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# The Canadian Agriculture Weather Prognosticator

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## *World Weather At A Glance*

- Argentina drought was eased in late January, but it will strengthen again during early February.
- Brazil weather trended a little too wet in late January except in the far south and northeast where conditions were a little dry
- North Africa has dryness in Tunisia and Morocco and that must be eased over the next few weeks
- U.S. hard red winter wheat areas are still drought stricken, despite some welcome January moisture
- Very little winterkill has occurred this year in Europe or Russia and temperatures will be warmer biased for a while
- China's rapeseed region is poised to begin spring growth favorably this year and the same is true for wheat areas
- India rainfall has slipped below average and must increase for the best potential yield.

## Another Dry Spring Will Raise Anxiety

Snow cover is minimal once again in Palliser's Triangle. The southwestern Prairies are approaching spring with limited snow depth, although there have been a few bouts of precipitation since early last autumn that put a little moisture in the ground. The situation is far from ideal, though. This spring will mark the seventh year in a row of dryness and concern will be rising once again over the potential for another stressful production year.

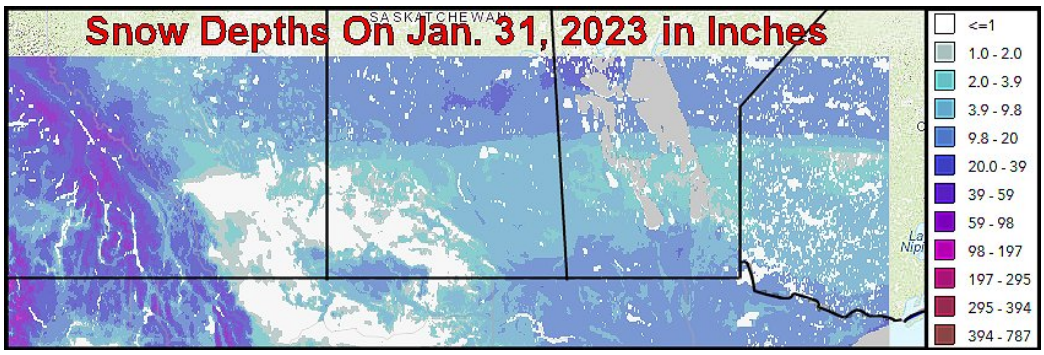
The southwestern Prairies have been dealing with varying levels of drought since 2016. The drier bias has seriously impacted the region's production in several of those years, but it is truly amazing that drought has not had a more devastating impact on the area and its producers. This year's dissipating La Nina raises hope for improved summer rainfall, but a ridge of high pressure expected this spring over western Canada promises to get in the way of early season precipitation. The lack of snow cover, restricted subsoil moisture and an outlook for below normal spring precipitation will cause some anxiety among producers; however, there are a couple of rays of hope.

Late February and March precipitation is expected to increase. That should put some snow back on the ground in the driest areas and raise the potential for some snow melt in the spring to increase runoff. Unfortunately for some of the driest areas frost extends deeply into the soil and will block runoff from melting snow from penetrating very deeply into the soil.

Some improved topsoil moisture will occur from melting snow in late winter and early spring, but the upper air wind flow pattern is not likely to be supportive of very many large scale precipitation events. The limited precipitation bias is true for much of the Prairies—not just the southwest.

April and May will be the two driest months of the growing season this year and the impact of that dryness will be greatest on the areas of southern and east-central Alberta and west-central through southwestern Saskatchewan where the moisture deficits accumulated over the past six years are greatest.

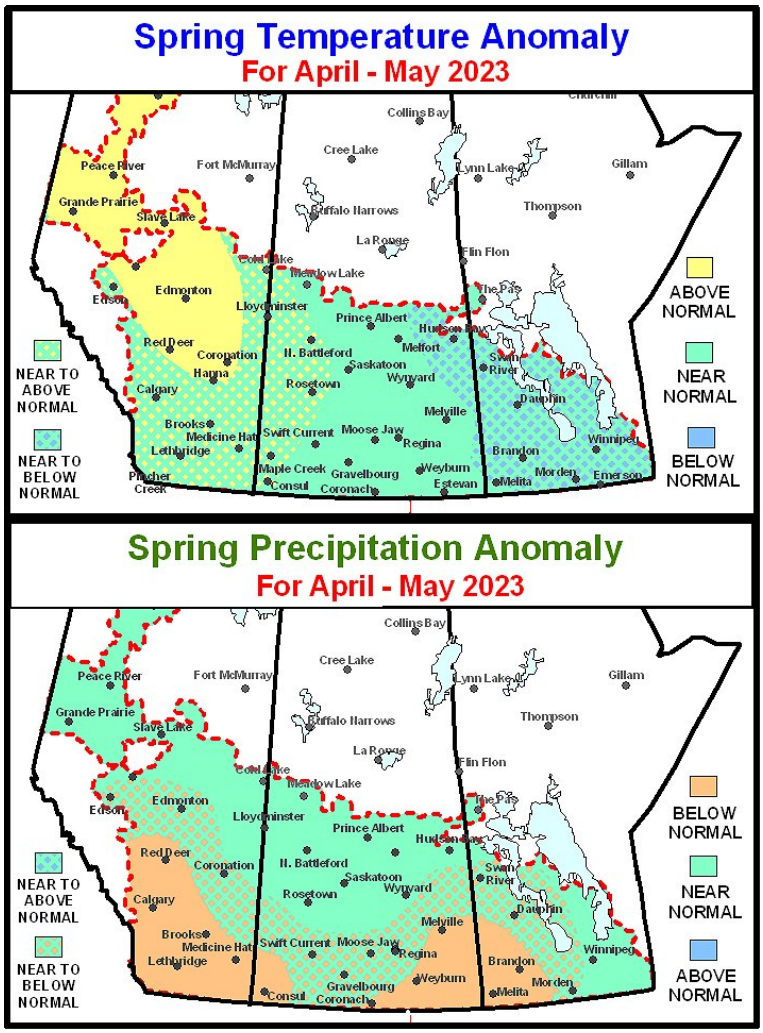
Snow cover in the central through east-central parts of the Prairies is more significant than that of the southwestern crop areas and some of the snow that accumulated



# Another Dry Spring Will Raise Anxiety (continued from page 1)

there occurred while temperatures were warm last autumn. That may have left a limited amount of frost in the ground. Upwards to 10 inches of snow covers some of this central and east-central Prairie region and some of that moisture should reach into the topsoil when the snow melts .

