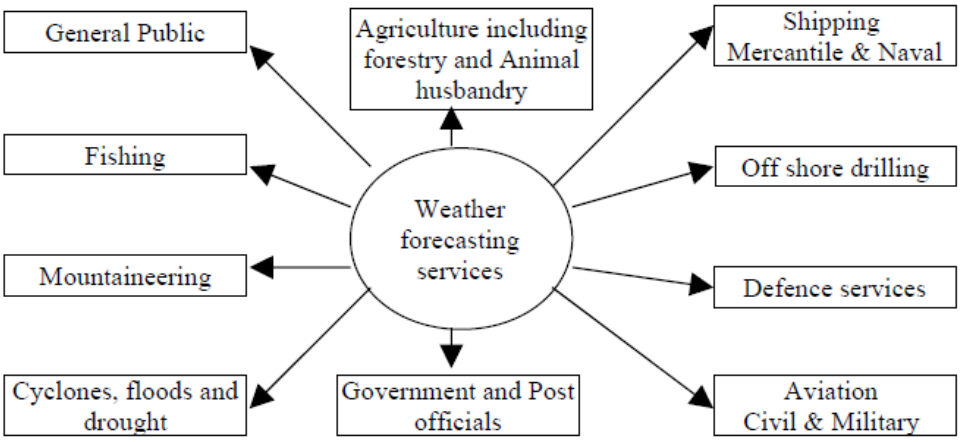
WEATHER FORECASTING

Climatic normals

The climatic normals are the average value of 30 years of a particular weather element. The period may be week, month and year. The crop distribution, production and productivity depend on the climatic normals of a place. If the crops are selected for cultivation based on the optimum climatic requirements it is likely that the crop production can be maximized.



Weather forecast

The prediction of weather for the next few days to follow. The Figure below depicts different weather forecasting services normally practiced in a country.

NEED / IMPORTANCE OF FORECAST

- Basically weather has many social and economic impacts in a place.
- Among different factors that influence crop production, weather plays a decisive role as
- aberrations in it alone explains up to 50 per cent variations in crop production
- The rainfall is the most important among the required forecast, which decides the crop
- production in a region and ultimately the country’s economy.

- The planning for moisture conservation under weak monsoon condition and for flood relief under strong monsoon condition is important in a region.
- A reliable weather forecasting when disseminated appropriately will pave way for the effective sustainability.
- One can minimize the damage, which may be caused directly or indirectly by unfavourable weather.
- The recurring crop losses can be minimized if reliable forecast on incidence of pest and
- diseases is given timely based on weather variables.
- Help in holding the food grain prices in check through buffer stock operations. This means that in good monsoon years when prices fall, the government may step in and buy and in bad years when price tend to rise, it may unload a part of what it had purchased.
- Judicious use of water can be planned in a region depending up on the forecast.

Type of weather forecast

Types of forecast	**Validity period**	**Main users**	**Predictions**
1. Short range a) Now casting	Up to 72 hours 0-2 hours	Farmers marine Agencies, general public	Rainfall distribution, heavy rainfall, heat and cold wave conditions, thunder storms etc.
b) Very short range	0-12 hours		
2. Medium range	Beyond 3 days and upto 10 days	Farmers	Occurrence of rainfall, temperature.
3. Long range	Beyond 10 days upto a month and a season.	Planners	This forecasting is provided for Indian monsoon rainfall. The out looks are usually expressed in the form of expected deviation from normal condition.

