PRODUCT KNOWLEDGE · MICRONUTRIENTS

V-Zinc 10%

Zinc sulfate · Zn 10% w/v

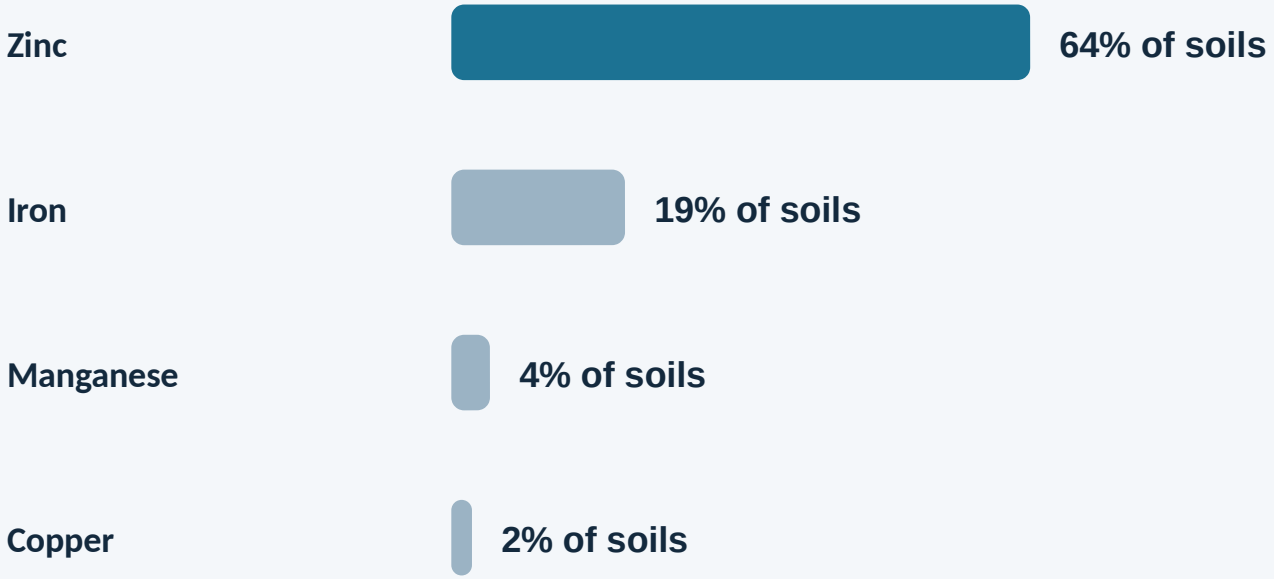
Liquid zinc for the most widespread micronutrient deficiency in Pakistani soils — two in every three of them.

PS 5469-2020 | Licence CM/L-3130/2024 | 1 L · 3 L · 20 L | Liquid

THE PROBLEM

Two thirds of Pakistan’s soils are short of zinc.

Percentage of Pakistani soils found deficient in each available micronutrient.



64%

of Pakistani soils are zinc-deficient

against about 50% of the world’s soils

Zinc shortage is worse here than almost anywhere, and it is made worse by the two things Pakistani growers do most: apply phosphate heavily, and farm calcareous ground.

! Rice and wheat — the two crops that feed the country — are both among the most zinc-responsive there are.

BEYOND THE FIELD

Zinc is the one nutrient where the deficiency in the soil is also in the people.

Pakistan's own National Nutrition Survey, 2018 — 100,304 households, the largest ever run in the country.

57%

of Punjab soils deficient in zinc

18.6%

of children under five, zinc deficient

22.1%

of women of reproductive age, zinc deficient

24.1%

in Punjab — the highest of any province

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Rural prevalence runs higher than urban on both measures. This is the argument that makes zinc different from every other micronutrient VAN sells: the grain leaving a zinc-deficient field is feeding a zinc-deficient household.

FROM THE SOIL TO THE GRAIN TO THE HOUSEHOLD

The chain is real for three links. VAN will not claim the fourth.

