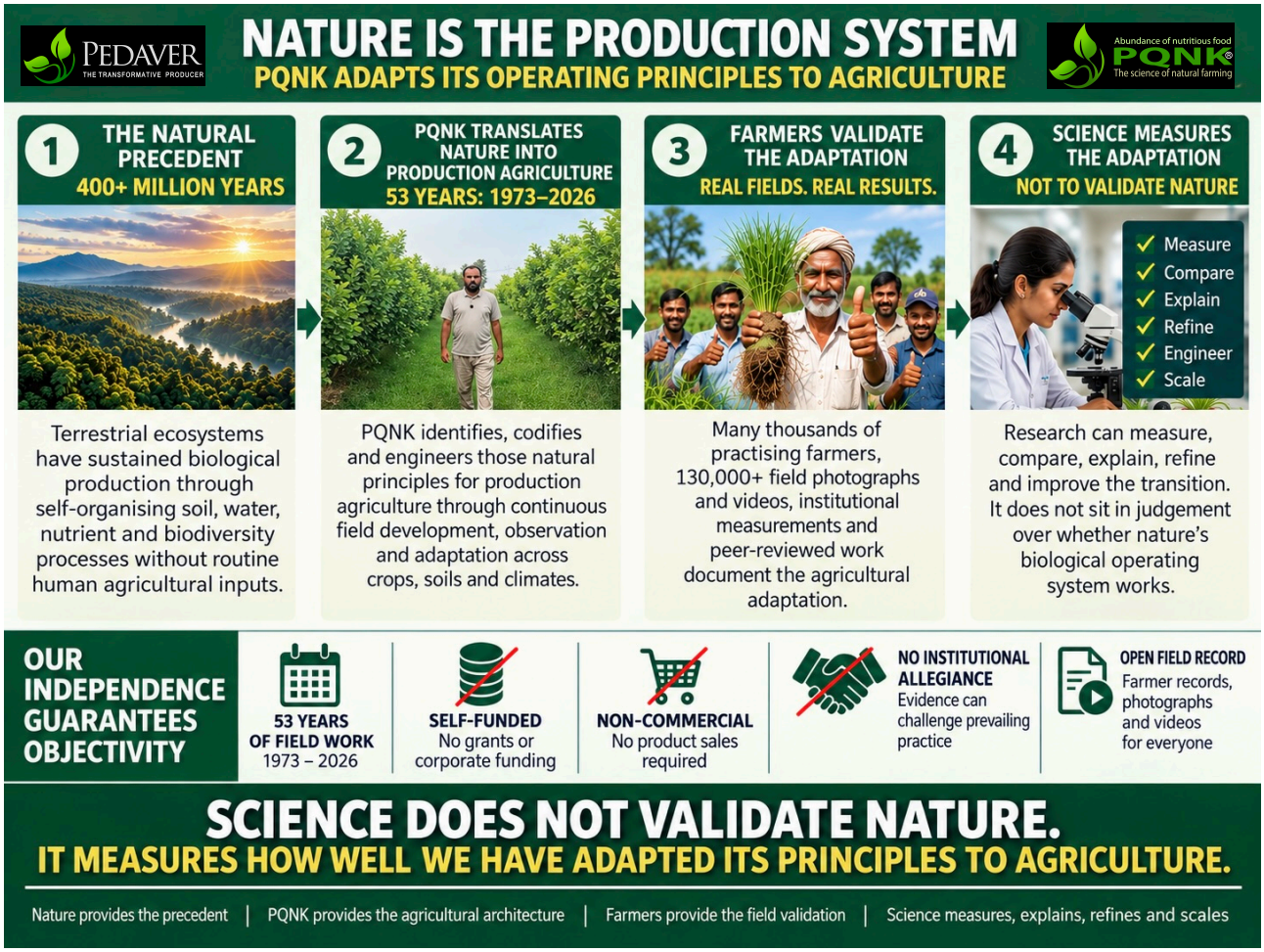
CHAPTER TWELVE

# Captured Science

*How Agricultural Research Became a Tool of the Input Supply Industry*




*"We tried to publish our findings. We wrote to major publishers. Their answer was always the same: it must go through peer review. And who are the peers? Professors whose careers are built on the old story. Researchers funded by the companies whose products our findings make unnecessary. Asking them to review PQNK is like asking candle-makers to peer-review the lightbulb."*

