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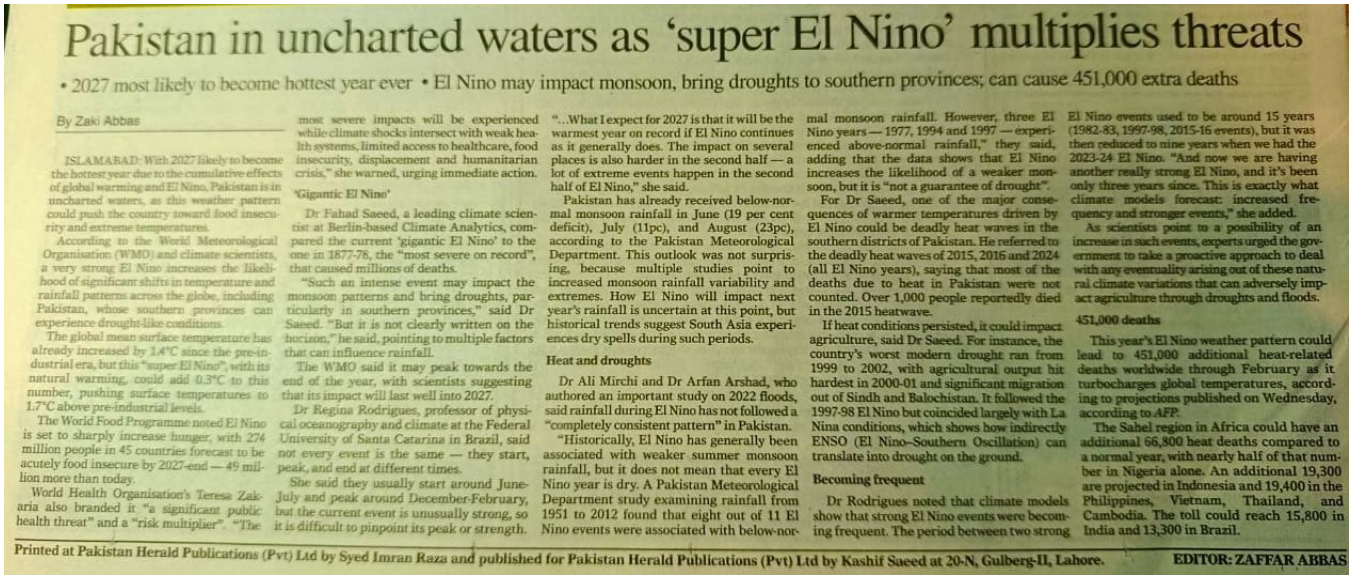
Farming Beyond the Calendar

PQNK Climate Resilience Under Uncertain Weather



Pakistan in uncharted waters as 'super El Nino' multiplies threats

• 2027 most likely to become hottest year ever • El Nino may impact monsoon, bring droughts to southern provinces; can cause 451,000 extra deaths

By Zaki Abbas

ISLAMABAD: With 2027 likely to become the hottest year due to the cumulative effects of global warming and El Nino, Pakistan is in uncharted waters, as this weather pattern could push the country toward food insecurity and extreme temperatures.

According to the World Meteorological Organisation (WMO) and climate scientists, a very strong El Nino increases the likelihood of significant shifts in temperature and rainfall patterns across the globe, including Pakistan, whose southern provinces can experience drought-like conditions.

The global mean surface temperature has already increased by 1.4°C since the pre-industrial era, but this "super El Nino", with its natural warming, could add 0.3°C to this number, pushing surface temperatures to 1.7°C above pre-industrial levels.

The World Food Programme noted El Nino is set to sharply increase hunger, with 274 million people in 45 countries forecast to be acutely food insecure by 2027-end — 49 million more than today.

World Health Organisation's Teresa Zakaria also branded it "a significant public health threat" and a "risk multiplier". "The most severe impacts will be experienced while climate shocks intersect with weak health systems, limited access to healthcare, food insecurity, displacement and humanitarian crisis," she warned, urging immediate action.

'Gigantic El Nino'

Dr Fahad Saeed, a leading climate scientist at Berlin-based Climate Analytics, compared the current 'gigantic El Nino' to the one in 1877-78, the "most severe on record", that caused millions of deaths.

"Such an intense event may impact the monsoon patterns and bring droughts, particularly in southern provinces," said Dr Saeed. "But it is not clearly written on the horizon," he said, pointing to multiple factors that can influence rainfall.

