



World Meteorological Organization

Working together in weather, climate and water

Review of Agrometeorological Bulletins from Developing Countries

Robert Stefanski

Chief, Agricultural Meteorology Division

Climate and Water Department



Inter-Regional Workshop on Improving Agrometeorological Bulletins

- **Inter-Regional Workshop on Improving Agrometeorological Bulletins, Bridgetown, Barbados (Oct 2001).**
- **Attended by 25 experts from 21 countries.**
- **Participants developed the concept of a centralized web server for agrometeorological products.**



Caribbean
Institute
for Meteorology
and Hydrology

Improving Agrometeorological Bulletins



Proceedings of the Inter-Regional Workshop

*15-19 October 2001
Bridgetown, Barbados*



AGM-5

World Meteorological Organization

WMO/TD No. 1108



Expert Group Meeting on Internet Applications for Agrometeorological Products

- **Expert Group Meeting on Internet Applications for Agrometeorological Products, Washington, D.C. (May 2002). Attended by 12 experts from 7 countries.**
- **Experts developed a plan to implement a centralized web server to host:**
 - **National Agrometeorological Bulletins**
 - **Agrometeorological Advisories**
 - **Agrometeorological Training Modules**



Online

- **December 2003, WAMIS officially went online with products from Peru and the US.**
- **Shortly thereafter, in January 2004, thanks to colleagues from Italy (<http://wamis.bo.ibimet.cnr.it>) and South Korea (<http://www.wamis.net>), the WAMIS mirror sites went online.**



Benefits of WAMIS to Members

- **WAMIS helps members to disseminate and improve their agro meteorological products.**
- **As a dedicated web server, it allows countries to place their existing agrometeorological bulletins and advisories on a near real-time basis.**
- **Provides tools and resources to help members improve the quality and presentation of their agrometeorological bulletins.**
- **Provides a central location for agrometeorological information so that members can quickly and easily evaluate the various bulletins.**



Reminder – Keep in Mind

- Providing agrometeorological bulletins through the Internet is **ONLY ONE DISSEMINATION METHOD** for interacting with users.
- This does not replace direct interactions with users or using other media (newspaper, radio, TV, etc)



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Products Available For:

- | | |
|------------------------------------|-------------------------------|
| ACMAD | Germany |
| Albania | India |
| Argentina | Italy |
| Australia | Kenya |
| Bangladesh | Lesotho |
| Belgium | Malawi |
| Belize | Malaysia |
| Brazil (2) | Mali |
| Bulgaria | Mauritania |
| Burkina Faso | Mozambique |
| Canada | Mexico |
| Chile | New Zealand |
| China | Niger |
| Colombia | Pakistan |
| Côte d'Ivoire | Peru |
| Cuba | Philippines |
| Dominican Republic | SADC |
| DMCSEE | Sénégal |
| Ecuador | Sri Lanka |
| El Salvador | South Pacific |
| Ethiopia | Swaziland |
| EU-MARS | Tanzania |
| Fiji | Turkey |
| Gambia | USA (2) |

Note: The numbers after country names indicate the number of different organizations or agencies that provide products.

www.wamis.org



Current Status

- **Currently, there are products and bulletins from 50 countries and organizations.**
- **Nearly 500,000 visits since the inception of the website in December 2003 and an average of about 15,000 visits are made per month.**
- **WAMIS mirror servers still maintained by Italian Institute of Biometeorology (<http://wamis.bo.ibimet.cnr.it>) and by NCAM – Republic of Korea (<http://www.wamis.net>)**