Asif Sharif, Lahore, 2023

Science is supposed to be the mechanism by which humanity corrects its errors. When a practice is demonstrated to cause harm, science documents the harm, publishes the evidence, and provides the intellectual foundation for policy change. Yet agricultural research does not operate outside economics or institutions. Public priorities, commercial investment, intellectual-property incentives, university partnerships and the availability of research funding all influence which questions are studied and which technologies receive sustained development. The concern examined in this chapter is therefore not that agricultural science is false, but that its funding and incentive architecture can favour product-based questions while giving less attention to systems whose principal outcome is reduced dependence on purchased inputs.

This argument does not require a conspiracy. The scientific and policy literature documents regulatory capture, conflicts of interest, sponsor effects, publication bias and agenda-setting incentives across many fields. These mechanisms do not mean that industry-funded research is automatically invalid, or that publicly funded research is automatically unbiased. They mean that funding relationships and institutional incentives must be disclosed and examined because they can shape research priorities, methods, interpretation and the speed with which alternatives receive serious investigation.

This chapter examines the mechanisms through which agricultural research can become structurally aligned with the input-supply paradigm: funding priorities, conflicts of interest, publication incentives, methodological conventions, extension relationships and institutional inertia. It then uses the documented PQNK experience as a case study in the difficulty a disruptive, low-input system can face when seeking evaluation by institutions whose established methods were built around a different production model.

The central problem is not that agricultural science has failed to invent a better production system. Nature established the operating principles long before agriculture existed. For hundreds of millions of years, terrestrial ecosystems have captured solar energy, cycled nutrients, built soil, regulated water and sustained biological production without tillage, synthetic fertiliser, pesticides or routine human management. PQNK does not claim to have invented that system. It identifies, codifies and adapts those natural operating principles to production agriculture.

This distinction changes the question. PQNK is not a laboratory technology waiting to be validated on a few square metres before it can be taken seriously. The natural ecosystem is the precedent. The agricultural question is how faithfully and efficiently those principles can be restored on land already altered by cultivation, compaction, chemical dependency and disrupted water management. Many thousands of practising farmers, together with a large archive of field photographs, testimonial videos and production records, have provided extensive practical validation of that adaptation process. Research can measure, compare and refine that transition. It does not sit in judgement over whether nature's underlying biological system works.

## THREE PRESSURE POINTS IN THE RESEARCH SYSTEM

University and public-private research funding. Agricultural companies fund research through grants, sponsored projects, partnerships and collaborative technology programmes, while governments and foundations remain major funders of agricultural science. Such partnerships can accelerate useful innovation, but they also create potential conflicts of interest when a sponsor has a commercial stake in the outcome. The appropriate scientific response is not to presume corruption. It is to require disclosure, publication freedom, transparent protocols and independent replication, while recognising that the availability of funding inevitably influences which questions are easiest to pursue.

Peer review and paradigm effects. Academic peer review is valuable for checking methods, evidence and reasoning, but it is performed within existing disciplines, methods and assumptions. A system such as PQNK can therefore be misunderstood when it is treated as a newly invented input technology rather than an agricultural adaptation of natural ecosystem function. The proper role of peer review is to test specific measurements and interpretations, not to require nature's operating principles to be re-proven before their agricultural application can be discussed.

Extension services and farmer education. Extension systems commonly operate in a mixed environment that includes public agencies, universities, dealers, seed companies, fertiliser and crop-protection firms, machinery suppliers and farmer organisations. Private-sector demonstrations and training can spread useful technology quickly, but they can also make product-based solutions more visible than management changes that reduce purchases. The safeguard is not to exclude private expertise, but to ensure that farmers can distinguish independent public advice from commercial advice and compare both against transparent field evidence and long-term soil and economic outcomes.

