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Kathmandu, Nepal 14–16 November
REGIONAL CONFERENCE 2024

Climate Resilient Land Governance and Disaster Resilience: Safeguarding Land Rights



Multi-Hazard Early Warning System(MHEWS) in Janaki Rural Municipality: A GIS Perspective (12929)

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Content

- Introduction
- Objectives
- Data and Software
- Methodology
- Result
- Conclusion
- Limitations
- References



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Introduction

- More than 80 percent of the total population of Nepal is at risk from natural hazards, such as floods, landslides, windstorms, hailstorms, fires, earthquakes, and Glacial Lake Outburst Floods (GLOFs) (Nepal Disaster Report, Ministry of Home Affairs).
- Nepal is considered the second highest country at risk of floods in South Asia (UNDP, 2009).
- Globally, Nepal ranks 4th and 11th in terms of its relative vulnerability to climate change and earthquakes, respectively (Maplecroft 2011, BCPR 2004 cited in MoHA 2015).





Introduction

- Sudurpaschim province has a high risk of multiple natural disasters (Gautam et al., 2021).
- Janaki Rural Municipality lies in the Karnali basin and many other small rivers like Kulariya, Pathriya, Dhobani, and Bijuliya run through here affecting most of the areas with flood and inundation during monsoon season every year(LDCRP).
- In the past decade, the Bipad portal has documented 23 incidents resulting in 3 casualties, 3 injuries, and 1 person reported missing. These disasters have also caused 7 million Rupees in losses, affected 24 livestock, and damaged 3 physical infrastructures.

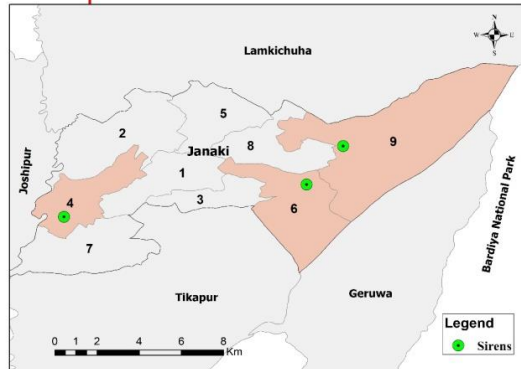
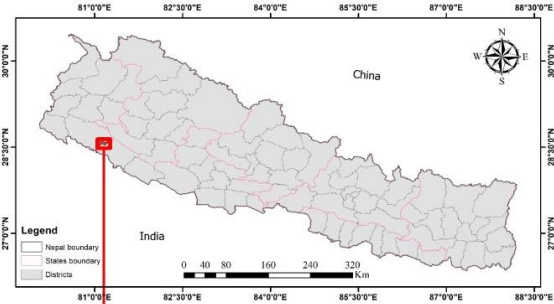


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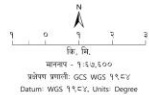
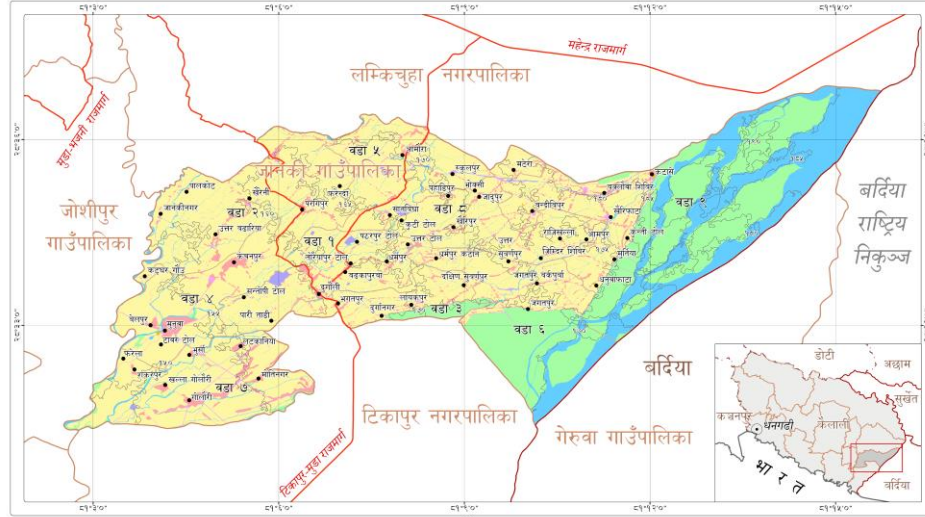