Current Status 2

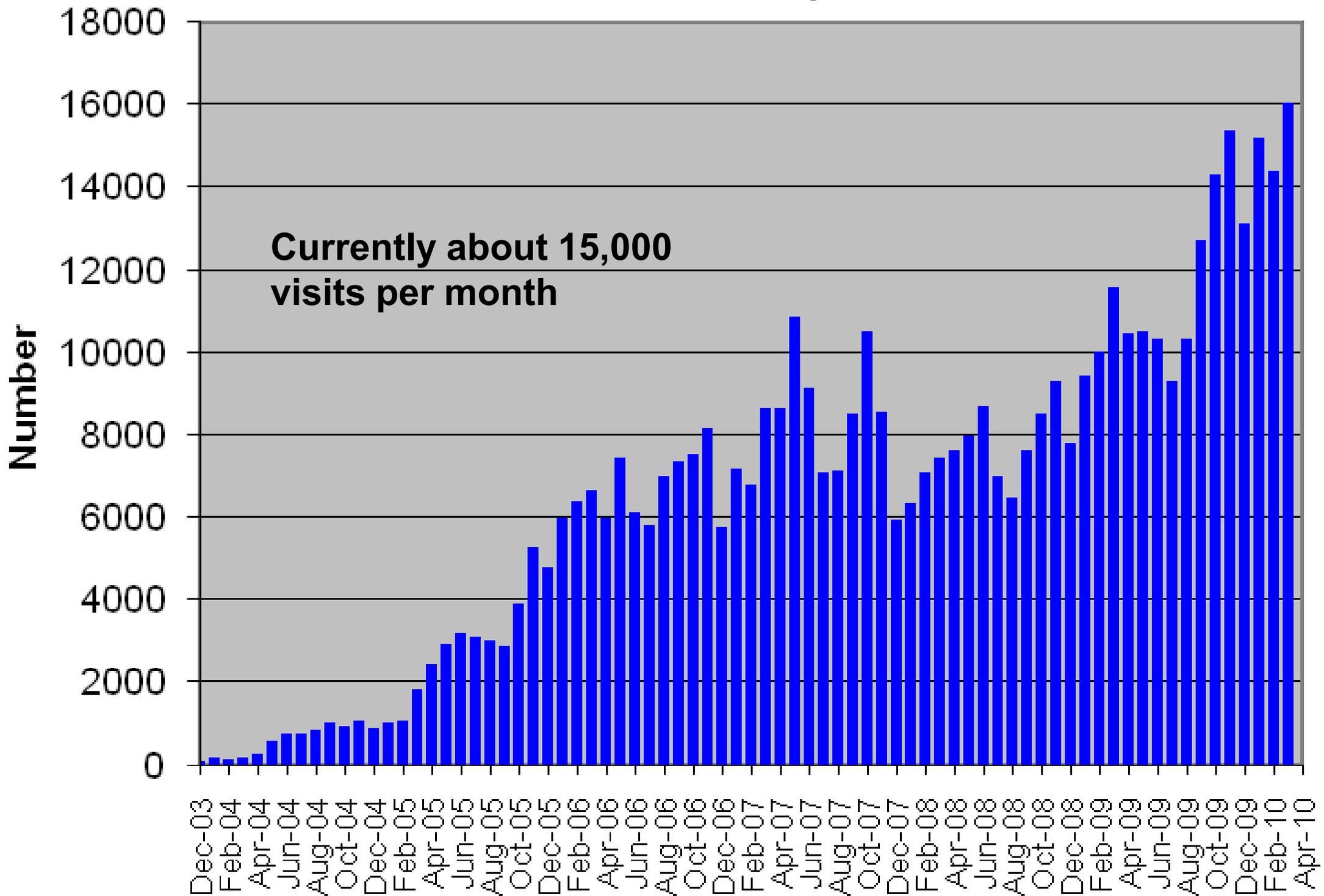
- **Number of Web Links only = 24**
- **Number of Actual Bulletins (PDF) = 26**
 - **Received by email = 12**
 - **Accessed by web = 14**
 - **Automatically uploaded = 0**



Current Status 3

- **Regional Distribution of Products and Links**
 - 16 - Africa (Region I)
 - 5 - Asia (Region II)
 - 7 - South America (Region III)
 - 8 - North and Central America (Region IV)
 - 6 - Southwest Pacific (Region V)
 - 8 - Europe (Region VI)

