CGIAR FOCUS Climate Security

**CGIAR Climate Security Webinar Series**

Policy Note 2: The importance of data and new technologies for climate security

*A systemic analysis of the role that climate, natural resource and food systems play in conflict and peace is key to design and implement interventions addressing and preventing conflict. This document is one part of the 6-policy note outputs from the CGIAR Climate Security Webinar Series. These notes summarize the key messages made during the webinar panel discussion. Recordings of the webinar sessions are available here.*

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## Panellists and short summary

The session was comprised of a multidisciplinary panel, consisting of experts from the fields of climate science, policy, humanitarian assistance and international development.

- **Enrica Pocari**, *Chief Technology Officer, UN World Food Programme (WFP)*
- **Maarten van Aalst**, *Director, International Federation of Red Cross (IFRC)*
- **Elisabeth Gilmore**, *Senior Associate Professor and Researcher, Clarke University & Peace Research Institute Oslo (PRIO)*
- **Andy Jarvis**, *Associate Director, Alliance Bioversity International and CIAT, CGIAR.*

Data and technology have been playing an increasingly important role in the development and humanitarian nexus. They are crucial components for informing decisions in the context of climate security. In our digital era, the possibilities to capture large amounts of data are vast, including satellite imagery, spatial data, machine learning. They provide a wide array of information to advise policy decision-makers.

During the discourse on "The importance of data and disruptive technologies for climate security", the panelists identified the existing types of data and technologies improving climate security and how available data and novel technologies can be leveraged to support resilience development and peacebuilding efforts.

## The need for data and technologies in the climate security context

Conflict scholars have been exploring the theoretical and empirical drivers of climate on conflict, including newly available sources of data (Burke et al., 2015; Ide, 2017). Within the realm of climate science, big data played a crucial role in generating new research opportunities, through revolutionizing technologies, i.e. machine learning, satellite data. However, at its current standing, big data is not able to predict conflict, as there is massive theoretical and empirical uncertainty. Nonetheless, realizing the great potential for big data to conduct socio-economic climate research, there is an opportunity to close this knowledge gap (Knüsel et al., 2019). "Conflict-preventive methods using information on climate extremes are increasingly available but can fail to reach the most vulnerable in time", is a key statement our panelists mutually agreed on. Hence, if we can understand the linkages between climate and security, anticipating climate shocks can promote action on the mechanisms known to be potential triggers for conflict and can shape peacebuilding efforts (Castro-Nunez et al., 2017; Gemenne et al., 2014).

A rising number of humanitarian and development actors agree that the issues of climate and security are becoming more inseparable, which has caused the humanitarian workload to increase over the years. Enrica Pocari and Maarten van Aalst explained that climate-related risks exacerbate socio-economic problems, while conflict undermines people's resilience and food security. Both highlighted the fact, that some of the most complex and expensive aid programs are caught between climate-risks and violent conflict, affecting people who barely have a chance of escaping the cycle of hunger. This leads to a double threat of climate change and conflict, leaving the most vulnerable to be trapped in a cyclical dimension. Several opportunities for affected populations in the recovery phase exist and tackling some underpinning vulnerabilities before conflict happens can decrease these negative impacts.

The driving information is the climate signal that is steering vulnerability to their hazards. Enrica Pocari identified that finding the right balance of programs providing acute food aid and programs strengthening the resilience of livelihoods is getting increasingly challenging. More attention is being shifted from reacting to situations to anticipating and preventing disastrous consequences through early warnings. A step towards that direction has been taken through forecast-based financing, which is a mechanism current in development by IFRC and WFP that

ensures that funding and support is in place even before it is needed and in the end is more successful in terms of humanitarian effectiveness. Better preparedness and anticipation are the key for more effective humanitarian and development action.

## Technological advances and the use of big data

In today's world, data is growingly available through modern tools in AI such as machine learning, satellite imagery and drones, which are collecting data almost in real-time and are constantly generating new data. Satellites are revolutionary and can directly inform on what is going on in the field. The WFP uses drones to inform on happenings on the ground and obtains micro-level data directly from field workers through crowdsourcing.

> **"Current technologies need to make development smarter, faster and more efficient, especially in the area of climate security. [This area] is a critical one, depending on fast movement of information. Fast movement of information is power for decision making."**
>
> **Andy Jarvis, Alliance Bioversity - CIAT, CGIAR**

Climate modeling and forecasting capacities have enabled accurate prediction of short-term weather patterns and create seasonal forecasts. While long-term climate projections are less certain, Enrica Pocari noted that they can nonetheless shed light on whether livelihoods within a region will be self-sufficient in the future, and whether transformative actions need to be taken to restructure societies.

In terms of current gaps, Andy Jarvis laid out that to organize this wide array of social media, socio-economic and climate data, better traditional methods need to analyze quicker to put acquired knowledge into immediate action and new methods are needed to create most relevant information. Moreover, he added that barriers to access data need to be reduced to move closer towards organizing the existing data and present it in a more relevant form to decision-makers.

## The blind alley in research and science

Academia has been increasingly working towards establishing a causal link between climate and conflict by making use of econometric tools and social theories aiming to explain causality. "Although not necessarily a model where climate leads to conflict shall be aimed for", Elisabeth Gilmore stressed. She and many other scholars argue that climate should be expressed as a threat multiplier, especially within the already existing conflict contexts, and not as the primary or even direct driver of conflict.

