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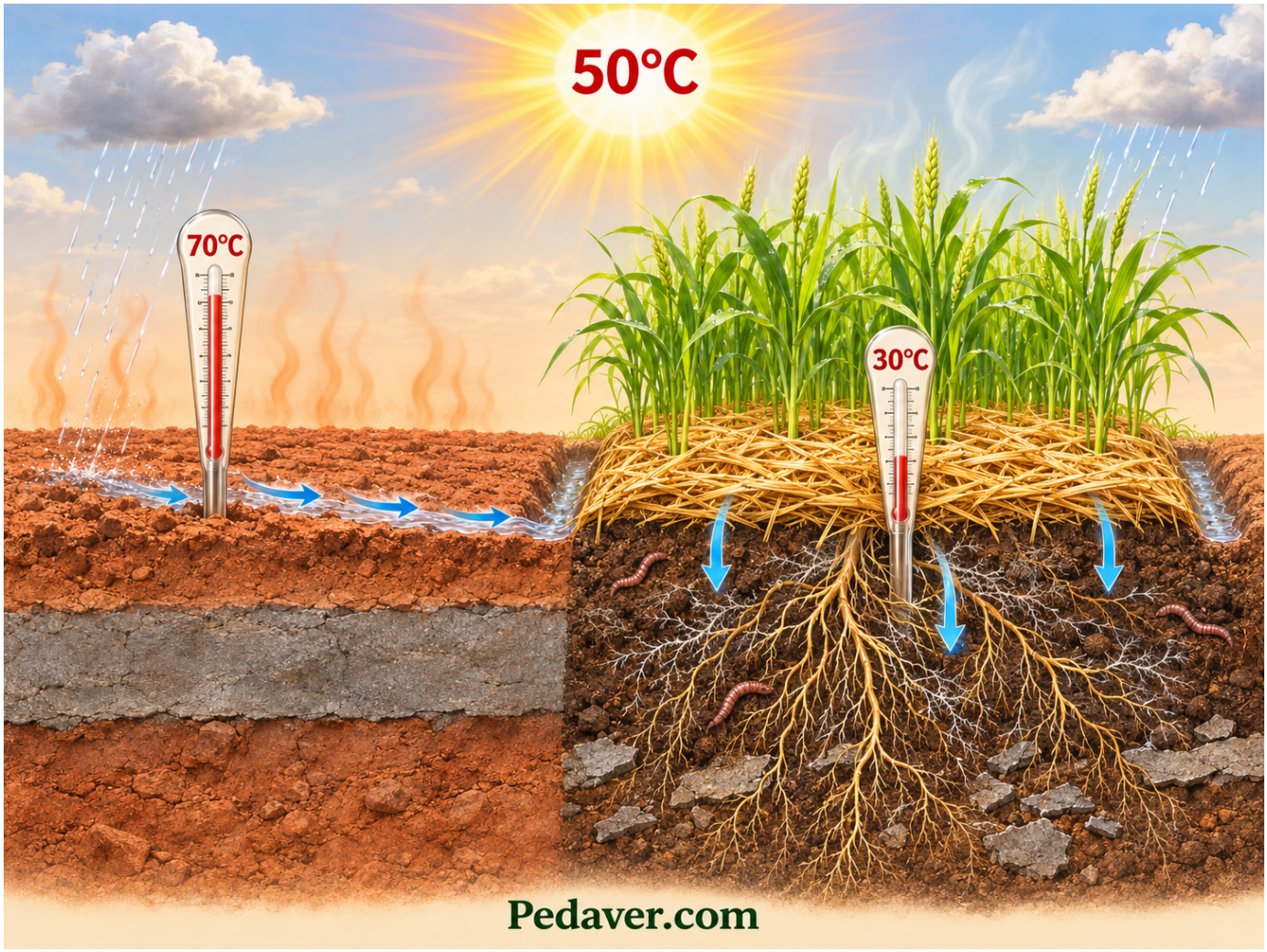
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The Hot Field: How Naked Soil and Hardpan Break the Weather, and How Covered Soil Mends It

The weather is not only getting hotter. It is losing its rhythm. Much of the cause lies under our feet: naked, ploughed soil that bakes in the sun, and a hardpan that will not let the rain in. Covered, unploughed soil reverses both

When the air is 50°C, naked soil passes 70°C. Soil under organic mulch stays close to 30°C. That 40-degree difference, repeated across the world's farmland, is a hand on the weather.



