The Role of Young Professionals in Driving the Integration of Early Warning Systems

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Early warning systems (EWSs) help society to prepare for, and respond to, all types of disasters, including those related to hydrometeorological hazards. They save lives and minimize potential economic and environmental damages. Several international initiatives at the regional and global levels address early warning systems. The Sendai Framework for Disaster Risk Reduction 2015–2030[6] specifically highlights the need to "substantially increase the availability of and access to multi-hazard early warning systems and disaster-risk information and assessments to the people by 2030." It urges efforts to make forecasting and EWSs more efficient, integrated and sustainable[7][8]. The WMO governance reform too emphasizes the importance of delivering integrated multi-hazard and impact-based services through EWSs that are scientific and people-centred. In this context, what is the role of young professionals – who would be mid-career by 2030 – in the design and implementation of integrated multi-hazard and impact-based EWS?.

Integration of a scientific and people-centred or end-to-end EWS requires the following four components (see illustration on facing page):

- disaster-risk knowledge based on a systematic collection of data and disaster risk assessments
- detection, monitoring, analysis and forecasting of the hazards and possible consequences
- warning dissemination and communication by an official source of authoritative, timely, accurate and actionable warnings and associated information on likelihood and impacts
- preparedness at all levels to respond to the warnings received[9]

Coordination and integration with multiple EWS actors – National Hydrological and Meteorological Services (NMHSs), civil protection agencies, ministries, the Information and Communication Technology (ICT) sector, non-governmental organizations (NGOs) universities and research centres – is essential. EWS also need to evolve from focusing on one or two hazards to a multi-hazard approach to different – but

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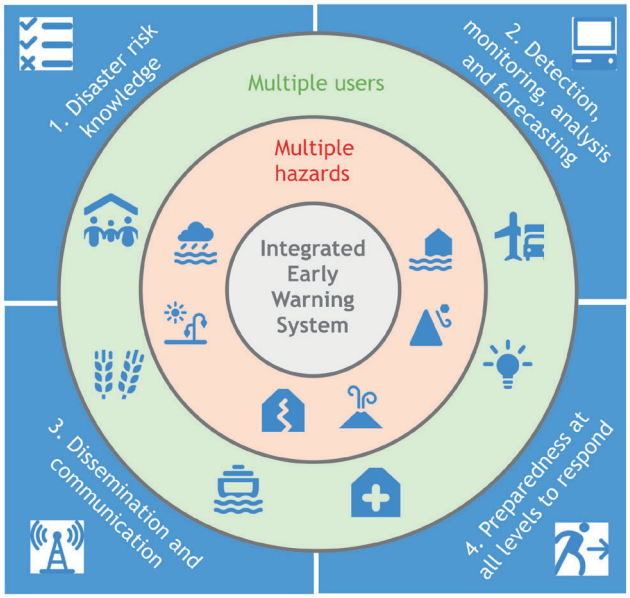
6 www.unisdr.org/we/inform/publications/43291

7 Cools, J., D. Innocenti and S. O'Brien, 2016: Lessons from flood early warning systems. Environmental Science & Policy, 58, 117–122. DOI: 10.1016/j.envsci.2016.01.006. sciencedirect.com/science/article/pii/S1462901116300065

8 WMO, 2018: Multi-hazard Early Warning Systems: A Checklist (Outcome of the first Multi-hazard Early Warning Conference, Cancún, Mexico, 22–23 May 2017). library.wmo.int/doc_num.php?explnum_id=4463

9 UNGA/UNISDR, 2016: Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. www.unisdr.org/we/inform/publications/51748

often interrelated – natural hazards. Synergies could be gained in data, modelling, monitoring, communication and response systems and we would over time acquire a clearer understanding of interdependencies. This new approach to EWSs requires professionals with various specializations working together to deliver targeted warnings to the public and diverse market sectors.



Integration challenge for EWSs

The integration of the EWS value chain is a complex task. Many different fields – natural sciences, social sciences, ICT and more – will have to learn to work together. New ways of thinking are required on the skills and capacity of staff, and about how to facilitate more collaborative work among sectors at different levels to deliver joint interdisciplinary solutions. In addition, integration requires a long-term commitment to building sustainable interdisciplinary relationships – and an attitude that embraces such complexity. Weak governance structures on national to local levels, due for example to a lack of funding, can also often hinder integration.