The deepest snow in the Prairies is on the ground from extreme southeastern Saskatchewan into southern Manitoba staying south of Lakes Winnipeg and Manitoba. Another region of significant snow is present from northeastern crop areas of Alberta to northern Saskatchewan and northwestern Manitoba. Some of the snow there varies 10 to more than 20 inches. Northeastern Saskatchewan and northwestern Manitoba have the most snow on the ground.




Late February and especially March will bring a boost in precipitation to the Prairies. Many of the snow free areas today should get buried in snow once again. The moisture should help bring a little topsoil moisture for early season planting in the spring, but follow up rain and snow will be very important. The spring jet stream is likely to be well to the south for an extended period of time, but the moisture that occurs in February and March will provide some hope for a better planting season than in recent past years. The real concern will be over April and May precipitation.

The 18-year cycle for spring 2023 is not providing much "hope" for "normal" weather this year. The jet stream should be far to the south in the states for a longer than usual period of time and that will keep most of the atmosphere's energy well south of the border.

Even though La Nina is expected to dissipate during the late winter and spring this year, the 18-year cycle is still promoting a similar upper air wind flow pattern which is likely to translate into less than usual precipitation for most of the Prairies in April and especially May. Temperatures may be warmer biased during this period of time as well.

A close watch on spring weather will be warranted. Snow melt will lead to some increase in topsoil moisture in support of pea, lentil and other early season crop planting, but additional precipitation will be needed to sustain early season crop development. Early season canola planting moisture should be favorable, but the lack of precipitation and warm temperatures will lead to faster evaporation and quick drying. That could lead to moisture shortages when early season oat, wheat, barley and canola planting begins. Greater rain will have to fall in late April and May to replenish low early spring soil moisture in support of the best emergence and establishment.

If the forecast is correct there may be some worry over crop emergence and establishment. May has the highest potential of being drier than usual and by the time that month has arrived most of the benefits from melting snow and March precipitation should be passing. As a result the concern over early season crop development will rise.

The best news for the Prairies is in the summer outlook. La Nina will have been gone long enough by the summer this year to allow other weather patterns to grab control of the atmosphere. The two patterns that are identified today for the summer are the 18-year cycle and the negative phase of Pacific Decadal Oscillation (PDO).

The 18-year cycle should create a better environment for rainfall across the southern Prairies and the northern U.S. Plains. This change will only occur after drier biased conditions of spring, but sufficient precipitation will occur across the southern Prairies to induce more aggressive crop development.

# Parallels To The Past Reinforce Spring Outlook

Spring weather is expected to have some drier tendencies this year as noted in the Page One article in this prognosticator. It is important to keep in mind that these studies presented here are based on past weather trends and there is no guarantee that they will be repeated in the exact same way. However, World Weather, Inc. has learned over the years that when more than one set of data points to the same conclusion confidence in the forecast can increase.

The charts shown below were of great interest because they are from the 18-year cycle. The images are from March, April and May of the years 1969, 1987 and 2005. Normally, surface weather anomalies from past 18-year cycle data should never be used as a forecast for the future simply because the 18-year cycle is an upper air phenomenon and not a surface pattern that can be easily used from one growing season to another. However, World Weather, Inc. found the similarities to these three years to be of great interest.

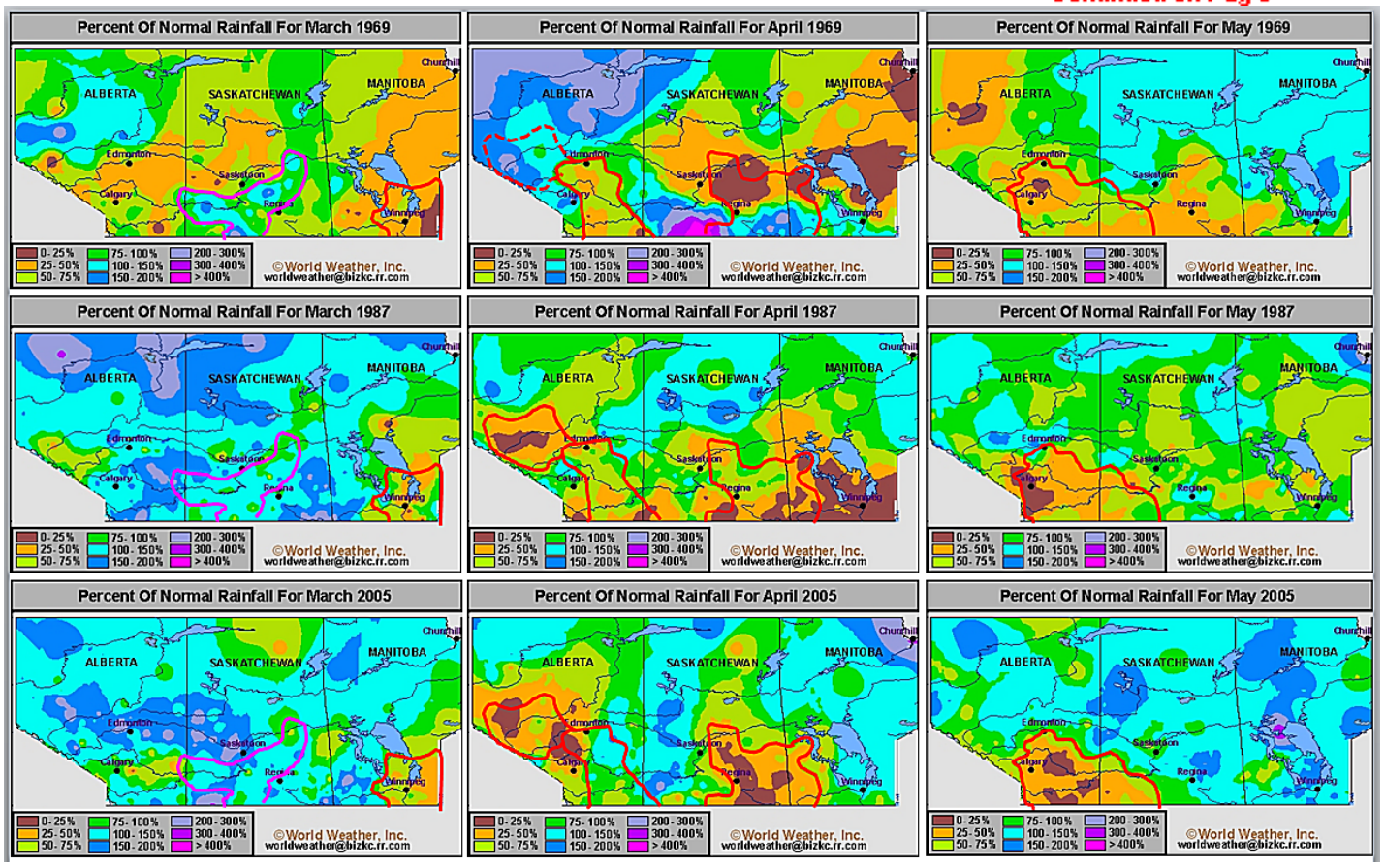
As you may or may not recall, the past 2-3 years of weather was strongly linked to weather patterns of the past. The multi-year La Nina event that occurred in this particular solar cycle resulted in similar weather for a large part of North America multiple times in the past. The 18-year cycle data for 2022 was also very similar and each of these weather patterns reinforced the other and had similar solutions of the atmosphere. The same can be said when adding in the negative phase of Pacific Decadal Oscillation—a phenomenon of surface temperature anomalies in the Pacific Ocean that also played into the weather in 2022.

