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**Science-Driven Disaster Risk Reduction and
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Science-driven Disaster Risk Reduction and Management for Sustainable Development in Papua New Guinea

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Asia and the Pacific region have suffered more losses from disasters compared to other regions in the world (UNDP 2013). In 2013 alone, 19 million of the 22 million people displaced by floods, typhoons, and earthquakes came from Asia. Out of ten worst disasters of the 21st century, caused by natural events, seven occurred in Asia and the Pacific region. This trend is expected to continue for the next decades with demographic growth and socio-economic expansion in the region.

Natural hazard events lead to disasters when the events interact with exposed and vulnerable physical and social systems. A disaster is a serious disruption of the normal functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community/society to cope using its own resources. A disaster is also a function of the risk process, and results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures of risk and exposure. Hydro-meteorological and climatological hazards are the most frequent causes of the disaster events among all-natural hazards in Papua New Guinea (PNG). Natural Disaster events continue to grow in number, intensity, and impact in PNG in the years ahead and will become direct threats to national food security and livelihoods. Most often disaster impacts are amplified by rapid growth and unsustainable development practices thereby increase exposure and vulnerabilities of communities and capital assets. Disasters will have very detrimental impacts on development. Hence, reducing disaster risk (DRR) becomes a foundation for sustainable development for PNG.

All DRR (prevention, mitigation and preparedness) including warning systems, requires long-term planning. To undertake that planning, a dependable, science-driven approach is necessary in understanding and assessment of disaster risks at all levels. The science-driven approaches to DRR and disaster risk management (DRM) will help communities become more resilient and reduce human and economic impacts of disasters at national level. Science plays a vital role in all stages of DRR and its management by regularly providing rapid assessment and usable knowledge to end users and decisionmakers. Science driven approaches provide robust, evidence-based frameworks and a variety of knowledge products (concepts, tools, technology, data, advices, training) for social policy engagement, development, and implementation.

PNG urgently needs to embrace science-driven approaches/tools like (i) improved understanding of the spatial distribution and drivers of vulnerability and exposure (ii) geo-referenced tools and spatial information about hazards (iii) systematic assessment of exposure and vulnerability from descriptive narratives and generalized overviews to more robust empirically and evidence-based analyses (iv) delineating and mapping areas at risk with better spatial information on hazards and risk derived from modeled (DEM) and observational data (satellite imagery) and computational and methodological advances.

It is imperative to introduce significant improvements in existing assessment processes by scientific advice on disaster risks to support and catalyze disaster policy development and management. Comprehensive periodic assessments of disaster risks at local, regional and national level should be undertaken by a team of trans-disciplinary experts appointed by the national government. This committee by working with civil society and relevant stakeholders will produce a clear and unambiguous scientific view on the state of knowledge in disaster risk and the ways to reduce significant human and economic losses. It will also help produce unambiguous evidence of economic, operational, and strategic benefits of using scientific knowledge and information, to address hazard prevention, mitigation, and response actions.

In addition, our knowledge of extreme weather forecasting and real-time public warnings have to be significantly improved by developing scientific and technological capability coupled with effective communication and response capabilities to substantially reduce the losses. For effective operations of early warning systems, there is a need for the technical information to be properly communicated to all who need it and for recipients to be prepared for, and able to take appropriate responses. It is important to recognize that reduction of disaster risks is a foundation for successful sustainable development and disaster risk is a crosscutting issue, requiring action across multiple sectors. Greater efforts and different skills are needed to ensure that integrated (co-engaged, produced and managed) science is better understood and communicated and to ensure maximum benefit to achieve Sustainable Development Goals. Science-driven approach to DRR through research and periodic assessments can engage greater action towards effective DRR and help the government and society in mitigating and finally preventing disasters. Institutions like the National Agricultural Research Institute (NARI) and the University of Papua New Guinea ((UPNG) can take lead in this noble endeavor and provide science driven DRR and DRM options.