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The Canadian Agriculture Weather Prognosticator

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World Weather At A Glance

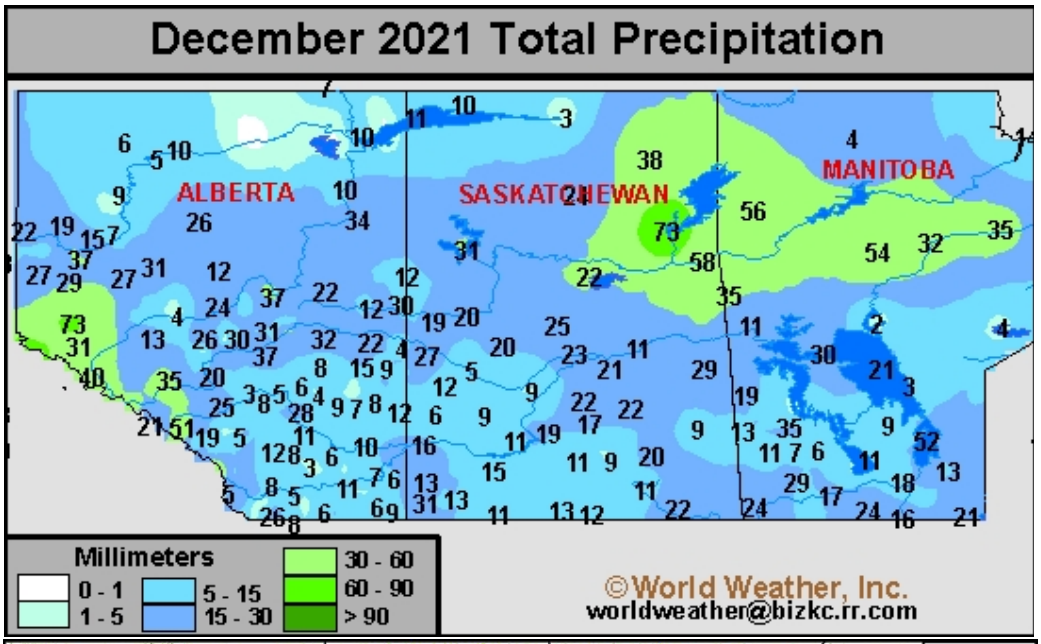
- Drought in the Western U.S. Plains prevailed in December leaving many wheat areas dry
- Patches of winterkill may have occurred in Montana, South Dakota, SW Nebraska, NE Colorado and NW Kansas due to lack of snow and bitter cold Dec. 26-Jan. 2.
- Argentina's good crop condition ratings in early December deteriorated significantly with corn rated 75% very good to excellent early in the month falling to 56% Dec. 31.
- Parana, Brazil, Paraguay and some areas of Mato Grosso do Sul and Rio Grande do Sul were dry enough in December to induce crop stress and lower yield potentials; dryness relief was expected in early January
- India winter crops will get timely early January rain to support February reproduction
- Australia's winter crop harvest finished well.

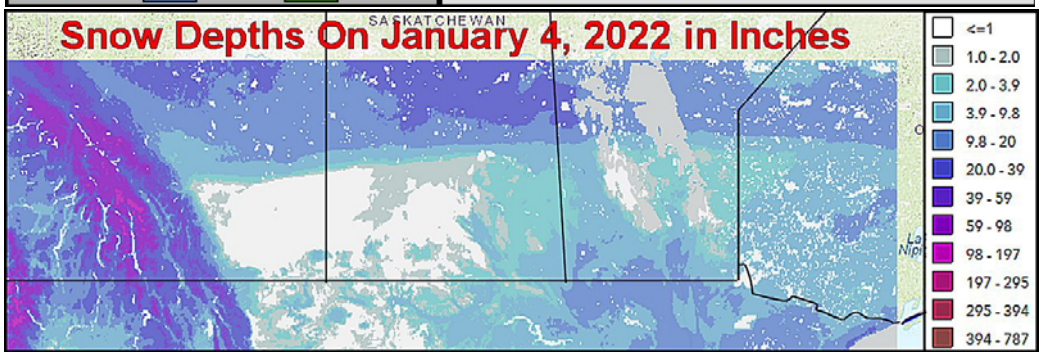
December 2021; Precipitation Woes Remain

Precipitation in the Prairies during December was amazingly limited once again in the very same areas of the Prairies that have been cheated of rain in all of 2021 and during many of the previous years as well. The drought is certainly not over, although no one is questioning that.

As World Weather, Inc. suggested in previous prognosticators, the odds are high that we will come into spring 2022 with moisture deficits continuing in the southwestern and central Prairies, but there is good potential for improvement as we move through the growing season. That potential has not waned, but the biggest concern is over "when" the relief will begin rather than "if" it will occur.

February probably will not offer any good reason for serious changes, but March could bring a little more precipitation to a part of the dry region. Confidence is still a little





