

Experience from Latin America and the Caribbean*

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1.0 Introduction

Weather is critical in agricultural production, especially in rainfed agriculture systems like those in Latin America, the Caribbean and other developing countries of the world. In Belize, for example, less than 8% of all crop land is irrigated. The remainder is rainfed. Any abnormal tendency in rainfall activity during the growing season spells disaster to the country's economy, 22 per cent of which is derived from the agriculture and fisheries sectors (Annual Report, 2001, MAFC, Belize). Other extremes in weather pattern like those associated with hurricanes and climate variability impact negatively on the agriculture sector of the region, resulting in millions of dollars in losses annually (WMO Bulletin, 1999). The United Nation's Food and Agriculture Organization (FAO), reported that weather continues to be the main threat to the production of food and a significant threat to many Members's national economy (Cornford, 1999).

Future global population increase will place more stress on shrinking grain land, fresh water resources and the environment. The world population at the end of 1999 stood at six billion and is projected to rise at the rate of one billion every twelve years during the first half of the 21st century (UN Report, 2001). The growth rate will be largest in developing region, where the constraint in agricultural production is greatest.

Agriculture productivity will have to increase as greater demands for food becomes evident. Farmers and policymakers will have to rise to the challenged, utilizing every available technology and information base in order to increase yield per hectare in a sustainable manner.

Agrometeorological information and advisories can contribute effectively in the decision making process, provided they are streamline to meet the specific needs of policy makers and farmers, and are delivered in a timely and user friendly format.

Improved Information and Communication Technologies (ICTs), including the Internet, can facilitate the rapid and efficient dissemination of all agrometeorological information and related advisories. Agrometeorological Services in the region should therefore take advantage of the potential offered by the World Wide Web in an effort to improve the service they provide to farmers. The benefits of a centralized Web Server for agrometeorological information from the six WMO region is a step in the right direction to highlight the importance of applied agrometeorology in the economic development of member states.

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- ❑ Increasing world and regional population
- ❑ Growing demands for food
- ❑ Need for greater efficiency in agricultural production
- ❑ Sustainable use of resource base
- ❑ Climate variability: a limiting factor in crop and livestock production

2.0 Need for Greater Efficiency in Agricultural Production

Agricultural production systems will have to be improved in order to meet the growing demands, especially in developing regions where population growth will be higher in the next couple of decades. Timely and accurate agrometeorological information and forecasts have proven to be effective tools for critical decision making in routine farm operation, and medium and long-term planning. The ability to disseminate timely and relevant agrometeorological information to the user community, so that it can act on it, is of paramount importance for any Agrometeorology Service. Information and Communications Technologies (ICTs), including the INTERNET have become a rapid and dynamic means for the dissemination of agrometeorological information in many countries of Latin America and the Caribbean.

In rural settings where Internet facilities are unavailable, the traditional means of information dissemination such as radio, television, and the news media can be used in combination with limited ICTs to get the message across to a much larger audience. Multipurpose Community Telecenters (MTCs) is another option to narrow the gap between the information rich and information poor areas within a country and other parts of the Latin American and Caribbean region. MTCs offer telecommunication services such as: telephone, fax, email, Internet, World Wide Web Server facilities and capacity building. These centers may use the existing telecommunication infrastructure or they may introduce new technology such as digital satellite communication or wireless facilities, and modern fiber optics routing, with increase bandwidth capabilities.

Agrometeorological information for farmers via a Web Site can be limitless, especially if the package is prepared in a collaborative effort with the agricultural experts and farm extension service personnel, which is the recommended approach. However, it will serve no purpose if the information is complex and irrelevant to the specific needs of the users. Consequently it is important that the designers of the web site bear in mind how to structure the content of the web pages in order to prioritize the user needs and present the information in a user-friendly manner that is easily accessible.

In a recent survey conducted in Belize among some farmers and extension officers attending a seminar on crop management, the following were the agrometeorological information requested in order of importance:

- a) Rainfall
 - i. Forecast estimates for next 24, 48 and 72 hours
 - ii. Seasonal rainfall characteristics (probability of wet or dry conditions)
 - iii. Current or seasonal rainfall status and climatology
- b) Temperature
 - i. Air Maximum and Minimum
 - ii. Maps of current and forecast temperatures
 - iii. Soil temperature
- c) General Weather Outlook and satellite imagery
- d) Humidity
 - i. Relative Humidity
- e) Wind
 - i. Surface wind direction
 - ii. Surface wind speed
- f) Warning from floods and other extreme weather conditions
- h) Phases of the moon

A recommendation that was made by extension officers and farmers was that the agrometeorological information must compliment the phase of the cropping season and the cycle of livestock rearing. In other words, the agrometeorological information should be crop / livestock relevant and must be integrated within any agronomic advisory or bulletins emanating from the extension services.

Status of Internet Web Sites for Agrometeorology in some Countries of Latin America and the Caribbean

Argentina: <http://www.meteonet.com.ar>

Agrometeorological information and products have a cost. Consequently they are not easily accessible.

Belize: <http://www.hydromet.gov.bz>

<http://www.bzewxcrop.iwarp.com>

<http://www.netkom.agriculture.com> (under construction)

The “hydromet” site was developed through NOAA STARIV project, and is maintained by the National Meteorological Service of Belize. It contains options for agrometeorological forecasts, fire weather forecasts and a seasonal climate outlook.

