LOWER MEKONG EWS CONFERENCE

Phnom Penh, 3-4 December 2019

The South East Asia (SEA) region includes 13 of the 30 countries most vulnerable to climatic change and remains exposed to a variety of disasters. The region has witnessed numerous local and national EWS initiatives with the support from national governments, UN, NGOs and private sector, yet gaps remain. Especially in the "last mile" of early warning systems - reaching the most vulnerable and exposed populations at the community level with timely and actionable warning information. The first **Lower Mekong Early Warning Systems Conference took place in Phnom Penh, Cambodia on the 3rd and 4th December 2019.** The conference was organized by People In Need (PIN), Mekong River Commission (MRC), and was funded by United Nations Development Programme (UNDP) and The Global Environment Facility (GEF) Trust Fund. Its objective was to contribute to the strengthening of connectivity and trans-boundary policy dialogue on flood Early Warning Systems in the Lower Mekong sub-region. Specifically, the aim of the conference was to inform relevant stakeholders in the Lower Mekong sub-region on regional and national flood Early Warning System technologies, approaches and methodologies. Furthermore, efforts towards strengthening transboundary dialogue and cooperation on flood early warning and sharing of flood early warning data were discussed. As a part of the conference, an in-depth **research study of flood Early Warning Systems in Cambodia, Laos, Myanmar, Thailand and Vietnam,** conducted by People in Need (PIN) thanks to funding provided by the United States Government, was presented. The study maps the current state of local, national and regional flood Early Warning Systems, highlights good and best practices, and makes recommendations for collective actions moving forward. The participants of the conference were representatives of National Disaster Management Organisations (NDMOs), National Meteorological Institutions, Regional Institutions (e.g. Mekong River Commission, RIMES, ADPC), donors, NGOs, UN agencies, private sector, media, telecommunications and academia.

The Conference has provided a platform for participants to not just learn about the latest advances, best practices, and gaps in early warning systems, but also to consider what the future of early warning systems may look like in the region. A common **consensus on the need of information sharing as well as future data sharing platforms within the region** and its **positive impact on reducing disaster risk reduction and strengthening their**

adaptation to climate change was reached. The importance of **translating the positive outcomes of the discussions into practical actions** in order to be able to positively impact peoples' lives in the region was highlighted.

Conference Minutes - Day 1

Opening Remarks

U.S. Embassy in Phnom Penh – Mr Michael Newbill (Deputy Chief of Mission)

- PIN to share findings from a research study in EWS from the lower Mekong. Supported by the grant from the USAID, LMI, partnership between MRC countries [named] for inclusive and sustainable growth. Narrowing the development gap between countries. Focusing on transboundary
- 340,000 people to access to drinking water
- Training 3,000 people
- Improving sanitation for 70,000
- 3.8 billion dollars to the region from USAID
- PIN EWS report is important in Cambodia. Consistently ranked as very vulnerable to natural hazards
- 2.5 million people affected by floods in 2016.
- EWS is vital.
- PIN wants to ask questions:
    - What systems are in place?
    - What are the pressures comms place?
    - What are the impacts?
    - What kind of EWS would be relevant to the local people?
    - Hope today to answer these questions
- He wants coordinated DRR.

Embassy of the Czech Republic in Phnom Penh – Mr Tesař (Chargé d´Affaires)

- The river is a power of life, and is difficult to predict
- Much has been done in the Mekong Basin alongside MRC
- New challenges, new emergencies
- Climate economy and ecology, nutrition and health are all vital
- The river is more internationalised
- Man's behaviour is also exasperating the hydrology of the river
    - Excessive littering
- EWS is a rewarding idea
    - Good to know what to expect from the river
        - Need to warn the stakeholders
- Need a strong incentive to take remedial action
- 1997 floods in Czech.
- Due to management in Czech it is now well managed.
    - Cooperation of countries in the MRB
- Main principles are river monitoring, exchange of information and assistance
- Water management is a function of respect to each other, the same in a simple household
- Eu shows its readiness to share its knowledge on how to monitor river
- Danube/Mekong is also promising.
- The mutual ties between the countries is also promising. For the convention of biodiversity on 20th October.
- Rules based international order. To ensure transparent cooperation between all countries.

- EWS needs to be in these political talks and meetings
- A tool for floods. It could also be useful for water decline, droughts.
- We can learn from rivers in other countries, like the Kok river in US. That was horrifically polluted, that turned into a national park over time
- The establishment of the MRC is an important step
    - However, the Mekong is not the only river
- Almost half of EWS is covered by half by the Czech national countries
    - Harmony between UNDP, US etc.
- More effective in synergy in all stakeholders
    - Municipalities, governments and individuals.
- Need a good discussion between all.

MRCS - Dr Winai Wangpimool (Director of Technical Division)

- Appreciate to be able to work together with PIN.
- Monitoring and forecasting, which is vital for the people of MRC
- Phnom Penh RFMRC – to support member countries to reduce and minimize the impacts of flooding and drought
- This is where the project is useful, to be able to increase understanding of natural hazards with early warning data.
- As CC is increasing, then the extreme weather is also going to increase. Economic and social implications are huge. It is important to understand how people perceive risk.
- To ensure that there is a clear and sustainable future.
- In the river basin, you have the responsibilities to improve the basin
- Wider cooperation is vital, especially outside the MRC
- The important of being able to have data instantly.
- To be able to prepare
- Early action can prevent a natural hazards turning into a human disaster
- The conference today is important to discuss
    - The common issues
    - Go forward to make sure that there is a minimum loss of life and economics

Presentations

Thailand - Mr Pongsathon Panyaprachoom (Royal Irrigation Department): EWS in Thailand

- From the royal irrigation department
- 540000 square km
- 25 major basins, with 254 major basins
- There is a strong structure with other 24,702 personnel
- Water management in the dry season:
    - To estimate the supplies of water demands
    - Understand the priorities
    - Formulate the water management plan to balance supply and demand
- Then prepare the supplementation of water
- Cooperate with other governments, to ensure an integration of work. To make a water allocation plan.
- For the rainy season
    - Wet season crop cultivation

