RESULTS OF THE NWA AGRICULTURAL WEATHER SURVEY

Robert S. Robinson

Clearwest, Incorporated
Wenatchee, Washington

David Miskus

NOAA/USDA Joint Agricultural Weather Facility
Washington, DC

Abstract

During the last half of the year 2000, the National Weather Association committee on specialized operational services conducted a voluntary survey of organizations providing weather information to agricultural users. The purpose of this survey was to determine characteristics of agricultural weather service today and to quantify some details of this service. The results of this survey are provided in this report.

1. Introduction

In order to answer questions about how the meteorological community has responded since the 1996 cessation of National Weather Service agricultural weather service programs, members of the National Weather Association's Specialized Operational Services Committee developed a questionnaire. More than 75 potential survey participants were contacted in late 2000, either directly or by e-mail, and asked to submit a completed questionnaire. Twenty-five completed questionnaires were eventually received. The full text of the questionnaire and accompanying background material can be found at Web site: www.nwas.org/committees/ag-wx-survey.html. Survey participants are identified in Appendix A.

The purpose of this paper is to present the results of this survey and publicize the extent to which meteorological services are involved in operational agricultural meteorology.

2. Method

Selective utilization of existing lists of meteorological organizations provided by the National Weather Service, National Weather Association, American Meteorological Society and U.S. Department of Agriculture were used to identify potential survey participants. Direct contact was made to most of those on the aforementioned lists, if the authors felt that the organization was involved in some aspect of agricultural weather. In addition a "fan-out" method of notification of potential survey participants was sought through organizations already identified. From other surveys of different types reviewed, the authors found that a response of 10 to 30 percent of those contacted is a reasonable response rate. For this survey, it is impossible to cite an actual response rate because the total number contacted cannot be determined.

3. Survey Data Results

Raw survey results are provided below. The number of respondents is shown for each of the multiple choices offered for each survey question. Numbers for a question may not total all participants due to omitted answers. Also, numbers may total more than the total of participants in those questions allowing more than one response.

Choices	**Number of Responses**
Geographical Area of country served:	
All U.S.	9
Southeast states	5
Northeast states	6
Midwest	5
Northern Plains	3
Southern Plains	4
Rocky Mountain states	4
Pacific Northwest	4
California or Desert southwest	5
Alaska	0
Hawaii	0
Other, specify *World*	1
Type of agricultural weather information provided to users:	
Surface Observations, synoptic network	15
Surface Observations, special network(s)	12
Other Observations (upper air, satellite)	8
Forecasts, standard variables (temperature, wind, likelihood of precipitation)	21
Forecasts, special variables (humidity, dewpoint, sunshine, duration of phenomena, etc.)	19

Agricultural advice (planting, harvest, pesticide application, crop protection, etc.)	14
Climatological information	19
Other, specify *Frost / freeze, soil info, fieldwork days*	4

Method of information delivery:

U.S. Mail	3
Newspaper	3
Radio/TV	9
E-mail	15
Internet	20
Fax	11
Telephone, including recordings	12
Face-to-face briefings	2
Other, specify *Not specified*	3

Most frequent method of information delivery:

More than once per day	16
Daily, once per day	4
Two or more times per week	2
Only once per week	1
Less than once per week	0
Provide on-demand service, not routine	5
Other, specify _____	

Experience/education of staff responsible for preparing agricultural weather information:

Computer operator or computer systems manager	7
Meteorologists with a university degree in meteorology	20
Non-degreed meteorological or agricultural service staff	4
Staff with Life Science or Agronomic university degree	2
Staff with experience in operational meteorology	8
Other, specify *Statisticians*	2

Kinds of surface weather observation networks utilized:

Use synoptic scale observations (primarily NWS/FAA/DOD)	24
Use network observations provided by private source	8
Use network observations provided by state or university source	10
Use network observations provided by federal funded Non-NWS/FAA/DOD	7
Own and/or operate an observation network of 20 or less stations	2
Own and/or operate an observation network of more than 20 stations but less than 100 stations	3
Own and/or operate an observation network of 100 or more stations	3

Questions relating to data utilized by the Ag weather organization:

Primary meteorological and agricultural data ingestion methods:

