

# The Communication of Weather Information in Humanitarian Organisations

14th Workshop on meteorological operational systems

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18 November 2013



**World Food Programme**

# Outline



- **Outline**
- **WFP Background**
  - Responding to Emergencies
  - Structure
- **Communication**
  - Seasonal forecasts
  - 1 to 7 days before event
  - During and after event
  - Technical users

# WFP: Who we are

- Founded in 1961, the World Food Programme is the food aid arm of the United Nations
- WFP is the largest humanitarian agency fighting hunger worldwide
- On average, WFP aims to reach more than 90 million people with food assistance in more than 73 countries
- Around 12,000 people work for WFP, most of them in remote areas
- Offices all over the world, and 6 regional bureaux

# Types of Emergencies



WFP's emergency operations cover three main kinds of crises:

- Sudden disasters: natural disasters that affect food access and/or cause population displacements
- Slow-onset disasters such as droughts and crop failures
- Complex emergencies: conflicts, widespread social and economic disruption and large population displacements that usually involve UN coordination

# Responding to Emergencies



- **Time saved means lives saved**
- **Being prepared**  
we need to be prepared for emergencies, so we can respond quickly with food assistance. In the aid world, this is called *Emergency Preparedness*.
- **Gathering information**  
we need precise information on where the hungry are, how many there are and where they might be in future. This is known as *Food Security Analysis*.
- **Buying or obtaining food**  
we try to buy food as near as possible to where it is needed. This is handled by our *Procurement* team.
- **Ensuring good nutrition**  
we ensure beneficiaries receive the right food and nutrition for their needs. This is why our *Nutrition* unit is closely involved with all of our operations.
- **Transporting food**  
we organize food transport to the most inaccessible places on earth. This is the domain of our *Logistics* experts.
- WFP supports national, local and regional food security and nutrition plans. It partners with other United Nations agencies, international organizations, non-governmental organizations, civil society and the private sector to enable people, communities and countries to meet their own food needs.



# Logistics



- WFP's logistics team has to negotiate some of the toughest terrain on the planet.
- In 2005 the agency was mandated to lead logistics operations whenever a humanitarian emergency requires a joint response from UN agencies and the humanitarian community.
- The Emergency team provides support to logistics



WFP Convoy Braves Treacherous Roads To Reach Afghanistan Central Highlands

# Logistics in the Philippines

- Some of the first WFP staff to arrive in the disaster zone were the emergency telecoms specialists. They play the crucial role of ensuring connectivity for the entire humanitarian operation.
- A key part of WFP's role is to provide equipment – such as this power generator -- for the humanitarian response and to coordinate the logistics side of the operation.
- The main challenges right now are related to [logistics](#). Roads are blocked, airports are destroyed. As the UN agency leading the humanitarian community's Logistics Cluster, WFP is working with the government to set up operational hubs and organize airlifts of essential supplies," WFP Country Director in the [Philippines](#) Praveen Agrawal said.



# Philippines: Transportation of Food

- Typhoon Haiyan made landfall on November 8
- As soon as news of the destruction wreaked by Typhoon Haiyan came out, emergency food supplies were prepared at the UN Humanitarian Response Depot in Dubai and flown to Manila
- From Manila, the food supplies were flown to Tacloban City, in the worst hit part of the eastern Philippines. The supplies – several tons of High Energy Biscuits -- arrived on 13 November





