



# COMMITTEE ON COMMODITY PROBLEMS

## Seventy-fifth Session

Rome, 13–15 July 2022

### THE GLOBAL INFORMATION AND EARLY WARNING SYSTEM ON FOOD AND AGRICULTURE (GIEWS)

#### Executive Summary

The Global Information and Early Warning System on Food and Agriculture (GIEWS) was created in response to the global food crisis of the early 1970s. The establishment of GIEWS as well as of its mandate and working arrangements were endorsed by the FAO Council at its Sixty-fifth Session, held in Rome in March 1975. GIEWS has since established itself as a leading source of information on food supply and demand at global, regional and country levels. It provides the international community, governments, policy-makers and other stakeholders with the most up-to-date and objective data and information and issues alerts and warnings on imminent food crises. GIEWS is located in the Markets and Trade Division (EST).

This document presents the work activities and outputs of GIEWS, as well its databases and tools, and discusses future developments to increase the capacity and capability of the system in the face of new challenges.

#### Suggested action by the Committee

The Committee is invited to review the work conducted by GIEWS and provide guidance, as deemed appropriate.

In particular, the Committee may wish to:

- express appreciation for the work conducted by GIEWS;
- recognize the continued development of GIEWS over time to meet emerging issues;
- confirm the increased importance and relevance of GIEWS, in particular in view of the increasing risks and uncertainties to world food security;
- provide guidance as regards potential future developments of GIEWS to respond to the new challenges and allow early action in cases of impending food security crises;

- urge Members to provide support to GIEWS to allow further developments of the system.

*Queries on the substantive content of the document may be addressed to:*

Secretariat of the Committee on Commodity Problems (CCP)  
 Markets and Trade Division  
 Email: [FAO-CCP@fao.org](mailto:FAO-CCP@fao.org)  
 Tel. (+39) 06 570 52723

## I. THE GIEWS MANDATE

1. The Global Information and Early Warning System on Food and Agriculture (GIEWS) was established following the food crisis of the early 1970s. The FAO Council endorsed the establishment of GIEWS, its mandate and working arrangements at its Sixty-fifth Session held in March 1975. Ever since, it has continuously monitored and reported on food supply and demand across the world. It has established itself as a leading source of information on food production and food security at national, regional and global levels.
2. Through broadly disseminated assessments, reports and direct interaction, GIEWS alerts national and international decision makers on impending food crises, aiming to guide timely and proper interventions. GIEWS provides comprehensive market intelligence on key staple food commodities and supports national and regional initiatives to establish and enhance early warning systems, supporting the call of the humanitarian community to engage in early action to increase resilience capacity, particularly of those most vulnerable.
3. GIEWS monitors food production, consumption, trade flows (imports and exports) and changes in stocks in all countries of the world, with particular attention to Low-Income Food-Deficit Countries (LIFDCs), for which data are not readily available from other established sources. Monitored variables range from weather and climate conditions, input availability and accessibility, pest and disease outbreaks, policy changes, trade flows, international and domestic food prices, food stock changes, to humanitarian situation and ongoing interventions, conflicts at various levels, and general macro-economic conditions.
4. The information collected and analysed by GIEWS originates from different sources. At country level, information is provided by governmental and non-governmental institutions, research institutes, universities and the private sector. GIEWS relies also on information provided by a wide variety of international organizations and regional institutions and agencies. Great knowledge support comes from FAO country offices, technical divisions, teams and projects that flag emerging issues that may affect food supply and demand, including the Desert Locust Information Service (DLIS), the Food Chain Crisis Management Framework (FCC), the Emergency Prevention System (EMPRES) on transboundary diseases of animals and plants.

### A. Tools and databases developed and used by GIEWS

5. To support monitoring of conditions of major crops across the globe and supplement ground-based information to assess production prospects, GIEWS utilizes a number of state-of-the-art digital tools, including remote sensing tools. Satellite-based imageries supplement ground-based information to assess vegetation conditions and crop production prospects. On its website, GIEWS hosts and maintains a suite of publicly available Earth observation indicators, including the Normalized Difference Vegetation Index (NDVI), the Vegetation Health Index, the Vegetation Condition Index, precipitation estimates and rainfall anomalies.

6. The Agricultural Stress Index (ASI), a quick-look indicator for early identification of cropland areas across the globe with a high likelihood of water stress and, in extreme cases, drought, has been developed and used by GIEWS since 2014. From the start to the end of each cropping season, the ASI is updated every ten days with new satellite images at 1 km resolution, which are freely available online. In addition, a number of indicators provide information about water stress on pasture land as well as drought intensity, historic drought frequency and drought probability forecast (as of early 2022, a test version remains available only for internal FAO users while a broader dissemination is being considered).