## WHAT CAPTURED SCIENCE DOES: THE BIAS IN THE LITERATURE

The consequence of this funding and incentive architecture is not one uniform bias across all agricultural literature. Rather, several mechanisms known across science can distort parts of the evidence base if they are not actively controlled: publication bias, selective reporting, conflicts of interest and research-agenda effects. Agricultural economics itself has documented underpowered studies, selective reporting and publication-bias risks. The relevant question is therefore not whether every paper is captured, but whether the overall evidence system asks a sufficiently broad set of questions.

Publication bias. Positive or statistically significant findings can be more likely to be written up, submitted or published than null findings, a problem documented across scientific fields. Financial conflicts can add another source of bias, but the direction and magnitude vary by field and study. The defensible conclusion is not that agricultural literature uniformly overstates product benefits; it is that publication bias and sponsor relationships must be measured, disclosed and corrected through transparent protocols, publication of null results and independent replication.

Research agenda distortion. Private R&D is naturally concentrated where innovations can be commercialised, while public research is more likely to support areas with broad social benefits. USDA ERS explicitly notes this difference. The resulting balance can leave some long-horizon, system-level questions comparatively underfunded even when they matter greatly to farmer welfare or ecological sustainability. The PQNK concern is therefore an agenda question: are we investing enough in multi-season soil biology, water cycling, nutritional quality and low-input system performance, or mainly in technologies that can be sold as products?

Methodological fit. Small-plot replicated trials can answer narrow questions, but they are not the court of final appeal for a whole production ecosystem. PQNK is not a product whose efficacy begins and ends inside an experimental plot. Its claims concern the restoration of soil structure and biology, water capture and movement, input elimination, crop performance, nutritional quality, economics and resilience as the system matures. These are field-scale, multi-season processes. Research is useful when it measures them appropriately. It becomes misleading when the limits of a short, square-metre experiment are mistaken for the limits of the ecosystem itself.

*A method is not biased merely because it is conventional. But a method becomes incomplete when it measures only the outcome for which one system was designed. The correct scientific response is to expand the measurement frame, not to abandon experimental discipline.*

## THE PQNK EXPERIENCE: A CASE STUDY IN INSTITUTIONAL RESISTANCE

The PQNK experience provides a first-hand case study of what can happen when a disruptive agricultural system seeks recognition from institutions organised around established research programmes. This does not by itself prove institutional capture. It does, however, provide a record against which the chapter's broader argument about methodology, incentives and institutional inertia can be tested.

The peer-reviewed paper published in Paddy and Water Environment in 2011 reported an average paddy yield of 12.84 tonnes per hectare in the mechanised SRI trial and approximately seventy percent lower irrigation-water requirement, while also reducing labour demand. It met the formal standard of peer review and remains independently discoverable in the scientific literature. Fifteen years later, the significance of that work is not that PQNK still awaits institutional permission. It is that formal agricultural research has yet to engage at comparable scale with the field evidence and measure the wider production architecture that subsequently developed. (Sharif, A. 2011. Paddy and Water Environment 9(1):111-119. doi:10.1007/s10333-010-0223-5.)

Subsequent attempts to publish PQNK findings have, in Pedaver's experience, encountered reviews that challenge both the evidence and the theoretical framework. The answer is not to seek permission for nature's operating principles. It is to preserve the correspondence and evidence, make the field record accessible, and require critics to engage with the actual production outcomes and mechanisms. Peer review may test a reported yield, a water measurement, a nutritional analysis or a proposed mechanism. It cannot reasonably make the existence of natural ecosystem function conditional upon acceptance by an agricultural research establishment.

The candle-maker and lightbulb analogy captures the author's experience, but the argument does not depend on proving motive. The natural ecosystem is not a new framework awaiting acceptance or rejection. What is new is its deliberate agricultural adaptation through PQNK. Specific PQNK measurements and proposed mechanisms can be examined scientifically, but the burden is not to re-prove the biological operating principles that terrestrial ecosystems have demonstrated over geological time.