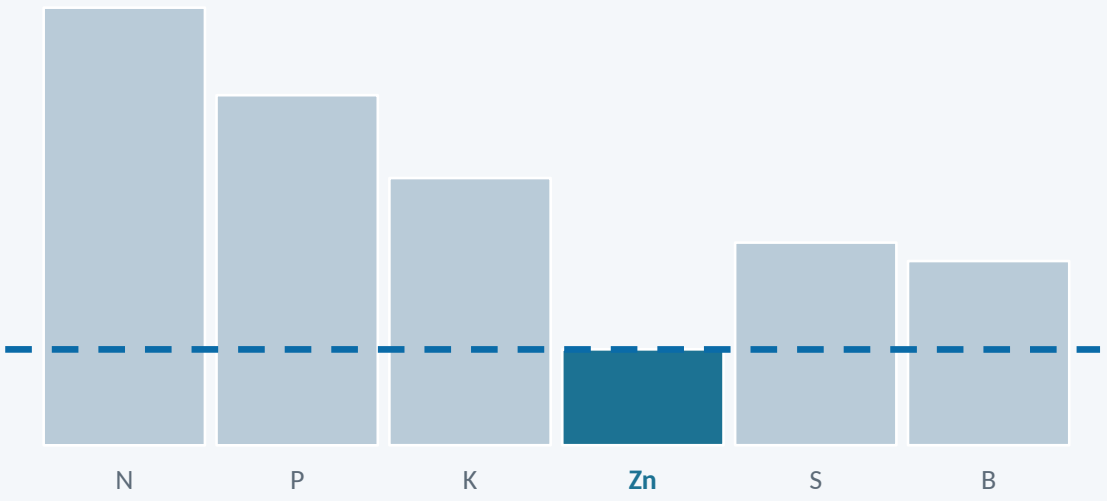
What the evidence supports, in order, and where it stops.

1	**Link one — zinc raises yield**	Survey-level median wheat response in Pakistan is +8% in Punjab and +14% in Sindh. On severely deficient sites individual trials report far more, but a national programme should be costed on the medians, not the outliers.
2	**Link two — zinc raises grain zinc**	Pakistani wheat grain zinc rises from 24.9 mg/kg unfertilised to 28.1 with soil-applied zinc and 38.5 with foliar — about +19% and +63%. Foliar beats soil for grain concentration, consistently.
3	**Link three — that would move dietary intake**	Modelling on Pakistani consumption puts national dietary zinc inadequacy at 23.9%, and suggests full fertilizer adoption could roughly halve it in Punjab and Sindh.
4	**⚠️ Link four is not closed, and we say so**	The one randomised controlled trial run in rural Pakistan doubled flour zinc and raised women's intake by 30–60% — but did not produce a sustained improvement in plasma zinc. The agronomic case is strong. The clinical case is not yet made, and anyone claiming it is will be corrected by a well-briefed agronomist.

LAW OF THE MINIMUM

The cheapest stave in the barrel to lengthen.

Carl Sprengel set the law out in 1840; Justus von Liebig made it famous. A nutrient needed in grams limits yield exactly as hard as one needed in kilograms.



Grams vs tonnes

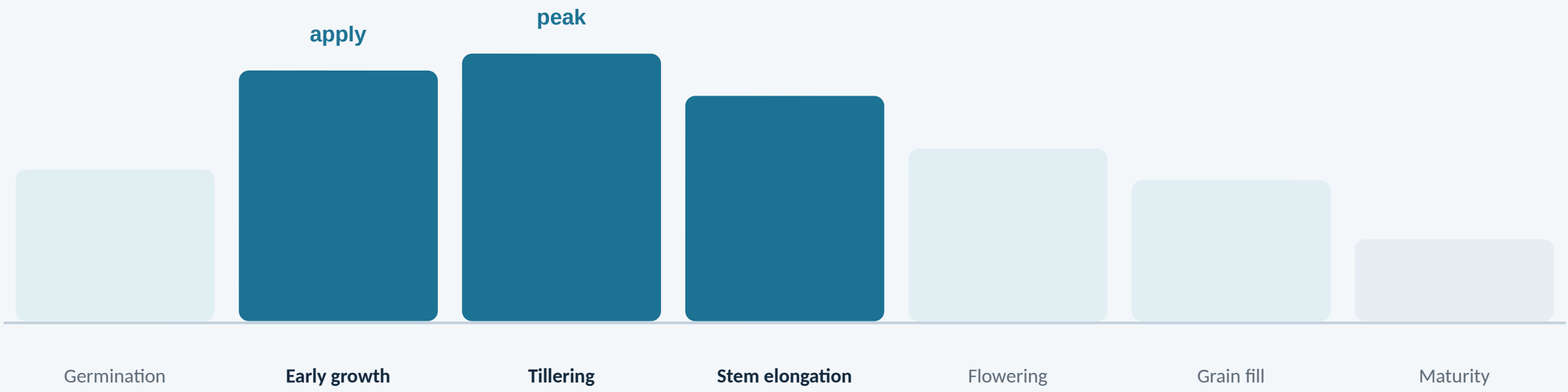
A grower can spend the whole fertilizer budget on the first three staves and lose the crop to the fourth. Correcting zinc costs a fraction of a nitrogen programme, and two soils in three need it.