The WMO said it may peak towards the end of the year, with scientists suggesting that its impact will last well into 2027.

Dr Regina Rodrigues, professor of physical oceanography and climate at the Federal University of Santa Catarina in Brazil, said not every event is the same — they start, peak, and end at different times.

She said they usually start around June-July and peak around December-February, but the current event is unusually strong, so it is difficult to pinpoint its peak or strength.

"...What I expect for 2027 is that it will be the warmest year on record if El Nino continues as it generally does. The impact on several places is also harder in the second half — a lot of extreme events happen in the second half of El Nino," she said.

Pakistan has already received below-normal monsoon rainfall in June (19 per cent deficit), July (11pc), and August (23pc), according to the Pakistan Meteorological Department. This outlook was not surprising, because multiple studies point to increased monsoon rainfall variability and extremes. How El Nino will impact next year's rainfall is uncertain at this point, but historical trends suggest South Asia experiences dry spells during such periods.

Heat and droughts

Dr Ali Mirchi and Dr Arfan Arshad, who authored an important study on 2022 floods, said rainfall during El Nino has not followed a "completely consistent pattern" in Pakistan.

"Historically, El Nino has generally been associated with weaker summer monsoon rainfall, but it does not mean that every El Nino year is dry. A Pakistan Meteorological Department study examining rainfall from 1951 to 2012 found that eight out of 11 El Nino events were associated with below-normal monsoon rainfall. However, three El Nino years — 1977, 1994 and 1997 — experienced above-normal rainfall," they said, adding that the data shows that El Nino increases the likelihood of a weaker monsoon, but it is "not a guarantee of drought".

For Dr Saeed, one of the major consequences of warmer temperatures driven by El Nino could be deadly heat waves in the southern districts of Pakistan. He referred to the deadly heat waves of 2015, 2016 and 2024 (all El Nino years), saying that most of the deaths due to heat in Pakistan were not counted. Over 1,000 people reportedly died in the 2015 heatwave.

If heat conditions persisted, it could impact agriculture, said Dr Saeed. For instance, the country's worst modern drought ran from 1999 to 2002, with agricultural output hit hardest in 2000-01 and significant migration out of Sindh and Balochistan. It followed the 1997-98 El Nino but coincided largely with La Nina conditions, which shows how indirectly ENSO (El Nino–Southern Oscillation) can translate into drought on the ground.

Becoming frequent

Dr Rodrigues noted that climate models show that strong El Nino events were becoming frequent. The period between two strong El Nino events used to be around 15 years (1982-83, 1997-98, 2015-16 events), but it was then reduced to nine years when we had the 2023-24 El Nino. "And now we are having another really strong El Nino, and it's been only three years since. This is exactly what climate models forecast: increased frequency and stronger events," she added.

As scientists point to a possibility of an increase in such events, experts urged the government to take a proactive approach to deal with any eventuality arising out of these natural climate variations that can adversely impact agriculture through droughts and floods.

451,000 deaths

This year's El Nino weather pattern could lead to 451,000 additional heat-related deaths worldwide through February as it turbocharges global temperatures, according to projections published on Wednesday, according to AFP.

The Sahel region in Africa could have an additional 66,800 heat deaths compared to a normal year, with nearly half of that number in Nigeria alone. An additional 19,300 are projected in Indonesia and 19,400 in the Philippines, Vietnam, Thailand, and Cambodia. The toll could reach 15,800 in India and 13,300 in Brazil.

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Dawn, September 2026: "Pakistan in uncharted waters as 'super El Nino' multiplies threats." A forecast can announce the threat; the condition of the field decides how the crop withstands it.

Changing weather has made the traditional fixed sowing calendar unreliable. No forecast can protect a crop growing in bare, disturbed, compacted or inundated soil, and PQNK does not depend on one. PQNK is the only complete production-system solution designed to reduce the field-level effects of heat, drought, erratic rainfall and excessive rain by restoring the soil's natural capacity to regulate temperature, water, air and biological activity.

1. The Farmer's Concern Is Justified

Farmers plan months ahead, but the weather now changes faster than customary calendars can accommodate. A crop sown on the date that worked for the previous generation may meet a heatwave during flowering, an unexpected dry interval after germination, excessive rain during establishment or warm conditions that favour a new pest cycle.