    - Flood prevention
- Upstream: Store the water, Manage the water in reservoirs
- Midstream: retard the water and manage the water
- SWOC: Smart Water Operation Center
- Have 4 major missions
    - Data collection
    - Analysing
    - Monitoring
    - Integration
- SWOC integrates information from all agencies on water management. Looks at climate conditions,
- Looks at water level and volume
- Also quality and risk of water shortage
- Looks down to an hourly level.
- 17 units in its networks.
- Real time report
- Looks at rainfall, surface runoff and reservoirs
- Water management needs to be active throughout the year
- 437 reservoirs
- 800 telemonitoring stations
- Have a mobile app, WMSC is the application to show daily water situation report and the collect the data.
    - Also Facebook can be used, too
- Working together with 10 agencies
- Monitor > Evaluation > Analysis > Forecasting > Make Decision
    - Then send out a warning
- Rainfall data first
- Track the weather data, and estimate the hourly rainfall.
- Using Neural Networks for a flood forecasting model
    - Developed by JICA.
- Also use a water allocation model
    - NARK
        - National Research
        - Agricultural research development agency
        - Royal irrigation department
        - King mongkate of technology north Bangkok
    - Gives a weekly and monthly report.
    - Applications also on the mobile phone
- CPY monitoring application.
    - Able to use CCTV to look at the monitoring tools.

Vietnam - Mr Khanh Pham Doan (Vietnam Disaster Management Authority): <u>EWS in Vietnam</u>

- Phoan Doan Khanh - Vietnam Disaster Warning Authority
- Identify many types of natural disaster
- Natural disaster situation
    - 20/ 21 types except tsunami
    - Over 11,000 fatalities and missing in last 20 years

    - Natural Disaster Database
        - More than 500 national stations monitoring hydrology and meteorology
    - Storm Monitoring
    - Sea Vessel Monitoring
        - GPS device monitoring from the vessel
    - Database on dam and reservoirs
    - Dyke Database
    - Landslide Database
    - Database for flood maps and reservoirs
- Disaster information communication
    - Online Training
    - Facebook information sharing
    - Instant message apps
    - Flycams to monitor, survey and access areas affected by natural disasters
- EWS PROJECTS
    - EWS for Landslide
        - Integrate censoring devices for measuring water levels and mudflow
    - EWS for Flash flood
        - Based on risk level of observed rainfall
        - Satellite observation in addition to hydrometeorology
        - FFAS inundation maps and risk maps in Lao Cai and Yen Bai provinces
        - Develop domestic monitoring and observation equipment going forward/ integration between monitoring systems
    - Reservoir operation and management tool (real time)
        - Integrated information of constructions in downstream areas
    - Multipurpose warning systems (Tsunami)
        - Warning and guidance for people to respond to observed storm hazards
- Challenges in developing EWS
    - Decision making tools
    - Improved equipment for steering and operation on site
    - Way forward:
        - Need integrated database, through development of pilot projects on flash flood etc

MRC – Dr Son Lam Hung & Dr Sothea Khem (The MRC Regional flood and drought management center): <u>Floods and Droughts forecast, links to EWS, and the importance of data sharing</u>

- MRC Background – 4 member countries, 2 partners China and Myanmar
- 4 divisions in MRC – 1995 agreement
- MRC 5 procedures – explained each one in turn
- MRC applications – data portal, modelling (mainly SWAT and ISIS), river flood forecasting, drought assessment tools
- 4 member countries share information and store at regional level, share through various channels
- Mekong river monitoring, set up 2007 →2010, open for public in 2012. Various stations which show different status etc. alarm level, normal level
- Attempted to show website but not connected to internet

- MRC-RFDMC – 3 core functions – daily flood forecasting, flash flood guidance, drought forecasting/ monitoring
- Flood forecasting – mainly use data from member countries – use 2 satellite data sets
- Ground observation data – merge data between ground and satellite for forecasting system
- Use ISIS and URBS models together
- River forecasting system – outputs can be updated daily/ weekly
- Flood forecast bulletin – show alarm level of stations
- Flash flood guidance – predict inundated area based on rainfall, can detect for 1hr, 6hr and 24hr in advance to warn local communities, trying to update so people in LMB can access
- Also soil moisture mapping – useful to look at drought
- Drought forecasting info on website – currently at a testing stage
- RFDMC – River Flood Drought Management Centre
  Question: Aside from water level on drought, what other parameters does MRC use to communicate that?
  Answer: Considers the flow at each station, uploads to website, other parameters such as water quality and fisheries have been studies by environmental departments
  Question: Any engagement with Ministry of Irrigation (National Ministries)?
  Answer: Information goes through National Mekong Committee first who have connections with relevant ministries. Each member countries have their own systems. MRC provides information to stakeholders and then leave up to member countries to distribute to grassroots levels. MRC deals more at the national level.
  Question: Monitoring dams – is it part of MRC? Critical issue of LMB
  Answer: Difficult point, at regional level we have a lot of programs. Initiative of hydropower dam program. Very difficult to collect information on dams. We recently raised issue. MRC deals on data provided by member countries such as rainfall but lacking in data on dams.

RIMES – Ms Carlyne Yu: <u>RIMES programs in SEA, insights and experiences</u>

- Regional Integrated Multi-Hazard Early Warning Systems
- Intergovernmental, chair is India, also with Maldives
- Portfolio – improving data availability EQ, tsunami and ocean weather climate and hydrological services capacity building of users
- Aim is to connect science-based information to institutions and societies
- Flagship program – seasonal forum – national climate outlook forum – conducted right before wet/dry season
  Present 3 month – 6 month forecasts – agencies can then learn about climate outlook and can integrate into their own plans, at end of season can report back and share experiences and give recommendations
  Process of convening and going back to agencies should hopefully see an improvement e.g. after many monsoon forums, forecasts and resolution have been vastly improvement
- RIMES – second flagship program - Tools have been produced to aid modelling and forecasting
- 3rd program – help analyse technical data and explain what it means for different sectors such as agriculture and water resources → how can forecasts be used in saving lives, development programs, contingency plans etc.