The staves show the shape of the problem, not measured soil values. A soil test is what tells you your own — VAN Lab publishes its prices.

THE DEMAND WINDOW

Zinc is an early-season nutrient.

Relative zinc demand across a cereal season. Zinc runs the enzymes of vegetative growth and the auxin synthesis that sets plant architecture.



Applied early to mid-life, foliar or through fertigation. Zinc corrected at flowering is correcting a shortage that has already decided the size of the plant.

The band shows the shape of demand, not measured uptake for a named crop.

THE PACK

What is actually in the bottle.

Three packs, one zinc.

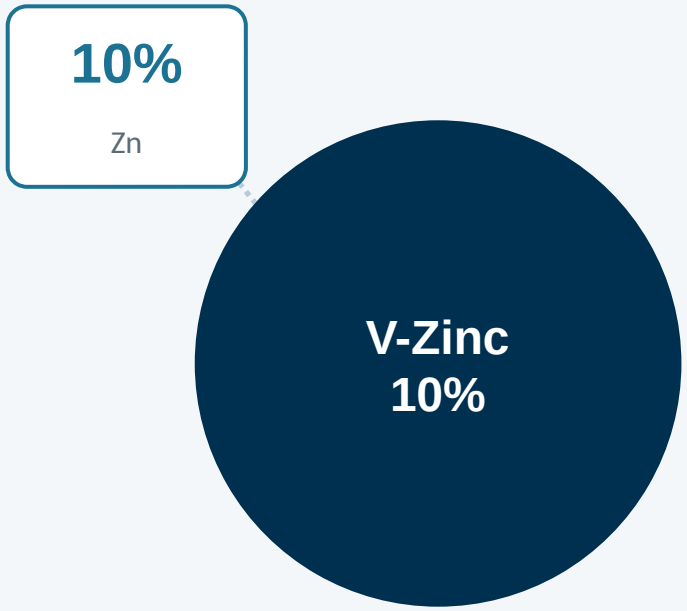
V-Zinc 10% — 1 L, 3 L and 20 L

ZINC	Zn 10% w/v, as zinc sulfate. Liquid, fully soluble — no residue in the tank or the emitter
PACKS	1 L for foliar; 3 L and 20 L for fertigation. A crop plan asking for 12 L is asking for four 3 L packs, not a 12 L bottle
THE 1 L FOLIAR PACK	The value-added grade — the same zinc with iron, amino acids and seaweed extract added. No percentage is declared for those three, so VAN publishes none
ALSO IN DRONE GRADES	One of six VAN products already in commercial production in drone and ultra-low-volume grades
STANDARD & LICENCE	PS 5469-2020 · PSQCA marks licence CM/L-3130/2024

THE REGISTERED ANALYSIS

What the label declares.

As registered under PS 5469-2020 and as published on van.com.pk.



SOURCE

Zinc sulfate

the sulfate form — see the next slide on why that matters

CONCENTRATION

10% w/v

weight per volume — 100 grams of zinc per litre

ROUTE

Foliar & fertigation

also available in drone and ULV grades

TWO ZINC CHEMISTRIES

Sulfate and chelate are different products for different problems.

VAN makes both. They are not competing versions of the same thing, and a field team should know which question each one answers.