# Current Philippines Deliveries

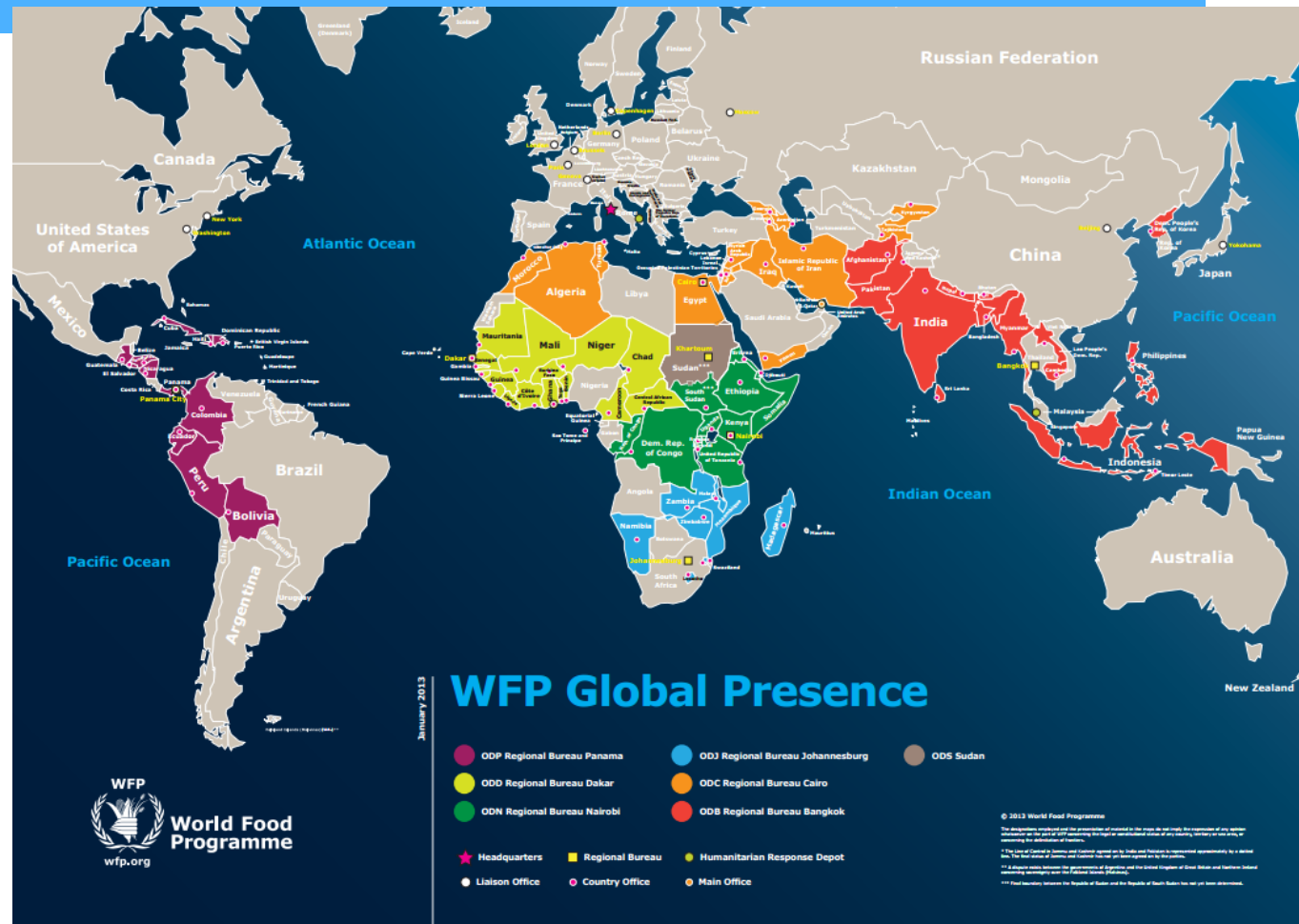


- More than 170,000 people have received rice rations to date.
- About 300 boxes of High Energy Biscuits were flown on 14 November by Philippines military helicopters to two areas that had not yet been reached
- Sixteen trucks carrying 320 metric tons of rice were en route to Tacloban on 15 November.
- A barge carrying 2,000 metric tons of food and other relief items from WFP, other UN agencies heading to Tacloban.
- WFP has contracted a large 'Roll-on Roll-off' cargo vessel capable of carrying more than 5,000 metric tons of cargo.

# Philippines: WFP Supports Relief Effort For Typhoon Survivors

- <http://www.wfp.org/videos/philippines-wfp-high-energy-biscuits-comfort-typhoon-survivors>