Number of WAMIS Visits per Month





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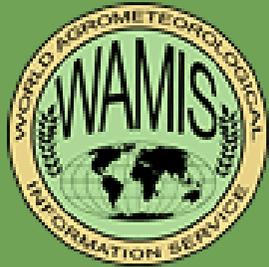
[Other Links](#)

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North and Central America

- [Belize](#)
- [Canada](#)
- [Cuba](#)
- [Dominican Republic](#)
- [El Salvador](#)
- [Mexico](#)
- [United States of America \(2\)](#)





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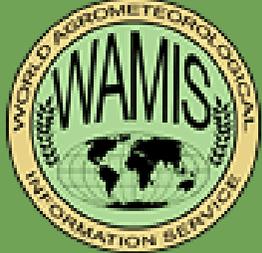
Dominican Republic

Various Monthly Bulletins

The [National Office of Meteorology of the Dominican Republic](#) (Oficina Nacional de Meteorología - ONAMET) provides several agrometeorological bulletins and other products on their website. Most of these products also have an archive.

These products include:

- **[Monthly Effects of Climatic Conditions on Agriculture](#)** (**Incidencia de las Condiciones Climaticas el la Agricultura**) - This bulletin a monthly summary of the effect of rain, temperature, humidity, soil moisture, and evapotranspiration. It provides detailed tables of stations by region.
- **[Monthly Agroclimate Summary](#)** (**Resumen Agrometeorológico**) - This is a short summary of climatic conditions during the month.
- **[Monthly Agroclimate Outlook](#)** (**Agroclima Mensual**) - This bulletin provides an agroclimatic outlook for the next month on water balance, rainfall, temperature, pests and diseases for each region.
- **[Precipitation Anomalies](#)** (**Desviación Precipitaciones**) - This bulletin provides a monthly summary of rainfall anomalies (difference and percentage) for stations by region.
- **[Monthly Climate Perspective](#)** (**Perspectiva Climatica Mensual**) - This bulletin provides a summary of the synoptic climate of the past month and a seasonal climate forecast for the region and country.



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Belize

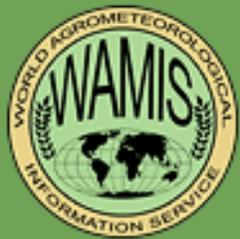
Agrometeorological Forecasts and Various Weather Products

Agromet Section of NMS

The National Meteorological Service of Belize (NMS) has provided a map of agrometeorological stations in the country. This section also provides a 4-day agromet forecast and a 10-day cumulative rainfall report for some stations in Belize. An email address to contact the agromet division is given in this section for further data request.

Information and Products provided are:

- 4-day agrometeorological forecast for farmers and livestock Producers
- 10-day cumulative rainfall (for some stations)
- 4-day weather outlook
- Monthly Weather Summary
- Drought monitoring page
- Flood forecast
- Fire forecast



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India

India Agromet Advisory Bulletins

The [Indian Meteorological Department](#) provides several products on their [Agricultural Meteorology Division's website](#). The Agromet website also has links to detailed state level information such as the pest and disease incidences, Cropwise Agromet Services, and the Agromet Advisory Service Bulletins. There is an [weekly archive of the All India Agromet Advisory Summary](#) which provides information on the progress of the Southwest Monsoon, regional and state agromet advisories, Salient weather features, Desert Locust Forecasting, and crop state and stage information.

These products include:

- [All India Agromet Advisory Bulletin](#)
- [Statewise Bilingual Agromet Advisory Bulletin](#)
- [Statewise Comprehensive Agromet Advisory Bulletin](#)
- [All India Monthly Weather and Crop Bulletin](#)
- [Agroclimatic Information](#)
- [All India Daily Weather Report](#)
- [All India Weekly Weather Report](#)
 - [Map of Weekly Rainfall](#)
 - [Map of Seasonal Rainfall](#)
 - [Rainfall during Monsoon Season \(Table\)](#)