**Conflict makes it harder to exit the situation as conflict erodes livelihoods around institutional capacity and makes it more difficult to cope with the climate change impacts, effectively leaving the affected vulnerable population in a climate conflict trap.**

Elisabeth Gilmore, Clarke University, Peace Research Institute Oslo & Center for Integrated Mountain Development

In current climate security research, there is clear presence of the street-light bias, leading to innovations and solutions only being applied where relevant data is already available (Adams et al., 2018). Elisabeth suggests that to overcome this obstacle to new findings, scientists need to move beyond their barriers and engage more in collaboration to generate policy-relevant knowledge while working together with a variety of different stakeholders. Access to more spatial data could help researchers to forward new insights and hypotheses and expand the array of understanding around pathways and drivers of conflict. Moreover, the better use of statistical methods could accelerate the learning process and could test the forwarded hypotheses and models in a faster manner, resulting in information that can be provided in a timelier manner. The ability to test the predictability of models could be a very innovative next step and should be happening together with the decision-makers. Elisabeth advises that the results should be co-produced at all scales in order to increase response to the climate crisis.

## Ways forward for data use in climate security

Realizing the identified opportunities and challenges, our panelists detailed 3 key points that will be to harness current data and technology capacities for research and action on climate security:

***(1) Leveraging the latest data and technology to for integrated research***

The political will to include data and technology in climate and security work is constantly increasing. A large responsibility lies ahead to create a platform for deep integrations of data where the whole humanitarian and development community can work together, was which was recommended by Enrica. It is important to consider ways of channeling support, further, understanding the role of affected communities and lastly, what information should be provided to them.


***(2) Better communication of information***

Technologies have proven its benefits in a variety of areas but are at risk of not being used if the emphasis is not put to the decision-makers, as stated by Maarten van Aalst. Often the information that is already at hand, fails to reach the people on the ground and so to travel the 'last mile' from the knowledge to the local action. The capacity to analyze data is there, and now the crucial point is that the right analysis is also communicated effectively. Overall, the attention needs to lie on providing the answers exactly when the decision-makers require them. The challenge is that it can be difficult to frame and to communicate in a way that is not only true to the information but also understandable, as climate science often works with probabilities and statistics of individual events to occur. Maarten and Andy both agreed that it is challenging to communicate this type of uncertainty.


***(3) Collaboration and partnerships***

To answer knowledge questions in the climate security context, a multidisciplinary approach linking science and policy is needed. Elisabeth argues that cooperation can help to better make use of the data, information and research that is produced from the academic community. Collaboration needs to be tailored for each individual context and centered to the most affected populations. Joint work with digital tools is more effective, and public and civil society and the private sector should aim to find common solutions. Andy suggests one approach to provide decision-makers with the relevant information could be through providing a toolkit of science-based approaches.

## CGIAR's role in big data and technology

Overall, the biggest contribution by the CGIAR in achieving climate security lie behind the food security lens and the provision of climate information, as highlighted by Andy Jarvis. CGIAR's work in agricultural science helps climate vulnerable farmers to balance agricultural production costs and outputs and livestock management programs which are helping to create a stable food system and potentially preventing or mitigation the outbreaks of conflict.

In big data and technology, the CGIAR is increasingly working on improving its efforts related to focusing on three dimensions – "organize, convene and inspire" (CGIAR, 2020a). Firstly, CGIAR works on improving the organization of data aiming to improve capturing and delivering information, secondly, on effectively transmitting information from and to the field and thirdly, linking CGIAR's expertise in global agriculture and digital technologies with expert industry partners. Contributions are made on analytics with machine learning and sensor

technologies as new methods, as well as on improving traditional methods to more rapidly analyze and integrate the right information into action.


Some of the most effective approaches lie behind the combination of meteorological and spatial data on the climate research side and translating it into effective tools for stakeholders in policy making and in the field. Technological innovations relate to climate information systems and improved agricultural practices, which are contributing to peace building efforts in a variety of projects (CGIAR, 2020b).

## CGIAR's contributions to climate security

Approaches addressing both the impact of climate variability on food insecurity and strengthening government institutions are seen as instrumental for preventing conflicts and contributing to the prospects of peace. These approaches are central in CGIAR's work. To demonstrate these contributions, the CGIAR has created a searchable database, the CGIAR Climate Security Explorer. This database maps exactly how our research, across our institutions, are addressing specific environmental, economic, institutional and social drivers of conflict.

***Examples of current and past projects:***

- Shortly after the outbreak of the COVID-19 pandemic, IWMI together with CGIAR Research Program on Water, Land and Ecosystems (WLE) has releases a global crop monitoring tool to aid farmers and decision-makers to plan harvest timings under health restrictions. The tool is embedded in a satellite map, showing present states of maturity of crops around the world (Amarnath et al., 2020).

- Satellite imaginary showing flood affected areas in Bangladesh is aiding insurers with claim settlements through an in innovative index-based flood insurance. This initiative was developed with IWMI and Oxfam Bangladesh, as well as private sector insurance and microfinance companies, serving as the first initiative using satellite data to insure low-income rural households against climate-related risks (Amarnath, 2020).
- To strengthen resilience in climate-vulnerable regions, the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) together with the WFP created an agricultural forecasting toolbox helping to predict crop yields, enabling farmers and policy makers to better prepare strategies to mitigate risk (Gyawali et al., 2018).
- CGIAR center IFPRI in collaboration with its partners IGAD and ICPAC, has been providing high resolution quantified seasonal forecasts, communicated as expected rainfall, to rural communities, with the aim of contributing to food security in East Africa. Jointly with its partners, CGIAR is providing early warnings to national and local governments to strengthen effectiveness of response and enhance climate risk management (Coffey et al., 2015).

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