highlighting high-risk periods for prioritized hazards, enabling targeted preparedness efforts.

Specific Hazard	Risk Level	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flood	Very high												
Landslide	Very high												
Antimicrobial resistant microorganisms	High												
Fire	High												
Transportation accidents	High												
Air pollution	High												
Heat wave	High												
Dengue	High												
Cholera/ Acute Watery Diarrhea	Moderate												
Animal attack/Snake bite	Moderate												
Storm	Moderate												
Civil unrest	Moderate												
Seasonal Influenza	Moderate												
Hazardous waste	Moderate												
mental health issues/suicide	Moderate												
Pesticide use	Moderate												
Water/food borne disease	Low												
Rabies	Low												
Earthquake	Low												
Avalanche	Low												
COVID-19	Low												
Bird flu	Low												
Leishmaniasis	Low												
Measles	Low												

2. **Risk Prioritization Matrix:** A comprehensive categorization of hazards based on their severity, vulnerability, and coping capacity.



3. **Actionable Recommendations:** Tailored strategies for each high-priority hazard, complete with lead agencies, implementation timelines, and estimated budgets.

To address the risks associated with various hazards, the participants finalized the following key actions:

Hazard	Narrative
Earthquake	• Preparing and implementing an Integrated Action Plan that outlines comprehensive strategies for earthquake preparedness and response. • Regular training and simulation exercises for rescue teams to ensure they are well-prepared for real-life scenarios. • Procuring search and rescue equipment for the response teams to effectively manage earthquake-related emergencies.
Flood	• Preparing and implementing an Integrated Action Plan, developing an early warning system, and providing training to DHM staff. • Prepositioning relief materials such as tents and essential medicines • Regular risk communication and community engagement in vulnerable areas
Landslide	• Landslide risk assessment and mitigation work to be conducted, including bioengineering and protection measures

	• Prepositioning response kits and human resources for timely assistance. • Establishing an early warning system for proactive management of landslide hazards.
Fire	• Preparing and implementing an Integrated Action Plan. • Advocacy for separate burning wards in hospitals to manage fire-related injuries effectively. • Enhancing the knowledge and skills of Municipality and Rural Municipality Police through training for response to fire incidents. • Awareness campaigns using media to educate the public on fire prevention and safety measures.
Road Traffic Accident	• Awareness campaigns using media will educate the public on road safety. • Strict implementation of rules and regulations is necessary to enforce safe driving practices. • Orientation programs for drivers and helpers to enhance their understanding of safety protocols.
Air Pollution	• Conducting surveys for site selection, installing equipment at different locations to assess air quality, and collecting, analyzing, and reporting data to concerned authorities. • Afforestation and stricter regulations on emissions from vehicles and industries
Heat wave	• Formulating a Heat Action Plan to manage heat wave risks. • Community and public awareness campaigns to educate people on how to stay safe during heat waves. • Establishing Cooling Centers and Water ATMs to provide relief to affected populations.
Seasonal influenza	• Improving Supply chain management • Conducting awareness programs • Establishing a dedicated epidemic control team or hospital
Antimicrobial Resistance	• Conducting community awareness programs • Developing SOPs and guidelines for antimicrobial use and distribution • Enhancing laboratory capacity for testing AMR in humans and food
Hazardous waste	• Conducting Behavioral change programs and onsite coaching for hospital workers • Identifying land for waste disposal

	• Establishing effective disposal mechanisms
Pesticide use	• Upgrading lab capacity for testing pesticides in agricultural products • Strengthening vigilance against illegal pesticide entry • Strengthening risk communication and community engagement
Civil unrest	• Conducting community and public awareness programs to educate people on the importance of maintaining peace and order during civil unrest.
Storm	• Preparing and implementing an Integrated Action Plan to ensure a coordinated response to storm-related emergencies.
Cholera/Acute Watery Diarrhea	• Conducting community awareness programs • Capacity building of laboratories for cholera detection at water sources • Conducting mass media campaigns for safe water use
Animal attack/snake bite	• Conducting community awareness programs. • Training for wildlife rescue handling to improve response to animal attacks and snake bites • Developing treatment guidelines for humans
Mental health/suicide	• Conducting awareness programs and initiatives to address stigma and discrimination to improve mental health outcomes. • Establishing a hotline number and widely disseminating it • Providing psychiatric services at the district level through telemedicine and camp-based approaches
Rabies	• Conducting community awareness programs • Improving procurement supply chain management of ARV vaccines in province
Bird flu	• Sanitation promotion and awareness programs for poultry handling and meat-consuming populations • Regular inspection of fresh houses • Cross-border screening of poultry
Measles	• Immunizing children with missed vaccinations • Collaborating across borders for mobile population screening and vaccination
Leishmaniasis	• Case-based surveillance and treatment, risk communication, and community engagement • Conducting vulnerability mapping • Improving housing conditions
COVID-19	• Running vaccine campaigns for elderly people • Conducting community and school awareness programs