The “bzewxcrop.iwarp.com” site is a test web site for the *Weekly Weather and Crop Bulletin*, which includes web pages for National Weather and Agriculture Outlook, coupled with agronomic bulletins and advisories, satellite imagery, ten-day rainfall model outlook, seasonal climate outlook and a hydrology page. Proper administration of this web site through collaborative effort with personnel from the Ministry of Agriculture and Fisheries, and the Forestry Department in the very near future will make this an ideal web site for the dissemination of agrometeorological information and early warning advisories. This web site was developed by the Agrometeorological Unit of the NHMS.

The “netkom” web page being developed by the Ministry of Agriculture will cater primarily for the dissemination of agronomic and marketing information. However, the plan is to incorporate a “page” or two containing agrometeorological information within this site. Linkages will be established among the three web sites in the near future.

Brazil: <http://www.inmet.gov.br>

Developed by the Ministry of Agriculture and Fisheries.

The index page has one option for Agrometeorology. Under Agrometeorology one can find:

- Water Balance
- Agrometeorology Bulletin
- Precipitation Forecast

The National Institute of Meteorology of Brazil has also developed two sites for meteorological and agrometeorological information and products. These are:

1. VISUAL TEMPO...This site allows the user to have access, through different modalities (BBS or Internet) to real-time meteorological information such as weather forecasts and satellite imagery.
2. VISUAL CLIMA...Users can have access to agrometeorological information as published in the decadal or monthly bulletins.

The software for access can be downloaded free from :

<http://www.inmet.gov.br/frameset.htm>

A source of agriculture-related information, including prices, weather, databases etc. is maintained by the National Confederation of Agriculture and others on an Internet web site called SIAGRO. The address for this site is:

<http://www.siaagro.com.br/siaagro/clima.tempo.htm>

Chile: <http://www.meteochile.cl/agrometeorologia>

This web site was developed and is maintained by the Chilean Meteorological Service. The options provided include:

- Centros Regionales
- Alertas Agrometeorologicos
- Comentarios Agrometeorologicos
- Perspectivas Agrometeorologicos seminal
- Tendencias Agrometeorologicos
- Boletin Agrometeorologico

Colombia: <http://www.ideam.gov.co/index4.asp>

This web site was produced by the Institute of Hydrology, Meteorology, and Environmental Studies. It provides support to agriculture and animal husbandry at:

<http://www.ideam.gov.co/sectores/agri/index4.htm>

Two of the products provided are: weekly forecasts and rainfall maps.

Costa Rica: <http://www.imn.ac.cr>

There is no option or link to a agrometeorological information web page from the index page. Meteorological products and services are commercialized.

Cuba: <http://www.met.inf.cu>

The web site is maintained by the Meteorological Institute of Cuba. No option for agrometeorological information available in the index page.

Ecuador: <http://www.inamhi.gov.ec>

This site contains two options related to agrometeorology, namely:

- Hydrometeorological information for agriculture
- Ten-day Agrometeorological Bulletin

Mexico: <http://smn.can.gob.mx/SMN.htm>

The Index page for this site contains a linkage to a web page for climatological products, which includes near real-time rainfall maps and other climatological products.

Peru: <http://www.senamhi.gob.pe>

This site has an option for Agrometeorology, under which one can find the entire content of the Agrometeorology Bulletin for Peru.

Uruguay: <http://www.armada.gub.uy/dimat/sohma/sohma.htm>

No option available for agrometeorology on the Index page.

Venezuela: <http://www.marnr.gov.ve/direcciones/cuencas/hidrologia>

This web site does not provide any option or linkage for agrometeorological information or forecast.

It is quite possible that in many of the countries of Latin America and the Caribbean, there are other Internet sites, especially those from research institutions, universities and private agencies that are providing agrometeorological information for a specific set of users. However, from the brief survey of some NMHS web sites in the Latin American and Caribbean region, we can conclude that there is a shortage of agrometeorological information on the Internet. In most countries of the English-speaking Caribbean and Central America, for example, agrometeorological services have become obsolete or are non-existent, even though most of these country's economy is based on agriculture, agro-based industries and tourism. Internet and other forms of ICTs offer a golden opportunity for the strengthening of applied agrometeorology regionally.

A centralized web server to host agrometeorological bulletins and other relevant agrometeorological information as is being envisioned by the Commission for Agrometeorology (ACgM), has lots of potential in enhancing the provision of agrometeorological services around the world. Such a site will be ideal for the rapid and timely dissemination of agrometeorological information, reliable, and a medium for collaborative work among agronomists, integrated crop and livestock managers, extension service personnel and the agrometeorologist. The web site will increase the visibility of agrometeorological units under NMHS and extension services, and provide some economic recognition to the invaluable service provided by the agrometeorologists.

Information and Communications Technologies will continue to advance, becoming more accessible to a greater number of people around the world. At the same time there will be demands for increased agriculture productivity in a world of shrinking per capita gain land, diminishing freshwater resources and the negative impacts of climate variability. Farmers will require improve, value added agrometeorological information to help them in critical decision-making. The Internet will continue to be one of the preferred means for the rapid and efficient dissemination of agromet information to farmers and policymakers. The proposed CAgM Agromet web site will surely provide the impetus for the provision of better agrometeorological information and services worldwide.