- Decision support systems – agriculture, health, water resources, disaster management, multi-sector
- Agriculture – SESAME – using weather and climate data to integrate with crop specific info (soil data, cropland maps, crop calendars) e.g. what does rice need at different stages of growth, can match this with rainfall maps, mechanises the provision of agro-forecasts.
  Systems introduced to farmers – conduct classes – capacity building
  How can farmers decide what crops to plant?
  Should they irrigate?
  When do they fertilise? – use forecasts
- DSS – flood forecasting, implemented in 5 countries, flash flood and reservoir management
- Disaster management – integrates info from multi-hazards, uses resource maps (hospitals, roads, warehouses, shelters), use information from historical data to get thresholds for risk, once you have a prediction then an , advisory can be issued, 11 modules in TNSMART, comprehensive database, mobile app which is accessible to users
- Water sector – in Sri Lanka rainfall forecast from Oct 2015 – Feb 2016, predicted extra rainfall, it meant that water was released slowly and reduced the probability of flooding and avoided the cost of disasters
- Collaboration between different agencies such as those providing forecasts and disaster agencies has had success in Sri Lanka – advanced in institutional decision making – not afraid to take action, between 2014-2018 much less people have been affected by flooding
- Agricultural sector – large savings in Myanmar, April 2017, cyclone Maarutha, farmers happy because of rainfall useful, however it was already harvest time so forecast allowed early harvesting and planting to produce extra crop
- RIMES has evolved over the last 10 years – collaboration with hydromet services is very key, improving forecasts improves the access, capacity building is crucial but 1 or 2 trainings is not sufficient, it should be a long-term process, after a project the CB must be sustained, can people who learn things utilise on them and make decisions? RIMES has made use of open source software so countries have better access
  Question: Jon US Aid foreign disaster assistance – any plans to roll the same type of systems out in these countries?
  Answer: Last example we showed was Myanmar, agriculture. Hoping to pilot DSS for disaster management in Myanmar. Limited work in Laos and hope to expand. Started implemented seasonal forums in Cambodia and done modelling and training with UN staff, hope to continue over few months until first half of next year. Collab with DHRW and UN. Talked with Vietnam and maybe looking at potential of SMART DSS, aware of events happening. PDC is implementing systems. Don't want to duplicate other efforts, want to focus on countries that need it the most. Has had discussions with Thailand and want something positive to come of that.
  Q: Miguel from MSF. Countries in Eastern-Africa, any information on climate impacts, want to expand?
  A: Mozambique, Madagascar, Seychelles – Sudan, Kenya, Djobouti discussions, plans to introduce SESAME, drought is a big problem there, Want to consider drought and food security. Depends on current discussions.
  Q: Mr Barreras – PIN – similar apps being developed in Cambodia – how has been the feedback from farmers especially in regards to trust, reluctant to take things in the app seriously. May see historical knowledge as better.

A: Very early stages in Cambodia, only just introduced in October, going to do follow up next year. Whole range of considerations for farmers, app may only contribute 10% of decision making, wants to look at really vulnerable areas to increase receptivity of farmers, no concrete info at this stage as to whether farmers use info, in the future they will mainly use app with forecasting and only a little with advisory because they trust own judgement on planting but need information usually on what will happen over longer timescales. RIMES is aware of these things, need to integrate it all, provide one source of information for forecasts

Lao - Mr Onevong Keobounnavong (Disaster Prevention and Risk Reduction Division): <u>EWS in Lao</u>

- Dam Safety
  - Overview of Lao PDR- hydropower development status
    - Land locked
    - Precipitation high in avg. 1200-3000mm/an
    - Abundant hydropower potentials
    - 64 projects in operation
    - 56 projects in construction
    - 387 projects under development
    - Highest dam = Nam Ngum 3 – 210m
  - Legal Frameworks:
    - Ministry of Natural resource and environment
    - Ministry of energy and mines
    - Ministry of public work and transport
    - Ministry of agriculture and forestry
    - Ministry of public health
    - Ministry of education and sports
  - Related to hydropower:
    - Recently: Lao dam safety guidelines completed end of 2018.
  - Dam safety guidelines as part of LEPTS
    - Training/ documentation/ quality control and management/ surveillance/ monitoring/ geology and geotechnics/ emergency action plan → every dam has their own EAP, disaster management committee + plan for the provincial committees/ reservoir impoundment
  - Emergency Operation Centre
    - Response reporting and emergency relief/ emergency assistance
  - Structure of NDMC(National Disaster Management Committee):
    - Chair→ VC→ national → line agencies → provincial → district → village disaster management committee.
  - + AHA Centre on assistance
  - International responses to emergencies → responses/ relief @ district and province level → local level responses and disaster management.
  - Secretary of NDMC directs EOC
    - Coordinates emergency response/ organises meetings
    - Disaster Monitoring and Response System (DMRS)
  - Customised multi hazard monitoring system
- Logistics plan
  - EOC (emergency operation committee), NMDC, humanitarian organisations.

Myanmar – Ms Wah Wah Win Khin (Department of Meteorology and Hydrology): <u>EWS in Myanmar</u>

- River basin and hydrological forecasting observation network (DMH)
    - Hydrological forecasting along 14 major rivers = DMH only issue daily water level
    - 5 transboundary river basins
- Types of hydrology forecasts
    - Daily water level forecasts -45 forecast stations
    - 10 days water level forecasts- 26
    - Monthly WL - 26
    - Significant water levels - 26
    - Flood warnings - 45
    - Minimum alert water level/ low flow bulletins- 7
    - General long-range WL forecasts (pre/mid/late- monsoon and winter season) – 45/26
- Procedures of flood EWS:
    - Hydrometeorological info
    - Check and analyse above data
    - Dam and weir WL info upstream
    - Weather forecast using global weather websites
- Flood- forecasting methods in DMH
    - Daily water level forecast
    - Seasonal water level forecast
- River Stage observation systems of DMH
    - Monitoring mostly manual gage 3x per day. w/ se
        - W/ severe flood = monitor hourly
    - Every year, try to upgrade hydrological monitoring system with telemetry (radar sensor) and staff gauge.
- River Flow monitoring system of DMH
    - Moving boat method and conventional method
    - Enhance capacity of river flow MS with ADCP river surveyor M9
- Development of flood hazard and inundation map
    - Develop FH maps with different return periods
- EWS information and Dissemination systems
    - Based on forecasting and warning
        - From river stage and rainfall from reporting station, discussions, analysing satellite images, weather forecasts down to local/ higher/ ministry
- Types of flood in M
    - River floods
        - Widespread
        - Flash
    - Storm floods
        - Storm surge floods
- Flood conditions, Myanmar rivers 2019
    - During monsoon season, 2019 DMH issued timely 54 times for flood warning and 119 for flood bulletin
    - Mid monsoon period July:
        - Southwest monsoon intensity strong and vigorous
        - Water levels at many rivers exceeded their danger levels
    - August mid monsoon

        - Widespread rain, water levels continued to rise in rivers and exceeded some rivers expected danger levels
        - 6 DMH stations faced flood
    - Late monsoon period
        - Weak to moderate in southwest
        - Due to influence of monsoon, and widespread rain in country rivers rose up 4- 10ft respectively.
- Challenges for EWS:
    - Difficult to forecast in northern river basin
    - Data sharing internationally needed
    - Hydro- met stations within transboundary RB
    - Prepare international water policy
    - Expend extensively

Anthony Green Question: do you forecast surges/ sea level rise. In terms of the flooding that comes from the sea?