The natural response is to ask experts for the correct sowing date. Expert guidance is valuable, but a single date cannot be prescribed for an entire province, much less for the whole country. Temperature, rainfall, soil moisture, elevation, crop variety, irrigation access and field condition differ between locations. Even within one district, a dry sandy field and a compacted heavy field may not become ready at the same time.

The Production Manager must therefore replace the rigid calendar with a field-based sowing window. The decision comes from the condition of the field, not from a forecast.

2. Why PQNK Does Not Depend on Forecasts

Seasonal climate forecasts can indicate an increased probability of unusual heat, above- or below-normal rainfall, or an El Niño or La Niña influence. None of them can predict the exact rainfall or temperature a particular field will receive, or guarantee that a crop will escape every damaging event. A production system that must wait on a forecast remains exposed to every event the forecast misses.

PQNK therefore builds its protection into the field itself. A permanent raised bed under continuous organic mulch keeps soil temperature moderate and holds the balance of moisture and air in the root zone. In that condition the crop is safe: a healthy plant can withstand extremes of ambient temperature that would stress a crop rooted in bare, compacted or inundated soil. A new sowing date cannot correct compacted soil, weak infiltration, high evaporation or poor aeration; the PQNK field corrects them permanently.

Agriculture cannot control the weather. It can control the condition in which the crop receives the weather.

3. Why Conventional Fields Amplify Weather Damage

Weather becomes disastrous when the production system has already removed the field's natural protection. Repeated tillage breaks aggregates and biological networks. Bare soil absorbs extreme heat and loses moisture rapidly. Compaction restricts rooting and infiltration. Flood irrigation displaces air and creates repeated cycles of saturation and stress. Simplified cropping reduces biological buffering.

Under these conditions, both too little and too much rain become dangerous. A short dry period becomes drought because the field stores little moisture. A heavy shower becomes runoff or waterlogging because the soil cannot accept water rapidly. High temperature becomes root-zone heat because the soil surface is exposed. A weather shock that a living ecosystem could moderate becomes a crop emergency.

4. The PQNK Resilience Architecture

PQNK does not claim to stop El Niño, heatwaves, drought or excessive rainfall. It changes the physical and biological condition of the field so that the crop is less exposed to their effects. This protection comes from the simultaneous application of four non-negotiable rules: no inundation, no soil disturbance after conversion, continuous organic mulch and biodiversity.

Weather pressure	Vulnerability of the conventional field	PQNK field response
Extreme heat	Bare soil overheats; evaporation and root stress rise.	Organic mulch shades and insulates the soil, reduces evaporation and moderates root-zone temperature. A 2% ethanol foliar spray relieves ambient heat stress.
Cold spell	Exposed soil loses heat quickly; chilling slows growth and weakens the crop.	Mulch insulates the root zone and holds soil temperature. A 2% ethanol foliar spray relieves ambient cold stress.
Dry interval	Shallow roots and weak structure provide little stored moisture.	Permanent pores, retained roots, organic matter and Soil Moisture Management improve usable moisture and rooting depth.
Intense rainfall	Sealed or compacted soil sheds water as runoff.	Aggregates, root channels and undisturbed pores improve infiltration; furrows receive and distribute supplementary flow.
Excess water	Flooded root zones lose air and biological function.	Raised beds keep the productive root zone aerated while furrows provide drainage and controlled water movement.

Weather pressure	Vulnerability of the conventional field	PQNK field response
Weather-driven pests	Uniform stressed crops are vulnerable and often trigger routine spraying.	Biodiversity, balanced plant nutrition and predator habitat strengthen biological regulation.
One crop fails	A single crop and harvest window concentrate risk.	Crop-in-crop, crop-after-crop and functional diversity spread climatic and economic exposure.

5. How PQNK Moderates the Major Weather Threats

Heat and cold

Continuous organic mulch intercepts solar radiation before it reaches the soil. It reduces direct heating, slows evaporation and moderates temperature fluctuations around roots and soil organisms. A protected, moist and aerated root zone allows the plant to maintain transpiration and physiological cooling longer than a crop rooted in hot, dry and compacted soil.

When the ambient temperature rises above or falls below the crop's comfortable range, a foliar spray of 2% ethanol solution relieves the plant of temperature stress. The spray supports a crop that is already protected at the root; it does not replace the mulch-covered bed.