• **Current All India Agromet Advisory Summary**

- Jan 29, 2009
- Jan 22, 2009
- Jan 15, 2009
- Jan 07, 2009
- Jan 01, 2009

- Dec 24, 2008
- Dec 18, 2008
- Dec 11, 2008
- Dec 04, 2008
- Nov 27, 2008
- Nov 20, 2008
- Oct 30, 2008
- Oct 23, 2008
- Oct 16, 2008
- Oct 08, 2008
- Oct 01, 2008
- Sep 25, 2008
- Sep 18, 2008
- Sep 11, 2008
- Sep 04, 2008
- Aug 28, 2008
- Aug 21, 2008
- Aug 14, 2008
- Aug 07, 2008
- Jul 31, 2008
- Jul 24, 2008
- Jul 17, 2008
- Jul 10, 2008
- Jul 03, 2008

- May 22, 2008
- May 15, 2008
- May 08, 2008
- May 01, 2008
- Apr 24, 2008
- Apr 17, 2008
- Apr 10, 2008
- Apr 03, 2008
- Mar 27, 2008
- Mar 13, 2008
- Mar 06, 2008
- Feb 28, 2008
- Feb 21, 2008
- Feb 14, 2008
- Feb 07, 2008
- Jan 31, 2008
- Jan 24, 2008
- Jan 17, 2008
- Jan 10, 2008
- Jan 03, 2008

- Dec 27, 2007
- Dec 20, 2007
- Dec 13, 2007
- Dec 06, 2007
- Nov 29, 2007
- Nov 22, 2007
- Nov 15, 2007
- Oct 31, 2007
- Oct 25, 2007
- Oct 18, 2007
- Oct 11, 2007
- Oct 04, 2007

- Dec 28, 2006
- Dec 21, 2006
- Dec 14, 2006
- Dec 07, 2006
- Nov 30, 2006
- Nov 23, 2006
- Nov 16, 2006
- Nov 09, 2006
- Nov 02, 2006
- Oct 12, 2006
- Oct 05, 2006
- Sep 28, 2006
- Sep 21, 2006
- Sep 14, 2006
- Sep 07, 2006
- Aug 31, 2006
- Aug 24, 2006
- Aug 17, 2006
- Aug 10, 2006
- Aug 03, 2006
- Jul 27, 2006
- Jul 20, 2006
- Jul 13, 2006
- Jul 06, 2006
- Jun 29, 2006

Geneva, Switzerland. [Disclaimer.](#)



Tools and Resources

- 19 categories of Tools and Resources with over 77 links.
- Climate Forecasts
- Data Management
- Dissemination
- Drought
- Feedback
- Forestry/Fire GIS
- GRADS
- Irrigation/Drainage
- Natural Disasters
- Observations
- Online Training
- Phenology
- Plant/Animal Health
- Rainfall Monitoring
- Remote Sensing
- Soil Erosion
- Statistics
- Weather/Climate Data



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Tools and Resources

The following tools and resources were compiled from different sources to aid WMO Members in improving their agrometeorological bulletins and increasing their knowledge of available agrometeorological-related resources.

[Climate Forecasts](#) | [Data Management](#) | [Dissemination](#) | [Drought](#) | [Feedback](#) | [Forestry/Fire](#) | [GIS](#) | [GRADS](#) | [Irrigation/Drainage](#) | [Natural Disasters](#) | [Observations](#) | [Online Training](#) | [Phenology](#) | [Plant/Animal Health](#) | [Remote Sensing](#) | [Soil Erosion](#) | [Statistics](#) | [Weather/Climate Data](#) |

Climate Forecasts and Agriculture

- [Applications of Climate Forecasts for Agriculture \(PDF\)](#) Proceedings of an Expert Group Meeting for Africa held 9-13 December 2002 in Banjul, Gambia
- [WMO's Climate Information and Prediction Service \(CLIPS\)](#)