# WFP's Presence : Country Offices Worldwide



- Headquarters Rome
- 6 Regional Bureaux
- Assist in over 73 Countries

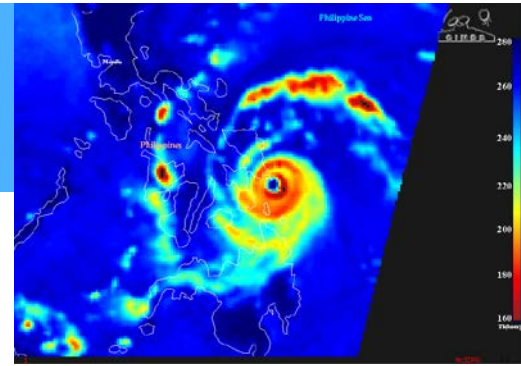


# WFP Anticipation and Response to Natural Hazard Events

- **Seasonal Long term Planning: 2 to 6 months ahead**
  - A warning flag is the best defense against disaster. WFP has one of the most comprehensive Early Warning Systems, collecting and analyzing information on natural and man made hazards.
  - Having the plans in place to move staff and supplies quickly.
- **Short term Planning: 1 week to 1 day before event**
  - If WFP can see that an emergency is looming, we can lessen its impact. Extra supplies can be ordered in advance and moved by trucks and ships, rather than by air. This saves time, money - and lives.
- **During and after event**
  - When a disaster strikes, our scientific partners help us produce a Rapid Impact Analysis. They use satellite imagery to show us the situation on the ground, and computerised modelling to predict how it may change.
  - Emergency Assessment teams are also sent in to quantify exactly how much food assistance is needed for how many beneficiaries and for how long.
  - They must also work out how food can best be delivered to the hungry and distributed

# Weather Forecast Protocol

- Global Forecasting: Weather team provides support for all branches of WFP
- Refer first to the forecast from National Weather Services
- Can not beat local knowledge
- Example – India Meteorological Department monsoon forecasts
- However, information is not always freely available or in needed format
- 5000 people threshold
- Does this event have impact on WFP operations or vulnerable populations?
- 1 meteorologist, several conflict analysts and international consultants and economists. Help provide additional context.



- In 2011 ECMWF began to provide WFP with full access to its products, which have since then provided essential support during a variety of meteorological scenarios.
- Sample of Products:
  - 6 month climate outlook
  - 2 month hazard outlook
  - Weekly state of the world update
  - Onwatch / warning products as needed
  - Special requests

# Visualizing for Users



- Communicating weather to wide range of users across the world with different needs and experience with weather data
- Communicating the danger is essential – not under or over-warning. Making sure they have the latest information
- Goal is to encourage an action and response to forecast
- Wide range of needs from basic to technical – one standard product not sufficient

# Communicating the Hazard

## Different Products for different needs

### Seasonal:

- Two to six month forecast: Early Warning Report

### Short term:

- Decision maker Preparation Forecast (1 to 7 days): Prior to event: World Weather Watch
- Local Forecast during and post event (1 to 4 day forecast) : Point forecast



# Two to six month forecast:

- Early Warning Report: Monthly forward-looking review of contextual risks that have a significant likelihood of necessitating a WFP response in the coming two months
- Allows for all offices to prepare for a needed above average response to a seasonal natural hazard
- Communicates a detailed analysis of expected increased needs
- Conflict and economic hazards are evaluated by the early warning team



# Seasonal Forecast: Early Warning Report

- Strong indications from ECMWF of above average Tropical Cyclone season near Philippines
- Outlook from September indicated above average tropical cyclones this year



## Philippines: Flooding and landslides



Flooding and landslides in the Philippines are a high risk for October and November 2013. The latest models

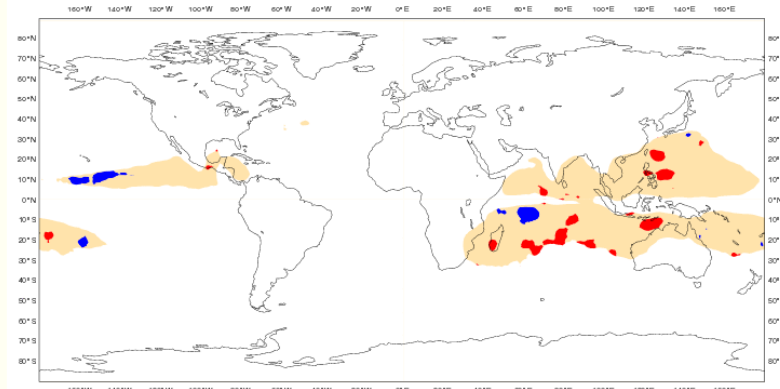


### Tropical storm standardized density

ECMWF Seasonal Forecast  
Standardized Tropical Storm Density  
Forecast start reference is 01/09/2013  
Ensemble size = 51, climate size = 300