Drought and delayed rainfall

PQNK does not create rainfall. It increases the usefulness of the water that arrives from rain, atmospheric moisture and supplementary irrigation. Undisturbed aggregates, permanent root channels and biological activity improve infiltration and storage. Deep rooting gives the crop access to a larger soil volume. Mulch reduces unproductive surface evaporation, while the ball test guides irrigation from actual field moisture rather than a rigid interval.

Excessive rainfall

Heavy rain is most damaging where the surface has sealed, the plough pan or hardpan blocks downward movement, or the root zone is already saturated. During PQNK conversion, the restrictive layer is corrected where necessary. Permanent beds then remain undisturbed. Water can enter through pores and root channels, while the furrow provides a lower pathway for movement and drainage. The crop remains on the aerated bed instead of standing in inundated soil.

Erratic monsoon

An erratic monsoon may combine dry periods, sudden intense rain, high humidity and unusual pest pressure within the same season. No single input can manage this combination. PQNK responds as a system: mulch protects against heat and splash; the bed-furrow architecture manages excess water; Soil Moisture Management addresses dry intervals; and biodiversity supports biological stability.

6. The Field-Based Sowing Protocol

PQNK does not wait for a calendar date or a forecast; the sowing decision is made from the field. Before sowing, the Production Manager should evaluate:

- the crop's safe soil- and air-temperature range during germination and early growth;
- actual moisture within the intended seed zone, confirmed in the field rather than assumed from rainfall;
- the sensitive stages of the selected crop and variety;
- whether the permanent beds, mulch, furrows and drainage pathways are ready;
- the availability and calibration of the SIPP or VIPP and the competence of the operator; and
- the farm's capacity to provide supplementary furrow irrigation if nature does not supply sufficient moisture.

Where uncertainty is high, the entire acreage should not necessarily be exposed to one date. Planting may be phased within the suitable window, provided the crop, machinery programme and market plan allow it. Diversity and crop-in-crop can further reduce the risk of one event damaging the whole farm's income.

7. Precision Machinery Is Part of Climate Resilience

A resilient field can still be damaged by poor machinery operation. The Production Manager must be master of the machinery and its correct use. The operator must place seed at the intended depth and spacing without reopening or destroying the permanent bed. Tractor wheels must remain in the designated furrow lanes. Mulch should be moved only as much as necessary for precise establishment and then continue protecting the soil.

Operator training is therefore not a secondary service. In PQNK, the operator is the gunman: the machinery may be correctly designed, but the result depends upon the person aiming and using it.

8. Transition Requires Additional Vigilance

A field does not acquire full resilience merely by adopting the PQNK name. During transition, soil structure, rooting depth, biological regulation and water behaviour are still recovering. Early crops require closer observation, timely supplementary water where justified and careful use of transitional protection when a verified threshold is crossed.

The speed of recovery cannot be promised by a fixed number of seasons. It depends upon the field's starting condition, compaction, salinity, drainage, organic cover, crop sequence, weather and management discipline. Maturity must be established from field evidence.

9. From Weather Prediction to Production Resilience

Weather services have their place in public safety and planning, but a farm cannot be protected by prediction. Every forecast leaves some events unannounced, and every warning that does arrive still meets the field in whatever condition it is in.

The nation cannot protect agriculture by repeatedly changing sowing dates while leaving the underlying soil system degraded. Nor can every new climatic warning be answered by another purchased product. The durable response is to rebuild the field so that natural processes again perform temperature regulation, water absorption, moisture conservation, nutrient cycling and biological protection.

10. Conclusion

PQNK is the only complete solution that addresses weather risk at the level where the crop experiences it: the soil-root-water-air system. It does not promise immunity from extreme events, and it does not depend on forecasting. It converts a vulnerable field into a more buffered living production system.

Weather cannot be controlled. The condition of the soil, the timing of operations and the resilience of the production system can be.

The immediate requirement is therefore to convert fields to PQNK. A forecast can only announce a hazard. A PQNK field, with mulch-covered beds holding soil temperature and the moisture–air balance, gives the crop the capacity to withstand the hazards that no forecast can precisely predict.

Sources and Evidence Basis

PQNK field framework and governing principles: four non-negotiable rules, permanent raised beds, Soil Moisture Management and the ball test: Pedaver / PQNK knowledge system.

Author's field experience with PQNK conversion, precision establishment (SIPP/VIPP) and transitional crop management in Pakistan.

Zaki Abbas, "Pakistan in uncharted waters as 'super El Nino' multiplies threats," Dawn, September 2026.

2% ethanol foliar spray for ambient heat and cold stress: PQNK field practice.