Answer: department does not yet. Monitoring stations are currently simply around the Mekong River. Storm surge warning is monitored by another department.

Question: How do you do rainfall forecast?

Answer: another department conducts. We monitor seasonal forecasting for weather.

Cambodia – Mr Sokha Tep (People In Need Cambodia): <u>EWS in Cambodia (EWS1294)</u>

Early Warning Systems for Cambodia (NCDM-National Committee for Disaster Management)

Short code is 1294 is a phone number that belongs to the government, MoPTC.

3 main phone companies joined together for warning systems and humanitarian purposes.

- Metfone, Cellcard and Smart

Measures the water level. Now are trying to produce a cheaper version. So they are 3D printing it in only 7.5 hours. They are trying to upgrade sow the sensor is more industrial.

The sensor is usually working and it collects water level in the river or lake. Every 15 minutes sent through mobile phone networks.

If you want to send a message through the mobile phone

1. You just press 1294, then you listen to the instructions, you select the province and commune, then you explain the situation.
2. Mostly these sensors are on bridges.
3. Warnings are then sent, and action is taken.

So it is in 21 provinces. There are 4 that does not have a system in place. Down by Takeo, Kandal, Phon Penh, and Kampong Speu.

They are normally on the main tributaries.

There is a total of 134,000 subscribers.

There should be national coverage by 2020.

In 2019, there were 10 provinces sent 35 warning messages.

- This is a total of 74,768 individual messages.

Facebook is also going to start being used as it has more of an impact to the younger communities.

At the moment, they are not able to send a message if you only subscribe.

- However, in the future, they want to be able to push messages to everyone within the satellite area.

Questions: How do you also provide other types of data to complete the warning? From Thailand/MOWRAM.

- NCDM essentially uses as many channels as they possible, and then will provide a warning.

How do you define what the flood level is?

-

Why not use the digital level of the flood rather than just what people say?

- You need to be able to use as many data sources as possible to get the most reliable output/warning.

Mr Jeppe Mariager-Lam (People In Need Cambodia): <u>EWS and ICT</u>

He has had a lot of experience in software projects, he knows what the issues are.

There a lot of softwares that do not talk to eachother, including sensors in MOWRAM, MRC etc.

Need to ensure that the system is scalable. If you have 10 sensors, does not mean that this framework will still work if there is 100.

Sustainability – what happens when the money runs out? Can it still stand? Need to look at 2025 and 2030.

Biggest Issue: Systems are not designed with the user in minds.

How does this relate to early warning systems?

What does an EWS include?

- Data collection level
- Analysis level
- Dissemination Level

What is the key? >>>Going from detection to warning as fast as possible (ideally in minutes/seconds)

In Cambodia, warnings sometimes come hours or even days after the flood.

- Data collection
- Original the data system was manual.
- For floods you do not want people there, you want a computer to measuring the velocity; for example.
- The EWS, the data is collected every 15 minutes.
- Open data sharing

    - There is a large economic benefit to make all of the data free to use.
    - 750 billion in the EU.
    - It is important to make sure that we have the data to be able to tackle climate change in the future.
- How do we share this early warning system?
    - Facebook/Text/Radio etc.
    - You can call up to 10,000 people in one hour. So there is also a maximum amount, so that also needs to be thought of.
    - Social media and new channels of communications can drastically increase the outreach of an early warning system.
    - Potentially, 10,000 messages in a second!
    - In Cambodia they are hoping to do this with facebook messenger.
    - Phone calls are still extremely important. Make sure that you also use radio/phone.
    - If you are sending a EWM they you need to make sure that the time applies, if it is 1am in the morning – a phone call is the best. A text message is unlikely to be able to wake them up with a text message.
    - How are we able to do it without them subscribing the message?
- Facebook launched something called local alerts in October
    - FB are rolling out a network where Disaster Company can share messages.
    - However, they have only released in US.
    - They are looking for new countries to be able to do a pilot stage.
        - Why not Cambodia?
        - We can leapfrog into the future!
- Broadcasting alerts
    - This is where you can get an alert that has not signed up before.
    - Only if they have a smart phone. But life is going that way.
    - With 5g, you can actually also send a voice call aswell. Now you can only send one by one on the current system.
    - Both solutions, you need laws and SOPs to be implemented.
- Summary:
    - These 5 opportunities are really important to give people a chance to respond faster to ensure that no time is wasted.
    - We are able to increase the reach to (hopefully) everyone.
    - To do this, we need a smart, coherent and properly planned strategy for EWS in the region

Mr Jacob Thompson (Danish Red Cross in Myanmar) – <u>The potential of participatory EWS to inform transboundary disaster risk management in the Greater Mekong Subregion (GMS)</u>

The presentation is about his own work from doctorate.

- Every dollar we spend before a disaster can save much more in recovery costs
- EWS struggle to capture multi-hazard typologies and those over longer lead times
- Persistent challenge to disseminate warning
- Most rural populations have historical information on their environment – traditional disaster risk is changing very rapidly and dynamically
- Traditionally – risk = probability x consequence. Now it is a composite of hazard, risk and exposure
- Looked at East-West economic corridor – through Myanmar to Da Nang in Vietnam

- DROP model and Red Cross HVCA – looked at baseline, hazard dynamics (short-long onset hazards, warning, short-term responses) and capacities
- Approach to get data at household level needs to consider context
- Findings – rapid change in disaster risk dynamics

