**Near-real-time monitoring of food crisis risk factors   
for improved early warning early action**

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Table of Contents

Topic note 3

Contributions received 5

1. Marco Brini, Switzerland 5

2. Hamad Lyimo, Ministry of Agriculture, United Republic of Tanzania 7

3. Tilman Brück, ISDC - International Security and Development Centre, Germany 8

4. Kamau Wanjohi, FAO, Italy 9

5. Sumanth Chinthala, National Institute of Technology, Warangal, India 9

6. Lal Manavado, Independent analyst/synthesist, Norway 11

7. Pathawit Chongsermsirisakul, Panyapiwat Institute of Management, Thailand 13

8. Mario Zappacosta, FAO, Italy 13

9. Betina Dimaranan, facilitator of the discusión 14

10. Jorge Carulla, Consultor independiente, Colombia 14

11. Rajendran TP, Visiting Fellow, Research & Information System for Developing Countries, India 16

12. Bhubaneswor Dhakal, Nepal 17

# Topic note

The most recent *Global Report on Food Crises* finds that 135 million people in 55 countries faced crisis level acute food insecurity in 2019 - driven by conflict, weather extremes, and economic shocks. With hunger on the rise, there is a clear need to improve early warning systems and other tools to prevent food crises. One way to do this is to improve and increase the use of real-time monitoring of food crisis risk factors in early warning early action systems. Real-time monitoring includes production-related information, climate and conflict data, price information, and other factors to identify the likelihood of acute food insecurity and help policy makers enact timely policy responses. It monitors actual developments and can be used to update assumptions, validate or change projections, and adjust programming quickly.

A recent Food Security Portal webinar took stock of the advances in real-time monitoring tools and approaches. In follow-up, this online discussion focuses on the next steps in improving, scaling up, and integrating real-time monitoring in existing early warning early action systems and policy responses to food crisis risk. Specifically, this discussion aims to share experiences related to the role of real-time monitoring in existing early warning systems, experiences in integrating real-time monitoring into existing monitoring platforms and tools, research in this area, and how to make real-time monitoring actionable by governments and regional institutions.

**The purpose of the discussion:**

This discussion in one in a string of policy dialogues organized by the Food Security Portal that seeks to catalyze research and policy efforts to utilize real-time monitoring in food crisis risk assessment and prevention. In partnering with the FSN Forum, the Food Security Portal would like to invite experts and stakeholder worldwide to share their experience with the use of early warning systems, their pros and cons, features and gaps. In addition, we would like to learn from your experiences in integrating early warning data into policy work and the challenges faced along the way.

**Questions:**

1. How should real-time monitoring be designed and utilized to strengthen existing early warning systems and support preventative policy responses to food crisis risk.
2. What are examples of successful policy responses at country level that have been guided by existing monitoring tools?
3. Local food prices are one way to get a temperature check of local market conditions, but high frequency local market price data is not widely available. Where are the gaps such as this one in real-time monitoring and how can these be addressed both in a research and policy context?
4. Advances in early warning technologies and data must be matched by developing capacity within institutions at the country and regional level to transform relevant data into preventative actions. What is needed to initiate and scale up the use of real-time monitoring in early warning early action systems by regional organizations, national governments, and other country level institutions? What are the technical and policy-related challenges associated with the use of such tools?
5. Over the years, a series of different early warming early action systems have been developed by various organizations. How could greater collaboration among the various tools and approaches facilitate their effectiveness in driving policy responses?

We thank you very much for your valuable comments and look forward to learning from your experiences.

*Betina Dimaranan*

# Contributions received

## Marco Brini, Switzerland

**1. How should real-time monitoring be designed and utilized to strengthen existing early warning systems and support preventative policy responses to food crisis risk.**

Digital solutions will provide valuable globally aggregated and accurate realtime data about food production.  Digital solutions are on their way to provide farmers with:

* Agronomic recommendations
* (micro)finance services
* (micro)agri-insurance services

These services can provide tremendous improvement in terms of productivity and resiliency for the food production system. In order to work properly, such solutions require real time data to be shared by farmers about crops, productions…  This is key.

These data can feed big data & analytic solutions to aggregate information and having both a near real time feedback of harvests along with expected production (with some more sophisticated analytics).

Internet of Things and satellite along with Cloud solutions will allow climate prediction to anticipate food shortage. IoT (Internet of Things) + BigData/Analytics can integrate existing satellite data with local AWS (Automatic Weather Stations) to estimate the impact of weather conditions on global & local farming area.