Now that La Nina is diminishing, the amount of time that is left in which these multiple weather signals are operating in tandem with one another is short, but World Weather, Inc. believes the parallels will last long enough to get us into spring.

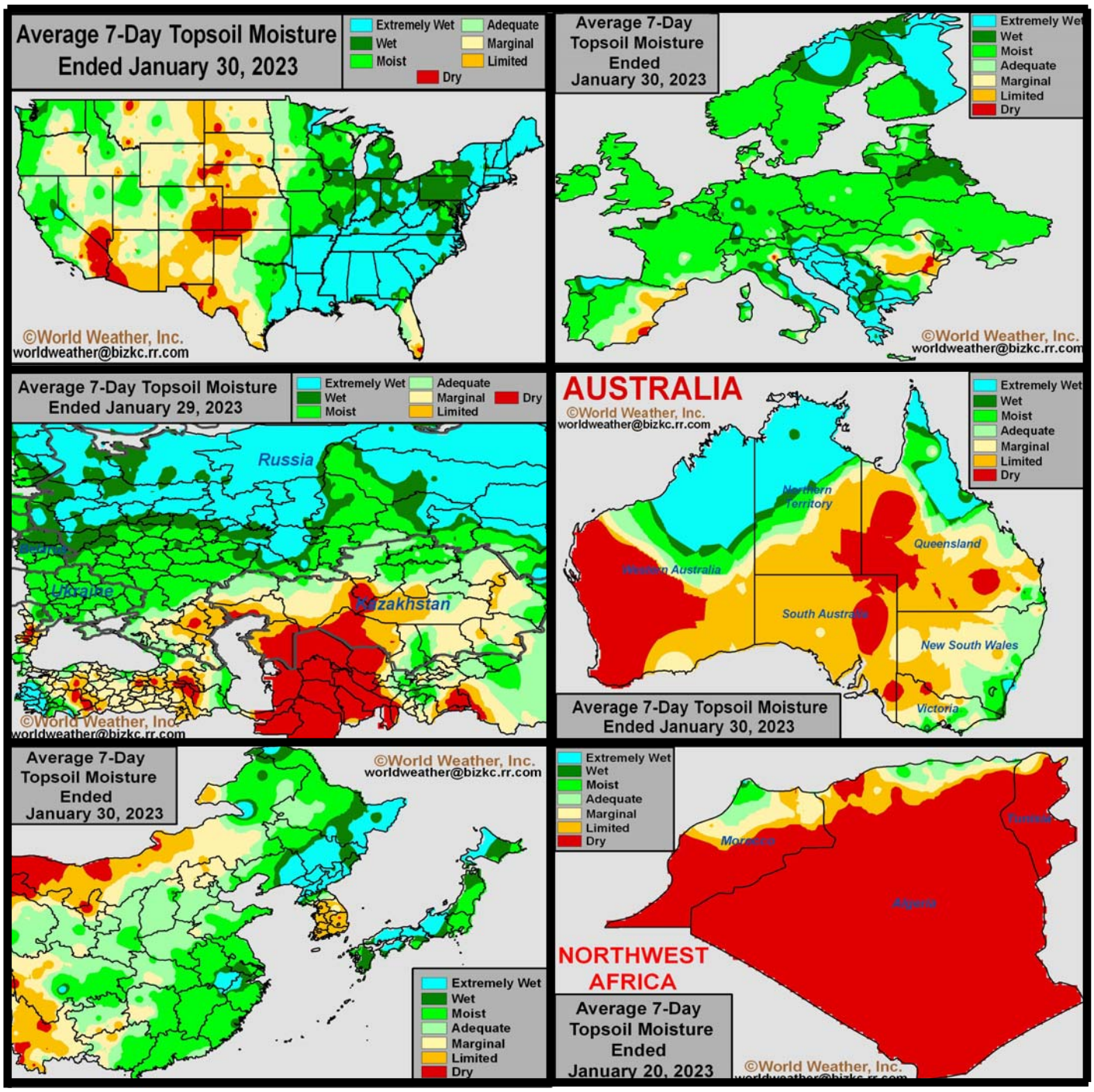
The series of percent of normal precipitation charts at the bottom of this page show some similarities and some differences in the 18-year cycle data, but there is a common denominator of dryness that shows up in a part of the Prairies during April and May. The most obvious similarity is in May precipitation in which Pallisser's Triangles seems to have a problem with getting significant precipitation to fall. That same region also shows up with lighter than usual precipitation in at least a portion of the same region during April.