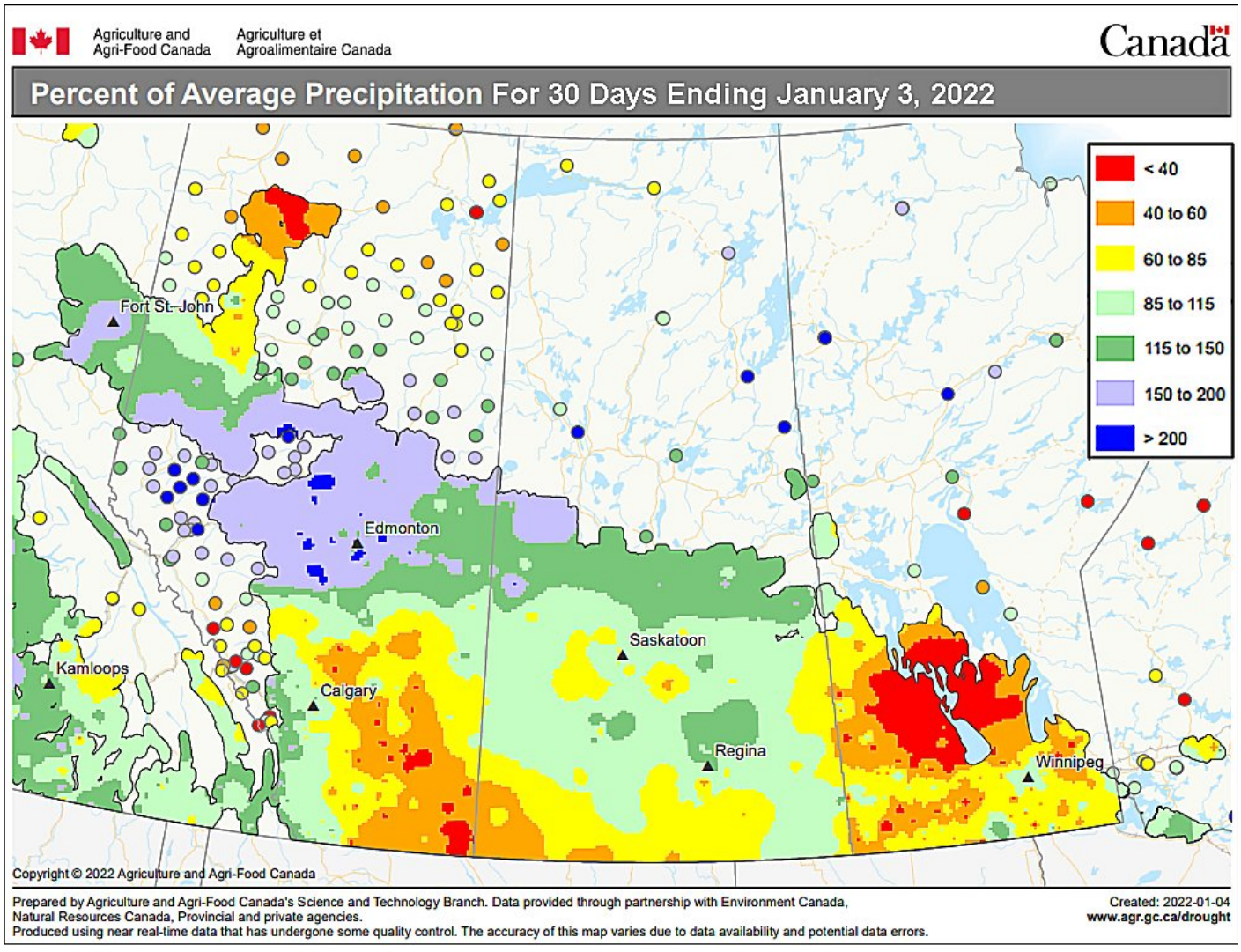
December 21; Precipitation Woes Remain (continued from page 1)

low because of the strong potential for La Nina to still be prevailing during the balance of winter and that could cut into the precipitation potential as a cooler and drier bias to Prairies weather continues especially in the drier-biased areas.

Most of the December precipitation occurred after frost impacted the region, although a little moisture did get into the topsoil before the freeze up took place. The moisture obtained by the soil, though, is not going to be enough to support crops in the spring. The end result will be a strong need for routinely occurring early season rainfall after the ground has thawed. Precipitation that falls prior to that time will not penetrate the topsoil very far because of frost, although the runoff will be good for dugouts, "if:" a significant amount of snow accumulates during the winter. Today's on-farm water supply for livestock, general agriculture and other uses in east-central and southern Alberta and west-central, southwestern and some central Saskatchewan locations is mostly dried up and moisture is needed, but until "substantial" precipitation falls there is not much chance for a big change.

Not all of the precipitation noted in the Prairies last month was minimal. Above average precipitation occurred from southern parts of the Peace River region to the Athabasca, Slave Lake and Edmonton areas. The greater than usual precipitation extended southwest to the front range of the Rocky Mountains from Grande Cache to the Edson area. Precipitation across northern Saskatchewan was slightly greater than usual while it was near to below average in many other areas. The driest conditions in December occurred in east-central and southeastern Alberta, southwestern and south-central Saskatchewan and in much of Manitoba.

Temperatures in December were well below average in Alberta and below to well below normal across the central and western parts of Saskatchewan while more seasonable to slightly cooler than usual in Manitoba. Extreme lows slipped below –40C in a huge region from central and northern Saskatchewan to eastern and northern Alberta.