New generation smart sensors for agriculture will be simpler and cheaper enabling IoT at global scale. Farmers will benefit to invest few dollars to have real-time information about the soil & air humidity to fine tune irrigation and/or taking any agronomic choices (from seeding/harvest time to treatments). These additional data can be shared on anonymous base with larger data pools (in exchange of services such as software tool use providing agronomic recommendations, pricing information, etc.) further increasing the quantity and quality of climate data. Predictions about food production will not only be more and more accurate, but also more and more automatic.

Government incentives Local governments should support adoptions of such tools for instance incentivizing (\*) innovative startups and large corporations to cooperate to launch innovative solutions. (\*) policies, subsidies, credits, VC, tax holidays

Data privacy policies to incentive data exchange Key would be to define national and international simple but fair policies about data privacy to motivate data exchange.

Data to flow from “local data lake to global data ocean” Equivalently important would be having some sort of pragmatical protocol and format for data exchange among technologies and software to enable data to flow from local to global.

**2. What are examples of successful policy responses at country level that have been guided by existing monitoring tools?**

Some platform to aggregate data at national and global level are already available. They should ideally further develop integrating with other local and global solutions (gov and business oriented). Following some examples:

INDIA: http://agriexchange.apeda.gov.in/

CGIAR: https://bigdata.cgiar.org/shared-services/

FAO: http://api.data.fao.org/

GODAN: https://www.godan.info/pages/about-open-data

AGRIROUTER: https://my-agrirouter.com/en/

IBM & YARA: (The Open Farm & Field Data Exchange) https://newsroom.ibm.com/2020-01-23-Yara-and-IBM-launch-an-open-collaboration-for-farm-and-field-data-to-advance-sustainable-food-production

api-agro: https://api-agro.eu/en/the-platform/

**3. Local food prices are one way to get a temperature check of local market conditions, but high frequency local market price data is not widely available. Where are the gaps such as this one in real-time monitoring and how can these be addressed both in a research and policy context?**

Research and policies should support the development of open digital platforms and standard for data exchanges. These frameworks require financial resources and international agreements, while are necessary to boost the development of INTEROPERABLE digital solutions to provide market services to farmers and buyers with an expected relevant increase of efficiency in the supply chain, market pricing and food waste reduction.

Once such solutions will be widely used and based on common framework for data exchange, it would be easy to AGGREGATE LOCAL DATA AT GLOBAL LEVEL. Cloud analytics software could be developed to receive anonymized data flows from local & global digital platforms allowing to have a real time global assessment of prices and food availability.

**4. Advances in early warning technologies and data must be matched by developing capacity within institutions at the country and regional level to transform relevant data into preventative actions. What is needed to initiate and scale up the use of real-time monitoring in early warning early action systems by regional organizations, national governments, and other country level institutions? What are the technical and policy-related challenges associated with the use of such tools?**

The currently available solutions and technologies have already successfully proven to support agriculture on several levels:

* production (agronomic recommendations, water saving, costs optimizations,…),
* financial (credits, insurances),
* market (global and local trading solutions)
* and logistic (supply chain)

The digital adoption just started and the opportunities ahead are tremendous.

Which policies / actions can help? Local and global ecosystem allowing cooperation among public & private, local & global in a sustainable way would further promote digital solutions adoption. Incentives to farmers that adopt digital technologies can boost adoption as well. In micro-insurances several countries are supporting farmers with subsidies. Ideally similar approaches are taken to support farmers that intend to adopt smart sensors, digital agronomic recommendations, data sharing ...

**5. Over the years, a series of different early warming early action systems have been developed by various organizations. How could greater collaboration among the various tools and approaches facilitate their effectiveness in driving policy responses?**

Open and free platforms for agriculture data collection, storage and exchange in an anonymized way should be developed and made available to the international community of researchers and developers.

Standardization about data exchange is required as it was during the railway’s standardization at the end of XIX century. Once the above is available, business incentives would do the rest.

## Hamad Lyimo, Ministry of Agriculture, United Republic of Tanzania

Near-real-time monitoring of food crisis risk factors for improved early warning early action

In the recent decades several approaches have been employed in early warning systems with the aim of improving the quality of information that reach the tables of policy makers. The continuing thrives toward more advances real time early warning systems is a manifestation that policy designed to tackle food security crisis are far from being satisfactory. This does not mean those policies do not work, but rather they lead to designing interventions that do not perpendicularly address the crisis or influence implementation of a good intervention towards poor results. In a crisis event the time period between occurrence of the crisis and interference intervention to absorb its effects to livelihood is crucial. Even a good intervention that is implemented weeks after the crisis may seem as no intervention at all. Thus real time early warning system is an important input to effective policy decision that will lead to timed intervention.