Zinc sulfate — V-Zinc 10%

The zinc ion delivered as a simple soluble salt.

- Immediately available on the leaf
- Lower cost per unit of zinc
- The right answer for a foliar correction, where soil chemistry never gets a vote
- On calcareous soil it is captured quickly, so foliar is the route

Chelated zinc

The zinc ion held inside an organic molecule that protects it from the soil.

- Stays plant-available at high pH, where sulfate zinc largely precipitates
- The right answer for a soil or fertigation application on calcareous ground
- Higher cost per unit of zinc — you are paying for the chelate, not the metal
- A separate VAN product, not a version of this one

Rule of thumb: going on the leaf, sulfate is enough. Going into an alkaline soil, pay for the chelate or accept that most of it will be captured.

THE MECHANISM

What zinc is actually doing in there.

Zinc builds nothing. It runs the machinery that builds everything.

1 300+ enzymes

Activates over three hundred enzymes — zinc is a cofactor, not a building block

2 Auxin synthesis

Central to the synthesis of auxin, the hormone that governs stem elongation and plant architecture

3 Protein synthesis

Required for protein synthesis and for the integrity of ribosomes

4 Seed set

Supports pollen formation and seed set

5 Grain filling

Improves grain filling and root vigour

6 Human nutrition

Zinc in the grain is zinc in the diet. A zinc-short soil produces zinc-short food

IN THE FIELD

What zinc shortage looks like.

General agronomy, not a VAN measurement. Zinc is partly mobile, so it shows in the younger-to-middle leaves.

1 Pale banding

Pale bands either side of the midrib on younger leaves — the classic cereal signature

2 Short internodes

Shortened internodes and a rosetted, bunched appearance at the growing point

3 Small leaves

"Little leaf" — new leaves emerge visibly smaller than they should

4 Rice: khaira

Bronzing and brown patches in rice, worst on calcareous, flooded ground

5 Delayed maturity

The crop is late as well as small

6 Hidden hunger

The commonest case: no visible symptom, and yield quietly capped

NUTRIENT INTERACTIONS

Zinc is suppressed by the two things Pakistan does most.

Established interactions between soil nutrients — after Mulder. These describe how nutrients behave with one another, not how V-Zinc performs.

+ Works with

A foliar route bypasses soil chemistry entirely, which is why liquid zinc works where soil zinc does not

Sulfur acidifying the root zone improves zinc availability — VAN's coated urea helps zinc for this reason

Balanced zinc supports the enzyme systems that nitrogen and carbohydrate metabolism depend on

Correcting zinc often raises the return on nitrogen already applied

– Competes with

Excess phosphorus suppresses zinc. Decades of heavy DAP on Pakistani soil is a principal cause of the 64% figure

Excess calcium — calcareous ground — suppresses zinc as well

Excess zinc in turn reduces iron, phosphorus and calcium uptake; more is not better

Excess iron and excess copper both reduce zinc uptake

⚠️ Do not tank-mix zinc with a soluble phosphate. Zinc phosphate is poorly soluble: you lose both nutrients and you may block the line. Apply them on separate passes.

4R STEWARDSHIP

Right source, right rate, right time, right place.

The whole product is an argument about placement.

