Weather System Work Group
Summary of October 5-6 Brain Storming Session

Conclusions

1) There needs to be quality real time weather data publicly available that will be suitable for all public sectors.
2) Added value analyses and delivery are competitive
3) Another meeting is warranted

Actions

1) Letter to the editor of Phytopathology on the criteria for model validation
2) Develop list of potential new members
3) Flesh out list of issue and distribute for discussion
4) Develop discussion forum where all comments are archived at a website (password protected) but members are notified daily of new postings.
5) Next meeting
   March 8-9, 2005 location to be determined

Issues Identified

1) Raw weather data

Any large-scale regional weather network will likely consist of a collection of differ stations that are deployed various configurations.

a) Equipment Placement and configuration

Stations for regional monitoring are placed in an open environment with sensors at standard heights, while stations for site specific data will various configurations that will limit there use in a regional network. For instance: some station will be in dense canopies while others my located just above a canopy. There will be differences in quality of sensors and their maintenance (data quality).

Questions

How are differences in where the stations are placed accounted?
Do differences in station density in an area impact data usability?
Are the ways to deal will sensor differences?
Should reporting intervals be standardized?
Is there a minimum set of data that would make a station worth including in a network?

b) Data Quality

Due to a wide range of station placement, equipment configuration, maintenance schedules, and data recovery methods, there will be a wide range of data quality that could influence downstream analyses.

Questions

How can data quality be indicated?
What is the pest temporal interval? Should this be standardized?
How do we deal with missing data?
Will differences in reporting interval affect data quality?
What about individuals wanting to establish their own station but make it part of the network?

c) Public verses private data

Current networks are mixture of public and/or private data and there could be the potential of individuals establishing their own weather station but wanting to link it with a weather network.

Questions

Are their methods though which all data can be placed in a public database that still protects rights and financial interests while enhancing data utility?

d) Deliverability

Utility of the raw data will depend partially on the ease on obtaining rights to use the data

e) Liability

In today's tort climate, what will be the liability for providing the data?

2) Added value Analyses

Very few individuals can utilize unanalyzed weather data and the cost of data acquisition, either by purchasing raw data or establishment a weather network, is hindering the access and acceptance of products from weather data analyses.

a) Delivery to Customer

A common interface and presentation style through which all analyses products could be viewed would greatly facilitate end user acceptance and willingness to use and support these products. End users would prefer a push service while it is easier to provide a pull service.

Questions

Could a public software interface be developed that would assist all analyses providers in delivering their product while reducing the learning curve for the end user?

What types of analyses will require what type of interface? For instance; should all pest models be represented by a graph with prior values plus the forecasted value?

How can impacts be documented?

What resolution is needed?

What time ranges are needed?

b) Indication of confidence

Given that any analysis will be based on varying quality of information, either due to the quantity of data used, assumptions and inherent errors in the algorithms used, and other sources of error, an indication of confidence or error associated with the analysis product would help boost acceptance of the product.

Questions

Are there criteria for when an analysis value accepted as inaccurate?

Does each value the analysis produces need to have a confidence indicator or would an indicator from previous accuracy be sufficient. Example: confidence intervals for a disease forecast could be derived from the accuracy of prediction from previous years for each day or from the accuracy for the previous days in the current growing season.

What are the criteria for validation of analyses?

c) Public verses private analyses

There will be both public and private development of analyses techniques and competition between the two will likely develop.

Questions

Does the public sector acquiesce to the private sector? Under what terms?

d) Missing Data

There will be missing data due any number of circumstances (i.e. station or sensor malfunction, telemetry issues, time delays, human error)

Questions

What method is best for dealing with missing data?
Do you and if so how do you incorporate delayed data post analysis?

e) End User Input Requirements

Numerous analyses will also require input from the end user that is specific for their situation.

Questions

How will this data be gathered and incorporated into an analysis?
Who has rights to this information?

f) Liability

There will likely be more liability associated with analyses of the data than collection and distribution of the data.

Questions

Who has the liability? The developer or the analyses or those providing the analyses?

3) Spatial Interpolation

The utility of any analysis is going to dependent on how far data or analysis product can be interpolated from the source.

a) Resolution

The resolution required will depend on the analysis while the degree of resolution possible is dependent on the number of stations, parameters, calculation points, and computing resources.

Questions

What is the minimum resolution needed for most end users?
How do you present actual values verses interpolated?

b) Weather data verses analyses

Spatial interpolation of each weather parameter would likely give a more accurate analyses result but require immense computer resources. This will be particularly true for analyses needing near real0time data every 15 minutes.

Questions

c) Interpolations methods

The majority of interpolation methods currently used to generate estimates between weather stations do not account for geographic or crop differences

Questions

What methods give the most accurate estimate of the needed parameters or analysis product? Will this be dependent on the type of analysis?

d) Deliverability

While maps are easy to generate and are very useful for examining what is happening over a region, they are very cumbersome to use for site specific uses (i.e. individual fields).

Questions

Can we combine maps with graphical presentation of the data and analyses for specific resolution points? Example: A regional map for the risk of powdery mildew infection is posted on a web site. The map was generated using a weather network with a density of one station/1000 ha^2. A grid was interpolated from which virtual stations and analyses results, at the resolution of 25 ha^2, could be presented in the form of a xy scatter graph.

e) Missing Data

While maps are easy to generate and are very useful for examining what is happening over a region, they are very cumbersome to use for site specific uses (i.e. individual fields).

Questions

What affect does missing data impact interpolation and accuracy of analyses products?

Can interpolation be used for detecting malfunctioning sensors or weather stations?

4) Interfacing with other efforts

The utility of any weather network will be enhanced by combining with multiple efforts that utilize similar data.

Questions

How to assist in the on going updating of NOAA weather stations?

How can we interface with ACIS (http://rcc-acis.org/)?

5) Sustainability

The only means to create a sustainable system is to create dependency on the information. This will require that the network provide high quality information to multiple public and private sectors.