January, February Moisture To Distribute Similarly

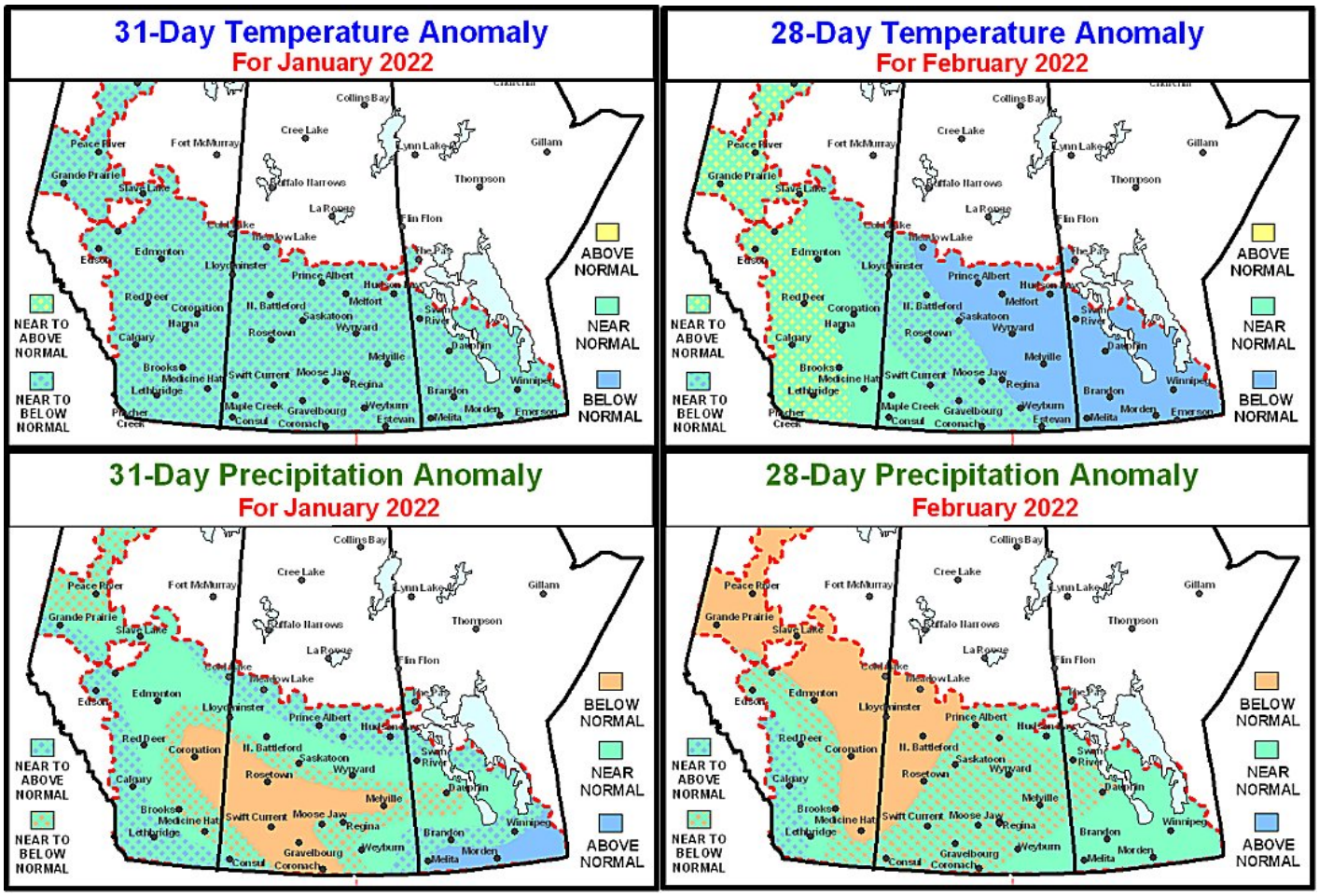
January and February precipitation will continue to be poorly distributed in the areas that need it most. That will translate into no change in drought status for the central and southwestern parts of the Prairies. Worry over spring weather will steadily rise during the two months if precipitation does not fall with greater significance than that advertised. There is potential for greater February precipitation, but with the ground frozen the benefits of such a feat may be restricted. No one would complain if it was wetter, though.

Temperatures in January will start off cold and then warm up significantly for a week and maybe a little longer. The break in the cold will be immediately followed by more bitter cold air and the month will finish out quite chilly. Extreme temperatures will be possible once again, although how cold it gets will be determined by Arctic Oscillation (AO). If the arctic region sees an abundance of high pressure aloft at any time during the second half of winter there would be potential for some extremely cold temperatures to take place. High pressure aloft over the arctic creates the negative phase of AO and would force cold arctic air to lower latitudes. In contrast, low pressure aloft in the arctic would minimize the cold and keep much of it trapped in the higher latitudes. World Weather, Inc. expects at least a short term bout of negative AO from late January into February, but predicting AO is very difficult keeping confidence low.

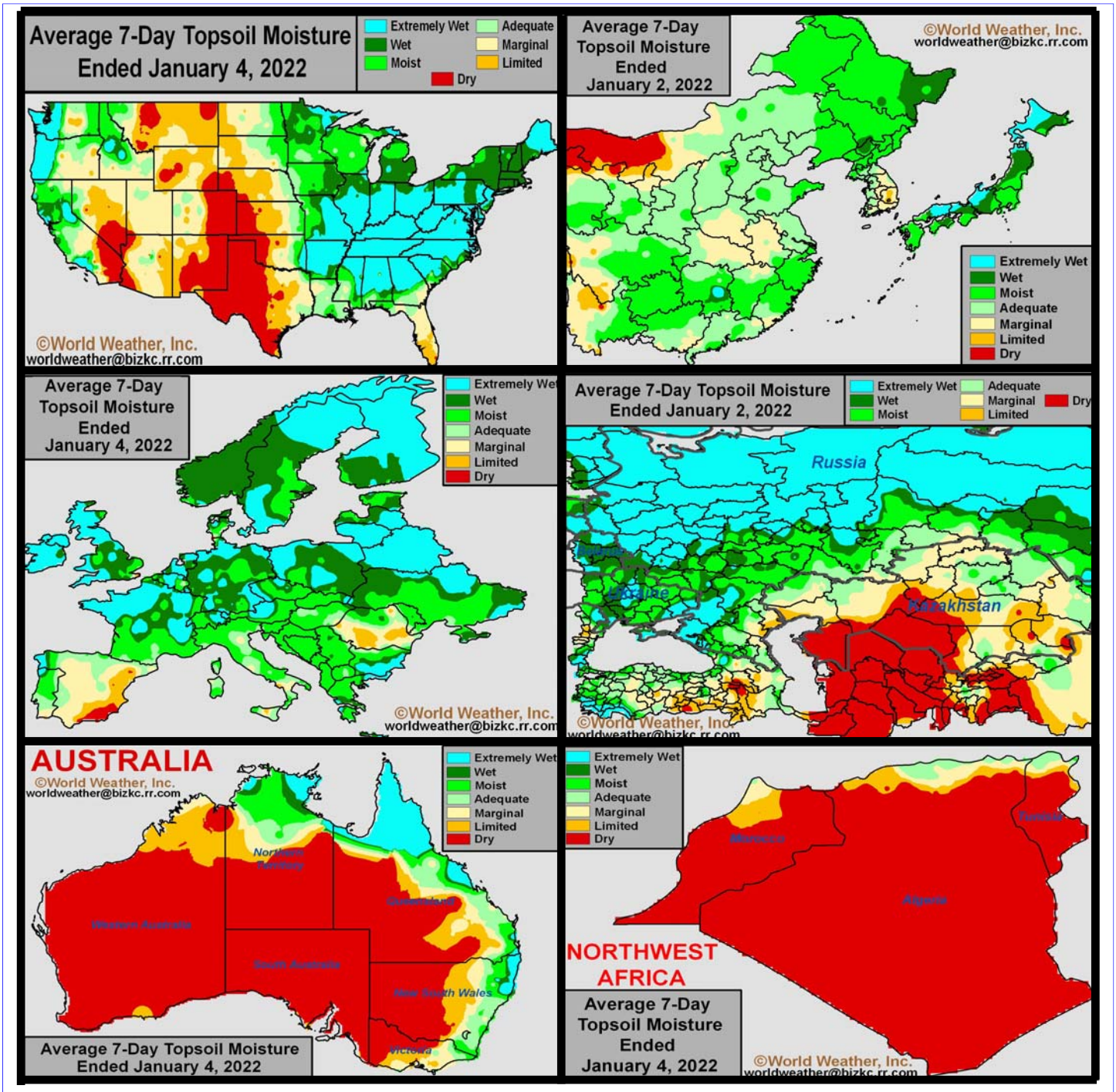
February temperatures will start out quite cold, but will warm during the month especially in the far western Prairies. Some areas in western and southern Alberta might trend warmer than usual in February, but areas to the east would likely have a very cold month.