System 4  
ONDJFM 2013/14  
Climate (initial dates) = 1990-2009

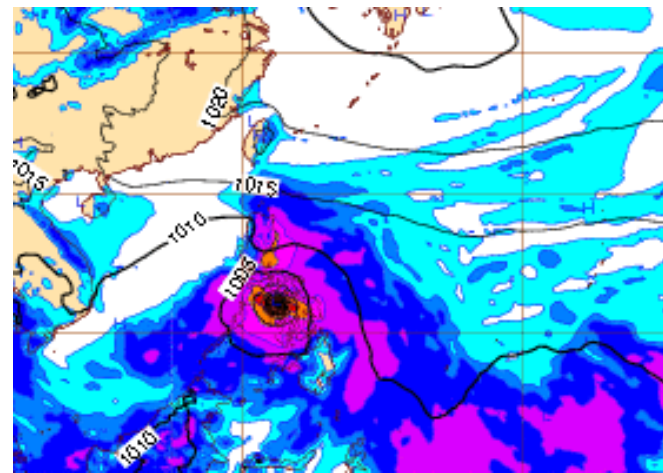
■ Reduced expected value   ■ Usual expected value   ■ Enhanced expected value



[Show original product](#)

# Decision maker Preparation

## Forecast (1 to 7 days): Prior to event



- Created for decision makers across the organisation
- Management staff must look at a wide range of risks- weather is just one piece of the puzzle!
- Should I be worried?
- Is this normal?
- What are the possible impacts?

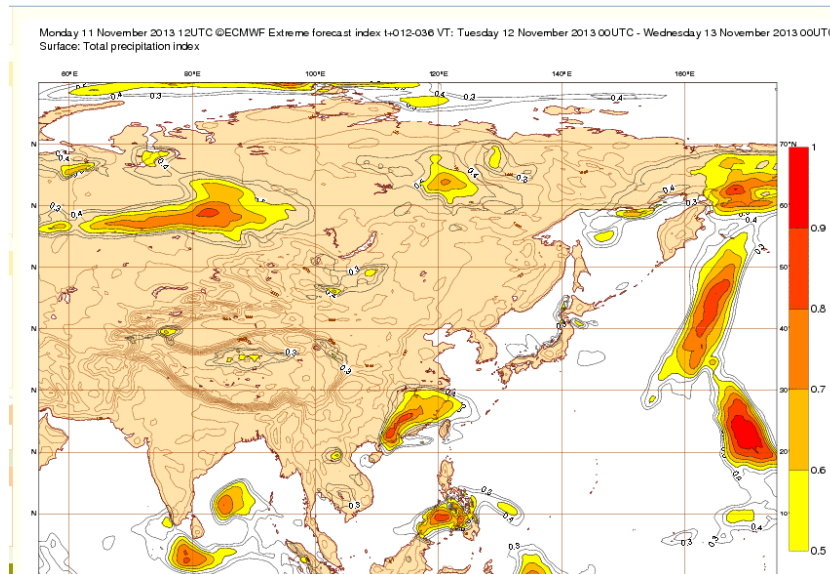
# World Weather Watch

- Created with help from GIS team
- Looks at possible events for upcoming week
- Possible severity of event is shaded
- Likelihood of event found by clicking on country
- Allows for quick assessment- is weather going to be a concern this week?
- Way to start a dialogue and contact WFP meteorologist if additional information is needed
- Allow people to be aware of risks one week in advance.
  - a way to deal with high impact – low confidence



# EFI

- Provides ‘local knowledge’
- Model climatology included in this product is crucial
- Also helps with global situational awareness while dealing with high – impact events
- Is this going to have major impact or not
  - 50 mm of rain in desert vs tropics
- ECMWF EFI and several meteorological products from National Meteorological and Hydrological Services inspired World Weather Watch Look



Models indicating a tropical depression could cause problems on 12 to 13 November

# Local Forecast post event (1 to 4 day forecast)

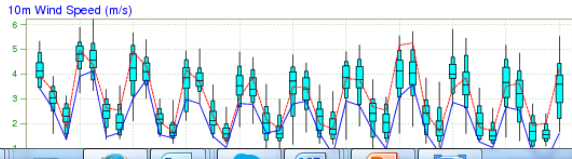
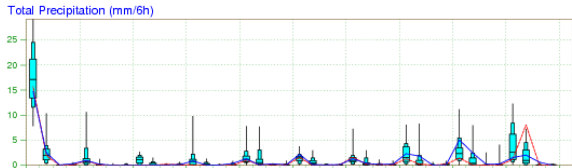
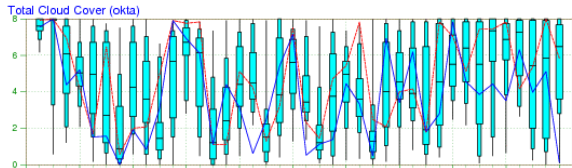
- Goals: To assist local country Office and Regional Bureaus with daily operations and logistics planning
  - Transportation of food
  - Distribution of food
- Generally 1 to 4 day forecast
- Particularly needed during crises or vulnerable areas
- Currently provide for Tacloban in the Philippines and Yida Camp in South Sudan