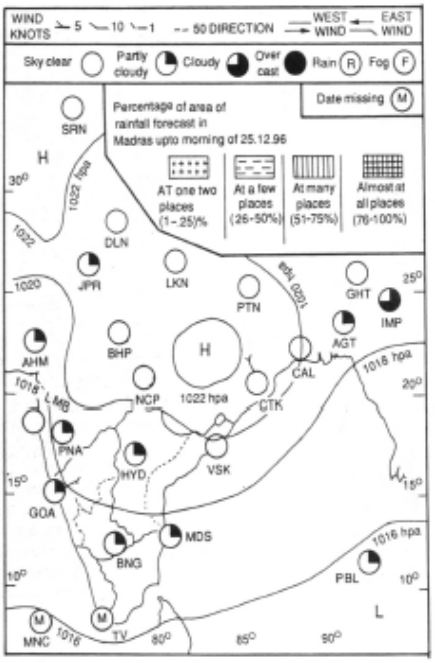
Synoptic charts

An enormous volume of meteorological data is being collected from all over the world continuously round the clock through various telecommunication channels. To assess, assimilate and analyse the vast data, they have to be suitably presented. For this purpose, the observations are plotted on maps instandard weather codes. These maps are called 'Synoptic maps or charts'. Synoptic charts display the weather conditions at a specified time over a large geographical area. The surface synoptic charts plotted for different synoptic hours (00, 03, 06, 09, 12, 15, 18, 21 UTC) depict the distribution of pressure, temperature, dew point, clouds, winds, present and past weather. In place of GMT, UTC (Universal Time Co-ordinate) is used. The upper air charts are also prepared at the standard pressure levels of the atmosphere (different heights) of the atmosphere wherein the pressure, wind and temperature are plotted. The surface charts together with the upper air charts provide a composite three-dimensional weather picture pertaining to a given time. Thus it gives a birds eye view of the state of atmosphere at a time over a large area and is a important tool used by operational meteorologists and scientists. The surface synoptic charts are the most used charts. It contains the maximum number of observations with the largest number of parameters plotted and often forms the base on which the pressure level charts are built up. The pattern of the pressure distribution is brought out by drawing isobars, troughs, ridges, lows, highs, depressions, cyclones, cols, fronts and discontinuities. These systems are clearly marked and labeled using appropriate symbols and colours. In synoptic charts different weather phenomena and atmospheric characters are marked with different symbols as mentioned below.

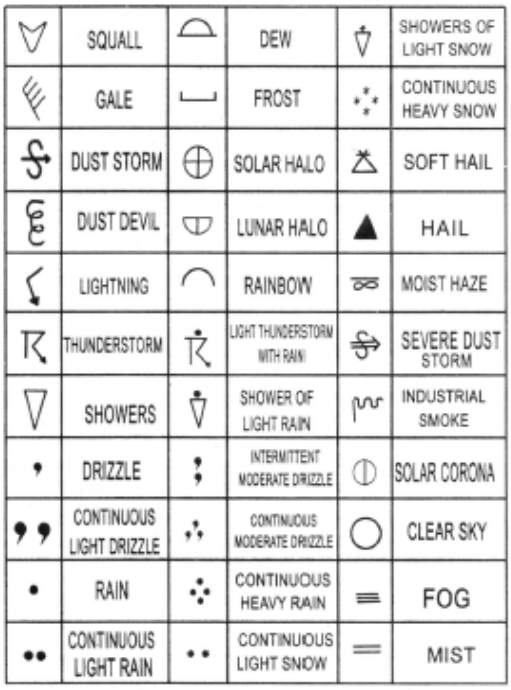
S.No	Symbols	Weather element/character/phenomenon

	Narrow black lines	Isobars
	Numbers at ends of isobars	Pressure values in hPa
	Shading	Precipitation
	Arrows	Wind direction
	Feathers in the arrows	Wind velocity
	Small circles with shading	Amount of clouds

In addition to the above, different symbols are used for recording weather phenomena.



Sample daily weather report



SYMBOLS FOR RECORDING WEATHER PHENOMENA

Weather calendar

In order to provide the farmers with an efficient weather service, it is essential that the weather forecaster should be familiar with the crops that are grown in a particular agroclimatic zone. The type of forewarnings to be given depend on the stages of the crop. In case of farmers, they should become familiar with weather bulletins and learn how to interpret. To meet the above requirement, the detailed information collected

from the agricultural departments has been condensed by the IMD and presented in a pictorial form known as crop weather calendar. This calendar has three parts as follows.

a) Bottom part

b) Middle part

c) Top part

a) Bottom part provides the activities related to crop or information related to phenological stages of the crop and the months.

b) Middle part gives information regarding normal weather condition required for active crop growth. It is divided into different sections according to rainfall, rainy days, minimum temperature, maximum temperature, pan evaporation and sunshine hours.

c) Top part gives information related to the weather abnormalities or to take precautionary measures. Top part is divided into different sections according to dry spell length, high wind, heavy rainfall and cloudy weather.

Sample crop weather calendar prepared for cotton in Tamilnadu for South Arcot district

CROP WEATHER CALENDAR

STATE : TAMILNADU **CROP :** COTTON **VARIETY** : LRA-5166, MCU-7 **IRRIGATED**

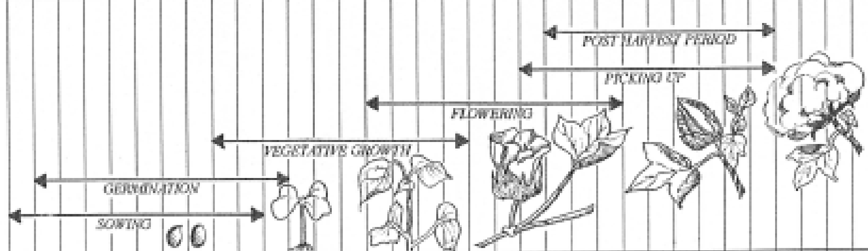
DISTRICTS : SOUTH-ARCOT **DURATION :** 150 DAYS **SOIL :** RED LOAM