Data Management

- An Expert Team Meeting on **Software for Agroclimatic Data Management** was held in Washington, D.C., USA in October 2000 to assess the current status of software for agroclimatic data management and determine the future needs for more efficient management of agroclimatic data to foster improved agroclimatic applications. Participants in the meeting discussed climatic data management, crop and soil data management, remotely sensed data management and integrated packages.
 - [Executive Summary from Expert Team Meeting \(PDF\)](#)
 - [Free Software for Agroclimatic Data Management](#) -- Over 35 links of free software

Drought

- **[Early Warning Systems for Drought Preparedness and Drought Management \(PDF\)](#)**
Proceedings from an WMO Expert Team Meeting in September 5-7 2000 in Lisbon, Portugal
- **[Canadian Drought Watch Web Page](#)** Produced by Agriculture and Agri-Food Canada, provides articles on drought related topics such as crops, livestock, pasture, pest management, and water.
- **[Southwest Asia Drought Monitor](#)** from International Water Management Institute
- **[National Drought Mitigation Center](#)** in Lincoln, NE provides some excellent resources (see the following links) on drought definition, planning, monitoring, and mitigation.
- **[Basics of Drought Planning: 10 Step Process \(PDF\)](#)** National Drought Mitigation Center, Nebraska, USA
- **[Download Standardized Precipitation Index \(SPI\) software](#)**
- **[US Drought Monitor Page](#)**
- **[North American Drought Monitor Page](#)** National Climatic Data Center, Asheville, NC, USA

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Feedback: Selected Papers

- **[Obtaining User Feedback on Agrometeorological Products - USA Experiences \(PDF\)](#)**

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Forestry and Fire Weather

- **[Global Fire Monitoring Center \(GFMC\)](#)** The GFMC is an activity of the UN International Strategy for Disaster Reduction (ISDR) and is hosted by the University of Freiburg, Germany. Selected GFMC web sites are listed below.
 - **[GFMC Wildland Fire Early Warning Portal](#)** Links to global, regional, and national fire weather forecasts and early warning systems.
 - **[International Forest Fire News \(IFFN\)](#)** IFFN is an activity of the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training, and

GIS/Analytical Tools

- [**Arcview 3.1 Tutorial \(HTML\)**](#) from U.S. National Weather Service
- [**GEO Data Portal**](#) - access to UNEP's online database of over 450 different parameters
- [**EU COST 719 Official Web Page - The Use of GIS in Climatology and Meteorology**](#)
Links to several workshops with online presentations
- [**GIS in Weather, Climate and Impacts Workshop**](#) Abstracts and Presentations (PDF) from NCAR Workshop held in Boulder, Colorado July 6-8, 2005
- [**Online AWIPS Map Database**](#) A listing of over 20 datasets and links for the US and North America from the U.S. National Weather Service
- [**USGS GIS Tutorials**](#) Tutorials from the United States Geological Survey (USGS) on Arcview, ArcviewIMS, ARC/INFO, GRASS, and IDRISI
- [**Papers and Presentations \(PDFs\) from the GIS Weather Project**](#)
- [**Useful GIS and Remote Sensing Links**](#) from Taylor & Francis GIS publishers
- [**Free ArcExplorer Software**](#) Free shapefile viewer from ESRI
- [**ArcExplorer Web**](#) Make an online map from ESRI
- [**Google Earth Software**](#) Free Viewer and Search software of satellite imagery, maps, and other geographic information for the world
- [**EarthBrowser Software**](#) 3D model of the earth with weather and geological information. Free Demo version available but full version must be purchased.

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GrADS (Grid Analysis and Display System)

- [**GrADS Home Page**](#) Free Analytical Software from the Center for Ocean-Land-Atmosphere Studies (COLA) Maryland, USA
- [**Download GrADS Software**](#)
- [**GrADS Tutorial**](#) from COLA
- [**GrADS Projects \(ZIP\)**](#) from WMO Training Seminar on IT
- [**GrADS User Guide \(HTML\)**](#)
- [**GrADS Station Data \(HTML\)**](#) Information on the structure, creation, and use of station data in GrADS



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Meteorological Information for Locust Control

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Background

The Desert Locust plague in 2004 drew the attention of the world to the threat they pose to the food security of the affected countries, especially in the developing world. All the different phases in the life cycle of a locust require ideal meteorological conditions for it to evolve from the solitary phase to the gregarious phase and cause the widespread damage.