# ECMWF Tool: EPSGRAM

Tacloban

EPS Meteorogram  
Tacloban 11.38°N 124.88°E (EPS land point) 0 m  
Deterministic Forecast and EPS Distribution Wednesday 13 November 2013 00 UTC



Tropical Depression Zoraida



**Air strip in Yida Camp, South Sudan, on a rainy day.** Picture courtesy of George Fominyen.

- Accounts for variability
- Allows for quick assessment during emergency situations
- Reaches nearly everyone helping in the current Philippines emergency
- WFP's Analysis and Early Warning Team first used the forecasts in the remote area of Yida in South Sudan where flooding had made getting help to 60,000 refugees almost impossible.



# Point Forecast Benefits



- People are more likely to respond to forecast as it feels more personalised
- When issued point forecast for Tacloban, had immediate response
  - *Thanks a lot for this! I just returned from Tacloban after 3 days, and since yesterday night, it's been raining a lot in Tacloban.*



WFP Emergency Preparedness & Response Branch

Philippines - Weather Forecast - Point Forecast - 12 November 2013

#### Regional Summary:

Tropical Depression Zoraida is currently over San Francisco, Agusan del Sur and is expected to continue to track to the northwest across the southcentral Philippines towards Palawan through the morning of 13 November (local time). Locally heavy rains are expected across especially the Central and Eastern Visayas, Zamboanga Peninsula and northern Mindanao, with rain rates of 5 to 15 mm/ hour and total amounts from 40 to 80 mm through 13 November. Locally in Tacloban, models generally indicate 20 to 50 mm of rain total.

#### Tacloban Point Forecast:

##### 12 November Tuesday

Rain: Moderate to heavy rain continuing into early afternoon. Rain amounts of 10 mm to 25 mm.  
Winds: 25 to 35 kph with higher local gusts  
Cloud Cover: Overcast

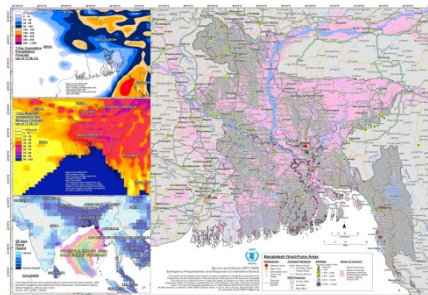
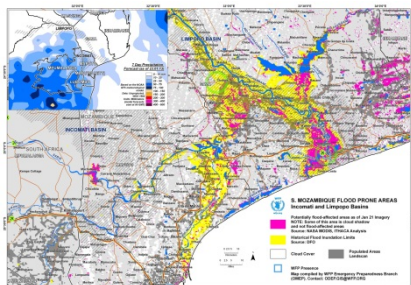
##### 13 November Wednesday

Rain: Moderate to heavy rain developing by afternoon. Rain amounts of 15 mm to 30 mm.  
Winds: 15 to 25 kph  
Cloud Cover: Overcast



# Technical Users: GIS

- One GIS team at headquarters
  - producing maps for significant natural hazard and conflict events around the world
  - Support country and regional bureaux
  - (wide number of themes to respond to)
- GIS teams at Country Offices and regional bureaux
  - Access to local data
- Highly skilled GIS team trained in using a wide range of data (i.e. using MODIS to detect flooding)
- Work directly with ECMWF grib files and produce analytical maps
- Collaborate with meteorologist



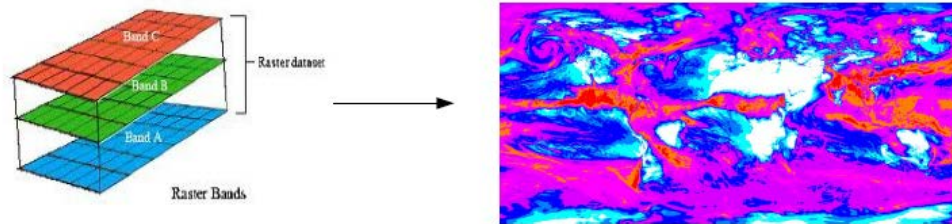
# Use of ECMWF data in maps

- Use precipitation forecast from ECMWF and track
- Receive grib forecast files directly from ECMWF twice daily
- Access to the latest model data
- Maps used by decision makers and other technical staff



# Implementation

- On our FTP server we receive 88 files, or 5.57 Gb each day
- To keep file size to a minimum, we download only 10 variables (i.e.)
  - Total Precipitation
  - Snow depth
  - High Cloud Cover (modis data availability)
  - Volumetric Soil Water
- Export the desired data and then convert into GeoTiff using python and GDAL. Then classify the file using ECMWF color scheme
- Thanks to the great ECMWF for help with this!