While the complexities and challenges are many, young professionals can play a role in integrating EWSs now and in the future. They bring energy and enthusiasm as well as openness and flexibility to try new things and adopt innovation, especially in communications. These characteristics can help promote integration of the EWSs value chain and ensure an interdisciplinary approach. This article examines why young professionals are in a prime position to support integration efforts and highlights the mechanisms that would enable them to achieve greater impact.

Methodology

Young professionals are defined for this article as having completed a first degree and under the age of 35 or within their first seven years of professional employment[10]. Young EWS professionals in an NHMS may be hydrologists, meteorologists, climatologists and geologists; however, integration requires the inclusion of other fields – such as the social sciences, communications, ICT, health – and those working in international organizations, the private sector, research centres, universities and NGOs as well as volunteers. These young professionals with multidisciplinary skill sets can make connections between the different EWS components, multi-hazards and diverse users.

The Water Youth Network collected the information used as the basis for this article in December 2018. Their research included 17 interviews on the opportunities for young professionals to support integrated approaches to EWSs, the challenges faced, the support mechanisms required, and views on how to build a successful young EWS professional network. The interviewees were from Argentina (3), Bangladesh (1), Brazil (3), Bosnia and Herzegovina (1), El Salvador (3), Finland (1), France (1), Georgia (1), Italy (1), Tanzania (1) and the United Kingdom (1). Fifteen work for public agencies responsible for EWSs and two for research institutions but positions were varied and in different fields. Six are female and 11 male. Time constraints limited the range of interviewees. Further interviews are planned to inform the development of the Network (see box on the following page).

Opportunities for young professionals to enable integration

The interviews revealed the characteristics below that the young professional thought would help to enable more integrated EWSs.

10 This is in line with the European Geoscience Union's definition of an early career scientist.

Early Warning Systems – Young professionals' network

The Water Youth Network connects young professionals in the water sector. Its Disaster Risk Reduction (DRR) team initiated a network for young professionals working on EWSs from various disciplines of science, policy and practice in the public, private and non-profit sectors. It is currently focused on water-related hazards. Members are under the age of 35 or within their first seven years of employment.

Current objectives:

- Understand challenges and needs: collect evidence on how young professionals identify with the challenges in current EWSs, the role they play in bridging those gaps and the support mechanisms they require;
- Share knowledge: share experiences and viewpoints of young professionals from different disciplines in different countries working on EWSs, e.g. via webinars, newsletters
- Build interdisciplinary working experiences: connect young professionals and senior professionals from different backgrounds working on different components of EWSs.

The Network offers a forum to exchange ideas and experiences and a space to stimulate motivation and enthusiasm as the next generation of EWS specialists[11].

Openness to new technology, learning and communication – The interviewees demonstrated a high capacity to learn and understand new and emerging technology and an interest in exchanging knowledge across a wide spectrum of disciplines. They placed importance on research and testing new approaches before and during implementation. There was a clear desire that users should be engaged at all stages. They were aware of their own potential to introduce ideas and drive innovative approaches to connect science and technology from different disciplines. They emphasized the importance of continuous learning. Through training and knowledge-sharing activities, they follow technical advances in different disciplines and focus on addressing users' needs. They also recognized that knowledge exchange with experienced professionals aided them to merge local knowledge creatively with new approaches, tools and technology.

> "Technologically, we are able to do it. We are able to provide the science. We have the computational power. We have the global forecasts at reasonable resolutions. They are not perfect but we are able to do them. The big problem is the translation of that information into actual actionable decisions at local scales. I think that gap is still massive." – Scientist, United Kingdom

> "I think one of the challenges is to bring new ideas to the existing system. It is not only about how to convince people, but also how to show the value of new opportunities, new data, new techniques. It's sometimes difficult to bring changes to existing systems and I think this can be an important role for the young professionals: to make a connection that helps to bridge the gap between existing systems and new opportunities that might better fit the operational reality of the field." – Researcher, France

Ability to span disciplinary boundaries – The interviewees were highly motivated to work across disciplines and cognizant of the criticality of involving less traditional disciplines. Integration requires individuals who can see opportunities for synergies between departments, institutions and users. The interviewees demonstrated how they did this in practice, for example, writing joint project proposals on EWSs and networking with departments to solve problems.

