

SEASONAL WEATHER FORECASTING – REQUIREMENTS OF THE FOOD CHAIN

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CCFRA, or the Campden and Chorleywood Food Research Association to give it its full name, is the UK's largest, independent, membership-based organisation carrying out research and development for the food and drinks industries worldwide. With a staff of around 370 and a turnover in excess of £11 million, CCFRA serves a membership base of 1,500 companies in 60 countries.

In keeping with modern business practice, CCFRA has a mission statement which commits it to providing industry with the research, technical and advisory services needed to ensure product safety and quality, process efficiency, and product and process innovation. It maintains close working relationships and maintains its relevance to industry through frequent direct contacts and formal meetings with its thirteen technical advisory panels and twenty-four industrial working parties. In addition, CCFRA holds frequent information exchange meetings to bring together the questions asked by industry and the possible solutions to these problems or opportunities.

One such meeting took place at CCFRA in April 1998 as part of a project run by the Food & Drink and Agriculture Panels of the Office of Science and Technology's (OST) Foresight programme. To trace events right back to the start, however, we need to mention the seminar held in October 1997 and the role that the UK's Foresight programme has played in raising awareness of this subject. The programme was first announced in the 1993 White Paper, "Realising Our Potential". Its aim is to create sustainable competitive advantage and enhance the quality of life by bringing together business, the science base and Government to identify and respond to emerging opportunities in markets and technologies. The meeting in 1997 highlighted that the ability to forecast is improving and that forecasters were keen to respond to the needs of the various sectors of the industry. It also observed that whilst there was more awareness in the agriculture sector than the later stages of the food supply chain, some food companies did recognise the potential for making better business decisions based on reliable weather information. The seminar concluded that there was a need to make forecasters aware of what is needed by industry and to make industry aware of what is becoming possible in forecasting. A report of this workshop is available from the Office of Science and Technology.

The meeting held at CCFRA in 1998 was therefore intended to produce an initial food chain requirements specification. The workshop involved participation from growers, agrochemical companies, manufacturers of ambient-stable foods, manufacturers of chilled and frozen foods, and retailers. In addition, forecasters were invited to comment on a series of questions to do with the forecast requirements themselves. The output from this meeting, i.e. the requirements document, has been available since October 1998 from OST. This talk will highlight some of the main points raised in the requirements document.

It was recognised that reliable forecast data could have a major impact on strategic business decisions and longer-term forecasts have potential to:

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- minimise business risk
- optimise the potential for reducing production costs through improved planning
- optimise the marketing opportunity to meet consumer demand
- optimise environmental care.

Representatives from growers, agrochemical companies, food manufacturers and retailers considered the needs of their own sector with regards to:

- why seasonal forecasts are needed
- what types of forecast were required in terms of critical parameters and acceptable tolerances, and
- what reliability of forecast is required for taking business decisions.

The conclusions of the workshop on these three questions were as follows:

Seasonal forecasts are needed for effective predictions and control of raw material supply, production and manufacturing stock control and distribution, retailing and consumer demand.

Raw material supply:

- Choice of cultivar with respect to potential growing conditions and potential pests and diseases
- Determination of sowing and planting times
- Irrigation planning
- Potential demand for application of pesticides (insecticides, fungicides, herbicides, etc.) and fertilisers
- Potential volume and quality of raw materials from competitor imports from other countries
- Choice of growing location
- Potential harvesting conditions
- Protection against extreme weather conditions, e.g. frost, drought
- Arrangements of contract growing
- Prediction of quality and quantity of crop, including protected crops
- Planning and requirement of integrated crop management

Production and manufacturing:

- Prediction of timing, quality and quantity of raw materials
- Management of factory utilities
- Production planning and scheduling

Stock control and distribution:

- Planning and control of stocks and distribution of agrochemicals (pesticides and fertilisers)
- Planning of retail stocks of food and drinks products and associated items (e.g. barbecues, charcoal)
- Planning distribution of food and drink during extreme weather conditions
- Choice of distribution system regarding environment control during transport

Retailing and consumer demand:

- Planning promotional events
- Predicting consumer demand for quantity of given types of products
- Prediction of consumption patterns for demand of types of products, especially in relation to special seasonal events (e.g. bank holidays)

The critical parameters and types of forecasts were considered to be temperature, rainfall and their associated effects (e.g. frost, snow, drought). Deviation from the norm was considered most important, especially relating to extreme conditions and the likely duration of such events. In view of the global nature of the modern food chain, there is interest in forecasts on a global basis, especially where weather conditions are likely to affect the availability and quality of raw materials and ingredients. It was clearly recognised that different parts of the food chain require forecasts for time periods ranging from days to several months and maybe years for long-term planning.

- 1-10 days – relevant to retail stock control and deliveries
- 1-3 months – planning production and marketing issues
- 3-6 months – supply issues, consumption
- 6-9 months – supply contracting, growing planning
- 2-5 years – factory planning, capital investment

Defining the level of forecast accuracy and reliability which would enable such information to be used in business decisions not surprisingly proved the most difficult aspect. In general terms, the required level of forecast reliability for all applications was seen as being at least 75-80%, with companies feeling prepared to pay much more for such information. Below this level of reliability it was felt the information would be only of general interest, not suitable for making strategic decisions, and therefore worth much less.

For the food industry to have confidence in the reliability of forecasts, the weather information providers must be able to demonstrate their track record, and the industry must be able to assess the cost-benefit relationships regarding inaction or action based on a particular forecast.

The recommendations arising from the workshop were:

- a. To consult more widely within the food chain in order to verify or elicit modification to the seasonal forecast requirements summarised in the report.
- b. To obtain further consideration from the food chain users of the required reliability and precision of seasonal forecasts.
- c. To seek response to this report from the weather forecast providers. What is their view about their future ability to meet the needs defined so far? What other detail or information do they need?
- d. To develop with the help of forecast providers food chain illustrations relating forecast quality assessment to application value assessment.

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- e. To encourage the Foresight Programme to maintain the current momentum in this topic and to help ensure that the full benefits of seasonal forecasts can be gained by industry in the future.
- f. To establish an effective network between the providers and users to monitor the current and developing types and reliability of forecasts.
- g. To disseminate future developments and successes.

Several of these recommendations are being progressed by the Foresight programme and some initiatives are underway. In the short time of my own involvement in this subject, I have, however, come to the conclusion that there is great scope for industry to use what is already available in a much more effective manner, particularly in relation to using probabilistic weather forecast data. Much of the type of information that the industry has identified as being needed is ideally suited to this approach. This is the area where demonstration is needed and where I am keen to progress matters.