The colder bias and high pressure aloft over far western Canada at times during the next two months will restrict precipitation. January will see near to above average precipitation in southern Manitoba and in the far northernmost parts of the Prairies while similar conditions occur near the Front Range of the Rocky Mountains in southwestern Alberta. Most other areas will receive near to below average precipitation with the central Prairies driest.

February precipitation will be lightest in the western parts of the Prairies because of a strong ridge of high pressure that is expected over Alberta and British Columbia during a part of the month. That same high pressure ridge will force a considerable amount of cold air into the eastern Prairies.



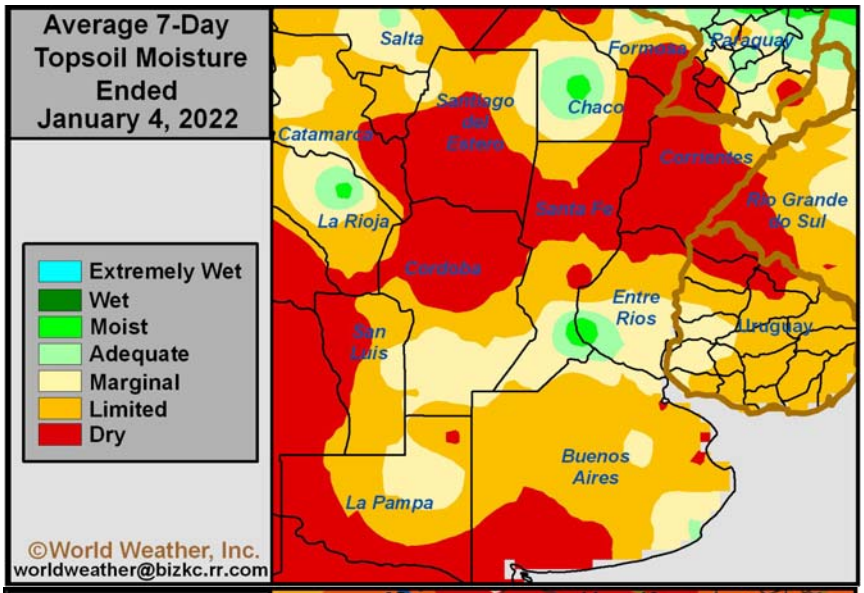
Selected Weather Images From Around The World

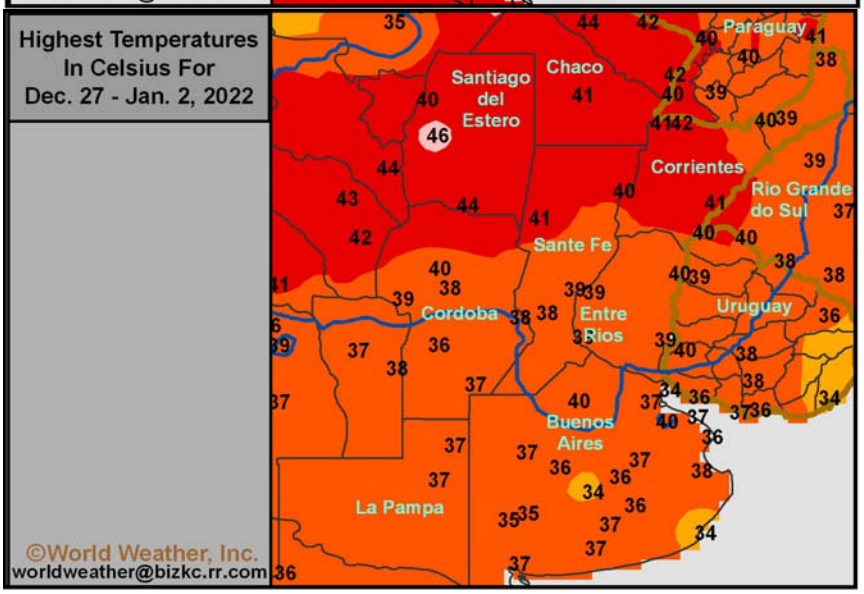


Dry soil remains in most of the interior western United States and in areas east into the Great Plains. Relief has occurred to dryness in California, the Pacific Northwest and Rocky Mountains, but drought still prevails. The same is true in Canada's central and southwestern Prairies. North Africa still needs greater precipitation with southwestern Morocco in a multi-year drought. Dryness is also remaining in northeastern Morocco and northwestern Algeria. A boost in precipitation is needed in each of these areas as well as in Spain and Romania. In the meantime, recent precipitation has improve soil moisture in Kazakhstan and Russia's southern eastern New Lands which is important for spring weather in 2022. Long term dryness remains in the subsoil soil, though. Eastern Australia has been drying out since the big November rains ended and there is a rising need for rain in summer crop areas of Queensland and New South Wales. Rain is expected in the coming week in New South Wales, but very little will fall in Queensland.