Drivers – altered weather patterns, greater FDI and infrastructure

Hazards – increased fires, uncertain seasons, chemical use, road accidents

Exposure – reduced forests and water resources

Vulnerability – increased remittance vs reduced social capacity

Capacity – greater links to services

- Net effect was further migration/ displacement – access remittance, loss of traditional resources
- Networked disaster risk – greater stress on local livelihood system, respondents believed in a threshold had been reached, best option may lie in outmigration
- In first model urban areas increased and so too did industrial areas
- Thresholds can occur unexpectedly which is an issue for disaster preparedness, may sound alarmist but already a precedent in southeast Asia
- 2011 floods led to large migration – people become a subject to new hazards, when people migrate back (harassment, imprisonment)
- Networked disaster risk is increasingly a global phenomena
- Assessment (long-term engagement) → data → participation→ multi-hazard → iterative (change is so rapid so needs to be done repetitively)
- Need to integrate real time monitoring with participatory practices
- Need to recognise that there are limits to EWS

Conference Minutes - Day 2

Opening remarks

People In Need Cambodia - Mr Lukas Laube (Country Director)

- Very happy to see you all here. Today current report will be presented. I would like to thank UNDP, thank PIN and thank MRC who enabled us to have study and access partners in the country
- Would like to say something about our motives. First motive is cooperation, remember when we were talking with previous manager, know about floods in Cambodia but don't know anything about Laos, idea Casper had. Decided to go for a project. Thinking about possibilities of Lower Mekong area, examples, Mississippi river committee and Duna committee, provide inspiration despite being in more developed companies. First purpose be on macro-level. Second purpose is inclusiveness, inclusion was to show possibilities of NGO's and give some inspiration
- Would like to thank you again for coming and wish you the best for the day

Presentations

Mr Karimi Gitonga (consultant of PIN Cambodia): Presentation of EWS Study Area (3) Warning, Dissemination and Communication & (4) Preparedness and Response

- Flood EWS in the Lower Mekong. Very happy to be here, heard that a lot of discussion has gone on, happy to build on this. Would like to thank various people who were instrumental in findings in each of the various countries who were very supportive and helpful in research. Other regional agencies who also supported the research findings so I would like to thank everyone for their support in this way. I don't want to replicate what was discussed yesterday so will talk about current challenges, best practices, regional conclusions and recommendations
- Starting with introduction. This region has 13 of the 30 countries most vulnerable to climate change. Flood EWS are aimed to empower individuals and communities, focus of this research is looking at how these systems can lead to positive actions and support marginalised groups. Overall project was looking at EWS more broadly, multi-hazard approach, focus on floods due to time restrictions and make it more manageable, focus on trans-boundary cooperation and information exchange between countries as well at whats going on at a national level. Future research will focus on other hazards but a focus on floods gives a good basis.
- Focus was to map, consolidate and analyse the current state of EWS. Method - April 2019 →Oct 2019 used interviews and focus groups which was set up with national stakeholders in each of the different countries. Emphasises that many different stakeholders are engaged in EWS at many different levels, many high-level and low-level agencies. Research built on CREWS framework, also looked at the potentials of technology, scope and application of those
- CREWS framework - 4 areas that need to be in place, disaster risk knowledge, detection, monitoring, dissemination and preparedness and response. Research looked at 4 areas in detail. Checklist developed with detailed questions for analysis in each of the different areas. Findings - talk about main challenges and national level findings

- Across all of the countries different approaches to risk mapping, project based so lack of a standardised way, in some cases most mapping at national level and little below. National level mapping often has large gaps and issues. Lack of mapping leads to issues in useability to reduce impacts at local level. Common in Cambodia, Laos, Thailand (certain extent), Vietnam (Certain extent), not clear where the mandate for producing risk maps sits, whether it sits with national or more technical agency. Different approaches are a direct result of legislative gap and clarity. Across all countries, different countries at different stages of DRM methods. Time series or data gaps on historical flood risk hazards and impacts or in terms of a national database. Will come onto steps to reduce historical gaps. Disconnect between local and national level mapping, common challenges is that many countries are at different stages with EWS SOPs. Most countries are trying to develop Hydro-Met services decrees or Road Maps, Cambodia currently being developed, recently developed, need these for stakeholders to know where they fit and where they get information

- Detection, monitoring, analysis and forecasting - extent, systems and coverage are insufficient for level of risk that are facing, result in black holes , lack of data and lack of visibility and ability to inform populations, outside of Mekong areas there is a lack of automatic meters, many readers still being done manually, hard to do real time forescasting and therefore real time EWS, some countries have done mapping of hotspots, need finance, lack of equipment standards and specification in terms of sensors, installations done by one donor where they don't talk to each other or earlier sensors installed and cant work with new ones, need to integrate all systems together, but projects putting bandages on problems rather than working with issues that caused problems in first place. Often not enough budget for operation and maintenance, this is at the heart of this issue, not a lot of data sharing, within the MRC it is focused on Mekong areas, other areas outside of Mekong lacking data

- Dissemination, communication - mistrust and misinformation at local levels, transition from EWS to action on ground, not leading to action, social media misinformation, official warnings through multiple different channels, information is really on forecast data, weather related or climatic information, disconnect between forecasts and impact information, need to know what the impacts will be

- Preparedness and response - mainly focused on other areas but touched on this, cross-ministerial bottlenecks, lack of finance for preparedness, people need to know where the safe sites are for flooding, need local level mapping

- Good practices and recommendations

- 9T/9C transboundary flood management - lots of economic interest, wider economic growth - regional steering committee, joint assessment and planning process, next phase, integrated flood risk management plan, pilot project on transboundary - Cambodia - Thailand, this project can be replicated in other areas. Cambodia recommendations - technical capacity building is required, need an integrated DRM database, last database stopped in 2015, no functional database, need to translate databases, rating curves from 2001 in some cases, need to be updates to enable accurate forecasting, 9T/9C looked at floods and droughts, PIN mobile EWS is good and should be expanded, low-productivity areas investments aren't taking place or tech isn't appropriate so should see what could be applicable, cost-benefit analysis

- Laos - best practice - DMH EWS SOP - really good practice, next step is sharing and rolling out but very good foundation, need to shift to impact-based warnings to support

decision making, need to evaluate effectiveness of messages as part of EWS, being discussed in Cambodia, institutional strengthening is a key challenge in Laos, good assessment of dam management which can look at flood risk, extent of hydro-met system needs to be increased, need to look at community-level EWS with limitations of budget for expansion

- Myanmar - good app DAN developed with UNDP in Myanmar, taken over by department of disaster management, SESAME has been successful which has been developed by RIMES, need to look at more local level committees, impact-based flood forecasting, study abroad for advanced knowledge and centralised system to enable decision making, capacity building from regional actors