The drier tendency shown in these three analog years is of great interest even though they are surface weather features and the 18-year cycle is normally an upper level wind feature phenomenon. The upper air wind flow pattern in each of these three spring seasons favors an active jet stream

Continued on Pag 6



# Selected Weather Images From Around The World




A notable improvement in eastern U.S. soil moisture has occurred since the late autumn when dryness was still an issue in many areas of the eastern Midwest. There is still need for significant moisture in the Great Plains and western Corn Belt. Europe is still a little dry in the lower Danube River Basin and in eastern Spain. Water supply is still a little low following last summer's European drought and greater precipitation would still be welcome prior to the start of spring. Eastern Australia has received some rain in sorghum and cotton areas, but dryness remains and with the demise of La Nina imminent the drier bias may not be a good omen for the coming year. North Africa in the meantime, still has notable dryness in southwestern Morocco and interior Tunisia where durum wheat and barley could be negatively impacted without greater rain this spring. China's moisture profile looks good for its wheat and rapeseed crops and the same can be said for most of Russia and Ukraine's winter crop areas.

# Some Improved February, March Precipitation

February temperatures are expected to bounce around quite a bit. The bitter cold of February 1-2 will quickly give way to much warmer temperatures making the first half of the month warmer than usual. A return of very cold weather is expected during the middle to latter part of February and that may skew the temperatures for the entire month below normal.

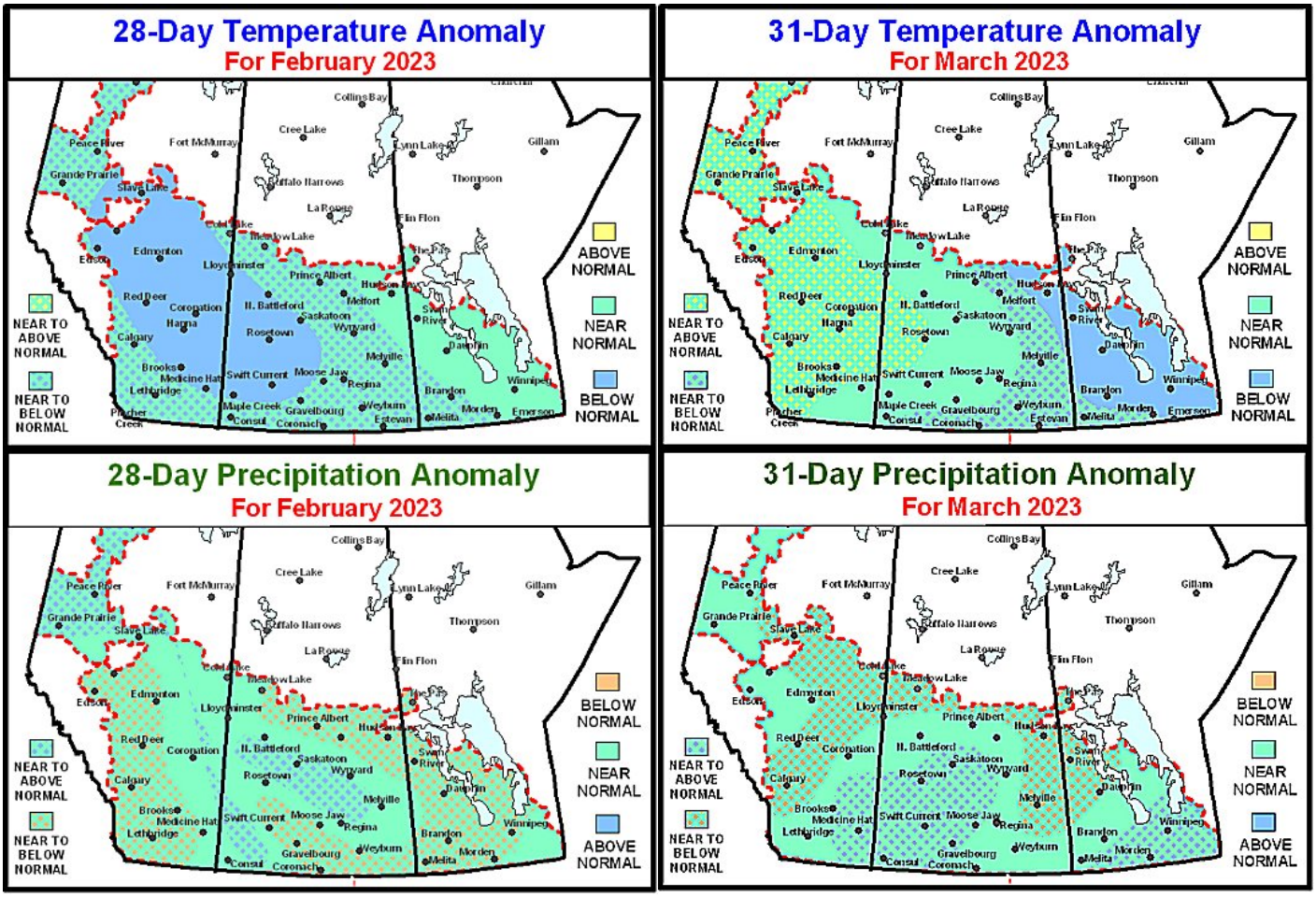
The transition of temperatures from cold to warm and back to cold again during February should set the stage for bouts of precipitation. The moisture is not expected to be well distributed, but there should be a boost in precipitation for many areas that will at least increase the snowpack for many areas. A significant storm system does not seem very likely, but one cannot be ruled out for the middle part of the month.

March weather is also expected to be more mixed with bouts of cool and warm weather during the month. There is some potential the precipitation in March could be as anomalously great as that of December with a little better distribution. Confidence is not high and the pattern supporting the greater precipitation may not last long, but there will certainly be a fair chance for some much needed moisture boosting in the southwestern and central parts of the Prairies.

Frost in the ground over the southwestern Prairies in March may limit the penetration potential for the precipitation that falls when the snowpack finally melts. However, the melting snow in early spring will be extremely important since the moisture profile in Palliser's Triangle will be low due to much of winter being snow free and the previous six years of below normal precipitation.

