Highlights…

- Below normal rains were reported in most of the agricultural plains of the country except in Faisalabad region in Central Punjab where above normal rainfall was reported during the month.
- Thermal regime in this month remained normal to hotter in most agricultural plains of the country.
- ETo and R.H mostly remained normal to below normal in the agricultural plains of the country.
- Agricultural soils showed mostly normal to cooler trend at shallow layers and above normal in intermediate and deep layers in the country.
- Spraying of chemicals on cotton and picking/harvesting of early grown varieties of cotton, rice and maize were the major field operations in most of the agricultural areas of the country during the month.
- Farmers have started land preparation and sowing of Rabi crops especially on fallow lands.
- Farmers are advised to cultivate Rabi crops well in time so that soil moisture stored due to recent rains may be fully utilized. The most suitable dead line for sowing wheat crop is 15 November. Sowing after this date causes significant drop in the yield.
- Dry weather is likely to prevail all over the country except northern Punjab, Azad Jammu and Kashmir and Khyber Pakhtunkhwa regions where normal to slightly above normal rainfall/snowfall is expected during December.

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EXPLANATORY NOTE

1. This Agrometeorological bulletin is prepared on the basis of data from 15 stations of Pakistan Meteorological Department (PMD). These stations, selected in consultation with the agricultural authorities, represent major agricultural areas of the country. There are still important agricultural areas which are not represented by the stations included in the bulletin. This may be (a) because there are no PMD stations in these areas and/or (b) the fact that we had to limit the number of stations due to the requirement of speedy data communication and processing (both of which are important for producing and dispatching timely Agrometeorological bulletins).

2. Due to the above, all inferences and conclusions hold true primarily for the above areas and not for Pakistan territory which include areas that may not be very important from the agricultural point of view and the climate of which may not bear directly on agriculture in the major producing areas.

3. The normally expected weather of next month is prepared on the basis of premise of normal or near normal weather prevailing during the coming month. As such it should not be confused with synoptic weather of the next month.

4. Summer Season/Kharif remains from April/May to October/November and Rabi season from November to April. Mean Daily Maximum Temperature images are included in summer and Mean Minimum Temperature images are included in winter in the Bulletin.

5. In the tables, the values in the parentheses are based on 1981 to 2010 normal. Normal values (in parenthesis) of Soil Temperatures are based upon 10 years data. Dotted line (---) means missing data. Solar radiation intensities are computed from sunshine duration using coefficients developed by Pakistan Meteorological Department.
Rainfall Departure from Normal (mm) during October, 2016
Minimum Temperature (°C) during Rabi Season (October-2016)

**Dotted Curve**: Current Season (October-2016) in °C

**Smooth Curve**: Normal values of Rabi Season
Evapotranspiration (mm/day) during Rabi Season (October-2016)

Dotted Curve: Current Season (October-2016) in °C
Smooth Curve: Normal Values of Rabi Season

- Gilgit
- Skardu
- Peshawar
- Rawalpindi
- Jhelum
- Sargodha
- D.I.Khan
- Lahore
- Faisalabad
- Multan
- Quetta
- Tandojam
Crop Report during October, 2016

Spraying of chemicals on cotton and picking/harvesting of early grown verities of cotton, rice and maize were the major field operations in most of the agricultural areas of the country during the month. Farmers have started land preparation and sowing of Rabi crops especially on fallow lands.

In Punjab: Major field crops in Punjab were cotton, rice and sugarcane. Picking of cotton crop is in full swing. High temperature has caused fruit shedding in some areas. Harvesting of rice variety “irri” is in full swing. The basmati crop is heading towards maturity. Crop condition is reported satisfactory and better average yield is expected as compared to last year. The growth and development of sugarcane crop reported satisfactory. The crushing of cane for making ‘gur’ is reported to have been started at some places. Condition of maize crop is normal and the crop has reached to full maturity stage. Land preparation/Sowing of wheat, masoor and gram is in progress especially in rainfed areas of the province.

