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The world-first deployment of narrowband IoT for rural hydrological monitoring in UNESCO biosphere environment

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Abstract: The success of a rural wireless monitoring system depends on establishing a reliable wireless link over the TCP/IP communication protocol in a challenging terrain and elevation profile. Several studies have shown that link reliability in a rural area can neither be predicted with high accuracy nor precisely modeled using existing mathematical channel modeling tools. Hence, the use of the empirical approach to infer wireless link reliability. This work focuses on the revival of a rural hydrological/water monitoring system with emphasis on the wireless link located in Tasik Chini, a lake with UNESCO biosphere status. The contributions of this study include: understudy the link reliability of a centralized wireless sensor network infrastructure system using the 2G and Long Range (LoRa) wireless network, the performance limitation of the low data wireless sensor network in a rural environment, approaches to revive rural water station monitoring center and finally highlight potential opportunities in rural wireless communications. View less

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I. Introduction

Wireless sensor networks (WSNs) are an integral part of any remote monitoring system as it provides an amenable strategy to automate data collection with less human and material cost [1]. The system design of Tasik Chini hydrological monitoring center is based on WSNs infrastructure. Consequently, for Tasik Chini hydrological monitoring center to operate optimally, the reliable wireless link is crucial. As a matter of fact, this was the main problem that leads to near system collapse before this project set out to resuscitate the center.

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