## THE NARC ENCOUNTER: INSTITUTIONAL VALIDATION ON ITS OWN TERMS

The engagement between PQNK and Pakistan's national agricultural research establishment represents a different kind of institutional story: a formal wheat comparison was undertaken and generated results that Pedaver retains as an important part of the PQNK evidence record. The figures below are presented as results recorded in Pedaver's copy of the institutional trial documentation. Their importance is measurement: an institution applied its own procedures to an agricultural adaptation already functioning in farmers' fields and recorded the resulting performance.

The NARC wheat trial compared three treatments: Treatment One (PQNK: no-till raised beds, precision planting, zero purchased inputs); Treatment Two (conventional drill seeding with full inputs); and Treatment Three (broadcast seeding with full inputs). The results were unambiguous on the economic measure most relevant to farmers: Treatment

One produced a cost of production of Rs. 11,052 per acre against Treatment Two's Rs. 26,236, a reduction of fifty-eight percent. At eighty percent planting precision, Treatment One's projected profit margin exceeded Rs. 130,000 per acre, more than double the conventional alternatives. The trial record used for this chapter reports a seed rate of 2.64 kilograms per acre (about 6.5 kg/ha), against 50 kilograms per acre conventionally. The exceptionally low rate reflects precision placement of individual seeds at planned spacing, relying on plant establishment and tillering rather than compensating for imprecise placement with excess seed.

According to the trial records held by Pedaver, these results were documented in the institution's reporting format. What followed is equally relevant: the trial did not develop into a sustained national programme to measure the adaptation across locations, seasons and management conditions. That institutional inaction does not erase the result. Nor does PQNK depend upon a national institution to establish that natural ecosystem principles are valid. The missed opportunity was to quantify how rapidly and economically those principles could be restored to Pakistan's agricultural soils at scale.

The NARC trial did not create the validity of PQNK. It provided an institutional measurement of an adaptation already operating in farmers' fields. The useful next step was not to ask again whether nature works, but to measure transition speed, water use, yield, cost, soil recovery and crop quality across locations and seasons. That programme did not follow. The evidence remained in the file while the larger agricultural question remained unexamined.

## THE INTERNATIONAL ARCHITECTURE: HOW GLOBAL INSTITUTIONS MAINTAIN CAPTURE

The institutional architecture of agricultural research is global. International research centres, development banks, governments, foundations, universities and private firms all influence what technologies are developed and scaled. Their mandates are not identical and should not be collapsed into a single commercial interest. The relevant PQNK question

is narrower and testable: do their programmes devote comparable attention to systems that reduce recurring input dependence, or do established investment and evaluation frameworks make capital- and product-intensive interventions easier to finance and measure?

CGIAR and the optimisation of the existing paradigm. CGIAR's centres played a central role in the Green Revolution and in developing the crop varieties, production packages and research architecture that helped establish modern ACI agriculture across much of the

developing world. In subsequent decades, CGIAR and similar institutions have added programmes on climate resilience, sustainability, nutrition, water management, conservation agriculture and natural resources. These programmes may improve particular components of agricultural production, but from the PQNK perspective they largely remain attempts to make the existing human-designed agricultural system more efficient, less damaging or more resilient. They do not confront the more fundamental question: why should agriculture continue to operate against the principles by which natural terrestrial ecosystems produce and regenerate? PQNK does not seek another

optimisation of ACI. It challenges its starting assumptions. Nature does not begin with tillage and then develop conservation tillage, apply fertiliser and then improve fertiliser efficiency, use pesticides and then seek safer pesticides, or degrade the soil-water system and then engineer increasingly sophisticated irrigation. It begins with an undisturbed, biologically organised, permanently covered and biodiverse living system. The central research failure, therefore, is not that institutions such as CGIAR have done nothing about sustainability. It is that sustainability has largely been pursued as an improvement to the

## What the Funding Structure Tells Us About Research

### Q If the natural ecosystem already demonstrates biological production, why does agricultural science remain centred on purchased inputs?