Designing a quality real time early warning system should focus first on integrating a number of sub systems that provide information which when analyzed give the meaning we need to fully understand the crisis. Unfortunately, food insecurity crisis can emanate from an array of origins from failure of a crop due to drought, floods, plant diseases, post harvest losses, political instability, trade difficulties and health to decision making in the household like food preparation and distribution among family members. Thus a good system has to combine data from all these sources and allow selection of the best intervention option. For preventative policy response such a system should be able to provide early signs that a crisis is coming. Early signs can be for example a spike in under five malnutrition, signs of a pest/disease outbreak etc. Fortunately, these subsystems are available but work independently in different departments in most countries.

Preparedness to emergency food aids, disease outbreaks, evacuations are policy responses that have shown success when guided by weather monitoring tools. In many countries there are national disaster committees that constantly receive weather updates and interpret into policy response that avert food crisis and save lives.

Local food prices are one way to get a temperature check of local market conditions, but high frequency local market price data is not widely available because of geographical discrepancies and communication endowments. In real time monitoring this gap is likely to widen if internet use will not be promoted up to the local level. Fortunately internet use need less effort to promote as it has been accepted easily to its multiple use. Policy concern is needed to address literacy in local areas as this can limit sharing of market information via internet.

Advances in early warning technologies and data must be matched by developing capacity within institutions at the country and regional level to transform relevant data into preventative actions. Promoting use of internet, developing easy to use electronic monitoring platforms, institutional capacity building and making efforts to link several platforms into a common backbone is needed in order to scale up the use of real-time monitoring in early warning early action systems by regional organizations, national governments, and other country level institutions. This requires government willingness to invest in building technical capacity of the people to develop and run such systems effectively.

As noted earlier, an effective real time monitoring system is the one that incorporate outputs from several other subsystems and allow interpretation of data that will give logic to a phenomena. To have such a system collaboration of organizations with interest in early warning is important to remove flaws that are inherent in one system.

## Tilman Brück, ISDC - International Security and Development Centre, Germany

The earlier famine and other forms of acute and severe food crises can be identified, the sooner programmatic responses can be designed and implemented. Often, however, these earliest stages fall into a grey area: where food insecurity is too severe to be considered a development problem but not severe enough to be considered a humanitarian one. In turn, in the period when programmatic interventions could be most useful, funding levels are often at their lowest. This opens up an urgent need to provide timely information on deteriorating food security trends and to confirm that this deterioration constitutes a crisis.

How these trends and confirmations can be captured, however, is an open question. Significant debate has taken place on how to accurately capture food security, even in non-crisis contexts. While food consumption diaries are often considered as a ‘gold standard’ in the field, they are far from perfect and are often cumbersome and difficult to collect, even in more standard situations. Other approaches, such as collecting information on the amount spent on food, are less cumbersome but prone to other errors, including weaker inference. Households could equally spend more on food due to increases in income, or changes in preferences, as from food insecurity, for example.

In the context of both idiosyncratic and covariate food crises, where deteriorations often take place very rapidly, practical concerns arise with the collection of survey data that goes beyond these standard measurement problems. Standard surveys are often collected with years between waves; while even more frequent ones could miss the crisis onset period entirely. Similarly, given the close relationship between conflict and food insecurity, collecting any data in person could be tricky. In this White Paper, we explore the requirements of a survey-based early warning system for the onset of severe food crises, then consider specific variables that should be collected in order to populate this system.

We argue that any system needs to comprise two stages: the first is designed to ascertain that trends are deteriorating, indicating that a crisis could be imminent; the second aims to confirm whether or not these deteriorating trends constitute a food crisis. Further, it implies that what is most important – in this context – is to correctly identify deteriorating trends in given locations. This requires data that can be collected at high frequency from a panel of individuals, which in turn imposes restrictions on the collection methodologies, and which variables should be considered. We conclude that, due to survey fatigue, survey duration, and access concerns that data should be collected remotely, from a large number of panels. This allows data to be collected in an on-going, near-continuous, manner, while each individual in the survey answers questions much more infrequently.

This data collection design imposes restrictions on the variables that can be collected. Multi-response or in-depth food diaries, especially over extended time periods, cannot be collected in this manner, for example. We therefore propose a number of tweaks to standard survey questions that allow them to be collected easily, and remotely, whilst holding strong ties to either the identification or confirmation stages. From this, we conclude that modern survey techniques can be a strong part of the armory in the early identification of food security crises; but that how surveys are collected, how often they are collected, and the variables that are collected in them must be tailored to the task at hand.

## Kamau Wanjohi, FAO, Italy

Challenge: Since the introduction of mobile technology in data collection and management e.g. use of table, the idea of near-real-time monitoring was born through use of CATI (computer assisted telephone interviewing) methods such as mVAM and others, but never has it been real like now after COVID-19 created barriers to the traditional data collection methods. This opportunity created by the pandemic should be extended beyond data colleciton using CATI to developing scientifically accepted methods on the use of remotely collected data e.g. sampling, in order to have acceptable evidence that informs policy. One of the challenges that remotely collected data face (mainly from academia) is mainly around representativeness and sampling.