7. The ASI has been adopted as a key indicator for natural hazards in the Index for Risk Management (INFORM) as well as in the FAO's Fall Army Worm Risk Index (FAWRisk). Since 2016, with the support of the FAO Office of Climate Change, Biodiversity and Environment (OCB), a country-specific version of the ASI has been developed and deployed in several countries, providing precise information regarding the water stress periods for different crops in different regions to allow for higher granularity of country-level analysis as well as country-level ownership. In 2021, all ASI datasets have been integrated in the FAO Hand-in-Hand Geospatial platform and are showcased by the Google Earth Engine and the Living Atlas by the Environmental Systems Research Institute (ESRI), expanding the use of ASI in a broader context and making it available for a broader audience of analysts in real time.

8. Following the 2007-08 global food price crisis, GIEWS intensified its food price monitoring and analysis activities, leading to the development of the online Food Price Monitoring and Analysis (FPMA) Tool. The FPMA Tool tracks prices of basic food commodities in many countries around the world, particularly in developing countries and LIFDCs and constitutes an advanced technical platform for the analysis and dissemination of price information. Currently it includes about 1 800 monthly domestic retail and/or wholesale price series of major foods consumed in about 100 countries and weekly/monthly prices for 85 internationally traded food items.

9. Besides supporting the work of GIEWS and other FAO units, the FPMA Tool and database have been increasingly appreciated as a valuable public good. The data is shared on a regular basis with several international and national institutions, including the International Food Policy Research Institute (IFPRI), the World Food Programme (WFP), the World Bank and the United States Department of Agriculture (USDA), and increased ad-hoc requests for data were fulfilled, in particular in the months immediately following the COVID-19 outbreak in 2020. Currently, GIEWS is working to increase the data coverage in terms of markets and commodities, in particular including data for food commodities that are nutritionally significant in local diets.

10. Building on the success and experience gained at the global level, the FPMA Tool has been adapted for use at country level, with the provision of technical support to strengthen countries' capacities in price collection, analysis and reporting. First national versions of the FPMA Tool were operational in Guatemala, Kyrgyzstan and Tajikistan, while in 2021 a cloud-based web service has been established in Angola, Zimbabwe, Costa Rica and North Macedonia. GIEWS has also supported the establishment of a regional version of the tool in Central America, where it incorporates not only price data, but also data on production and trade, upon request of the local implementation partners.

11. Crop and Food Security Assessment Missions (CFSAMs) are another core and long-standing activity of GIEWS. They are carried out jointly with WFP, upon request of national authorities, and aim to assess and analyze the extent and severity of shocks, whether pre-existing or anticipated, in terms of impacts on production and food security. CFSAMs have traditionally been fielded in countries experiencing natural disasters, such as droughts and floods. However, in recent years, the number of requests from countries where crop production and food security are affected by wars and conflicts have increased notably. In these particular situations, where access to areas is severely limited by insecurity, CFSAM inquiries make use of information from remote-sensed imagery. The reports of the CFSAMs provide analysis at both macro and micro levels and recommendations with proposed actions to governments and the international community in order to mitigate the impacts of crises on the affected populations.

## B. GIEWS outputs

12. GIEWS issues several periodic publications throughout the year, reporting and alerting on different aspects of food security at global, regional and country levels. All GIEWS publications are available online and disseminated via newsletters and social media. GIEWS' main publication is the quarterly *Crop Prospects and Food Situation* report that provides a forward-looking analysis of the food situation by geographic region, focusing on the cereal production outlook, market situation and food security conditions, with particular attention to LIFDCs. The report includes a detailed list of countries requiring external assistance for food and highlights the main factors behind the food insecurity situation in each case.
13. Every month, GIEWS publishes the Food Price Monitoring Analysis (FPMA) Bulletin that provides an overview of international cereal price developments, regional roundups on domestic price trends, and warnings on price anomalies at country level.
14. The GIEWS Country Briefs provide up-to-date information at country level on current production prospects for the main crops, forecasts of cereal import requirements, a brief analysis of food price trends and an overview of the food security situation in the country. The Country Briefs are to be considered as the building blocks for all GIEWS publications and are also widely used by several institutions in various reports dealing with early warning and food security.
15. Furthermore, when warranted, GIEWS issues short reports on anomalous (GIEWS Updates) or alarming (GIEWS Alerts) food security situations at country or regional level.
16. In close cooperation with the G20 Agricultural Market Information System (AMIS) Secretariat and other teams of the FAO Trade and Markets Division, GIEWS maintains up-to-date commodity balance sheets (CBSs) for the major food commodities and for over 220 countries. By provide data about food supply and demand, CBSs are a powerful tool for monitoring and analyzing global commodity markets and food security situation at country level. CBSs data are used in various knowledge products and reports and are particularly useful to inform FAO estimates of Dietary Energy Supply (DES) and the prevalence of undernourishment (PoU), one of FAO's key food security indicators published in *The State of Food Security and Nutrition in the World* (SOFI) annual report.
17. In 2015, GIEWS has developed the Indicator of Price Anomalies (IPA) as an early warning tool to identify abnormal changes in prices both within and across years. Using this indicator, which is monitored at country level, GIEWS periodically issues early warnings on high food prices that may negatively affect food security. The IPA has been adopted as an official indicator for monitoring progress towards Sustainable Development Goal (SDG) Target 2.c on food price volatility.