11 http://www.wateryouthnetwork.org/special-projects/ews-young-professionals-network/

"In our department we are trying to hire a young professional with a social science background – a sociologist or someone focused on risk communication. If we aspire to create a good impact-based forecast and warning system that triggers appropriate responses from citizens during emergencies, hydrologists and forecasters can't be the only professionals in the team!" – Hydrological forecaster, El Salvador

"When I started this job, my boss sent me to the hydrological forecasting department for a couple of months. This was funny, because I am a sociologist! Now I understand that, in order to see the whole picture and create relevant people-centred EWSs, we need to work with all types of backgrounds! From my experience, once you adopt an interdisciplinary approach, you can't go back! This is the future." – Sociologist, Argentina

Numerous bridging efforts occur through informal communication between young professionals building their network. Many felt driven to identify and analyse problems from an interdisciplinary perspective. They perceive their role in EWSs integration as educational and awareness-building on the importance of interdisciplinary work for positive impacts. They can communicate the value of integrative approaches within their workplace and wider networks.

Proactive and motivated attitude – Enabling integration requires individuals with a proactive attitude and motivation to connect different elements of an EWS and drive changes. Young professionals have potential to apply their motivation and enthusiasm to enable more integrated approaches. The interviewees were open to sharing knowledge, actively proposing new ideas and finding solutions to problems. They tried to look at things with "fresh eyes" to develop ways make their daily work smoother. The positive results of their work on end users has stimulated their desire to contribute more towards enabling multi-hazard and end-to-end approaches, and to a long-term commitment to build interdisciplinary relationships. They are committed to good results and want to be entrusted with greater responsibility. However, this proactive energy may wain if there is no evidence of them having an impact.

"What really gratifies me is when I see that our severe weather forecasts have been correct. Knowing that this information might have helped to reduce adverse impacts on the ground is a great achievement." – Meteorological forecaster, Italy

"What I love about my job is that I'm working for someone else's relief, I have a pure passion for the risk field and extreme weather. I feel I'm doing something good towards impact reduction, both economic and loss of life, by helping people to be more prepared". – Expert adviser, meteorologist and researcher, Finland

Enabling mechanisms to support young professionals

The turn-around from research to application needs to be accelerated. To enable this, topics, such as the holistic approach for disaster risk management and EWS, would have to be introduced into university curricula at an early stage to start merging the multi-disciplinary needs that future experts will require.

Strengthening links between research and practice – Government agencies could help tackle this by sharing their knowledge and tools – through open days and guest lecturing, student mentoring – with universities to spark interest amongst students. Opportunities could be created for postgraduate researchers to work directly in NMHSs or disaster-management agencies. Young EWS professionals should be encouraged to continue their education, to take on postgraduate degrees in local universities and to seek out exchange programmes and secondments to gain expertise.

"I have served as thesis mentor for bachelor students of civil engineering. I find that the curriculum is almost entirely focused on construction and structural design, with one or two classes in hydrology and hydraulics, but almost nothing on disaster risk reduction or hazard-related events. Even when I was a student, I faced the same challenges and actually had to study abroad to specialize in something more than the usual hard line of civil engineering." – EWS specialist, El Salvador

EXAMPLES OF ENABLING MECHANISMS

Institutional changes

In Argentina, the National Meteorological Service created a Meteorology and Society Department, which focuses specifically on the link between forecasts and users. The Department hires young professionals with a background in the social sciences to work on warnings, communication and risk perception.

In Brazil, the Centre for Disaster Monitoring and Warning of Natural Disasters was created in 2011. A large number of young people were hired – hydrologists, meteorologists, geologists and researchers with multidisciplinary backgrounds, including the social sciences, to work on the interface between research and its application to generate impact-based warnings.

Project involvement

The Regional Integrated Multi-hazard Early Warning System for Africa and Asia places young professionals in the Flood Forecasting and Warning Centre and the Bangladesh Meteorological Department to support project implementation – and to avoid bureaucracy. These young professionals propose interdisciplinary solutions for project implementation, develop new projects and network among multiple national and international actors.

In Georgia, a large EWS project was launched in 2018 entitled "Scaling up the multi-hazard early warning system and the use of climate information in Georgia", funded by the Green Climate Fund and implemented by the United Nations Development Programme in partnership with the Georgian Ministry of Environment Protection and Agriculture and the Swiss Development Cooperation. It provides important opportunities to build the capacity of the Hydrometeorological Department in the National Environmental Agency and to involve many young people from different backgrounds through innovative means.

Develop inter-disciplinary skills and job opportunities – Young EWSs professionals face many challenges finding jobs – and when they do find them, new recruits have a generation gap with senior staff and difficulty building interdisciplinary skills. Like many highly qualified young professionals in developing countries, young EWS professionals are often obliged to work in areas outside their expertise or to go abroad. However, this may help them acquire more interdisciplinary skills and experience.