Use case: In countries such as Yemen where traditional data collection is often a challenge due to conflict, the opportunity created is an acceptance by majority of stakeholders to expand the use of CATI methods in key informant interviews (KII) e.g. market price monitoring, agriculture extension services, desert locust monitoring and agriculture input survey as well as household food security and livelihood surveys. Such interviews are providing higher frequency data used to monitor the impact of the pandemic and can dynamically be adopted to new stressors and shocks as they emerge. Therefore, the use of remote data collection has a dual advantage in conflict countries i.e. high frequency data collection (although sample may be smaller – challenge stated above) and agility to monitor new shocks as they emerge.

Design: Real-time monitoring systems should be designed in a simple and easy to use methods in order to be useful and easily adopted in the country. As mentioned above, the main challenge remains the extent to which analyses generated from such systems can be generalized to inform policy and other decision making. Unlike in development work where time is not a major factor, in humanitarian context time is of essence and quick turnaround from data collection to decision-making can mean life or death for large populations. Therefore, in such context, real-time monitoring should be designed in a way that allows, as much as possible, generalization that are solid and trust-worthy in as much as the statistical requirements of randomly selected sample are not fully met. In Yemen, due to lack of a sampling frame of telephone numbers, the current remote data collection utilizes information form past beneficiaries and using that list as a sampling frame, a small sample is selected for interviews.

## Sumanth Chinthala, National Institute of Technology, Warangal, India

1. How should real-time monitoring be designed and utilized to strengthen existing early warning systems and support preventative policy responses to food crisis risk.

The real time monitoring be performed in 4 stages

Stage 1: Spatial data collectors (individual or an organization) has to be identified.

A mobile based application can be used for monitoring the data of the approximate amount of food that is generated through agriculture in a particular area after a particular time. An individual in a village or an organization in a village can use this application for adding the data in the mobile application from time to time.

Stage 2: Identification of a regional data transfer point for monitoring

Many of the spatial data collectors are associated with a research institute nearby. The research institute can become a nodal point in getting the data systematically and the institution may help in getting data in those places where individuals and organizations could not get. This can be possible by collaborating with research institutions which can get the data from the students who hail from different villages and help in getting the data. The student groups and clubs associated with social service wings can play a crucial role in mobilizing the real time data which is crucial .

Stage 3: Incorporating the risk coefficients in the region

After the collection of the data at regular intervals, the risk coefficients in the region can be assigned based on crop loss due to floods and droughts, lack of transport etc. Based on the risks associated, the food shortage can be estimated. For instance, in many cases mango trees get heavily damaged due to sudden rains just before harvest. In such cases wide damage is reported but not estimated. Under such circumstances, the data from the spatial data collectors and institutes can help us in identifying the crop loss and inturn the productivity can be estimated and inturn the shortage can be predicted.

Stage 4: Identification of action plans and the way forward

After the identification of the risks, suitable action plans can be formulated to reduce the food shortage risk. For instance, a specially dedicated freight train was inaugurated to transport the turmeric produced in South India to Bangladesh where it is not available. It was planned based on the expected productivity in that area. On a similar lines, a dedicated train for farmers and food products was launched to supply the fruits from one location where they are in excess to the place where they are needed.

3. Local food prices are one way to get a temperature check of local market conditions, but high frequency local market price data is not widely available. Where are the gaps such as this one in real-time monitoring and how can these be addressed both in a research and policy context?

The local food prices are generally published in a local print/electronic media which is generally telecasted in a local or a regional language. As a result, the data cannot be extracted due to the language barrier. Involving more ground level volunteers is one of the ways to bridge this gap.

In the policy context, we need a permanent administrative body which can be made accountable for acquiring this data. If this is not possible, the existing institutions should set up a wing which collects this data along with the volunteers.

4. Advances in early warning technologies and data must be matched by developing capacity within institutions at the country and regional level to transform relevant data into preventative actions. What is needed to initiate and scale up the use of real-time monitoring in early warning early action systems by regional organizations, national governments, and other country level institutions?

Scaling up needs more trained volunteers or staff members who can execute the task of real time monitoring. Many educational institutions have rules which specify that a student should work for certain hours for a social cause to meet the requirements of the course. Such students must be trained and should be involved in the real time data monitoring task by using suitable tools. Since a student stays at an educational institute for 3-4 years, it will be easy if the student is trained to aquire the necessary data in his vicinity. Further, all the educational institutions should make social service mandatory and under these social service initiatives, these trained volunteers in large numbers should be deployed at various locations to complete the tasks. These trained volunteers should be allocated under regional organizations, national governments and other country level institutions to complete the tasks of real time monitoring.