A Because agricultural research largely developed around improving the agricultural system humans had already created. Funding naturally followed questions that could improve seeds, fertilisers, pesticides, irrigation, machinery and other marketable technologies. Far less attention was given to a more fundamental question: how does nature sustain biological production without these recurring interventions? PQNK begins with that question. It does not ask science to validate nature. It asks science to understand, measure and apply nature's operating principles to production agriculture.

### Q What is the difference between PQNK's evidence base and conventional agricultural research?

A PQNK did not begin as a laboratory hypothesis tested on a few square metres. Its foundation is the natural terrestrial ecosystem, whose biological principles have sustained plant production for hundreds of millions of years without tillage, synthetic fertiliser, pesticides or routine human management. PQNK identifies and adapts those principles to agriculture. More than fifty years of field development, many thousands of practising farmers, extensive field records, photographs and testimonial videos, government trial data and peer-reviewed work document that adaptation under real farming conditions. Research can measure, compare, explain and refine this process. It does not need to prove that nature's biological operating principles work.

### Q Then what should agricultural research investigate about PQNK?

A The useful question is not simply, “Does PQNK work?” The important questions are: How rapidly can degraded agricultural soil recover natural ecosystem functions? How should the transition be adapted to different soils, crops and climates? How much irrigation water, energy and purchased input can be eliminated? How do soil biology, nutrient cycling, crop yield and nutritional density change over time? How should machinery be redesigned so that production protects rather than repeatedly disturbs the living soil? These are questions of measurement, adaptation and engineering, not permission to use principles nature has already demonstrated.

### Q How should a farmer evaluate conflicting claims between PQNK and ACI science?

A Look at the whole system and look at the field. Ask what happens to soil, water, biodiversity, purchased-input dependence, production cost, crop performance and food quality over time. Examine who funded the research, what was measured, how long it was measured, what comparison was used and whether the method actually tested the whole production system. A square-metre experiment can answer some questions. A functioning farm answers others. The field is not inferior evidence because it is a field. It is where agriculture ultimately has to work.

prevailing agricultural architecture rather than by questioning why agriculture departed from the natural production system in the first place.

The World Bank and other development institutions have financed irrigation, mechanisation, seed systems, market infrastructure and agricultural modernisation in Pakistan and elsewhere. Many of those investments addressed real constraints and cannot fairly be reduced to an agrochemical agenda. The PQNK challenge is that development appraisal should compare engineered and purchased-input solutions with the value of restoring biological soil function, infiltration, nutrient cycling and farmer independence. If those ecosystem services are not measured, the comparison is incomplete before the project begins.

The December 2025 PQNK Research Collective analysis, submitted simultaneously to the FAO, UNEP, IPCC, World Bank, IMF, WHO, WEF, UNDP, IFAD, CGIAR, GEF, and OECD, as well as to national governments and philanthropic foundations, represents PQNK's most sustained attempt to engage the international institutional framework on its own terms: with a quantified cost-benefit analysis, documented field evidence, and a clear policy prescription. The analysis estimates roughly $1.9 trillion a year in avoidable costs from ACI agriculture and a further $2.8 trillion restoration opportunity, a combined transformation potential of about $4.7 trillion a year; its methodology and boundaries are developed in Chapter Fourteen, The True Cost. At the time of writing, no formal institutional response has been received from any of the organisations to which it was submitted.

## THE FARMERS AS EVIDENCE: WHAT INSTITUTIONS IGNORE

Farmer evidence is not an embarrassment to be explained away as anecdote. It is the field record of adaptation. PQNK has been practised on many thousands of farms under real production conditions, while Pedaver's field and social-media archives contain more than 130,000 photographs and videos documenting crops, soils, water management and production outcomes across several countries. These records are not controlled experiments and should not be described as such. Their strength is different: repeated implementation by independent farmers across diverse crops, soils, climates and seasons. They demonstrate that PQNK is not a laboratory concept awaiting its first encounter with reality, but an operating production approach whose adaptation has already been validated extensively in the field.