> "We are expected to create a new impact-based EWS this year. We need to hire professionals with different backgrounds to achieve this, but the reality is that hiring new people or creating jobs is complicated and sometimes unrealistic with the money that we have available." – Hydrological forecaster, El Salvador

Young EWS professionals need opportunities to step outside their comfort zone to learn wider skills and support interdisciplinary integration. This can be done by supporting knowledge-sharing, training and networking workshops that mix teams, departments or institutions. Access to international good practices can help experts in different disciplines to learn how to work with one and other. Short exchanges within other institutions, agencies or teams can also yield benefits. Institutional change would be required to integrate ways of working, departments and to redefine positions.

New, less bureaucratic mechanisms should be identified for recruiting young interdisciplinary EWS professionals, for example, hiring young professionals as consultants on projects, promoting entrepreneurship or soliciting the private and non-profit sectors. Large internationally funded EWS projects currently offer good opportunities for young professionals and build their interdisciplinary experience.

> "There is a big gap between young professionals and principal staff in the Tanzanian Ministry of Water and Irrigation. However, not all young professionals in the field of hydrology come with a hydrology background; some are from geography, water engineering, environment and civil engineering to mention a few. This means that capacity-building through on-the-job coaching and other formal training is paramount."
> – Hydrologist, United Republic of Tanzania

More responsibility/leadership – Motivated young professionals with the right mind set, interdisciplinary skills and networks have potential to lead the development of integrated EWSs. Senior professionals should value their inputs, hone their leadership working skills, coach and mentor them.

Create networks at global, national and local levels – It is essential to build strong relationships between individuals in different disciplines and sectors to enable integration. Young professionals should have opportunities to networks, partner and interact with other young and senior professionals locally, regionally and globally as well as in the public, private and non-profit sectors. This can lead to joint projects and the development of innovative tools and approaches.

Next steps

WMO is mandate to preserve life and property by providing early warning systems for natural hazards. To improve such systems, it will implement an integrated Earth System approach and develop impact-based multi-hazard warning. It also has to address the technology and know-how gaps between its Members and find solutions for the many NHMSs with limited budgets and human resources – and a majority of staff nearing retirement who will leave a knowledge-gap behind them. Yes, the gap is not only spatial, between Members, but also temporal, between generations. Facilitating the inclusion and mentoring of talented multi-disciplinary young professionals – with the energy, know-how and skills to make connections between research and practice – is part of that solution.

WMO - RIMES Bangladesh

The needs of young professionals today, and in the future, should be on the WMO agenda. WMO can play a role by offering more internships and network opportunities for young professionals at international events; accepting more secondments, Junior Professional Officers, short-term contracts and consultancies; and facilitating the development of young professional networks. WMO could also promote interdisciplinary research that can be applied in practice.

> "Networks and communities are of high importance for young professionals to learn and understand the different approaches to tackle the common environmental and social problems we are all currently facing! Every 15 days I tell one of my co-workers, 'we should create a national network', just so we can meet different professionals working on EWSs with a DRR mentality. I also believe international organizations, such as WMO, should support young professional networks and open up spaces for these types of vital interdisciplinary interactions within their agendas."
> – Sociologist, Argentina

Other institutions also have a role to play. NHMSs should explore opportunities to work more closely with universities to assure that research moves to practice. International organizations, donors, private-sector organizations and NGOs can help identify loopholes and creative ways to hire young professionals. Those in responsible positions should take the time listen to their ideas and weigh their proposals, then entrust them with responsibility when possible.

Young professionals can contribute to the integration of EWSs in line with the WMO Earth system approach. They have the skills, energy and motivation to achieve more integrated approaches to EWSs. Today's young professionals have grown up in a tech-savvy world with its many start-ups and breakthroughs, they have incredible adaptive capacity and openness to ideas. They can invest the long-term commitment needed to build relationships, have the persistence to overcome barriers and will seize new ideas. Their proactive and motivated attitude can drive change and they can be strong advocates for interdisciplinary approaches.

Responsible positions, trust and believe in young professionals, listen to their ideas to work towards more integrated approaches to EWS, and help them to implement them.

Appeal from the authors

The young EWS professional network is still under development, but hopes that this article has successfully highlighted the influence young professionals could have in building interdisciplinary networks to collaborate, exchange knowledge and share opportunities at the local, regional and global levels. As those young professionals gain experience and responsibility, they will come into leadership roles. We urge readers to help us to expand our network by informings and encouraging young professionals to join us.

Acknowledgements

We would like to thank all the young professionals who took part in the interviews, the WYN members who are supporting the development of the Network and the reviewers who helped improve this article.