- Thailand - positive data sharing step, one map/ all for one, variety of actors combining data, office of national water resources mandated to lead, allows for common understanding, very good example, system is very advanced compared to other countries but need to better identify quick changes, all for one system aggregates data but makes it hard to be drilled down into and time series data to be accessed, OWNR needs to build a civil society group

- Vietnam - VinAWARE, real-time decision making and analysis of risk, mirrors what is currently being used, may start to be used in Laos, allows integration and sharing of data, need a Road Map alongside SOPs, work done by CRS and looking at time taken for messages to meet people, need more automatic stations and seasonal outlooks

- Conclusions → integration is very key, should be tackled as a collective, more projects at the local level, need to share and display warnings over a wider area, Thailand could share more, MRC system provides a good basis for sharing, lots of countries exploring mobile applications, can share best practices, need a focus towards impact-based warnings, coordinate regional and national agencies. Lots of good work going on, lots of sharing potential, hopefully conference is first stage in moving things forward

- Q: from GIZ, coordination of transboundary EWS would be recommended, based on research, how did you find perceptions on cooperation? A: very positive, countries know where they can cooperate more, communication routes missing, DMH in countries not speaking directly due to protocols and systems, countries know which areas it was necessary but need to identify mechanisms, issue is the extent of decentralisation and sub-national planning in place in different areas but also there is good examples of regional disaster management, but overall positive

- Q: Miguel, MSF, based in Cambodia, comment - need of harmonisation because linking the dots can create mistrust among populations leading to economic and social cost - do you also look at cost effectiveness and budget constraints? A: agreed, lots of different systems, need a clear understanding of formal routes of communications and accuracy of information to build trust, some systems looked at historical accuracy, MRC looked at 10-year period accuracy, cost-benefit this study didn't do that, some examples have e.g. one looked at hydro-met services, important point, worry is how you value social and environmental cost of these actions and how you get information to people, cost-benefit is good but need to be careful not to exclude the most-vulnerable where there is lower productivity and investment

- Q: Muslim Aid, interested to know about the information we provide to people in Cambodia, what is the meaning of risk mapping that you have researched A: In Cambodia, good examples from Vietnam as where information on warnings has been explained at local level, need a better level of socialisation in Cambodia, need clear

instructions to what people can do on actions. Second answer on risk mapping, need to highlight high flood risk areas at national level and then more detailed study at local level, risk mapping should be done to inform local actions of preparedness and response, need risk map coherence and link methods, people may often only trust local mapping and are not aware of local level mapping

- Q: UNDP, no functional database, we still have data in 2018 and has been updated so not true about ending in 2015, 1294 has been a success story, not in other countries, fan of this and could be a very good tool, MRC has own forecasting, can't we use 1294 as a medium to disseminate warnings, working with PIN and MOWRAM, implications with trust. Cost-effectiveness- UNDP is looking at economic impact of climate EWS, study is being done and will be done by January A: use of 1294 as a dissemination tool is very good

- Q: ADB project in Cambodia, who in your opinion would be a possible reasonable aggregator of all this information because so many agencies applying for projects A: many bodies based in the region, because of work that's gone into agreement it should be the MRC as they are in a very good place

- Q: Thailand, suggestions, another perspective, organisation wrong for EWS, only looking at a few papers, not research, need more and wider data A: was mentioned in meeting with ONWR with various stakeholders, can be discussed, this has been an 'assessment', more data could always be achieved

- Q: Vietnam, recommendation, very surprised that you mentioned VinAWARE, data is not yet effective, we tried to develop our EWS, best practice in 2017 to send SMS to people for typhoon, we would like more information from all the countries A: insights will be taken into consideration as only a limited number of organisations were contacted, limitations with VinAWARE are noted, knowledge there are issues with it being applicable, agree that best practice in Vietnam is ability to send SMS messages.

Mr Suparerk Janprasart (Pact Thailand): <u>Mekong Water Data Initiative", a project of the Lower Mekong Initiative</u>

- MWDI

- He is glad to see that the economy of Phnom Penh is growing. He sends his congratulations.

Background of MWDI:

- During the 2016-2017 we were taught by the department of state that there should be a local water initiative. Needed to provide some background info to help develop the study in a useful way.

- Initially, he was sceptical, especially by the concept of data sharing since he had worked in the area for nearly 2 decades.

- They made 4 regional consultations to see if there is a need for data sharing and an online survey. 20% responded from the survey. Nearly everyone said that you should do it. But if you do it, make sure that you do it well.

- Make sure that you set up some rules in the programme.

- Water data is more difficult to share, not like sharing dollar bills. There is a lot of invested knowledge, requires a high capacity. Useful data needs a lot of expertise. There is a process of developing the water data cycle
    - Data collection
    - Data storage
    - Data processing
    - Data dissemination
    - Feedback
- There are 9 main opportunities.
    - Modernization of the data is important.
    - Spatial land use data
    - There needs to be more support from all the countries - shared support.
    - Do we really need another data portal? We should just support the MRC to share the data more widely
- There are 4 main user groups, from dam operators to academia and researchers. They are all important.
    - Working with Arizona Uni, to look at visual scenarios for the policy makers. ANd how can we apply this to the Mekong region?
- There are many key challenges that have been spoken about before in this conference. At this point
    - Data sharing is not the only issue. Also the absence. In some areas of the rivers in Cam. and Myanmar there is no monitoring systems.
    - Satellite technology - we might be able to remove the fieldwork. There is still some work, and it is not above 30% of data that can be replaced.
    - It is still difficult to get data from national and regional level. This does not mean there is no assistance of the data, there is an issue with the visualization and communication strategy. They have not been decided in the communities.
    - For example, the income that have been taken from fisheries and informal economic markets.
    - Trapped by strict rules and conflicts of interest.
- Sustainable Infrastructure Partnership (SIP)
    - Established in 2016 and includes a lot of foreign partners. That can help with the gaps that within the capacity building.
    - it is an adaptive programme, that is responsive to emerging needs.
    - The way that it is funded is also different, there is yearly funding, but to make sure that it doesn’t run out of money essentially.
    - SIP2 started I 2018. One of the main plans under the lower Mekong initiative.