GRIB multiband file

GeoTIFF single band file

# Sharing with the field:

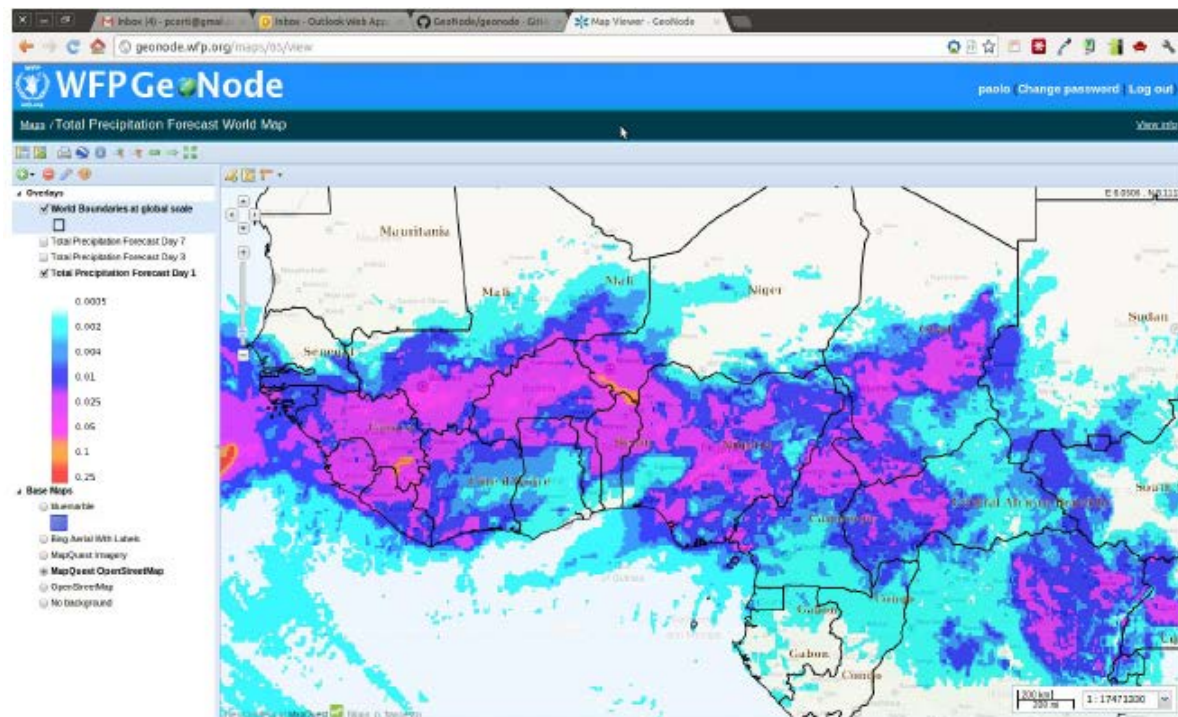
## Geonode



- GeoNode is an open source platform for sharing geospatial data and maps.
- Way to upload, manage, and browse data. Search for data or upload your own data.
- Able to create a map with built-in cartography tool, or explore maps shared by others.
- Way to share GIS information across WFP headquarters and field
- Password protected

# Data Sharing: Geonode

- Create 3 geonode layers and update twice a day the Provide 1, 3 and 7 day ECMWF precipitation forecast data
- Possible to create maps directly in geonode or use within GIS tools such as QGIS or ArcGIS



# Thank You!

- WFP's Director of Emergencies, David Kaatrud, says, "ECMWF experts have helped us every step of the way and have been incredibly generous in giving us free access to their industry-leading technology and information. This subscription costs \$265,000 a year, but as in-kind assistance is of great value to us in our first initiative in this important area. Increasingly, anticipating extreme weather is critical to WFP's emergency preparedness and emergency response

# Conclusions

- WFP aims to serve 90 million people each year
- Natural hazard emergencies contribute a significant number to these needs each year
- Emergency preparedness team uses ECMWF products to help prepare WFP responses to natural disasters
- An important goal is to tailor products to most effectively warn and inform WFP staff about natural hazards

# Questions?





# Future Ideas

- If server/ computer capacity allows it, run WRF based on ECMWF