Weather warnings	*Rain*	> 100 MM/DAY		
	Duration of wet spell	> 30 MM FOR 10 DAYS		
	Cloudy weather			
	Drought	40 DAYS	35 DAYS	35 DAYS
	High winds			> 30 KM/HOUR
	Temperature			
	Hail storm			
Weather conditions favourable for incidence of pests and diseases	*Pests*	STEM WEEVIL, BOLL WORMS	STEM WEEVILS, BOLL WORMS	STEM WEEVILS, BOLL WORMS
	Weather			
	Diseases	WILT	WILT	
	Weather			

Standard weeks	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13
Normal phase wise water requirement (mm)								79.6					230.2						
Weekly normal weather *Rainfall (mm) total*				20.3	18.6	18.3	13.1	16.3	4.9	4.6	2.4	2.4	2.7	3.9	2.9	1.6	5.3	2.6	4.0
Max. temp °C				28.6	28.2	28.1	28.5	28.7	29.2	29.7	30.2	30.7	30.9	31.9	32.4	32.7	33.5	34.4	34.9
Min. temp °C				21.1	20.7	20.1	19.7	19.5	18.7	20.3	19.9	20.3	20.3	20.8	21.8	21.8	21.8	22.3	23.7
Sunshine hours				6.4	7.0	6.0	8.2	8.8	9.0	8.9	8.9	9.8	10.2	10.1	10.1	9.7	9.8	9.8	10.4

Standard weeks	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Normal phase wise water requirement (mm)	287.8						179.0										
Weekly normal weather *Rainfall (mm) total*	21.4	15.0	5.3	5.2	7.2	15.6	22.2	10.5	18.7	9.7	13.0	8.7	10.2	14.8			
Max. temp °C	35.5	35.7	36.1	36.8	37.5	36.9	37.2	38.2	37.9	37.7	36.9	36.9	36.8	36.1			
Min. temp °C	24.8	25.6	25.9	26.1	26.7	26.7	26.4	26.9	27.1	26.7	26.5	26.2	26.1	25.8			
Sunshine hours	9.3	9.7	8.9	8.8	9.8	8.4	7.2	7.3	7.4	7.7	6.0	6.8	8.7	8.8			

Life history and mean dates of important epochs of crop growth



Months: *DECEMBER* | *JANUARY* | *FEBRUARY* | *MARCH* | *APRIL* | *MAY* | *JUNE*

A.D.G.M. (AGRIMET), I.M.D., PUNE 1993.

SSh → Sunshine hour; DUR → Duration.

WEATHER NORMALS FOR AGRICULTURAL CROPS

Sl. No.	Crops	Optimum Temperature ° C		Day length	Rainfall (mm)	Altitude above MSL (m)
		Germination	Growth stage			
1	Rice	Min 10 ° C	22-25 (flowering) 20-21(grain formn) 20-25(ripening)		1500	<3000
2	Maize	35-44 ° C				
3	Sorghum	7-10	25-30	Short day		
4	Pearl millet		28-32		400-750	
5	Finger millet				500-1000	
6	Kodo millet				400-500	
7	Wheat	20-22	16-22		250-1800	<3500
8	Barley		12-15 (growth) 30(reproduction)	Long day	400-500	
9	Oats	15-25			380-1140	
10	Ground nut	27-30	24-27		500-1250	
11	Sesame	25-27		Short day	500-650	<1250
12	Castor	20-26		Long day	500-600	<3000
13	Sunflower	20-25			500-700	<2500
14	Rape seed and Mustard	18-25		Long day	300-400	
15	Safflower	15-16	25-30	Day neutral	600-900	
16	Soybean	15-32	30-33		600-650	1200-2000
17	Pigeon pea	20-30				
18	Green gram	15	20-40	Short day	600-1000	
19	Black gram					1500
20	Cow pea	12-15	21-35	Short day	600	
21	Bengal gram		15-25		600-1000	
22	Cotton	18	21-27	Day neutral	500	
23	Jute		27-40	Short day	1500	
24	Tobacco	28	25-35		500-1000	
25	Sugar cane		24-30	Long day	2000-2500	
26	Sugar beet	12-15	22-30	Long day		
27	Potato	18-20	18-20			