RIGHT SOURCE

V-Zinc 10%

sulfate zinc for the leaf; chelated zinc for the soil

RIGHT RATE

Per the plan

the published crop programme carries the crop-specific rate

RIGHT TIME

Early to mid-life

while the enzymes it activates are running hardest

RIGHT PLACE

Foliar

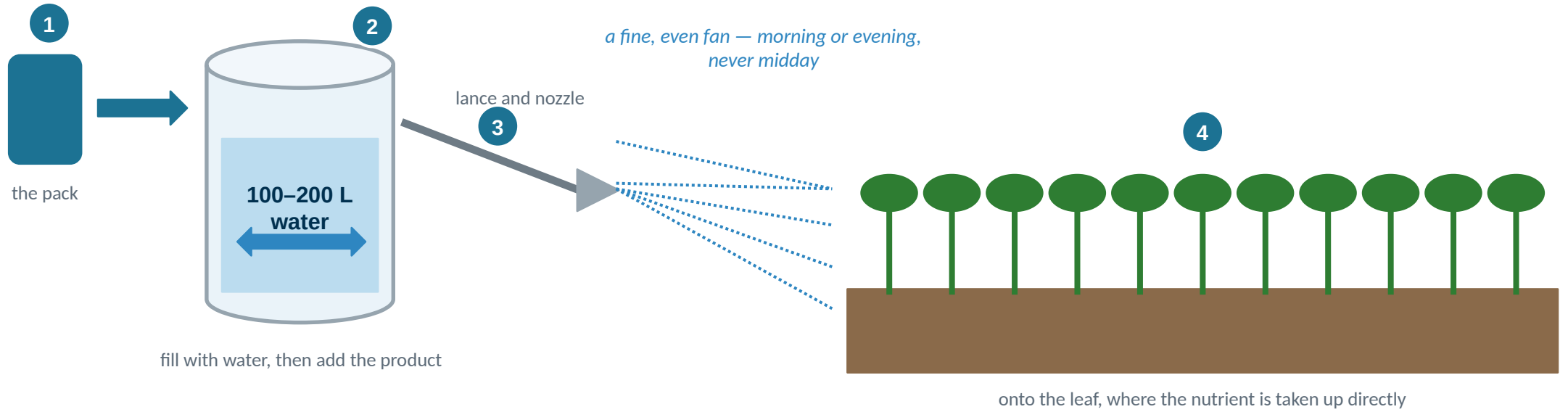
on the leaf, where calcareous soil never gets a vote

Applying a zinc sulfate to a calcareous soil surface is the least effective route available: free calcium takes it out of solution before the root sees it.

HOW IT IS APPLIED

Water first, product second — never the other way round.

Zinc on the leaf reaches the crop that calcareous soil would starve.



1 Water first
100–200 L of clean water in the tank. Always water first, product second — never the other way round.

2 Add and keep agitating
1 L per acre. A tank that settles sprays the last acre at a different rate from the first.

3 A fine, even fan
Cover the leaf without running off it. Morning or evening — midday is the wrong half of the day.

4 At the right stage
Early to mid-life.

Doses are per acre, from VAN agronomy. The dilution is part of the rate: cutting the water to save a pass doubles the concentration on the leaf.

SOURCES

Where every figure in this deck came from.

Pakistan soil zinc	Soil Fertility Research Institute, Government of the Punjab — 57% of Punjab soils zinc deficient. ⚠ Undated. Rehman, A. et al. (2020), Front. Sustain. Food Syst. 4:591722 — about two thirds nationally, over 70% of South Punjab wheat soils
Yield and grain zinc	Joy, E.J.M. et al. (2016), Plant and Soil 405:257–273 — wheat +8% Punjab, +14% Sindh; grain Zn 24.9 → 28.1 soil-applied, → 38.5 foliar
Human deficiency	National Nutrition Survey 2018, Government of Pakistan with UNICEF and Aga Khan University — 100,304 households. Children under five 18.6%; women 15–49 22.1%; Punjab women 24.1%
⚠ The clinical limit	Lowe, N.M. et al. (2022), Frontiers in Nutrition 8:809783 — doubling flour zinc raised intake 30–60% but produced NO sustained improvement in plasma zinc
Soil chemistry	Alloway, B.J. (2008), Zinc in Soils and Crop Nutrition, 2nd edn, International Zinc Association and IFA. ⚠ Industry-association co-publication, but written by an academic soil scientist and the standard reference
Analysis, standard, licence	van.com.pk — V-Zinc 10%, zinc sulfate 10% w/v, PS 5469-2020, CM/L-3130/2024
National deficiency figures	64% zinc, 19% iron, 2% copper, 4% manganese — as cited in VAN's VL-Micromix deck
Zinc physiology	Standard plant physiology — enzyme activation, auxin synthesis. Not manufacturer-specific
Nutrient interactions	After Mulder's chart — established relationships
Drone grades	van.com.pk application-systems page — V-Zinc named among six products in commercial ULV production
⚠ Separate product	Chelated Zinc 5% is a distinct Tier-2 material (VAN, 19 Aug 2026)

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