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भू-उपयोग नक्सा

जानकी गाउँपालिका, कैलाली, सुदूरपश्चिम प्रदेश, नेपाल		भू-उपयोग	
● सडकजोडी	— प्राथमिक सिमान्त	■ कुपि	■ जङ्गल
○ किल्ला सदरमुकाम	- - - किस्म सिमान्त	■ आवासीय	■ नदी, ताल
● खाडी/सिक्किमको कार्यालय	— पाषाण सिमान्त	■ औद्योगिक	■ पर्वत/तल
● बडा कार्यालय	— बडा सिमान्त	■ औद्योगिक	■ पर्वत/तल
● बस्ती	— राजमार्ग	■ प्राकृतिक	■ प्राकृतिक
— अन्तरमण्डल सिमान्त	— शस्येष्	■ खादी तथा खनिज	■ अन्य

यो नक्सा युनेस्को विश्वको आर्थिक साक्षरताका रूपमा प्रयोग गर्नका लागि तयार पारिएको छ। यो नक्सा युनेस्को विश्वको आर्थिक साक्षरताका रूपमा प्रयोग गर्नका लागि तयार पारिएको छ।

स्रोत: सार्वजनिक स्रोतहरू, DSM, २०१९ जसको साथै निर्माण।

यो नक्सा युनेस्को विश्वको आर्थिक साक्षरताका रूपमा प्रयोग गर्नका लागि तयार पारिएको छ।

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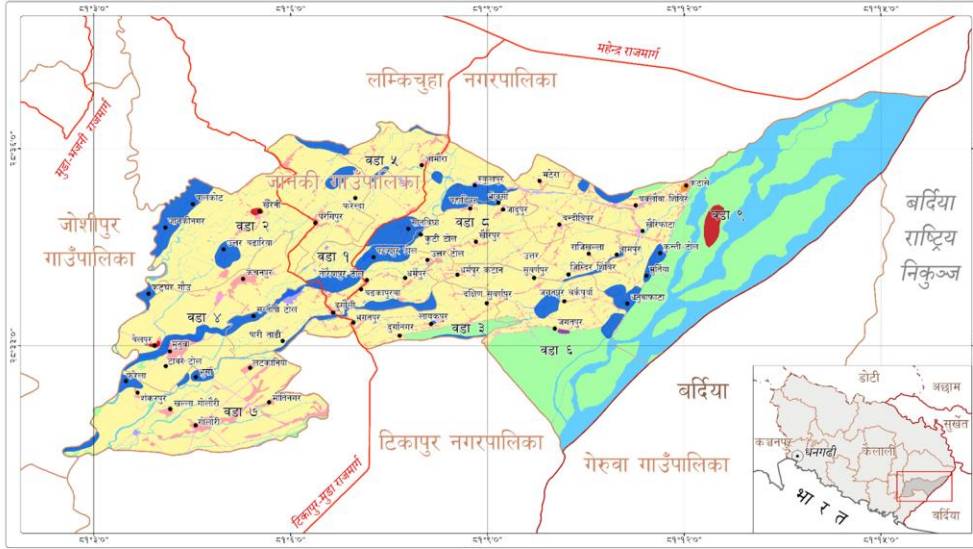
Source: Youth Innovation Lab, NYCAGG

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Source: Youth Innovation Lab, NYCAGG



Introduction

- The multi-purpose sirens are placed in Janaki from 2079/80 for effective and efficient information flow around 2 km radius from the siren place.
- The multi-purpose sirens in Janaki were funded by NDRRMA and are controlled by Disaster Focal Person at Local Emergency Operation Centre (LEOC) of rural municipality.



FIG

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Objective

- To explore the implementation and effectiveness of a multi-hazard early warning system integrated with multi-purpose sirens in enhancing disaster management and response capabilities within Janaki Rural Municipality.



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Data and Software

- Spatial data like location of sirens, road network, settlement data.
- ArcMap version 10.8 is used for network analysis