In Sindh: Picking/harvesting of cotton crop has been almost completed. Condition of rice crop is observed satisfactory. Harvesting of the crop is in progress. Sugarcane crop is reported in good condition and harvesting of early sown crop is started. Sowing of wheat crop was started during the month in some areas. Condition of oilseed crops like caster and sesame is reported well. Caster is reported to be at maturity stage and harvesting of sesame is in progress. Rape mastered is in germination stage. Sunflower is growing at seed setting stage. Jatropha is at flowering stage. Seasonal fruits are reported at good condition. Cheeko, bananas and other orchards are reported at flowering stage. Some of the early grown winter vegetables are at mature stage and are now available in the market.

In Khyber Pakhtunkhwa: Crushing of the early grown sugarcane crop has been started in the region. Large scale crushing of the crop will take place in the months of January and February. Cultivation of canola crop has already been completed during the month. Harvesting of rice crop has started in the province. Harvesting and threshing of early growing verities of maize crop has almost completed in plain areas and is in progress in upper hilly areas of the province. However late growing varieties are in the field. Overall condition of orchards is reported satisfactory. Sowing of gram in rainfed and irrigated areas has completed and land preparation is in progress for sowing of wheat crop is in progress. Sowing of winter vegetables was in progress during the month and germination/emergence of vegetables is reported satisfactory. Picking of persimmon is in progress.

In Balochistan: Condition of standing crops and orchards is reported satisfactory. All varieties of apples have developed color. Sowing of Rabi crops has been started. Winter vegetables reported in normal condition and are now available in the market.

In Gilgit-Baltistan: Harvesting of maize and red beans has almost been completed.
Moisture Regime during October, 2016

October is one of the driest months in the country. Monsoon weather systems completely retreat till the end of September and dry continental winds prevail in October over most of the agricultural plains. Accordingly, during October below normal rains were reported in most of the agricultural plains of the country except at Faisalabad in Central Punjab where above normal rainfall was reported.

The highest amount of rainfall recorded in the country was 73mm in Kakul followed by 63mm in Mithi, 38mm in Balakot, 30mm in Malam Jabba and 28mm in Murree. Number of rainy days recorded in agricultural plains of the country reached up to 8.

Maximum number of rainy days was recorded (8 days) in Bagrote followed by 7 days in Pattan, 5 days in Balakot and 4 days in Muzaffarabad, Kohat, Malam Jabba and Saidu Sharif each.

Comparison of Actual Precipitation (mm) during the month of October, 2016 with Normal values
The evaporative demand of the atmosphere represented by reference crop evapotranspiration (ETo) remained normal to below normal in most of the agricultural plains of the country except Tandojam in Sindh where it remained above normal. The highest value of ETo was estimated in Tandojam in lower Sindh.

Comparison of Actual ETo (mm/day) during the month of October, 2016 with Normal values
The mean daily Relative Humidity (R.H) also remained below normal in most of the agricultural plains whereas at Rawalpindi in Potohar region and Tandojam in Lower Sindh, it was observed above normal.

Maximum value of mean Relative humidity was observed 62% at Peshawar, while the minimum value was observed at Quetta due to its dry weather during the month and dry climate in this month.

Maximum number of days with mean R.H greater or equal to 80% was observed nil. Maximum number of days with mean R.H greater or equal to 80% and temperature greater than 35°C was observed for 25 days in Rohri, 4 days in Multan and 2 days in Khanpur.

From overall analysis of this month it is evident that mostly below normal rains have been received in most of the agricultural plains. From overall analysis of monsoon season up to October, satisfactory rains have received during this season. Due to which moisture condition is mostly observed satisfactory for sowing and early growth for Rabi crops in rainfed areas as well as irrigated agricultural plains of the country and no moisture stress persists in the agricultural plains.
Temperature Regime during October, 2016

Temperature plays vital role in the growth and development of crops. Thermal regime in this month remained normal to hotter in most agricultural plains of the country. The main reason for this trend is mostly below normal rains/cloudy atmosphere in the agricultural plains.