Additionally, many young researchers in various countries are given financial assistance in higher educational institutions. In return, the researchers should dedicate their time to the assigned tasks within the institute. Their services should be utilized to train the young volunteers who can collect the real time data.

In many instances, the governments try to train their existing staff members for executing a new task or using a new tool. This was found to be ineffective in many instances because the government employees are burdened by this extra assignment and as a result, the tasks were found to be incomplete inspite of spending a lot of resources and time.

5. Over the years, a series of different early warming early action systems have been developed by various organizations. How could greater collaboration among the various tools and approaches facilitate their effectiveness in driving policy responses?

Greater collaboration among various tools enable the development of a single platform where data can be made available.  When data is made available, various trends and factors affecting the variations in the data can be easily understandable and as a result it would be easier to draft the plan of action and subsequent drafting of policies.

Secondly, if an approach is failed/successful, the collaborators can eventually scale up/ignore the approach and act accordingly which may result in saving efforts and time in improving the situation at a local, regional and global scale.

## Lal Manavado, Independent analyst/synthesist, Norway

An Early Warning Mechanism to Identify Emerging Threats to Adequate Nutrition and Food Security

In this discussion, we will propose a holistic way to detect emerging threats to FSN as early as possible, so that an appropriate rapid response to such a crisis may be undertaken by the authorities at national, regional and global levels as indicated. However, what is constitutive of this response would be beyond the scope of our present brief. Therefore, we will assume  that a suitable inter-institutional plan to manage such an emergency has already been made by the responsible authorities.

Our suggestion comes in two parts; first, we will identify the possible generic threats to FSN that may make a sudden appearance and their impact on it. Secondly, we will describe what may best indicate their more or less immediate onset with a view to undertaking a rapid pre-emptive response to those threats. The present approach represents a holistic analysis of the problem and a synthetic solution. Every effort has been made to make the present discussion pragmatic and free of jargon.

The impact of such threats may manifest themselves recursively at three levels:

* Global; impact at this level would be comparatively rare but should a serious threat should affect a region or well separated countries which are major producers and exporters of a some staple food like wheat or rice, its effects may be felt throughout the world. Such an eventuality should trigger the emergency management plan of organisations like the FAO which should smoothly fit into the regional and national plans of the areas involved.
* Regional; some threats may affect a region bringing about shortage of food in several contiguous countries. If they are a members of a regional organisation, it may have a regional plan that dovetails into the national plans of its members.
* National; a discreetly localised threat to the FSN of a country. This in turn, may be seen as global relative to the area of its impact. However, this may be regional or local in its impact rather than national. For instance, regional or local flooding may have variable effects on national FSN.

We will now identify the various points of impact a threat to FSN may strike. These may occur singly or in some combination:

* Agricultural production and fisheries.
* Infra-structure; especially the transport network.

Let us next identify what kind of threat may bring about those two disruptions of FSN:

* Unfavourable weather conditions such as drought, unseasonable rain,storms, etc.
* Natural disasters like earthquakes, volcanic eruptions, tidal waves etc.
* Serious reductions in man-power in food production and its logistics due to ill health (epidemics   and/or pandemics), civil unrest, and armed conflicts.
* An unconcealable drastic reduction in food production resulting from inappropriate agricultural practices. This remains a future threat owing to the current drastic lowering of agricultural biodiversity, while the giagantic industrial farming of wheat and cotton in Amur-Daria basin led to the permanent salination of vast former grasslands and to the near disappearance of the Aral Sea. A similar result on a smaller scale took place in developing countries unfortunate enough to welcome into them the ‘green revolution’ of the sixties.
* Artificial food shortages brought about by the food trade and once by the authorities themselves as the “great grain robbery” by the defunct Soviet Union illustrates.

We will not take up civil unrest and armed conflict even though it could have grave consequences for the national FSN as the wars in Ethiopia and Biafra have shown. Resolution of such threats to FSN are the domains of diplomacy and/or the military. Early detection of such evantualities are delegated to diplomatic and intelligence services.

Thus, what we have to monitor and interpret as potential threats to FSN are linked to four phenomena:

* Adverse weather conditions.
* Natural disasters of the types descried above.
* Pandemics and epidemics insofar as they impact on agricultural production, its logistics, etc.
* Consequences of inappropriate agricultural practices.
* Speculation in food by the traders and authorities. It may be noted that sometimes, sanctions could include food exports.

Some previous contributors to this discussion have proposed specific monitoring techniques which will not be repeated here. However, we will mentions a few possible monitoring methods which may be directed at the global, regional and national levels. It is assumed that the ground work has already been done to coordinate such efforts from one level to the other. Further, we presume that standardised interpretation of monitored data is in place.