Argentina Rain Inadequate Against Dry Soil, Heat

Argentina's rainfall during the past week was inadequate relative to the dryness that was in the soil and the excessive heat that occurred. Rain fell in quite a few areas during the weekend to help ease some of the dryness, but the moisture was too light in the majority of production areas to seriously change crop or field conditions. The coming week does not offer a tremendous amount of help, although some rain will fall in western and some southern crop areas. The rising crop stress is hurting almost all crops outside of southern Cordoba, northwestern through central Buenos Aires and a few immediate neighboring areas where subsoil moisture is still rated favorably and where some showers did occur recently. World Weather, Inc. believes the forecast model runs may have taken out too much rain today and will be watching for at least some greater rainfall in future model runs.





Topsoil moisture, as assessed Monday, was short to very short in nearly every part of Argentina's crop country. A pocket of favorable soil moisture was noted in central Chaco and weekend showers and thunderstorms that occurred in nearly two thirds of the nation proved to be mostly inadequate against the moisture losses that occurred in the prior seven days to raise soil moisture for very long. Rainfall during the weekend varied from 0.20 to 0.75 inch from Cordoba through northern and interior eastern Buenos Aires a s well as central and southern Entre Rios, but such amounts against a week's worth of 90- and lower 100-degree temperatures was not enough to induce a lasting boost in soil moisture. Several areas in the region described did reported 0.75 to 1.50 inches and a few areas in northern Buenos Aires and Santa Fe received enough rain to make the topsoil briefly more moist at the end of the weekend, but with no follow up rain the precipitation was expected to be lost to evaporation in just a few days.

Temperatures in the upper 90s and over 100 degrees Fahrenheit occurred across the entire nation at one time of another during the past week. The most persistent hot weather occurred in the northern half of the nation and that is where soil moisture has been most depleted in the past two weeks because of limited rain and very warm to hot temperatures.

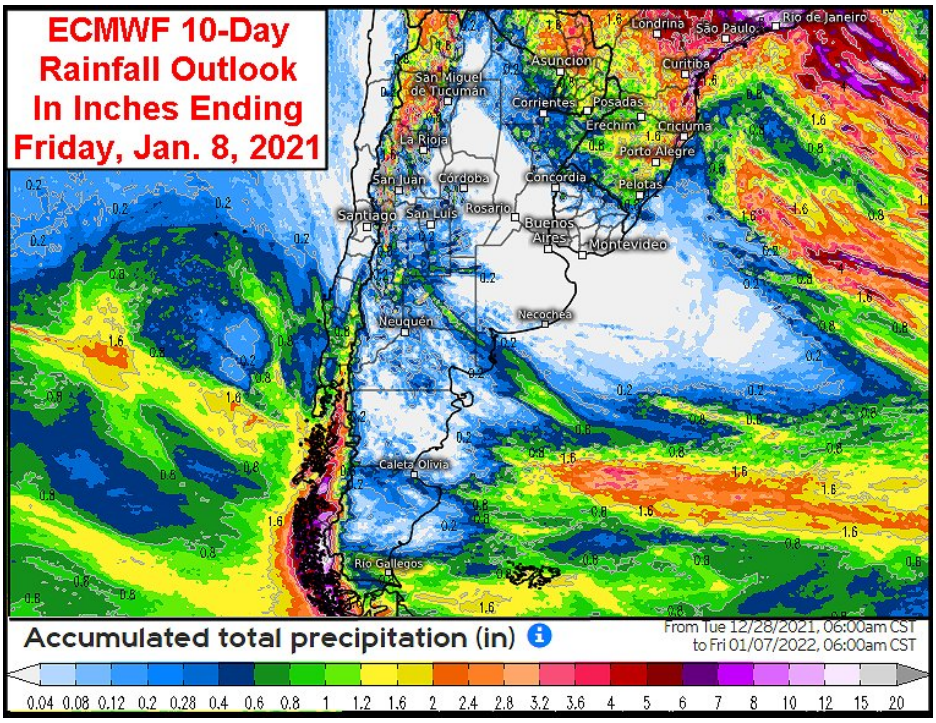
This is the second week in a row of limited rain and very warm to hot temperatures. The ground was already becoming too dry early last week and now after a second week of similar conditions the situation is much more serious with the only exception being in southern Cordoba and southeastern San Luis through northeastern La Pampa and from northwestern through central Buenos Aires where subsoil moisture continued favorably rated during much of the week. Crops in these areas with the greatest subsoil moisture were rated most favorably, but crop moisture stress was increasing and will become more significant in this coming week if greater rain fails to evolve.

Recent model computer weather forecast model runs were advertising very little rainfall during the next 10-12 days with the only exception being in the far southwest of the nation. Showers and thunder-

Argentina Rain Inadequate Against Dryness, Heat (from page 5)

storms have been advertised for San Luis, southern Cordoba and the southwest half of Buenos Aires during the forecast period with most of that rain occurring early next week. Rain totals in the southwest may vary from 0.20 to 0.80 inch with a few amounts of 1.00 to 2.00 inches; however, the greatest rain may miss some of the more important crop areas in the region leaving crops with a teasing amount of rain and more potential for production losses.

A word of caution is advised here. The upper air wind flow pattern shows disturbances moving across Argentina during the coming ten days, but there is not much moisture advertised to support much precipitation. It would not be surprising to see a little moisture become entrained in the flow to create a wetter bias than that advertised Monday. For that reason a close monitoring of the situation is warranted. World Weather, Inc. is not advocating a generalized significant rain event, but the recent model runs seem to be too dry and some increase in precipitation is anticipated in future model runs.