Internet information	20
Data streams ingested directly through satellite downlink	15
Data streams ingested directly through dial-up connection (other than Internet)	10
Data streams ingested through radio transmission	0
Data streams ingested over T-1 (or variation)	8
Other, specify *not specified*	1

Special analysis, modeling, or computations which are prepared for users:

Compute current data for crop development and/or pest models and provide information alphanumerically or graphically	9
Compute crop development forecast models and/or pest model forecasts and provide information alphanumerically or graphically	9
Compute other types of forecast Ag weather information based on local/regional computation models and provide output alphanumerically	9
Compute other types of forecast Ag weather information based on local/regional computation models and provide output graphically	9
No special computations provided	9
Other, specify *Supply / Demand, Price, Special studies, Frost*	2

Organization information:

The organization that you represent is primarily (check only one):

Private	20
University	1
State (other than university)	3
Federal	1
Other, specify *Global Ag Areas*	1

The number of staff primarily responsible for preparing Ag weather information

5 or less	16
6 to 15	4
16 to 25	3
26 to 100	2
more than 100	0
Other, specify _____	

4. Summary and Conclusions

While the survey response was small, a number of interesting characteristics of meteorological organizations serving agriculture were identified:

a. Responses underscore that both information necessary for the preparation of agricultural weather products and the dissemination to users is heavily involved in the Internet.

b. Value-added information appears to be a key ingredient in agricultural products disseminated to users. Special calculations, modeling or analysis is provided by a number of vendors.

c. Although there is evidence of utilization of special observing networks, there is almost universal reliance on conventional synoptic observations. A significant number of organizations own or operate a network of surface observations.

d. A variety of personnel and backgrounds are involved directly in agricultural weather information production. The use of non-meteorological personnel in some cases suggests an important degree of automation in preparation of products.

From personal communications, there were indications that some potential survey participants did not complete a survey due to the press of business and because of the limited number of personnel available. It is believed that the number of organizations involved in producing and distributing Ag weather products is at least four times the number that responded to this survey. The preponderance of private-sector meteorologists may reflect a real increase in the activity of the private sector in the provision of agricultural weather. However, it may also reflect a breakdown in the "fan-out" method of notification of potential survey participants. The authors had expected many from outside the private sector to be notified by this method. This is a flaw that can be corrected in a future survey. Also, as has been pointed out by reviewers, the number of people with agricultural training, serving agricultural weather support, is probably under-represented in the survey. A future survey could better define this group. Even with the low number of responses, there is a skeletal profile of Ag weather providers in the results of this survey, and the authors thank those who participated.

5. Future Work

The authors believe that publicity of the results of this survey will pave the way for better distribution and response of a future survey. The goal is to repeat this effort with a more refined question base and better advance distribution in three to five years. However, the limited responses from this survey indicate to the authors that the provision of agricultural weather services continues to be in a state of flux. As a result, new survey results will probably be different than the current results but may still reflect only a point in time of a changing agricultural economy.

Authors

David Miskus has been the Section Chief at the NOAA/USDA Joint Agricultural Weather Facility in Washington, DC, and managing editor of the Weekly Weather and Crop Bulletin since 1998. His work has involved the collection, summarization, analysis, monitoring, and dissemination of near real-time global weather and climate information and products, especially in the major agricultural areas. From 1985-1997, he worked at NOAA's Climate Prediction Center (formerly the Climate Analysis Center) in Camp Springs, Maryland, where he was part of the Analysis and Information Branch, now known as the Climate Operations Branch. He earned his B.S. Degree in Agricultural Meteorology at Purdue University in 1982, and a M.S. in Agronomy (Remote Sensing) at the University of Missouri in 1985. David has received three Department of Commerce Bronze Medal Awards; in 1994 for "dedicated delivery of time-critical climate and weather related information to an exceptionally broad range of NWS and NOAA customers", and twice as part of a group effort—in 1998 for "development and

Appendix A

The following organizations participated in the 2000 survey and agreed to be identified:

Earth Satellite Corporation - Cropcast Division
Agricultural Weather Information Services, Inc.
Data Transmission Network
Bridge News Global Weather Services
Connecticut Weather Center
WeatherBank, Inc.
Midwestern Regional Climate Center
AccuWeather, Inc.
Atmospheric Research Associates
WeatherData, Inc.
WeatherMarkets.com
Fox Weather, Inc.
Tornado Prediction Center
Murray and Trettel, Inc.
Weather Derivatives
FleetWeather, Inc.
Alden Electronics, Inc.
Jersey Weather Service, Inc.
Remote Systems Integration
Mountain States Weather Services
Crown Weather Services
State Climate Office of North Carolina
Clearwest, Inc.
AgriAmerica
The National Weather Station
VantagePoint Network
U.S.D.A./NOAA Joint Agricultural Weather Facility

delivery of a broad suite of current climate and El Niño related products to Federal, state, and media users", and in 2000 for "improvements in the coordination of the interagency U.S. Drought Monitor and issuance of the first Seasonal Drought Outlook".

Robert S. Robinson is a meteorologist and partner in Clearwest, Inc., an agricultural weather service company based in Wenatchee, Washington, serving agricultural interests in the Pacific Northwest with specialized weather information. He previously served in a number of forecaster and management positions in the National Weather Service, including national management of the agricultural and fire-weather programs. He retired from the National Weather Service in 1997 after 34 years of service. He is a 1968 Meteorology graduate of San Jose State, did graduate study in Agricultural Meteorology at Purdue University and Agronomy at Iowa State University. Bob is a charter member of the NWA.

Thanks to NWA member David Miskus for assisting with the survey above and for providing the following information –

ABOUT THE JOINT AGRICULTURAL WEATHER FACILITY

The Joint Agricultural Weather Facility (JAWF) is a cooperative effort between the U.S. Department of Commerce's National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS) and the U.S. Department of Agriculture's (USDA's) World Agricultural Outlook Board (WAOB). The JAWF provides the USDA with near real time monitoring of weather events and parameters and converts this information into an early warning crop assessment. Located in Washington, DC, the JAWF has been providing weather and climate information on global crop areas since 1978.

NOAA and WAOB meteorologists work together to provide global weather analyses and agricultural assessments using data from more than 7,000 synoptic stations (and over 10,000 cooperative stations in the U.S.) and weather satellite imagery. The team merges climatological analyses and global weather data to generate indices that relate basic weather parameters to crop growth. These indices help determine the weather's impact on agricultural production. The analysts monitor the global conditions daily and provide weekly agricultural assessments to keep the Nation's growers, exporters, USDA commodity analysts, the Secretary of Agriculture and top staff, and other users informed of worldwide weather-related developments and the effects on crops and livestock. Inputs from the JAWF are integrated into the USDA's monthly foreign crop production estimates.

The JAWF meteorologists also provide daily and weekly briefings for staff members, as well as Foreign Agricultural Service and National Agricultural Statistics Service, and other USDA agencies on recent global weather developments using satellite imagery, daily and seasonal plots and analyses, graphs of precipitation and temperature, and surface and upper-air weather maps.

The JAWF also produces weekly summaries of domestic and international agricultural weather conditions in the ***Weekly Weather and Crop Bulletin***. This publication, in existence since 1872, is distributed via the Internet (free) at: **www.usda.gov/oce/waob/jawf/wwcb.html** every Wednesday, and by hardcopy subscriptions through the NCDC Subscription Services Center (e-mail: noaasubsvcs@imcwv.com, or call (866) 742-3322).

Recent developments with respect to improvements in drought monitoring and assessment, as well as localized agricultural weather information coverage, has led the JAWF to become involved with the weekly U.S. Drought Monitor (see: **drought.unl.edu/dm**), and the newly introduced, experimental, monthly North American Drought Monitor (see: **www.ncdc.noaa.gov/nadm.html**) that depicts drought in Canada, Mexico, and the United States. In October 1998, the JAWF/WAOB opened a field office in Stoneville, Mississippi, co-located with the Mississippi State University Delta Research Center, to collect, quality-control, and manage agricultural weather data in the Delta and Missouri Bootheel, and make it available to public and private sector analysts.

Climate variations have a tremendous impact on the decision making process for monthly crop production supply and demand. For example, the El Niño Southern Oscillation (ENSO) influences weather over many world crop areas. The JAWF meteorologists monitor climate variations including ENSO indicators and review ENSO forecasts issued by the NOAA/NWS Climate Prediction Center to determine the potential impacts between crops and the ENSO signal. □