Abstract

Floods in deserts, fires in wet forests, heatwaves that stay for weeks and cold that arrives without warning: people everywhere now feel that the weather has lost its rhythm. The usual explanation looks to the sky and the poles. This paper looks at the ground. In hot regions such as Punjab, when the air reaches 50°C (122°F), naked soil passes 70°C (158°F), while soil under organic mulch stays close to 30°C (86°F), about 40°C (72°F) cooler. Ploughed, uncovered farmland is therefore one of the largest man-made heat surfaces on Earth. Beneath it, a plough and tillage hardpan stops rain from soaking in, so water that should enter the soil runs off to the rivers or is lost from the hot crust, and the land dries and heats faster after every rain. Pumped groundwater, spread over the fields, adds water to the air that had been locked underground. Ploughing also sends soil carbon into the air as carbon dioxide. This paper explains how these land changes feed the stuck, extreme weather now in the news, why the carbon dioxide story and the water story belong together, and how PQNK (Paedar Qudratti Nizam Kashatqari, the Pristine Organic Farming System) reverses all of them with one change of practice: never plough again, and never leave the soil bare.

1. Weather That Has Lost Its Rhythm

A short science video now circulating on social media puts the public feeling well. Weather, it says, is not just getting hotter; it is getting stuck. Hot places stay hot for longer, cold arrives suddenly, wet places flood and dry places burn. It explains this through the jet stream, the fast river of air high above the Earth that is driven by the difference between hot and cold air. When that difference changes, the river slows and wobbles, and weather systems get locked in place. Its own words on farming are simple: farmers can no longer predict the rain.

The video looks to the Arctic for the cause. Its central point, though, applies just as much to the land: if the Earth warmed evenly, the weather would not go wild. It is uneven heating, and water carried in the air, that drive the weather. Both are shaped every day by how the world treats its farmland, and that part of the story is almost never told.

2. The Hot Field: Naked Soil as a Heat Island

A city is called a heat island because its roads and roofs soak up the sun and give the heat back to the air. A ploughed, uncovered field does the same, and there is far more farmland than city. In ACI (Ancient Conventional Industrial) agriculture the soil is ploughed, burnt or cleared of residue, and left naked between crops and often between the rows of a growing crop.

PQNK field readings in Punjab show how large the effect is. When the air reaches 50°C (122°F), naked soil passes 70°C (158°F). Under organic mulch, the soil stays close to 30°C (86°F): about 40°C (72°F) cooler, on the same day, in the same sun (PQNK book, Chapters 27 and 38). In milder climates the gap is smaller, but the pattern is the same everywhere: naked soil is the hottest surface in the landscape.

That heat does not stay in the field. It rises into the air above, and each hot field joins the next. A region of ploughed, dry farmland behaves like a giant hot plate under the sky. It warms the air, pushes up the daytime peak, and helps a heatwave settle and stay. Dry, hot ground feeds the heat above it, and the hotter air dries the ground further. This is how a heat dome is strengthened from below.

A covered field behaves in the opposite way. Mulch shades the soil, and a living crop on moist soil cools itself and the air around it by releasing water through its leaves, as a person cools by sweating. The field becomes a cool island instead of a hot one.

3. The Hardpan: Rain That Cannot Get In

Repeated ploughing, heavy machines and flood irrigation press a hard layer into the soil a few inches below the surface: the plough and tillage hardpan (PQNK book, Chapter 25). Above it lies a loose, dead layer that crusts in the sun. Together they turn a sponge into a pavement.

When the rain comes, it cannot get in. Water stands on the field, runs off into streams and rivers, and becomes the flood downstream. What should have been stored in the soil for the dry months leaves the farm within days.

When the rain stops, the land dries fast. The little water held above the hardpan is lost quickly from the hot crust. Within days the field is dry and hot again, and the next heat builds on bare, thirsty ground.

The water cycle becomes short and violent. Instead of rain soaking in and returning to the air slowly, through roots and leaves, over weeks, water rushes off the land or is driven off it in a burst. The rhythm of the small water cycle, the local loop of moisture that returns as dew and nearby rain, is broken (KP-051, KP-052).

Where the hardpan is broken and the soil is alive and covered, the difference is dramatic. On one PQNK orchard, 13 inches (330 mm) of rain fell in eight hours and soaked into the beds, while the conventional land beside them stood under water (KP-213; PQNK book, Chapter 45).

4. Groundwater Pumped into the Sky

Across the dry and hot farming regions of the world, the shortfall of a dead soil is made up with groundwater. Water that lay locked deep underground for centuries is pumped up and spread over fields that cannot hold it. Much of it is lost from naked soil and standing water before any crop can use it. In this way irrigated agriculture lifts vast amounts of underground water into the air every year, while the aquifers below fall.