- Program Activities
    - Still open for discussion, and is not quite complete.
    - Piloted in October
    - plans to develop
        - Mekong hydroshare, a cloud peer-to-peer basis
        - Mekong wetness monitoring and assessment, from satellite imagery
            - Having a look whether a country has been withholding water further upstream
        - Regional rainfall and weather forecasts
        - Web based impact assessment tools.
    - Next year you will be able to see if this works or that if it needs any improvement
    - There is also a global catalogue of data, all data that is held by universities around the world. For example, USGS, US army corps.
    - Program activities, there has been training on the strategic environmental assessments
        - also for socioeconomic database development.
        - Ground water capacity building programme.
    - Mekong cascade hydropower management dialogues and platform.
    - mobile early warning hackathon (competition)
        - more to be explored

Questions: Estimation of the gap in Telementory per cent in data

- Its huge. 10/20 years ago, when you want to guess the level of flows, you hire someone int eh local village for a manual flow. Some countries like Thailand and Vietnam are becoming automated. A lot lower error.
- Countries like Cambodia and Laos rely on international donors. There is problems with funding. They have not been updated and need more maintenance. Do not have the capacity to be able to go and fix them. They are critical need of capacity building.

Likelihood/capacity of satellite imagery taking over field work

- Two types of data collection in water data. Planning and operational. IN planning you need statistical data, satellite can help. Operational data you need daily data collection, and the satellite imagery can replace.

Ms Chinaporn Meechaiya - SERVIR Mekong/ADPC: <u>Early Warning Early Action: Use of Earth Observation Data to Enhance Early Warning in Lower Mekong Region</u>

- Intergovernmental organisation, urban resilience and climate resilience, remote sensing on GIS, health risk, capacity building, response - look across different sectors

- Current status in Lower Mekong, Mekong has changed colour, maybe not a good sign, less precipitation, to do with dams, lots of floods in Thailand right now, drought issue in Cambodia, need to prepare ourselves

- SERVIR works in over 50 countries, connecting space to village, new hub in Amazonia, work with NASA in USA to understand remote sensing, look at different perspectives

- Flood focus - have VRSGIS service, rainfall, water level, differences in spatial and temporal resolutions. GPM-BICO - rainfall data, need bias corrections that consider localised context, together with the MRC working with the flood and drought department to really see how we can improve flood forecasting, testing status at the moment, also test offline through hydrological models

- TRMM → GPM IMERG product, aim is to transfer technical knowledge allow things to be sustained. SAR used to look at water level, satellite tracking, possibility to extract water level, restriction of 150m river width from SAR will launch in 2020, daily water level reconstruction possible, developed algorithms through regression analysis and rating curves

- Inundated area information - HYDRAFloods Viewer - satellite products can integrate data - in development in Beta version - want a daily scale in 30m spatial resolution, need to select right data and data fusion, use optical imagery along with SAR imagery to create a consistent water map, data will be open source

- Drought - this year even during monsoon season there was a drought in Cambodia - we don't understand droughts as well as floods - we have developed the tools talking with stakeholders to look at what are the real problems and issues, work with national and local governments, case study in Vietnam in Ninh Tuan province, RDCYIS Framework using earth observation and meteorological data inputs to create a public database updated every 2 weeks

- RHEAS - use WEAP and DSSAT (crop) model

- Outputs from these two frameworks give drought indices but there are very many different ones, not every index will be useful for every specific area, a user interface will be launched giving public information on the different indices

- Not just technical science, trying to increase capacity of stakeholders, national and local levels, need localised information in crop models to ensure outputs are reliable

- Big data - using google earth engine - 200 public datasets, 4000 new images every day, 5 million images, 5 petabytes of data, cloud-based data, computation engine, it is new technology so some stakeholders cannot use, we give training to use this and learn from each other

- Machine learning - use of remote sensing, RLCMS, land cover, used in hydrological modelling, dynamic data, 30m resolution, working with forestry organisation in Cambodia to improve data, can download, much better than other forms of freely available land use data such as UNEP and GLOBCOVER, good to look at urbanisation and deforestation, we need to think about how we are going to work together

- EWS - Dfid funded project in Nepal, tried to understand linkages and see how RS can improve EWS, each project is different, different countries have different cultural norms, need to understand local context, talk between national and local communities needed, a greater understanding leads to better implementation

- Q: Jon, early response co-ordination, how can I access relatively real-time satellite imagery to get a sense of initial impact to coordinate response? A: should work with hydro-met agency as well, disaster management authority mostly focus on impacts, need impact-based information, our data mainly looks at hazard level and needs to improve to impact-based to improve management, need quick access, flood map is needed for management, need to work with hydro-met to assess hazards of different type, need to share with authorities, need a better platform to share this information, one platform needs to be developed, we are trying to bridge the gap to monitor these hazards in near real-time, we try to work further on top of capacity that countries have, need information to be well understood and used.
- Q: Jon, Laos dam collapse, can I see quick imagery of impacts? A: All our tools are free to access and download, HYDRAFloods tools can show inundated areas, not 100% launched yet as working with Sentinel 1 and 2, will be launched in first quarter next year, this tool will be a platform to see magnitude and area of inundation, updated once a day, every 24 hours
- Q: Within 48 hours the government of Laos sent a request to SERVIR Mekong of imagery and received information A: Have to work offline in specific disaster events, from the future you will be able to access better information
- Q: Indigo, MRC, flood extent question, cant see flood extent under forest, any way in the future to see what has flooded under forests? A: try to validate with countries themselves, wetland areas may not be called a flood, trying to use machine learning to train algorithms, may be mangrove and seasonal flood and not a flood area, hope that our database will keep improving to see inundated area

Plenary thematic discussions

Panelists	**Hosts:**
Dr. Muhibuddin Usamah (UNDP)	Ms. Kelsea Clingeleffer (UNDP)
Mr. Jacob Thomson (Danish Red Cross)	Mr. Federico Barreras (People In Need)
Mr. Socheath So (WFP)	
Ms. Chinaporn Meechaiya (ADPC)	

How can civil society support, international organisation and government support one another in the development of lower Mekong EWS?

MU: How can the data reach the communities? We have to make a difference, and unite our approach. 1294 has been for years, but has not been used as a tool. Why cannot we influence the government. We need to understand the tools as an idea and not owned.

Openness and flexibility.

After all of the presentations that we have seen, what would you point out as the number one priority for the Lower Mekong region in regards to EWS, specifically going forward?

SS: We have seen presentations from a wide range of people. We need to bring in the government that is responsible for this contact, to work together and to see together. Harmonizing the program. Utilise the effectiveness of the different programs.