Across that field record, recurring outcomes reported by practising farmers include reduced purchased-input dependence, major water savings, competitive or improved yields, biological recovery and, in mature systems, movement toward closed-loop production. The appropriate role of formal research is to measure these outcomes more precisely, explain mechanisms, compare transition pathways and improve implementation. It is not to treat the absence of an experimental-station origin as the absence of evidence.

## THE PRIVATE SOCIAL NETWORK: DOCUMENTED INDUSTRY ATTACKS ON INCONVENIENT SCIENCE

The capture of agricultural science is not merely a passive structuring of incentives. In its more aggressive manifestations, it involves active efforts to discredit, suppress, and attack

researchers whose findings threaten commercial interests. The pesticide industry's response to research on the health and environmental effects of its products provides the best-documented examples of this active suppression.

A particularly important documented case was revealed by the Guardian and Lighthouse Reports in September 2024, with follow-up reporting in February 2025. The investigation described an invitation-only portal operated by v-Fluence that profiled more than 500 scientists, advocates and others seen as critics of pesticides or GM crops. Funding flowed in part through US-government-supported contracts, including work routed through IFPRI, and the portal's membership included regulatory officials, agrochemical-industry representatives, lobbyists and academics. The case does not prove that all agricultural science is captured. It does prove that organised efforts to influence debate and discredit critics have existed and deserve scrutiny.

Other documented cases reinforce the need for safeguards. Peer-reviewed research using litigation documents has described ghostwriting and attempts to influence peer review in the glyphosate controversy. Such cases justify strong conflict-of-interest rules and transparency. They do not justify assuming misconduct whenever research supports a commercial product. The principle must work in both directions: judge evidence by methods, data, disclosure and reproducibility, not by whether its conclusion favours PQNK or industry.

## WHAT GENUINE AGRICULTURAL SCIENCE WOULD LOOK LIKE

Research questions should begin where the real uncertainty begins. The foundational question is not whether an undisturbed biological ecosystem can function without synthetic agricultural inputs; nature has already answered that. Agricultural research should ask how rapidly degraded farmland can be returned toward that function, how the transition differs among soils and climates, how much irrigation and purchased input can be eliminated, how crop quality changes, and how machinery can be redesigned so that production protects rather than repeatedly disrupts the living soil.

Methods must match the system being measured. PQNK should be measured at the scales and times over which its processes operate. Multi-season work can quantify soil organic matter, infiltration, water use, microbial and mycorrhizal recovery, crop performance, nutritional density, input dependence and farmer economics. Replicated plots remain useful where they isolate a specific mechanism; farm-scale observation is necessary where the question concerns whole-system performance and operational practicality. These are tools for measurement and refinement of the agricultural adaptation, not a prerequisite for recognising the natural ecosystem as the governing production precedent.

**Independent funding with no commercial strings.** The PQNK research programme was built over fifty-three years on self-funded, non-commercial investigation, free from the institutional pressures that shape industry-funded research. This independence is what allowed the research to follow the evidence wherever it led, including to conclusions that challenge the entire foundation of the commercial input system. Genuine agricultural science requires funding structures that provide this independence: government funding with publication freedom, philanthropic funding without product interests, and, where

industry participates, regulatory structures that separate research conduct from research outcome.


## THE PATH FORWARD: WHAT MUST CHANGE

Pedaver Research (2025) sets out a specific set of policy prescriptions for reforming the agricultural research system. These prescriptions reflect the lessons of fifty-three years of engagement with the system's limitations from the outside.

Redirect a meaningful share of public research funding. The priority is not to place PQNK in an approval queue to determine whether nature works. Public investment should measure the agricultural adaptation at useful scale: transition speed, soil recovery, water use, crop performance, nutritional quality, economics, machinery, farmer education and crop-specific management across soils and climates. Research should document, quantify and refine the transition while teaching ecosystem function alongside conventional agronomy.

Strengthen firewalls around conflicts of interest. Funding sources and relevant financial relationships should be disclosed. Journals and agencies should manage reviewer conflicts, preserve investigator publication rights and encourage independent replication. Industry participation need not be prohibited, but commercial sponsorship should never be allowed to determine whether unfavourable results can be published.