	• Ensuring the availability of basic infrastructure, equipment, PPE materials, IEC/BCC materials, and WASH materials at points of entry • Making full-time permanent HR available at points of entry
Avalanche	• Avalanche forecasting and control structures necessary to manage avalanche risks. • Developing an emergency response plan to ensure a coordinated approach to avalanche-related emergencies.
Water/food borne disease	• Conducting community awareness programs and establishing traceability mechanisms • Training and awareness programs for street food vendors and food handlers will ensure food safety.

Closing Remarks

The workshop concluded with a ceremony acknowledging the contributions of all participants. Mr. Gyan Bahadur Basnet, Director of the Health Directorate, Koshi Province, expressed that the action plan prepared during the workshop was a significant step towards enhancing preparedness and response capabilities. He assured everyone that the plan would be communicated with the ministry to ensure its effective implementation. He emphasized that, together, substantial progress could be made in mitigating risks and improving health outcomes in the province. Appreciation was extended to all participants for their active engagement and valuable contributions.

Conclusion

The Koshi Province STAR workshop successfully identified and assessed 24 specific hazards. These hazards were further categorized into five main types: Biological, Environmental, Hydro-meteorological, Societal, and Technological. This was achieved through a step-by-step process that incorporated a participatory approach and existing data. The workshop led to the creation of a seasonal risk calendar, a risk matrix, and a database for prioritizing risks. Key actions and recommendations were developed for each hazard. Applying the results of the STAR workshop is essential for enhancing Koshi Province's health emergency preparedness and response capabilities. The comprehensive all-hazards approach derived from the workshop's findings will bolster the province's ability to respond to health emergencies, ultimately leading to better health outcomes for its residents. Next steps involve implementing the recommendations and regularly updating the risk assessment as new hazards emerge or existing ones evolve. Maintaining a multisectoral approach and involving various provincial departments and ministries is crucial for a thorough and inclusive risk assessment. The STAR workshop report should be disseminated to all relevant sectors, partners, and donors to support decision-making, prioritize readiness activities, and strengthen health emergency and disaster risk management capacities. This report will aid decision-makers in allocating resources to address priority hazards, even with limited resources and competing priorities.

Annex:

Annex 1: Identification of Hazards

S. N	Subgroup of Hazards	Specific Hazard	Main type of hazard
1	Geophysical	Earthquake	Hydro-meteorological
2	Geophysical	Landslide	Hydro-meteorological
3	Technological	Fire	Technological
4	Technological	Road Traffic Accident	Technological
5	Environmental	Heat Wave	Environmental
6	Animal-human contact (zoonosis)	Rabies	Biological
7	Weather Related	Flood	Hydro-meteorological
8	Environmental	Healthcare/Industrial waste	Environmental
9	Animal-human contact (zoonosis)	Animal attack/snake bite	Biological
10	Respiratory pathogens	COVID-19	Biological
11	Other infectious hazards	Antimicrobial resistance	Biological
12	Environmental	Seasonal Influenza	Environmental
13	Vector-borne diseases	Dengue	Biological
14	Vector borne disease	Leishmaniasis	Biological
15	Environmental	Air pollution	Environmental
16	Societal	Mental Health Issues/Suicide	Societal
17	Feco-Oral disease	Cholera/AWD	Biological
18	Weather related	Storm	Hydro-meteorological
19	Feco-oral disease	Food borne/Water borne disease	Biological
20	Technological	Pesticide	Technological
21	Respiratory Pathogens	Measles	Biological
22	Weather-related	Avalanche	Hydro-meteorological
23	Animal-human contact (zoonosis)	Bird flu	Biological
24	Societal	Civil unrest	Societal

Annex 2: List of Participants

World Health Organization
Nepal

USAID
FROM THE AMERICAN PEOPLE

Government of Nepal
Ministry of Health and Population
Department of Health Services
Epidemiology and Disease Control Division