CM: Everyone has their own platform [governments], the missing links is not the data/hydrometers, it is not talking to each other. Forums that you already have to talk together, these need to make sure that all of the ministries are there. Have an agreement in the data sharing first. Make sure you respect each other.

JT: the issue of consolidation, there is a lot of data out there. There is gaps also. gaps in what technology can apply us. we need create a network, we need to ensure that there is transboundary. He does not think that this will happen until there is a large disaster to break down the boundaries (he compares to the 2011).

MU: MRC on transboundary, why do you not look at the transboundary documentations. There is tendency of bringing new things, we need to focus on what is already there. We haven't managed to do this, we need to do this already. We are an entity in where we work.

What is in your opinion the best way to share early warning related data?

How can Lower Mekong Countries start working towards data sharing?

CM: Sounds really easy [data sharing], but it is actually really difficult. The governments have already tried to do that. But we need to push this further, the data sharing is not only solution. There should also be knowledge sharing - how to actually use the data? People often do not know how to analyse or interpret the data.

Guest= it is hard to be able to consolidate and share the data. Standardization is very important.

CM: WE need to have the same format, but this is very difficult to be able to do. We need to talk between people.

guest: some of the countries are commercialising data. On an economic basis, but also helping countries to develop countries

How can regional governments support each other in the development of lower Mekong EWS?

Maybe I can express my opinion, it becomes political. We need to get the highest priority, it is also inefficient, to get data, you need to send a letter to the minister.

We are trying to work in the government, how to advocate the government to becoming data sharing? Why are these ministries not working together? The challenge is that there is no trust. People don't want to give data to the NGOs etc. They should all give to the main government.

How do we get the benefits? What are the benefits that they will get? Then a willingness to share more. People don't understand why they have to share the data. What do they get back?

Does anyone have any input of what role the private sector can play?

JT: have to be very careful of increasing the reliance on organisations such as Facebook

MU: when someone comes to a ministry we can't just say 'my minister says no' we need to be a bit more practical, think about how we can come up with a solution, try to utilise our skills while we are under government protocols, we can't just say 'you have to go to my minister' need to move forward in a much more practical way

IB: do you agree about private datasets, Facebook?

JT: no data security so has to be considered, UN report, we need to exercise the precautionary principle, we know about how important trust is in terms of dissemination

SS: Private sector, companies think about the impact to them so can raise awareness to the communities around them, private companies can work with agencies to enhance the capacity of EWS, companies that impact the environment can try and enhance awareness that they are doing good for the environment, mobile network (SMS) in Nepal will provide these kind of

alerts and found that they got more customers when they did this - work with hydromet agencies so can be a positive

Question: Technology, what could be the role of technology such as blockchain to enhance the protection of data? A: blockchain is about data transparency throughout the chain, not one centralised authority, blockchain in itself will be anti-privacy, but it could be used for data sharing, lots of small databases that work together to make sure that the data is correct and not modified or hacked, don't give all the power to a specific agency, could be government and private sector

Question: We have to join together, cannot do alone, how can we join together? we have to build up the resource to know about the data? CM: sharing data within the government itself can have a benefit to feed into different things such as agriculture, we stakeholders who play the middle roles can analyse, data still belongs to the governments, the government agencies can do some analysis and share within other agencies, even if we put data online for everyone to access no one may use it, we need to think what will be useful to other people, work together with different agencies to understand how to use information, how can we build up capacity to collect data that we don't have MU: governance, haven't seen one project that solves data sharing problem, issue of data sharing has long been discussed but is not easily solved, a project should be developed to assess what can be done with governance on data sharing

Mr Federico Barreras (People In Need Cambodia): <u>Wrap up and introduction of Ms. Sonaly Darayatne</u>

On behalf of People In Need I would like to start this wrap-up session by thanking USDOS and UNDP for their support to both conducting the Transboundary EWS Assessment in and organizing this FIRST Lower Mekong EWS Conference.

In addition, I would like to thank the Mekong River Commission for their collaboration throughout the whole process. It has been great working alongside with you along these many countries, and I hope you are satisfied as we are with the outcome of this collaboration.

I'd also like to express a sincere gratitude to all the government representatives present in this room. Just by being here, and through your participation in this Conference, I believe that you are already working towards some of the key objectives mentioned over the past two days.

In the past two days, the different government and non-government presenters have helped to highlight key strategies, and to promote good practices of people-centered early warning systems within the region.

I sincerely hope that this Conference has served as a platform for participants to not just learn about the latest advances and gaps in early warning systems, but also to consider what the future of early warning systems may look like in the region

By facilitating this sharing of information and good practices, we aim to support each of the participant countries to continue reducing disaster risk reduction and strengthen their adaptation to climate change. We also envision that in the future data sharing platforms will be enabled and utilized within the region.

Muhi Usamah has mentioned during the panel session the importance of being practical, and I would like to end up asking everybody in this room to please reflect on this for a moment. Having these discussions in by no means necessary, but if we want to have an impact in people's lives, we need to somehow translate the positive outcomes of these discussions into practical actions.

In saying this, I would now like to invite Ms. Sonali Dayaratne, UNDP Deputy Resident Representative to give closing remarks.

Closing remarks

UNDP - Ms Sonali Dayaratne (Deputy Resident Representative)

Sonali D - UNDP: lots of exchange and learning over 2 days on advancements in EWS, country presentations have shown advancement and hope with persistent challenges.

UNDP and PIN have taken initiative in hosting conference because of ongoing work with EWS - 1294 which will cover all provinces in Cambodia by 2020. Regional research on EWS funded by US government mapped out current state of EWS, highlighted good practices and made recommendations going forward.

We believe in collaboration, regional research is a good tool and evidence, missing sharing of information amongst LMB. The Conference was a good opportunity to discuss data, and UNDP was honoured to have representatives from MRC. MRC has a trans-boundary early warning strategy, we hope this discussion has an impact, work with RIMES has shown capacity of forecasting - good showcase of collaboration, this event is a good platform for dialogue, **1294 could be implemented in other countries and could be trans-boundary**. **More dialogue leads to more regional collaboration**, but needs commitment also, **this event is a starting point on DRR and climate change adaptation**, need advocacy, data sharing and collaboration, persistent challenge for sustainable development, look forward to more EWS collaboration in the future.