Impending adverse weather conditions can be predicted with increasing reliability with the help of satellite data, air sampling (for dust particles that determine the quantity of winter snows), local monitoring of weather data, etc. The usefulness of the former depends on the degree of cooperation between the nations that own the weather satellites and those who do not. However, it is difficult to see how this fore knowledge might help to avert a disaster unless appropriate long-term plans are implemented in advance. Once it has taken place, international help may offer its temporary amelioration.

There is no conceivable way to avoid natural disasters. Advanced geological survey techniques may offer fairly reliable predictions of them. At present, we do not seem to have a comprehensive understanding of such phenomena even though they have been known since antiquity. We appear to have little choce in averting them, hence, what we can do is to make our food systems as resilient as possible so that and adequate FSN is restored as soon as possible.

As for the health threats that may adversely affect the FSN, their monitoring is obviously the domain of WHO, regional and national health authorities. The current Corona outbreak amply demonstrates their inadequacy. Food shortages due to this problem could have been avoided with comparative ease if the national authorities had in place a sutable plan to deal with all the aspects of such an emergency including food production and supply.

Monitoring of food trade in general and commodity futures in particular can warn the authorities of potential artificial food shortages. It is difficult to see how to counter this threat to FSN except by introducing and enforcing unequivocal food legislation based on the natural value of food. This value differs from the artificial value attributed to it by tradesmen in that its natural value stems from it being essential to life. And human life is supposed to be invaluable!

We have not said much about the actual modes of monitoring the indicators of impending threats to FSN. In our view, knowing about the threats from the described categories does not help us much to avoid them. Rather, we think that those indicators provide us some guidance for changing the structure of our current food systems in order to make them rational by being sustainable, really equitable, resilient, adequate and an integral part of our environment.

Best wishes!

Lal Manavado.

## Pathawit Chongsermsirisakul, Panyapiwat Institute of Management, Thailand

In the crisis of the COVID epidemic, there is a shift in the raw materials and ingredients businesses that will be used for cooking across the country. The food business was most affected by the crisis of interconnected transport interruption and short-term fluctuations of food market. All countries have turned to domestic or regional consumers as humans still have to consume three meals a day to survive.

Local food is the only way for all countries, even higher or more expensive than ever. But there is no other choice. Therefore, Real-time monitoring should be designed and utilized to strengthen of existing local food production such as the cop strategies, climate, conflict data of local food raw materials and ingredients, price information, and other factors to identify the likelihood of acute food insecurity and help policy makers enact timely policy responses for early warning systems and support preventative policy responses to food crisis risk in each local area.

## Mario Zappacosta, FAO, Italy

I am pleased to participate to the discussion presenting the GIEWS near-real time tools to monitor drought and food prices.

Drought: <http://www.fao.org/giews/earthobservation/index.jsp>

Global Information and Early Warning System on Food and Agriculture (GIEWS) monitors the condition of major food crops across the globe to assess production prospects. To support the analysis and supplement ground-based information, GIEWS utilizes remote sensing data that can provide a valuable insight on water availability and vegetation health during the cropping seasons. In addition to rainfall estimates and the Normalized Difference Vegetation Index (NDVI), GIEWS and FAO's OCB Division have developed the Agricultural Stress Index (ASI), a quick-look indicator for the early identification of agricultural areas probably affected by dry spells, or drought in extreme cases.

Food prices: <http://www.fao.org/giews/food-prices/home/en/>

This web site contains latest information and analysis on domestic prices of basic foods mainly in developing countries, complementing FAO analysis on international markets. It provides early warning on high food prices at country level that may negatively affect food security. All data used in the analysis can be found in the FPMA Tool.

Warmest regards,

Mario

## Betina Dimaranan, facilitator of the discusión

Dear FSN Forum participants,

Many thanks for the time you have taken to contribute to this discussion. A number of interesting points have been made related to the importance of near-real-time monitoring of food crisis risk factors for improved early warning early action.

Your comments have underscored the importance of timely information to inform programmatic responses to food crises and associated drivers in order to make the case for providing resources to avert food crises before they occur. Some of you have touched on both the strengths and limitations of current tools for real-time monitoring. The question of how to improve and expand use of real-time monitoring within national institutions has been raised. In addition, there has been discussion on how to institutionalize collection of relevant data such as on food prices so that there can be consistent, quality information at country level on which to base decisions.

Thank you very much for these and other insights raised thus far. As we continue this discussion, we would like to invite more contributions around the stated discussion questions. Of particular interest would be specific examples of policy responses at country level that have been guided by existing monitoring tools.