Brazil Weather Contrasts Greatly; Crop Impact Still Low

Brazil's weather continued to contrast sharply between southwestern and northeastern crop areas during the past week. Weather conditions did not allow much expansion of dryness out of the far southwest, but there was an expansion of excessive soil moisture and a greater level of concern over some of the wetter areas in northern Brazil. Despite the concern much of Brazil's crops have not yet fallen off a production yield cliff and the nation can still produce large crops, despite recent yield losses, but weather in the next few weeks will be extremely important.

Rain was reported in much of Brazil during the past seven days; however, amounts from far western Mato Grosso through western and some central Mato Grosso do Sul locations into Paraguay and Rio Grande Sul were not enough to counter evaporation. A brief bout of significant rain in western Parana last week brought in a little better topsoil moisture, but the subsoil is still quite dry. The nation's driest areas remain from western Parana into northwestern Rio Grande do Sul and all of Paraguay, including far western Mato Grosso do Sul. Rio Grande do Sul experienced some of the greatest expansion in moisture stress during the week while Paraguay continues to be the most seriously impacted grain, oilseed and cotton production area so far this production year.

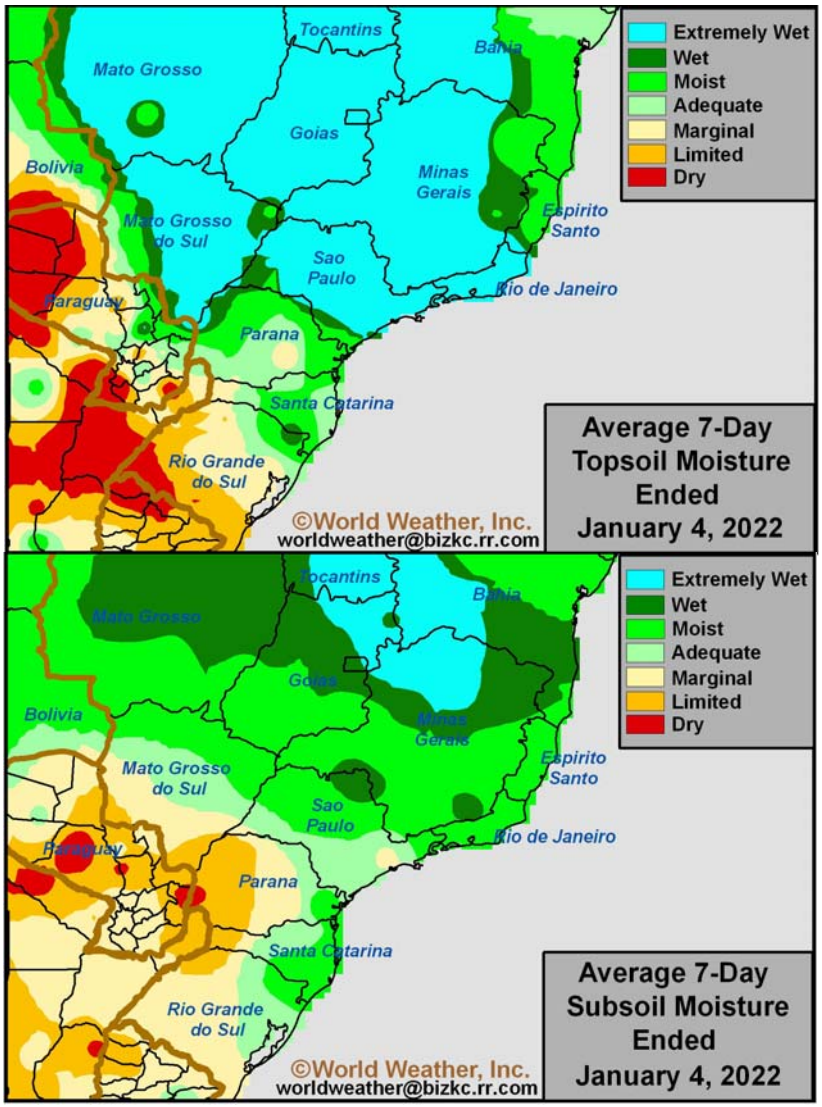
Rain that fell briefly in western Parana early last week induced a brief improvement in topsoil moisture, but crop stress has already been returning. Rain that fell in other drier-biased areas from Rio Grande do Sul to Paraguay and far western Mato Grosso do Sul was not enough to counter evaporation and dryness remains a serious concern. Rio Grande do Sul and Paraguay will have the toughest time getting out of the dry bias because the greater rainfall expected in the coming week to ten days will be from Parana to Mato Grosso do Sul and northeastward. For most of those areas that will get rain in the coming ten days, the amounts near the Paraguay and Argentina borders will continue lightest and most limited making the elimination of dryness deep into the ground in those areas very difficult to achieve. Rio Grande do Sul and Paraguay may get some relief, but their moisture stress will be quick to return when drier weather evolves again late next week.

Despite rain in western Parana briefly last week, the state is still hurting for moisture especially in its corn, soybean, sugarcane and coffee production areas. Enough rain fell from northern Parana and Sao Paulo

Brazil Weather Contrasts Greatly… (Continued From Page 6)

to eastern Mato Grosso do Sul to raise topsoil moisture and provide crops in the region with a temporary bout of improved growing conditions. Now that a new round of rain is beginning, the improvements from last week may be perpetuated for full season corn and late planted soybeans as well as sugarcane and coffee.