To ensure more effective monitoring and control of the desert locusts and the important role for the National Meteorological and Hydrological Services (NMHSs) in this task, WMO organized an [Expert Meeting on Meteorological Information for Locust Control](#) in Geneva, Switzerland from 18-20 October 2004 to discuss the response from NMHSs to the current Desert Locust infestation. Representatives from the Food and Agriculture Organization, AGRHYMET, Italy, and India attended the meeting.

One **major recommendation** from the meeting was that **NMHSs need to strengthen their collaboration with the National Locust Control Centres (LCCs)** and provide near real-time daily rainfall and temperature observations and forecasts at a centralized location to provide easy access for the LCCs, regional organizations and international agencies such as FAO. With this recommendation in mind, the capability of **countries to upload daily weather data** from



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Review of Agrometeorological Bulletins



22 Bulletin/Countries Examined

- Albania
- Bangladesh
- Benin
- Burkina Faso
- Cote D'Ivoire
- Cuba
- Dominican Republic
- Ecuador
- El Salvador
- Ethiopia
- Fiji
- Gambia
- Kenya
- Lesotho
- Mali
- Malawi
- Mauritania
- Niger
- Senegal
- South Pacific
- Swaziland
- Tanzania



Agromet Bulletins

- www.wamis.org/cami
- **Countries**
 - Burkina Faso
 - Cuba
 - Fiji Sugar
 - Mali
 - South Pacific
 - Tanzania



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INSTITUTO DE METEOROLOGÍA

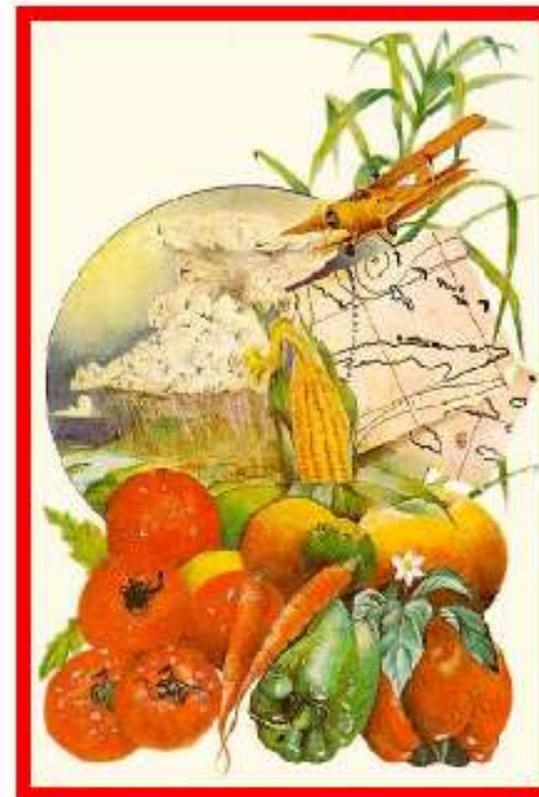
Vol. 27 No. 1

1RA DÉCADA

ENERO 2008

CONTENIDO:

Condiciones Meteorológicas
Condiciones Agrometeorológicas
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Avicultura
Arroz
Café y Cacao
Caña de Azúcar
Cítricos y Frutales
Cultivos Varios
Ganadería
Tabaco
Perspectivas Meteorológicas
Fases de la Luna



**NOTABLE DESCENSO DE LAS TEMPERATURAS
Y ESCASAS LLUVIAS. SE ESPERA UN NUEVO**



Results

- **Rainfall Summary (22)**
- **Temperature (15)**
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- **Hydrology (4)**
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- **Evaporation (2)**
- **Wind (2)**
- **Sunshine (1)**
- **Fisheries (1)**
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Thank You

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Geneva

Switzerland