Temperatures in March should favor the coldest conditions relative to normal to shift into the eastern Prairies while warming takes place in the west. Confidence in the timing and the temperature anomalies expected in March are low because of some confusion over the timing of a 64-day weather trend change that should come along in mid– February and again mid-April. There is some potential that March could see a more dramatic period of warming if the repeating pattern sets up just right.

The precipitation events of February and March will be extremely important if precipitation in the southwestern Prairies is going to be lighter than usual in April and May as suggested by the study revealed on pages 3 and 6 in this prognosticator. A close watch on the distribution of winter moisture is warranted.



# Parallels To The Past Reinforce Spring Outlook (continued from Page 3)

far to the south in the United States. The pattern suggests that April and May precipitation in the southern and some central parts of the Prairies may be lighter than usual because the jet stream will take most storm systems coming into North America through a larger part of the United States than in the Prairies.

This is not a pattern that is difficult to perceive because it is the same pattern that is prevailing today. The 18-year cycle data is suggesting a delay in the northward shift in the jet stream across North America and if that verifies rain and snowfall will have to be reduced in the southern Prairies just like in these three analog years of 1969, 1987 and 2001.

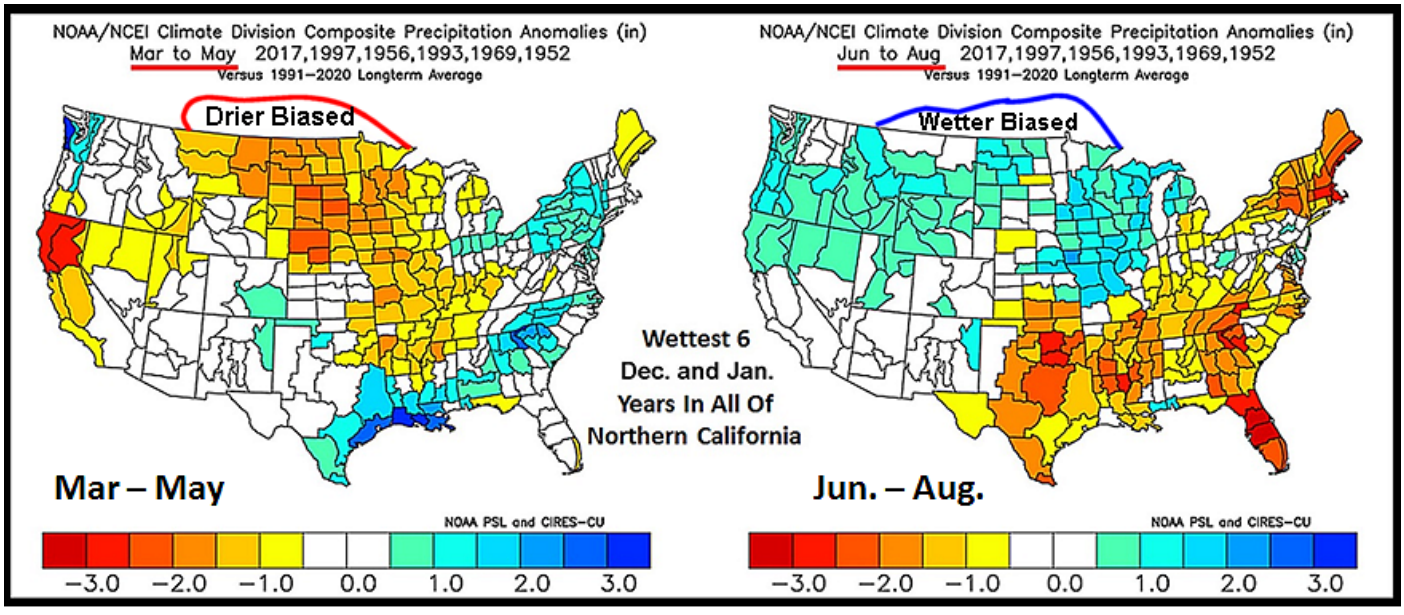
Reinforcing this research is another set of the data that is completely separate from the 18-year cycle data. The data comes from the repeating multi-year La Nina event in this current solar cycle with negative PDO. This data is the same data used to predict last year's weather and we are using it again in the spring season because the years 2005, 1969 and 1987 are all years in which a multi-year La Nina event was dissipating in this current solar cycle while the negative PDO was weakening., The data found here reveals another parallel for the northern U.S. Plains and neighboring areas of Canada's Prairies to experience below normal precipitation during April and again in the southwestern Prairies during May.

The 18-year cycle years and the dissipating multi-year La Nina events studied did not suggest drought in the springs of these years, but they did all suggest below normal precipitation. With the southwestern Prairies already carrying notable moisture deficits into the spring of 2023 having a drier bias in April and/or May can lead to some problems or at least some concerns. That is why the precipitation that should occur in late February and March will be so very important. Spring planting moisture will need to feed off of melting snow and any moisture other moisture that falls until summer rains kick in.

Rounding out the support for the lighter than usual spring precipitation in the southern Prairies was data associated with the record rainfall that occurred in northern California during December and January. Correlation studies from that event revealed six years of notably excessive rainfall in northern California and the bias for spring weather in each of those years was for below normal precipitation in the northern U.S. Plains and southern Canada's Prairies during the March through May period.

It is hard to turn one's back on these three different studies all suggesting the same conclusion of below normal April/May precipitation at least a portion of the southern Prairies. Assuming the forecast is correct, the expectation will be that planting will need to occur quickly in the spring to take advantage of the moisture while it is there. However, temperatures in the spring could be cooler biased and that might force some delay in planting to avoid crop damaging frost and freezes after emergence and establishment for early season crops.

The California study is the weakest of the three studies, but it certainly did reinforce the other research. You would be wise to also notice the near to above normal precipitation that occurs in the northern Plains and neighboring areas of the southeastern Prairies during the summer months that followed the wetter than usual December and January in California. That bodes well for our summer.