Kind regards,

Betina Dimaranan

## Jorge Carulla, Consultor independiente, Colombia

English translation will be available soon

Es importante que crisis similares a la del Covid-19 se presentarán probablemente en el futuro por lo tanto es indispensable proponer soluciones permanentes…que permitan direccionar acciones tanto del sector público como del sector privado….

Preguntas:

1. ¿Cómo debe diseñarse y usarse el seguimiento en tiempo real para reforzar los sistemas de alerta temprana existentes y apoyar las respuestas de políticas para prevenir el riesgo de crisis alimentariaszz?

R1:

En Bogotá recomendamos el montaje de un observatorio exclusivo para el seguimiento de las cadenas de suministro de la canasta básica de alimentos para la población del área metropolitana de la ciudad….Es indudable que este observatorio debe observar el sistema general del país y sus nueve cadenas de suministro básico….Existen observatorios de “seguridad alimentaria” pero se quedan cortos en la observación del comportamiento operativo de las cadenas….

2. ¿Cuáles son los ejemplos de respuestas normativas satisfactorias a nivel de país que se han guiado por los instrumentos de vigilancia existentes?

R2:

En Colombia, dada su condición de clima tropical, el país produce cerca del 90% de lo que consume en forma permanente. Presenta debilidades en la producción de materias primas para producción de proteína animal en (carne de cerdo y pollo) e indudablemente huevos pues importamos casi el 100% de los requerimientos…Eventualmente frente a la crisis se generaron políticas para garantizar la actividad de producción de alimentos….

3. Los precios de los alimentos locales son una forma de medir las condiciones en el mercado local, pero no siempre es posible contar con los datos del mercado local con periodicidad frecuente. ¿Qué otras deficiencias de este tipo existen en la vigilancia en tiempo real y cómo pueden abordarse tanto en un contexto de investigación como de políticas?

R3:

Me remitió a la necesidad de un observatorio permanente de la cadenas de suministro (respuesta pregunta 1)……debe detectar indicadores de insumos para la producción, seguimiento del clima en las zonas estratégicas…..variaciones importantes de la tasa de cambio que afecten la producción local o importaciones de insumos, sistema vial ,movilidad…..…..etc.…..por cadena de suministro…cada una de ellas tiene sus características diferenciables y es por lo tanto pertinente contar con indicadores independientes…

4. Los avances en las tecnologías y los datos de alerta temprana deben ir acompañados de un desarrollo de la capacidad de las instituciones a nivel nacional y regional para transformar los datos relevantes en medidas preventivas. ¿Qué se necesita para iniciar y ampliar la utilización de la vigilancia en tiempo real en los sistemas de alerta y acción temprana por parte de las organizaciones regionales, los gobiernos nacionales y otras instituciones a nivel de país? ¿Cuáles son los problemas técnicos y normativos relacionados con la utilización de esos instrumentos?

R4:

· Debe existir el observatorio capaz de monitorear las cadenas de suministro con observaciones e indicadores específicos de país, regiones, ciudades,…. Con la gestión de la data (BIG data) actual es posible hacer seguimiento en “tiempo real” del sistema….

· No soy especialista en el campo de la técnica pero he visto generar data articulada en tiempo real con bases de datos que maneja el sistema general de estadística DANE y que permiten recopilar datos históricos hasta el de hoy en precios de las centrales mayoristas del país y hacer seguimiento de múltiples variables(procedencias, volúmenes de ingreso..)… es un problema de diseño creo yo.

5. A lo largo de los años, diversas organizaciones han desarrollado una serie de diferentes sistemas de acción y alerta temprana. ¿Cómo podría una mayor colaboración entre los diversos instrumentos y enfoques facilitar su eficacia para impulsar respuestas normativas?

R5:

Insisto: creo que hay que separar las cadenas de suministro y articular las respuestas respectivas por cadena, de hecho las cadenas tienen sus líderes independientes por tipo de producto o productos afines(grasas y aceite, azúcar, ganadería, productores de pollos de engorde ,productores de huevos)…..………generalizar en este caso no me parece práctico pues lo urgente se pierde en lo genérico….las respuestas son dirigidas a los actores reales de cada cadena individual del sistema de suministro de alimentos básicos…….

Atentamente

Jorge CarullaFa

## Rajendran TP, Visiting Fellow, Research & Information System for Developing Countries, India

My response is as follows:

Questions:1. How should real-time monitoring be designed and utilized to strengthen existing early warning systems and support preventative policy responses to food crisis risk.

The best monitoring tool is based on artificial intelligence based public distribution system

(PDS) data management which can allow gaps in the supply chain as well as enumerate the beneficiaries who are unregistered for the PDS scheme. Access and availability of nutritious food (including processed food) could be integrated and aligned with wages of citizens. The employers can be enthused to provide in kind instead of cash as well as pay on credit food items that signify and assure nutrition to all age class of individuals in homes of the employees.