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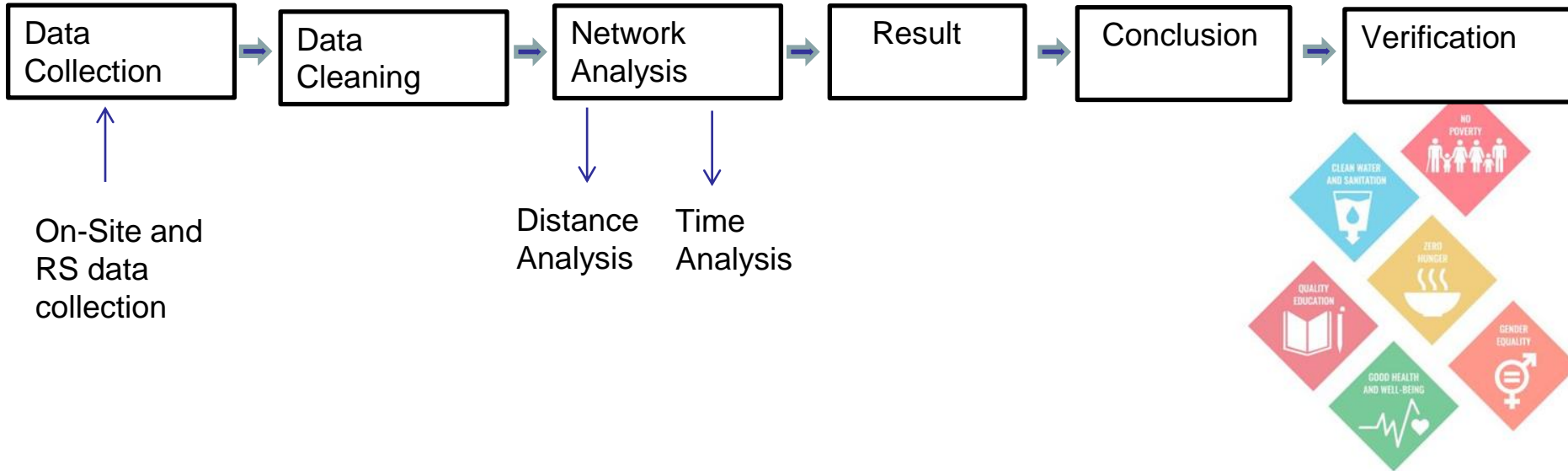


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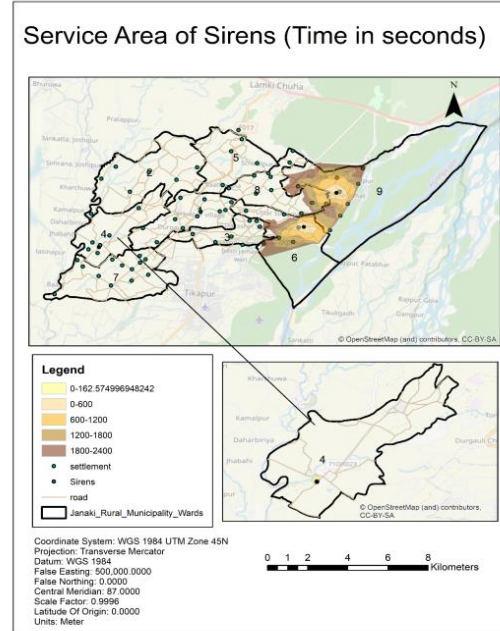
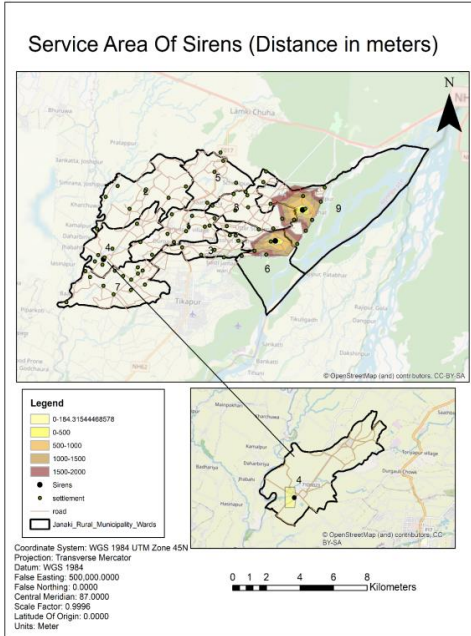


Methodology





Result





Result

- Siren alerts cover most settlements in targeted wards, people of vulnerable zones reaching siren place in less than 10 minutes for nearby areas, up to 40 minutes for farther locations.
- Safe zones are accessible within the warning period, allowing timely evacuation.





Conclusion

- According to interaction with community people, MHEWS has been effective and has significantly reduced casualties and economic losses by enhancing disaster preparedness (Validated with DRR Focal Person).
- No human and animal casualties from 2079/80 in siren placed wards because of timely information (Vulnerability and Capacity Assessment).
- For optimal impact, early warnings need to be issued at least 40 minutes before anticipated events.
- Most of the vulnerable settlements of ward 4, 6 and 9 are benefited from MHEWS.



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Recommendation

- Install additional sirens across other vulnerable wards for broader reach.
- Prioritize sirens placement near densely populated or high-risk areas to enhance community safety.



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Limitations

- Road network data being unreliable.
- Actual percentage comparison of economic losses before and after siren placement couldn't be done due to lack of data.
- Lack of data for the perspective of land tenure.





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