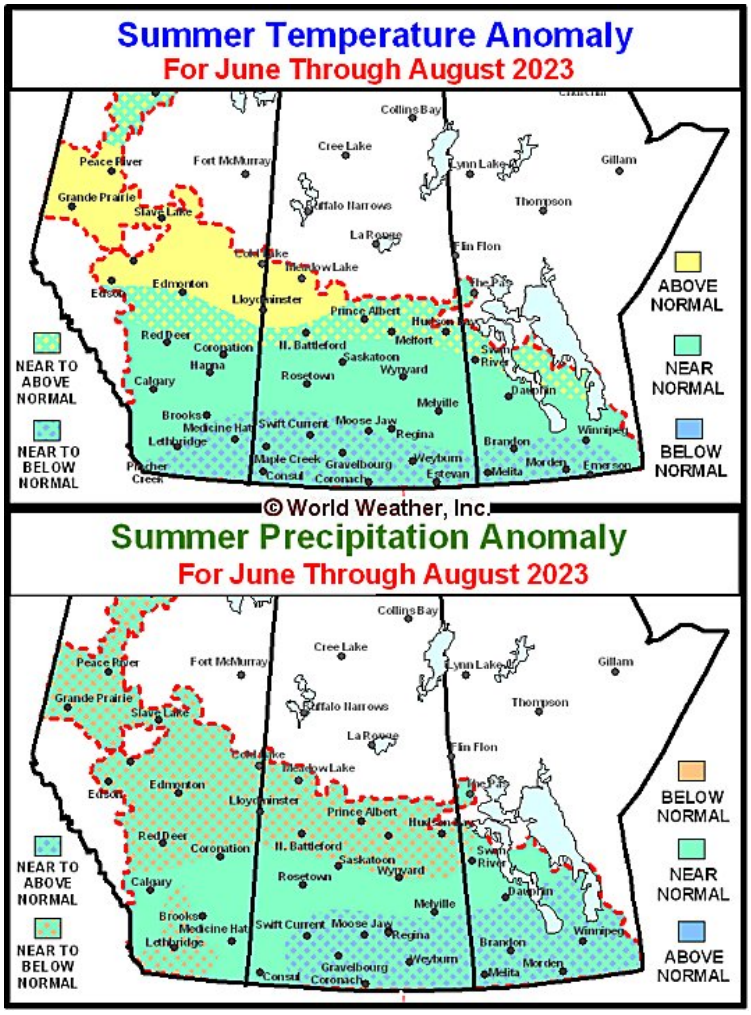
# Southern Prairies Should Be Wetter In Summer 2023

June weather is expected to be a month of transition and its weather will be largely determined by conditions in the United States. With spring (April and May) possibly running a little drier than usual in the northern U.S. Plains and southern Canada's Prairies the need for rain in June and the summer months will be strong.

A ridge of high pressure is expected in the middle of the United States like in most summers; however, the 18-year cycle data suggests the ridge could be of low amplitude and that waves of cool air may drift across the Canadian Prairies at times. The cool air moving over the top of a weak ridge of high pressure in the United States with a weak moisture feed coming into the same region from both the U.S. Pacific Northwest and the southwestern U.S. monsoon flow may result in frequent bouts of rain and thunderstorms. Temperatures should be warm below the ridge including the central and southern Plains.

The environment described above is not bad for inducing frequent rain, but the start of precipitation is expected to be slowed by unfavorable airflow aloft. The drier bias in May is expected to be partially due to these same unfavorable upper air wind flow, but the environment is expected to break down and become much more favorable for rain. Confidence is high for rain to occur frequently in July and August from southern and eastern Saskatchewan into east-central and southeastern Manitoba.

The area of greatest rainfall will be determined by the orientation of the U.S. high pressure ridge. The stronger the ridge...the farther north rain will fall in Saskatchewan and Manitoba. The weaker the ridge... the more rain will fall in the southern Prairies. There is potential for some heavy rain and the risk of severe thunderstorms will occur near the peak of the ridge and in the usual areas of southwestern Alberta.




There is potential for northwestern portions of the Prairies to experience less than usual precipitation and warmer biased temperatures during the summer. These anomalies are most likely during the July and August period and some of the dryness could become more significant than advertised here—again depending on the orientation and intensity of the U.S. high pressure ridge. Dryness could occur at the end of the growing season this year in the Peace River region and areas east and south through the Swan Hills region to Lloydminster and Cold Lake, Alberta. Some of this drier bias might extend into northwestern Saskatchewan as well, but the greatest dryness should be farther to the northwest.

Improved rainfall is also expected this summer in the southwestern Prairies. East-central and southern Alberta should see a better distribution of rain, but World Weather, Inc. is not convinced of drought-busting rainfall.

There is always the potential for excessive rain to evolve in a part of the Prairies that has been suffering from dryness for the longest period of time. Statistics reveal that quite often areas impacted by severe drought will come out of the drought with an excessive rain period. Such an event would not be out of the realm of possibilities this summer, but Palliser's Triangle is least likely to see such a pattern.

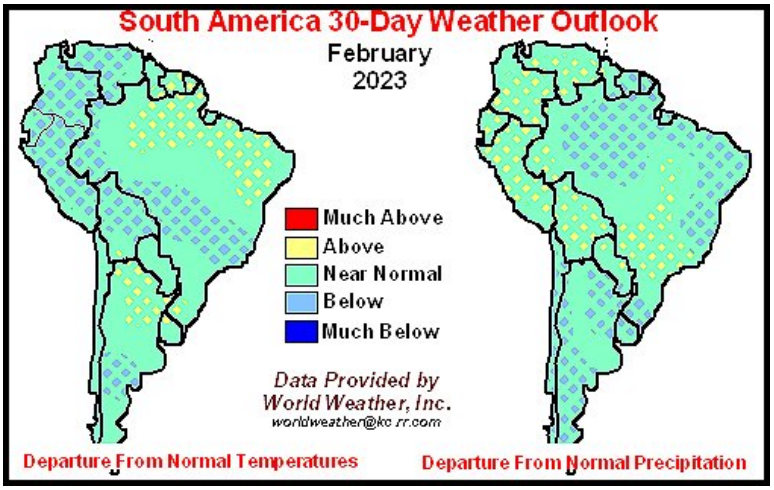
# Argentina February Rainfall To Be Timely, Not Great

Much-needed rain fell across the main production areas in Argentina during the past week. The rain helped improve soil moisture and ease long term dryness, but drought conditions remain and are not likely to go away for a while. Short-term crop development conditions have improved and the trend will continue for a little longer, but net drying is expected in most of the nation from Friday of this week to Friday of next week with the northeastern one-third of the nation likely to be dry for much of the ten days coming up beginning today and lasting into the second weekend of February.