Unemployed citizens families could be brought under the social network to assure access to such food class at their gates. Any perceived risk of providing processed ready-to-eat-food can be obviated through quality certification by the manufacturers. Such system of distribution can be easily monitored based on inventories.

Food crisis in terms of stocks, mobilistion, transport and supply chains emanating out of abiotic stresses in any geographic situation need close monitoring in terms of stocking of raw materials for ready-to-eat food preparation and packaging need futuristic prediction models aside to meteorological prediction models for each nation. Investment policy on the R & D for developing such IT and AI based models has to be prioritised.

2.What are examples of successful policy responses at country level that have been guided by existing monitoring tools?

Policy responses of Food Security Law enforcement are through measurement of the health parameters of the target citizens including body BMR and freedom from communicable and non-communicable ailments.

3.Local food prices are one way to get a temperature check of local market conditions, but high frequency local market price data is not widely available. Where are the gaps such as this one in real-time monitoring and how can these be addressed both in a research and policy context?

Local food prices may not be significant aspect for access to nutritious food till the purchasing power of the needy citizens are ensured. Alternate option for validating the supply chain for the nutritious fresh and processed food items (separately) through cloud computational tools could bring in real time picture of the supply process at the tail-end of beneficiaries. Generally schemes and programmes meant for food and nutrition security shall be insulated from market forces. Countries have to own up their food security law and implement it especially amongst the vulnerable population. Commercial food prices shall not be allowed to eclipse the free supply of nutritious food. Access of such food stuff for sustaining health and immunity of citizens to be disease-free has impact on the national GDP.

4.Advances in early warning technologies and data must be matched by developing capacity within institutions at the country and regional level to transform relevant data into preventative actions. What is needed to initiate and scale up the use of real-time monitoring in early warning early action systems by regional organizations, national governments, and other country level institutions? What are the technical and policy-related challenges associated with the use of such tools?

Deploying decentralised civil society organisation (CSO) infrastructure partnership in the country could scale up realtime monitoring using modern ICT tools and technologies. The government could create self-sustaining governance models amongst the registered civil society organisations that can be chartered for semester-based analytics of ground truth collation and impact analysis of the scheme through partnership based commitment for execution of the daily targets/

The challenge is to keep together committed, non-corrupted and idealistic CSO infrastructure of the country with appropriate and timely financial investment support and esteem recognition. Generally government schemes suffer from onset time investment and subsequent side-lining of priorities as time goes on. This results in break down of goals and actions. The CSOs alone may not be able to steer programmes under such eventualities.

5.Over the years, a series of different early warming early action systems have been developed by various organizations. How could greater collaboration among the various tools and approaches facilitate their effectiveness in driving policy responses?

The general principles of business management for the launch of a product need to be pursued in this case in order to forecast the demand of nutritious food at satiation level and plan the supply chain through perceived threats for both procurement, access and purchase by the target citizens for consumption. Intensification of net-works of CSOs as steered by government machinery might facilitate effective policy responses at ground level.

## Bhubaneswor Dhakal, Nepal

One of the emerging critical problem which requires the real time information for food security:

One of the low cost and practical areas for using real time information in Nepal's mountain area is protecting crops and livestock against wild animals.  Most farming lands in the mountains are surrounded by forests where wild animals destroy crops and prey livestock. Their harm has been increased due to increasing conservation activities. Some of the animals have increased life threats and scary feelings to the people living in the localities. Women and resource poor farmers have been suffered most from the wild animals.  Many arable lands are abandoned from farming due to loss of the crops and animals and threats to humans. Providing real time information of the animals' roaming location by putting a GPS tag on their body parts would help the victims farmers including women to make plans to keep their crop and livestock safe. It is a low cost method as the cost of GPS tagging is not much nowadays. The information can be sent on farmers' phone. But the government and other development support agencies have shown little interest in the real time approach for food and human security. The conference paper given in the following link well demonstrated that the wild animals will be further problematic for food security in Nepal and similar other countries in Asia and Africa regions where wildlife protected areas are going to be increased for meeting the global  target of allocating 30 % land territory for biodiversity conservation by 2030.

The material is published in the researchgate and can be accessed at this link .   
([https://www.researchgate.net/publication/344701483\_Strategic\_Policies\_to...](https://www.researchgate.net/publication/344701483_Strategic_Policies_to_Manage_Land_Resources_for_Addressing_Growing_Social_Economic_and_Environmental_Problems_in_Nepal%27s_Mountain_Region?linkId=5f8a1927458515b7cf8528b4&showFulltext=1))  
It has shared some surprising learning of a country highly dependent on foreign aids and international advisory support.

Thank you.

Cheers

Bhubaneswor Dhakal

Nepal