Water vapour is the largest single contributor to the greenhouse effect, larger than carbon dioxide (Schmidt et al., 2010). Water lifted by the pump and by the hot field adds to the air's load of vapour and heat. When that wetter, hotter air meets cooler air, it can release its water all at once: the cloudburst, the flash flood, a season's rain in a day.

5. The Carbon Dioxide Story, Told Whole

Carbon dioxide is part of this story, and PQNK does not shy away from it. What is usually left out is where much of it came from, and where it can go back. Soil is the largest store of carbon on land. Every time soil is ploughed, air rushes in, the organic matter that holds the soil together is burnt off by microbes, and its carbon leaves as carbon dioxide. Since farming began, the world's cultivated soils have lost about 116 billion tonnes of carbon to the air by one widely cited estimate (Sanderman et al., 2017). The plough is a chimney.

The same soil, left unploughed and covered, works the other way. A growing plant draws carbon dioxide from the air, and between 20 and 40 percent of the carbon it captures, depending on plant type and growth stage, goes below ground into roots and the soil life around them. In a PQNK field the roots stay in the soil after harvest and the mulch stays on top, so that carbon is not burnt off again. Across the world's 3.7 billion acres (1.5 billion hectares) of arable land, PQNK at the standing-forest rate would take up about 5.8 billion tonnes of carbon dioxide a year, before counting the emissions it stops (PQNK book, Chapter 46).

So the carbon story and the water story are not rivals. A wetter, hotter atmosphere traps more heat over land and sea alike, and carbon dioxide adds to it. Both come from the same practice, the plough and the naked field, and both are reversed by the same practice: an unploughed, covered, living soil. The water story is simply the part that was left untold, and the part a farmer can change from the next crop.

6. Two Fields Under the Same Sun

	Naked, ploughed ACI field	Covered, unploughed PQNK field
Soil surface at 50°C air	Passes 70°C (158°F)	Close to 30°C (86°F)
Effect on the air above	A hot plate: adds heat, strengthens heatwaves	A cool island: leaves release water and cool the air
Heavy rain	Runs off over the hardpan, feeds the flood	Soaks in: 13 inches in eight hours on PQNK beds
After the rain	Dries and heats within days	Holds moisture for the crop through the dry weeks
Water from underground	Pumped up and lost to the air	Mature beds need no irrigation where rain is 16 inches (400 mm) a year or more
Soil carbon	Burnt off by ploughing as carbon dioxide	Built up by roots and mulch, and kept
The weather it feeds	Short, violent water cycle: drought, then flood	Slow, steady water cycle: dew, humidity and local rain

7. What the Farmer Can Do

No farmer can steer the jet stream. Every farmer can decide whether his own field is a hot plate or a cool island. A PQNK conversion follows eight steps, done once and in order (PQNK book, Chapter 23):

1. Design the farm.
2. Probe for the hardpan and break it once with a subsoiler, to about 22 inches.
3. Wash the soil where the pH is above 8.
4. Form permanent raised beds.
5. Grow a Jantar cover crop, leaving its roots in the soil and using its biomass as the first mulch.
6. Plant through the mulch.
7. Water only when the ball test shows the soil is dry.
8. Harvest without disturbing the soil.

From then on, never plough again and never leave the soil bare. Each season the soil takes in more rain, stays cooler, holds more carbon and gives back its moisture slowly, as nature intended. Questions can be sent at any time to Ask PQNK, on WhatsApp or at pedaver.com/ask.

Conclusion

The weather has lost its rhythm, and the land beneath it is part of the reason. Ploughed, naked soil turns the world's farmland into a heat surface that passes 70°C in hot regions; a hardpan shuts the rain out and turns a slow water cycle into a violent one; pumped groundwater is lifted into the sky; and the plough sends the soil's carbon into the air. These are not separate problems. They are one practice, and they have one answer. Covered, unploughed, living soil stays 40°C cooler, takes in 13 inches of rain in eight hours, needs no irrigation once mature where rain is 16 inches a year or more, and draws carbon back into the ground. The farmer cannot change the ocean or the poles. He can change his field, starting with the next crop, and every field that changes gives the weather back a little of its rhythm.

PQNK Principle: Heal the soil and you cool the sky. A covered field gives the rain a home and the weather its rhythm.

Sources and Related PQNK Papers

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9. Ask PQNK: https://pedaver.com/ask, or on WhatsApp at https://wa.me/923437506442

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