Recent rainfall was enough to bolster topsoil moisture to more adequate levels outside the northeast corner of crop country. Topsoil moisture away from the northeast is generally adequate while moisture deficits are persisting further down in the soil.

Rainfall episodes in January were greatest during the 27th-30th, 20th-23rd, 18th and 1st-3rd. The precipitation events were relatively well timed, but were separated by some very warm to hot temperatures and mostly dry conditions. Had there been some moisture in the soil at the beginning of January the scenario would have been sufficient to support crops in highly favorable manner, but that was not the case. Rain frequency was greatest from the 18th through Jan. 30th and the heat was more limited in both duration and intensity resulting in the moisture improvement noted above. The ten day period of improved rain frequency and intensity is over, although one last opportunity for rain will evolve today and last through Thursday offering a little more moisture. After that, conditions will become harsh once again – at least for a little while.

Northeastern Argentina has the worst soil moisture with top and subsoil moisture exhausted and crops stress is quite high. The region produces cotton, and a minor amount of corn and soybeans as well as some citrus. The stressed environment from Formosa and much of Chaco to Paraguay and western and southern Rio Grande do Sul, Brazil is most serious with some areas in Uruguay quickly drying out as well.




Northeastern parts of Argentina are unlikely to see significant rain for the next ten days to two weeks. That kind of dryness on top of already exhausted soil moisture will worsen crop stress in that region. Temperatures in the area are likely to get hot again as well making the situation worse.

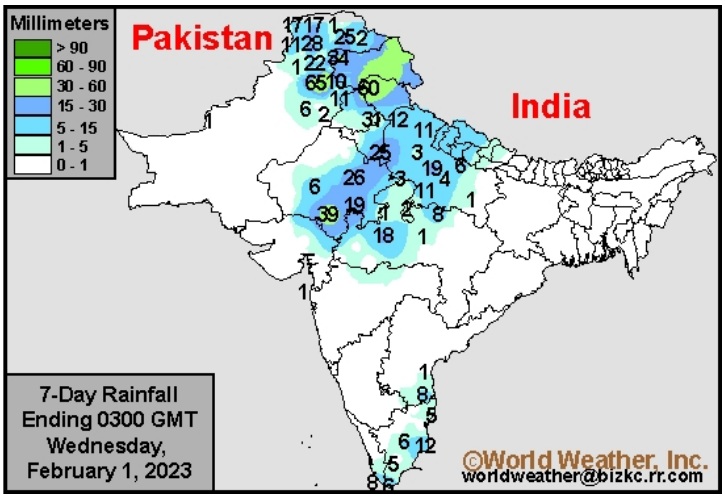
In the meantime, the moisture improvements in western Argentina will be reinforced by rain today and Thursday, although the expected moisture will be too light to add much to the improvement. The precipitation will help maintain adequate topsoil moisture and give the recent previous moisture a chance to percolate deeper into the subsoil adding a little cushion against the coming drying time. The moisture profile is best from La Pampa to Cordoba and western Santa Fe and in portions of Santiago del Estero. These areas will likely have the best environment for dealing with a full week to possibly ten days of drying relative to any other part of the nation.

Most computer-forecast model runs recently have suggested dry weather will impact the entire nation from Friday of this week through Friday of next week with "some" showers in the second weekend of February. That moisture will allow for some short term relief from the previous week of drying, but greater rain will be needed to stop developing crop stress in the west and south. A more general soaking must occur in northeastern Argentina to stop crop stress there because of the more seriousness of dryness leading into the coming dry and warm period.

Both the European and GFS Ensemble models from Tuesday into Thursday have agreed that a period of timely rainfall will occur after day ten of the forecast in Argentina. The advertised rainfall is not enough to fully reverse the previous period of drying, but relief is expected. Frequent follow-up rain will be needed to break the drought, but the second half of February does not look like it will be able to provide such aggressive rainfall.

# India Will Remain Drier Biased Through Mid-February

Two western disturbances finally brought some rain to portions of India during the past week. The periods of rain helped to briefly bolster soil moisture in northern India. Most of the precipitation was too light for a lasting increase in soil moisture, but those areas reporting 0.75 inch to 1.58 inches likely experienced a few days of benefit before the moisture was evaporated or dissipated within the soil. Only a small portion of winter crop country received the greater rain totals. Most other areas likely benefited from the lighter moisture, but only for a day or less. A greater volume of rain would be welcome, but it is not likely to occur for a while. Winter precipitation in India is normally restricted which is why the nation usually produces its largest Rabi crops in those winters in which rain falls periodically.




India irrigates a little more than one-third of its cropland; however, winter crops are usually more irrigated than other crops because of the usual dryness that prevails at this time of year. Nevertheless, a fair amount of the crop is not irrigated and yields from the dryland areas are totally dependent upon the distribution of winter rainfall. Planting moisture was abundant this year, but rainfall in December and January tapered off to the point of leaving much of the nation in need of rain. This week's rain helped to ease some of the dryness, but more is needed to bolster crop development in the unirrigated areas so that the nation experiences its greatest yields and overall production.

There have been some reports recently that frost and light freezes during January in Rajasthan and some neighboring states may have damaged a few crops. Mustard was mentioned specifically by India reporters that some damage may have occurred. Despite the frost damage and dryness, India is still working on a relatively normal-sized crop that could get bigger with some timely rainfall and no excessive heat over the next few weeks.

Even with irrigation being run in portions of India's Rabi crop areas over the winter, there is still an ongoing concern for dryness. A large section of India has been drier than normal since the beginning of December due to a lack of western disturbances reaching the subcontinent. The recent rainfall helped alleviate some of the dryness and support better short-term development and reproduction. However, more rain will be needed this month when some of the most important reproductive stages occur. The rain supplements irrigation and helps support ideal production potentials across the country. Crops may not perform as well as they can if the drier than normal weather persists for much of February.