Rain is advertised to fall across most of Brazil and Paraguay during the coming week to ten days. The precipitation will occur as scattered, daily, showers and thunderstorms. Such an environment should provide a very good opportunity for some relief to dryness in the southwest, although a full restoration to normal soil moisture is not likely in the driest areas. A ridge of high pressure expected to develop in northern Argentina this weekend will squelch southern Brazil and Paraguay rainfall as it shifts to the northeast next week. Temperatures to turn warmer once again reversing the improving moisture trend. The longevity of the high pressure ridge and its intensity will have much to say about the future of late season crops in southern Brazil and Paraguay, as well as that of Argentina. None of the rain in southern Brazil is expected to be persistent or heavy enough to cause a threat to harvesting of early season crops outside of some field working delay.



NORTHERN BRAZIL

There is a building concern over excessive moisture in eastern Mato Grosso, Tocantins, western Bahia, northern Goias and Minas Gerais. These areas have been saturated with moisture over the past couple of weeks and the weekly volumes of rain have been rising. During the seven-day period ending today rain totals from eastern Mato Grosso and Tocantins to Minas Gerais varied from 2.75 to a little more than 8.00 inches; however, there were local totals that reached 13.23 inches in central Minas Gerais. That same area may see some of the greatest rainfall again during this coming week.

Model rainfall forecasts for northern parts of center south and northeastern Brazil for the coming week to ten days are impressive for Tocantins, northern Goias, western Bahia and especially Minas Gerais. A few areas will receive six to 12.00 inches of additional rain during the ten-day period ending Jan. 12. That will fall over an already fully saturated soil column. There is no place for that predicted rain to go. It will runoff into rivers and streams eventually, but many fields may be inundated with excessive moisture resulting in serious soil erosion and a loss of plant life in some areas.

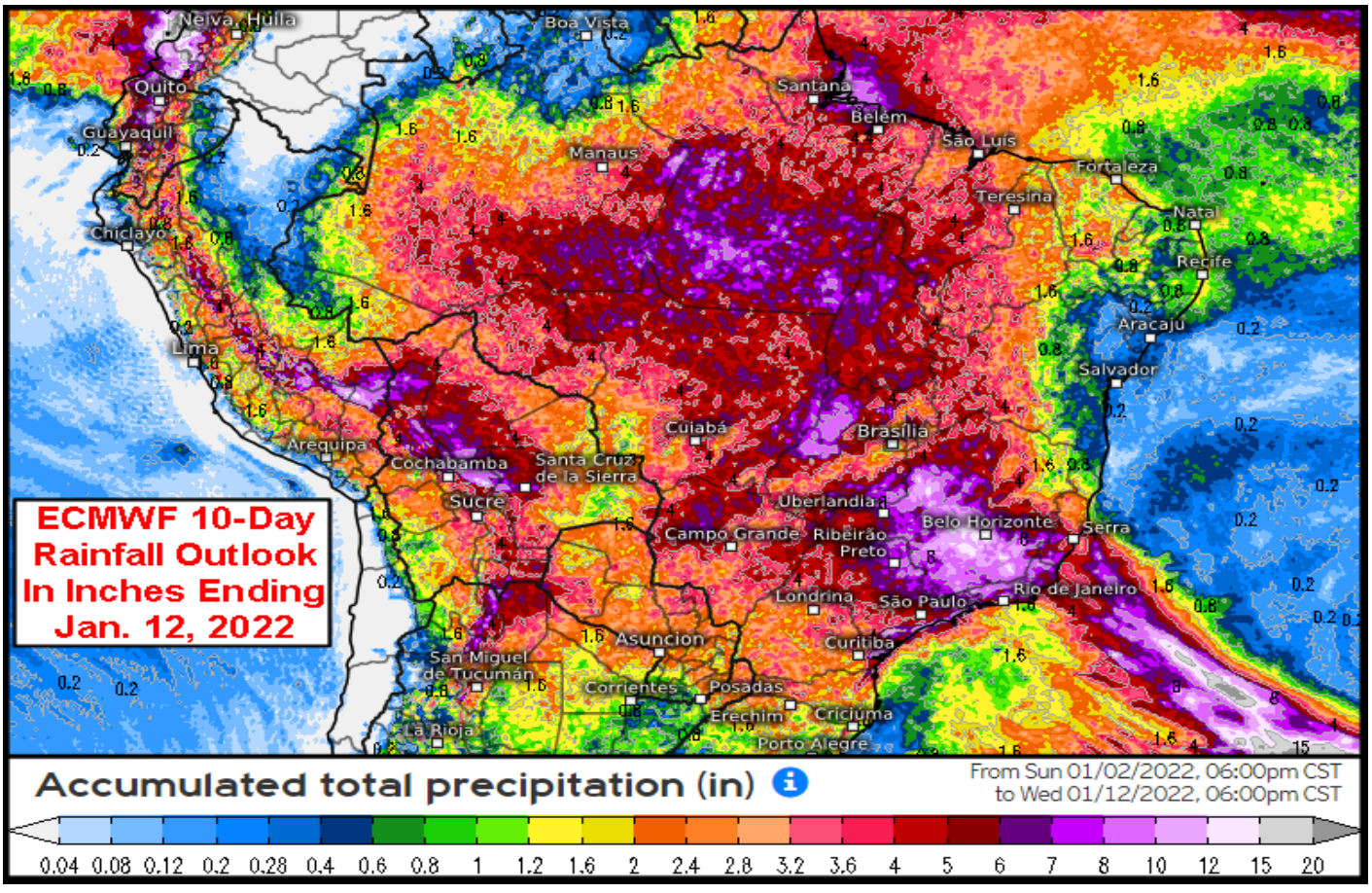
The areas most likely to experience the greatest rainfall and flooding during the coming week are not considered to be Brazil's most important soybean or corn production region, although crops are produced in the region and will be facing some damage if drier weather does not evolve soon. Drying is needed most seriously today from Mato Grosso to Sao Paulo and Para-

Brazil Weather Contrasts Greatly; Impact Low (from page 7)

na where the majority of early soybeans are planted and where harvesting should advance first. Most of these early planted soybean areas are not excessively wet, but rain expected in the next ten days will slow crop maturation and harvest progress. With that said, Brazil farmers are famous for harvesting their crops in the rain and mud and will not likely be seriously deterred without persistent all day rainfall from one day to the next. Harvesting might be slower than desired, but it should proceed even if they have to put the harvested beans in dryers. They will want to get their early soybean crops harvested and Safrinha cotton and corn planted while the environment is good.