Recognise farmer evidence as a legitimate knowledge source. Many thousands of practising farmers and the extensive archive of testimonial videos, photographs and field records constitute large-scale validation of the adaptation process. Such evidence should be organised, indexed and, where useful, paired with measurements so that institutions can learn from it. The farmer's field is not scientifically irrelevant because it is larger than a research plot; it is where the production system ultimately has to work.

The purpose of reform is therefore not to place PQNK back at the beginning of an institutional approval queue. It is to redirect agricultural science toward the questions that remain useful: measurement, comparison, mechanism, transition speed, crop-specific refinement, engineering and scale. Institutions can contribute enormously when they

study these questions independently and openly. They should not confuse their ability to measure nature with authority to validate nature.

## WHEN A DISRUPTIVE ALTERNATIVE CAN NO LONGER BE IGNORED: DISMISS, APPROPRIATE, REDEFINE

Capture is not a static condition. When a disruptive alternative accumulates enough field evidence and enough farmers to become impossible to dismiss indefinitely, the system does not concede. It adapts, in a predictable three-phase sequence that is now visible in real time around PQNK itself.

Phase One, in Pedaver's account, was dismissal. PQNK's claims were frequently treated as implausible or outside conventional agronomic thinking. Where specific statements of dismissal are documented, they belong in the historical record; where motive is inferred, it should remain identified as interpretation rather than fact.

Phase Two, in Pedaver's documented interpretation, was appropriation without attribution. Pedaver records a 1 December 2022 Planning Commission presentation of a programme called RAPS, Regenerative Agriculture Production System, to the visiting United States Ambassador. Pedaver states that the presentation used metrics and techniques closely matching previously published PQNK material, including lower production cost, water savings, chisel ploughing, permanent beds and no-till planting, without attribution to PQNK. Because plagiarism is a specific allegation, the strongest publication practice is to preserve the original dated PQNK material and the RAPS slides side by side so readers can examine the comparison themselves.

Phase Three is the contested meaning of 'regenerative agriculture'. Bayer and Syngenta now publicly place regenerative agriculture at the centre of their agricultural strategies while continuing to offer seeds, crop-protection products, biologicals and digital technologies. Syngenta explicitly describes regenerative agriculture as compatible with optimised chemical inputs. PQNK uses the term differently: restoration should progressively reduce dependence on recurring purchased inputs rather than merely optimise them. The important issue is therefore not the vocabulary itself but the production architecture hidden beneath it.

This sequence is presented here as Pedaver's interpretation of the institutional history, not as proof of motive. What can be tested are the documents, dates, language, metrics and practices. If independent readers find substantial overlap, the appropriate questions are attribution, provenance and whether the newer programme preserves or changes the biological principles from which those practices arose.

## WHAT THIS CHAPTER HAS ESTABLISHED

Agricultural science operates within a funding and institutional architecture that can create conflicts of interest, agenda effects, publication bias and methodological blind spots. Those risks should be confronted directly. But the deeper error is conceptual: agriculture has too often treated the human intervention as the production system and the natural ecosystem as background. PQNK reverses that hierarchy. Nature is the production system. Human engineering has value only when it helps agriculture operate within its rules.

PQNK therefore does not ask agricultural science to validate nature. Nature has already conducted the longest-running production experiment on Earth. PQNK's contribution is to translate that operating logic into practical production agriculture, and many thousands of practising farmers have validated that adaptation in real fields. What science can usefully do now is measure how effectively degraded farmland is restored toward natural ecosystem function, document the transition, quantify water, yield, nutrition, soil and economic outcomes, and improve the engineering required for adoption at scale.

The question before agricultural research is no longer, 'Does PQNK work?' The useful questions are: How rapidly can degraded agricultural soil be returned toward natural ecosystem function? What transition pathway works best under different soils and climates? How much water, energy and purchased input can be eliminated? How does nutritional density change? How should machinery be redesigned so that production no longer destroys the biological system on which production depends? These are questions of adaptation, measurement and implementation, not questions about whether nature requires human validation.

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*Chapter Thirteen: The Sevenfold Bankruptcy*