Mean daily temperature ranged 25 to 27°C in Khyber Pakhtunkhwa, 24 to 28°C in Potohar region, 27 to 29°C in remaining parts of Punjab 13 to 17°C in GB region. It was observed 33°C in Sindh represented by Tandojam and 18°C in the high elevated agricultural plains of Balochistan represented by Quetta valley.

The night time temperature represented by mean minimum remained above normal in most of the agricultural plains of the country. The lowest minimum temperature was recorded -3.4°C at Skardu. Whereas highest maximum temperature was recorded 43.5°C at Turbat.
Agricultural soils showed mostly normal to above normal trend at shallow layers in Potohar region and lower Sindh represented by Tandojam. Whereas it was observed below normal in central Punjab and Quetta valley in Balochistan. The rise in soil temperature was observed more significant at Tandojam than other parts during the month.

At intermediate and deep layers, above normal trend is shown in all parts of the country represented by Rawalpindi in Potohar region, Faisalabad in Central Punjab, Quetta valley in Balochistan and Tandojam in Lower Sindh.

From the general analysis of atmosphere and soil behaviour in this month, it is concluded that moisture condition is observed satisfactory in most of the agricultural plains of the country. Therefore, satisfactory soil and atmospheric conditions exists for cultivation and early growth of Rabi crops especially in rainfed areas of central and upper parts of the country.
Solar Radiation and Wind Regime during October, 2016

Total bright sunshine hours and solar radiation intensity remained below normal in most of the agricultural plains except GB, Sindh and Quetta valley in Balochistan where these values were recorded above normal.

Mean wind speed throughout agricultural plains of the country ranged between 1 to 15 km/h with North-east to North-west and South trend. Maximum wind speed was ~15 km/h observed at Tandojam in Sindh.
Cumulative Rainfall, ETo and Water Stress for Rabi Season (October-2016)
Normally Expected Weather during November, 2016

Normally, November is a dry month like October over Pakistan, northern parts of Punjab and Khyber Pakhtunkhwa may receive some precipitation due to westerly troughs passing across the area. Northern parts of Khyber Pakhtunkhwa, Punjab and North Western parts of Balochistan generally receive rain from 10mm to 25 mm during November. Decreasing trend may be observed from North to Southward. Over rest of the agricultural plains of the country, generally, weather would remain dry during November.

Mean daily relative humidity may increase by 3 to 10% as compared to October. The increase of relative humidity in Sindh and Khyber Pakhtunkhwa would be less, whereas it is likely to be prominent in Punjab. Mean daily relative humidity may vary in the range of 45 to 60%. For the convenience of farming community of Potohar zone. The probability of occurrence of rainfall is given below:

<table>
<thead>
<tr>
<th>Amount / Dates</th>
<th>Percentage probability of occurrence of different amounts of rainfall in November</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>6-10</td>
</tr>
<tr>
<td>10mm</td>
<td>16</td>
</tr>
<tr>
<td>15mm</td>
<td>6</td>
</tr>
<tr>
<td>25mm</td>
<td>0</td>
</tr>
</tbody>
</table>

Due to shorter days, lower solar intensities and light winds are expected as compared to October, the evaporative demand of atmosphere is expected to fall by 1 mm / day to 2 mm / day. They may range from 2.5 to 3.8 mm / day in northern Punjab and Khyber Pakhtunkhwa and 3.9 to 4.8 mm / day in southern Punjab and Sindh. The canopies of Rabi crops would be less dense during the period as it will be in early stage of its life cycle, therefore variations in ETo values will not be much as compared with the preceding month’s ETo values. No significant soil moisture stress is expected during November due to normal to above normal rains reported in most of the agricultural plains in October.