In the meantime, rain in southern Brazil and Paraguay will bring relief to weeks of limited rainfall. Crop improvements are expected, although a little too late for early season corn. The moisture will be good for soybeans and any Safrinha crops that are expected to be planted as the harvest advances. La Nina is expected to slowly weaken over the next few weeks, but its presence will maintain some lighter than usual rainfall in Argentina, Uruguay, Paraguay and southern Brazil. However, there may be enough rain in this coming week to ten days to offer at least temporary improvements to crops and field conditions so that late season crops can improve.

Overall, dryness relief in the south will be a welcome change that will benefit late season crops, but it will cause some early season soybean maturation and harvest delay. Rain in center south and northeastern Brazil is expected to become a little excessive in this coming week to ten days resulting in some flooding and higher level of concern over possible soybean conditions. Coffee, citrus and sugarcane areas will "weather" the situation relatively well, but drier conditions will be needed later this month to avoid a production and crop quality threat. All indicators suggest the coming rain will be well timed for the planting of Safrinha crops which should advance swiftly when drier weather resumes and soybeans are successfully harvested.



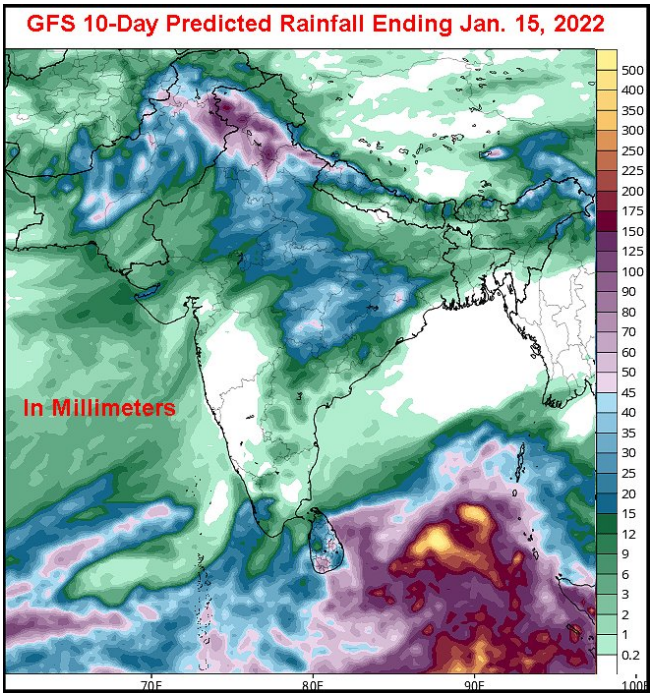
India Rain Next Ten Days To Improve Winter Crops

Winter wheat, barley, rapeseed and other crops in northern, central and western India are seasonally dry. There was enough moisture for planting during the autumn and crops should be well positioned for at least an average production year. What separates an average crop from one that is very good is rain during the establishment and reproductive seasons. Some rain was reported last month in a few crop areas and the potential for more in this next ten days should be sufficient to induce better crop establishment. Deeper and more complex root systems moving into reproduction will usually translate into higher yields and better crop quality especially if follow up rain occurs during reproduction.

Last year's wheat and other winter crops performed well because of some timely rain prior to and during reproduction and similar conditions are possible this year. La Nina events, like that prevailing today, usually support greater than usual winter precipitation and that nearly always results in higher yields and better crop quality.

Multiple weather disturbances will impact northern, central and eastern India during the coming week to ten days. The resulting rainfall should be perfect in setting the stage for better crop establishment ahead of reproduction. Two disturbances will bring rain to northern India in coming days. The first round of rain is already under way today and it will prevail Thursday. A stronger upper-level weather disturbance will then bring another round of precipitation Friday into Monday and one more will occur later next week that may impact central and some eastern parts of the nation.

Some of the rain in far northern India may be too much resulting in flooding, but that will be outside of key winter grain, oilseed and pulse production areas. Moisture totals by next Wednesday morning will range from 1.50 to 5.00 inches in most locations in the far north with local amounts of 7.00 inches or more in Jammu and Kashmir. Flooding will be a concern in Jammu and Kashmir, though crop damage should be low.



Outside of those far northern crop areas in India, the environment will be mostly good for the bulk of winter wheat, sorghum, millet, corn and winter oilseeds in northern parts of the nation. There should be plenty of moisture to support favorable crop development as reproduction approaches.

Several areas in western and central India will also see several waves of erratic rainfall through Monday as the two disturbances noted above advance over northern India. Rajasthan, Madhya Pradesh, and neighboring areas in Uttar Pradesh will receive the greatest amount of rain with totals ranging from 0.35 to 1.50 inches by next Wednesday. Several pockets in Madhya Pradesh and northern Rajasthan will receive 2.00 inches or slightly more while other areas in western and central India only receive 0.10 to 0.75 inch which will not be enough to counter evaporation. Many areas in Maharashtra, Telangana, and southern Gujarat will receive little to no rain.

Although rainfall in central and western India will be unable to completely fix the moisture deficits, winter crops will still react favorably to the precipitation. Crop conditions will either improve or remain favorable for most locations.

Southern and eastern India will be drier biased through the middle of next week. However, many areas in eastern India will receive light rain late Monday and Tuesday while pockets in Tamil Nadu and Kerala see periods of light and erratic rain in the coming days as well. Rainfall will be too light to counter evaporation in areas that do see precipitation. Southern India will still have plenty of moisture to support generally favorable crop conditions. Karnataka would still benefit from a good shot of rain later in January. Rice and oilseed conditions will be mostly good in eastern India as well despite the lack of rain, though timely precipitation later this month would be welcome.