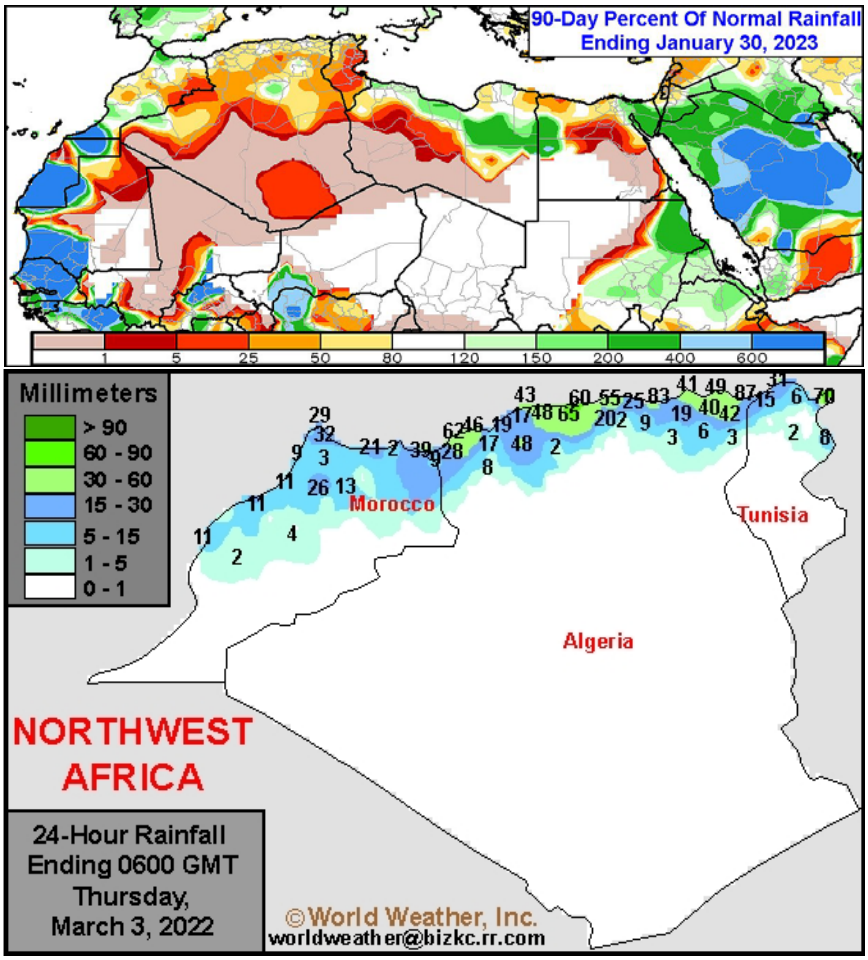
The most recent vegetative health indices indicate there are several pockets from Punjab into Uttar Pradesh and Bihar where crops may not be developing under ideal conditions. Uttar Pradesh and Bihar were drier than normal during the 2022 monsoon season and may be lacking moisture that is normally available at this time of year. Many areas in Punjab and Haryana are also drier than they normally are at this time of year, which may have stunted growth for some of the winter crops. Vegetative health is more favorable in other production areas, primarily due to irrigation.

Another factor that could impact winter crop production this season is if an early heatwave occurs later this month or early March. A strong heatwave occurred in February 2022 that significantly hurt some of the winter crops in India. With the ground as dry as it is due to the drier than normal weather, a strong heatwave could again hurt production potentials.

Winter crops will have to rely on irrigation for moisture during the next two weeks in much of India. Production potentials will remain generally good for the irrigated crops, though the need of timely rain will increase during the second half of the month. The ongoing dryness may keep crops from reaching their full potential despite the irrigation. The smaller amount of rain-fed crops may otherwise develop and reproduce unevenly or poorly in the coming weeks due to the lack of moisture. Production potentials will likely not be significantly reduced.

# N. Africa Drying Resumes; Tunisia, Morocco Need Rain

Timely rain was noted in many northwestern Africa winter wheat and barley production areas during the past week. The rain fell ahead of reproduction and may have helped some crops become better established after a dry autumn and early winter. Algeria and coastal areas of Morocco and Tunisia received the greatest precipitation. However, some very important production areas in the interior of Tunisia, southwestern Morocco and interior northeastern Algeria failed to get enough rain to change crop or field conditions and much more rain is still needed. The forecast through the middle of next week offers little relief from the dryness with exceptions for coastal Tunisia and Algeria. Tunisia and Algeria could see precipitation potentials increase during the second week of the outlook, though confidence is low. Dryness in interior Tunisia and southwestern Morocco will remain a concern.




North-central and extreme northeastern Morocco has been wetter than normal during the past 90-day period ending January 30, but the area produces not much more than 10% of the nation's wheat and only a percentage or two of the barley. The remaining production areas in northern Africa have received near to below normal precipitation. Many areas in southwestern Morocco have received less than 50% of normal precipitation.

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## WEATHER OUTLOOK

Morocco and northwestern Algeria will be mostly dry through the middle of next week. A few isolated showers will be possible, though resulting rainfall will be lost to evaporation. North-central and northeastern Algeria into northern Tunisia will otherwise have a few opportunities for rain. Isolated showers will occasionally evolve through the end of the weekend. More widespread rain will be possible early next week as a broad area of low pressure settles over Europe. Moisture totals by next Wednesday morning will range from 0.10 to 0.75 inch and local amounts over 1.00 inch along the coastline. Most locations will have opportunities for rain February 9 – 15. However, confidence is low for the exact amount of precipitation that will occur.

North-central Morocco will have enough moisture to maintain aggressive winter wheat development during the next two weeks despite the lack of rain. Other areas in Morocco will remain too dry for ideal conditions. The best soil moisture and crop development potential will continue in Algeria and coastal areas of both Tunisia and northern Morocco, but dryness in southwestern Morocco and interior Tunisia is serious enough to leave production cuts as a strong potential. There is plenty of time for improvement, though southwestern Morocco's drought is serious enough that planting was not completed