The mean daily temperature may fall by 6 to 8°C except high agricultural plains of Balochistan and lower Sindh where these may fall by 4 to 5°C respectively. These will range from 16 to 20°C Punjab, Khyber Pakhtunkhwa and about 10 °C at high agricultural plains of Balochistan. Mean maximum and mean minimum temperatures may fall by 5 to 8°C all over the country. Mean maximum temperature may range 25 to 28°C in Punjab and Khyber Pakhtunkhwa, 30 to 33°C in Sindh and about 18°C in high agricultural plains of Balochistan. Mean minimum may range from 7 to 10°C in Punjab and Khyber Pakhtunkhwa, 14 to 17°C in Sindh and about – 2° at Quetta representing the high agricultural plains of Balochistan. Highest temperature may not exceed from 40°C and minimum temperature may not fall beyond – 10°C. No heat stress day is expected anywhere in the county but some freezing nights in the later parts of the month are expected over high agricultural plains of Balochistan.

Due to seasonal shifting of the sun’s position towards southern latitudes, the total numbers of bright sunshine hours are likely to fall by 20 to 35 hours as compared to October. These may range from 230 to 260 hours in Khyber Pakhtunkhwa and northern Punjab and from 260 to 290 hours in Southern Punjab and Sindh. The solar intensities may fall by 4 MJ/M²/day as compared to October and may remain close to 13 MJ/M²/day all over the country. Mean wind speeds are expected to remain less than 3 km/hr except high agricultural plains of Balochistan, lower Sindh and Islamabad where it may range from 4 to 7 km/hr.

Water requirement of full canopied, healthy and stress free crops is given in the following table:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Region</th>
<th>Water Requirement (mm)</th>
<th>Cubic Meter/Hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Northern Punjab, Northern Khyber Pakhtunkhwa and high agricultural plains of Balochistan</td>
<td>110-160</td>
<td>1100-1200</td>
</tr>
<tr>
<td>2</td>
<td>Southern Khyber Pakhtunkhwa, and Southern Punjab</td>
<td>140-160</td>
<td>1400-1600</td>
</tr>
<tr>
<td>3</td>
<td>Sindh and Southern Balochistan</td>
<td>180-190</td>
<td>1800-1900</td>
</tr>
</tbody>
</table>
Weather Outlook for November 2016

The outlook for the month of November shows that mostly dry conditions are likely to prevail all over the country except the humid regions comprising of northern Punjab, Azad Jammu and Kashmir and Khyber Pakhtunkhwa where slightly above normal rainfall is expected during the month of November, 2016.

Weather Outlook for December 2016

The outlook for the month of December shows that mostly dry conditions are likely to prevail all over the country except the north-eastern Punjab, Azad Jammu and Kashmir, GB, northern Balochistan and Khyber Pakhtunkhwa where slightly above normal rainfall is expected during the month of December, 2016.
Findings of AgMIP Pakistan, University of Agriculture, Faisalabad

1. There would be significant increase in temperature i.e., 2.8°C in day and 2.2°C in the night during mid-century (2040-2069)

2. There would be significant variability in rainfall patterns (about 25% increase in summer & 12% decrease in winter during 2040-2069)

3. Climate Change will affect the crop yields negatively (about 17% for rice and 14% for wheat)

4. If there will be no adaptation to Climate Change, majority of farmers would be the economic losers

5. With Adaptation to Climate Change (through technology and management), there would be significant decrease in poverty and improvement in the livelihood of farming community.

(Agricultural Model Inter-comparison and Improvement Project (AgMIP) Pakistan 2012-2014)
نومبر 2016ء میں کاشتکاروں کے لئے زرعی موسمیاتی مشورے

اس سال اکتوبر میں سالف کے بیشتر علاقاؤں میں مسلسل گر کم بارشی روزAIN ۔ نومبر کے سہیلی میں ملک کے شمالی علاقاؤں میں خیبرپختونخوا میں شماال دیپر یا اور کئی ممکن ہے جب میں بارش متوسط ہے یک اور ایک یہ نومبر کے موسمی حالات کو مذکر نظر رکھنے کے لیے بیانیہ فصل کی اچھی پہاڑیوں حاصل کریں کیچر کی بڑی مزون ملائخ سبھ طے کی ایمہ صورت پر ۔ کسانوں کے لئے نومبر میں مفتیجہاں فلیٹ زرعی موسمیاتی مشورے ہیں۔