## C. Early warning based on consensus and stronger links to early action

18. During the past few years, reflecting the shifting trends of humanitarian frameworks from post-shock emergency relief to prevention, mitigation and risk reduction, the GIEWS approach to early warning has shifted toward more consensus-based analyses and closer to early action as a preventive measure. In particular, GIEWS has steadily increased its active involvement in various international and regional early warning platforms and working groups. This new approach is also driven by the fact that most food crises have multiple facets, and it is therefore urgent to rely on multi-disciplinary teams with different specific mandates and tools that complement each other. At the same time, GIEWS has strengthened its collaboration with the FAO Office of Emergencies and Resilience (OER), providing early warning information to design technically sound and timely early action interventions to prevent or mitigate the impact of impending disasters on the most vulnerable people.
19. Since its launch at the 2016 World Humanitarian Summit, GIEWS actively participates in the work of the Global Network against Food Crises, an alliance of humanitarian and development actors aiming to tackle the root causes of food crises and promote sustainable solutions through shared analyses and strengthened coordination in evidence-based responses. Through the Network, the work

and outputs of GIEWS are used as input in wide consensus-based analyses to effectively prevent, prepare for, and respond to, food crises and contribute to long-term recovery, development and resilience-building efforts.

20. One key output of the Global Network against Food Crises is the annual “Global Report on Food Crises” (GRFC), a unique global public good carried out with the coordination of the Food Security Information Network (FSIN) aiming to provide evidence for decision-making and resource allocations. Since the launch of the first edition of the GRFC in March 2017, GIEWS has increasingly contributed to the analysis and shared its knowledge on crop production prospects and food security with international and regional partners participating to the preparation of the report.

21. Since end 2021, under the auspices of the Global Network against Food Crises, GIEWS started to coordinate the preparation and publication of the FAO-WFP Hunger Hotspots report. The report is issued three times a year and provides a forward-looking, early warning analysis of countries and situations (referred to as hotspots), where acute food insecurity is likely to deteriorate over the coming months. These hotspots are identified through a consensus-based inter-agency analysis of key drivers of food insecurity and their likely combination and evolution across countries and regions. For each hotspot, the report provides detailed recommendations for early actions and emergency response.

22. Since 2017, GIEWS collaborates with the G20 Group on Earth Observations Global Agriculture Monitoring (GEOGLAM), whose aim is to increase market transparency and improve food security by producing and disseminating relevant, timely and actionable information on crop growing conditions and outlooks of production at national, regional and global levels. Every month, GIEWS participates in multi-agency consensus-based virtual meetings to assess crop growing conditions and production prospects in countries that are vulnerable to food insecurity. The results are then published in the GEOGLAM Crop Monitor for Early Warning (CM4EW) bulletin, an internationally recognized source of reliable early warning information often used by humanitarian organizations to guide their decisions on food allocation and assistance.

#### **D. Future developments**

23. To advance analytical capabilities, GIEWS is currently engaged in research to develop and test novel remote-sensing based tools and methods. The objective of this effort is to strengthen capacities to monitor growing conditions of primary cereal crops and generate in-season yield forecasts with increased precision and an earlier lead time. The data will enable international and national institutions to better predict supply shortfalls or shocks and take well-informed decisions, benefitting smallholder farmers, supporting the development of local early warning systems to support anticipatory actions and, overall, contributing to create agrifood systems that are more resilient to shocks. In additions, the outputs will directly support the Market and Trade Division’s monitoring of national and global cereal supply and demand conditions, while also contributing to FAO’s four Betters - better production, better nutrition, a better environment and a better life.

24. GIEWS is conducting this activity in partnership with the University of Maryland (UMD)/the National Aeronautics and Space Administration (NASA) Harvest Programme, a long-term collaborator, and is testing the tools in Malawi, Namibia and Kazakhstan. The tools are intended to be scalable and, thus, support global crop monitoring efforts. Specifically, the study aims to produce three key products: 1) mobile-based survey tool to facilitate the collection of geo-located data on crop conditions; 2) refined cropland and crop-type maps; and 3) a remote sensing and machine learning based yield forecast model.

25. Fundamental to the development of these tools is the need to corroborate remote-sensing based information with ground truth data. The lack of ground-truth validation has previously been an impediment to the advancement of this work. Ground observations are critical to calibrate and train machine learning (ML) models that produce crop maps in smallholder farming systems and validate yield forecast models based on remote sensing. In partnership with FAO country offices and national

governments, GIEWS and the NASA Harvest Programme are implementing nationwide campaigns to collect field data in Kazakhstan, Malawi and Namibia.

26. While the current Earth Observation tools used by GIEWS are still deemed satisfactory, efforts to fine-tune and improve them are ongoing. To that effect, GIEWS is actively collaborating with the European Space Agency (ESA) under the auspices of the Memorandum of Understanding between FAO and ESA to keep abreast of the latest developments in the remote sensing field. As a final user of the Earth Observation products developed by ESA, GIEWS plans to implement changes to its tools, including more detailed crop masks, rangeland coverage, and eventually combine Earth observation imagery with improved crop estimates for better monitoring.