1. ریاستی قفصلیں کی پرائی یا ایک گھیرے گھیرے کا نومبر کے وسط سے شروع ہو چکا ہے۔ گھیرے امموسم کی ایمہ ترین فصل ہے۔

2. بھٹھنی بہت اور معاوضہ ہو جائے گیا کہ کسان کی نومبر کے وسط سے بہت مفید مکمل کریں جائے۔

3. ایسے بارشی علاقاؤں میں میں جھارے زمین میں خاص حالتیں نہیں اور بارش کے باتی امکان بھی ہو سکتا ہے تاکہ کسان کی نومبر کے وسط سے بہت مفید ہو جائے۔

4. مذکر نبیولوں ۔ بارش کے امکان میں سبر مفتیجہاں استفادہ کی جائے۔

5. محکمہ زراعت مفتیجہاں فصل کی سنگھ گھیرے کی مخاطر کے امکان کو مفتیجہاں دیتے ہیں۔ بھارتی وزارت کے علاقاؤں میں سبر مفتیجہاں فصل کی مفیدی پر کسانوں کو مفتیجہاں کی فصل کو مفتیجہاں ہوئے۔

6. موجودہ موسم کی بارش سے متعلق حالات کو نظر کریں کہ نومبر کے بہت امکان کو کسان کرام جاں گا اور مفتیجہاں کے مفید کام کریں جائے۔

7. اس میں لرس مفتیجہاں مفتیجہاں میں مبتلا رہنے کا امکان ہے۔ جس کی وجہ سے جنگ کی اور زراعتیوں میں خرابی۔

8. بیمانی (fungus) کا خطرہ بھاٹا ہے۔ کسان حشرات محکمہ، زراعت کی متعدد ادوار کا مہینہ کہ کوئی فصل کو مفتیجہاں ہوئے۔

9. ہر وقت مکمل کریں جائے کہ محکمہ مفتیجہاں کی بنیادی سے اور مفتیجہاں میں اپنی کام کریں جائے۔

10. محکمہ موسموں کے قربی دفتر سے رابطہ کی جائے ہمارا الہام جو کا بہت پیچھے ہے۔
Germplasm Biophotol Monitoring System for Improved Wheat Yields and Growth

1. Germplasm Pakistan has a rich genetic diversity comprising 80 different wheat varieties. The major centres of diversity are Punjab and Sindh. The germplasm collection is managed by the Pakistan Agriculture Research Council (PARC). The potential yield (Potencial yield) of the germplasm is assessed by measuring the yield at the harvest stage, which is the most important factor affecting the yield of wheat. The evaluation is conducted in a field trial at the Divisional Agriculture Research Station (DARS) of the Ministry of Agriculture, Government of Pakistan.

2. The experiment was conducted in 18 plots of 100 m² each, with a total area of 1800 m². The plots were arranged in a randomized complete block design with three replicates. The experiment was conducted during the growing season of October to April. The treatments consisted of different wheat varieties and their germplasm.

3. The results showed that the germplasm accessions had a higher yield potential compared to the local varieties. The accessions had a higher yield potential at the harvest stage. The germplasm accessions also had a higher flowering percentage and a higher maturity percentage. The germplasm accessions also had a higher root length and a higher root weight. The germplasm accessions also had a lower disease incidence.

4. The results of the experiment showed that the germplasm accessions had a higher yield potential compared to the local varieties. The accessions had a higher yield potential at the harvest stage. The germplasm accessions also had a higher flowering percentage and a higher maturity percentage. The germplasm accessions also had a higher root length and a higher root weight. The germplasm accessions also had a lower disease incidence.

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<table>
<thead>
<tr>
<th>Week</th>
<th>Sowing</th>
<th>Germination</th>
<th>Harvest</th>
<th>Source</th>
</tr>
</thead>
</table>