Navigating the Complexity of

Plant Nutrition in African Landscapes

AN OVERVIEW

apni 2030

Our **Strategy2030 Vision**

APNI aims to contribute to **agricultural transformation** for Africa that delivers **resilient landscapes**, **reliable productivity** under climate stress, and **dignified livelihoods** through reduced risk and improved returns.

APNI's 2026–2030 strategy responds to a rapidly shifting African and global landscape marked by intensifying climate risks, worsening soil degradation, and rising demand for data driven and context specific agronomic solutions. With strengthened continental commitments to fertilizer and soil health, this moment presents a strategic opportunity for APNI to expand its role as a catalytic scientific partner in advancing resilient, productive, and sustainable agri food systems.

APNI's work is grounded in a set of core scientific competencies that enable integrated, context specific, and scalable solutions to plant nutrition and soil health challenges. These competencies include:

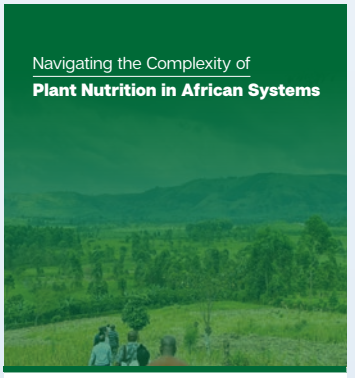
- **Site specific fertilizer and agronomic management** that aligns nutrient supply with crop demand across diverse agro ecologies;
- **Farmer centered research approaches,** that combine biophysical and socioeconomic insights to ensure feasibility, relevance, and adoption; and
- **Rigorous assessment of environmental services** that provides credible evidence on soil health, nutrient cycling, climate mitigation, and ecosystem outcomes.

These capabilities combine with our science-based application of the 4R Nutrient Stewardship Framework–Right Source, Right Rate, Right Time, and Right Place–to improve nutrient management in smallholder farming systems.

4R Nutrient Stewardship functions not only as a sound technical framework, but also as a practical system for value creation and informed decision making.

APNI's distinctive contribution lies in generating science anchored in conditions conducive to farmer and institutional adoption. By ensuring research responds to real-world demand, APNI bridges the persistent gap between agronomic potential and on-farm adoption, supporting broad impact with R&D that delivers scalable Minimum Viable Products (MVPs). Few organizations combine applied crop nutrition science, farmer-centric co-creation, and institutional embedding at a continental scale. This integrated model defines APNI's added value.

APNI operationalizes this value proposition through a challenge–solution model structured around **four mutually reinforcing R&D pathways.**



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Learn more about **APNI2030** at apni.net/strategy

PATHWAY 1:

Expanding Crop Nutrition Frontiers

Advancing multiple-benefit landscape agronomy by demonstrating how 4R-based nutrient management can move beyond yield enhancement to simultaneously regenerate soil health, stabilize carbon stocks, and improve human nutrition through nutrient-dense crops.

APNI prioritizes research that:

Quantifies environmental co-benefits of agricultural production, such as carbon stabilization, nutrient retention, and water quality protection, to strengthen the evidence base for **multiple-benefit agronomy.**

Optimizes 4R nutrient management across topographic, soil, and hydrological gradients to account for spatial and temporal heterogeneity in agricultural landscapes.

Demonstrates how specific 4R source, rate, time, and place combinations stabilize soil carbon, increase soil organic matter, and reduce nutrient losses.

Links soil biological and chemical processes under 4R management to nutrient density and dietary quality, strengthening the evidence base for nutrition-sensitive agronomy.

PATHWAY 2:

Innovating Crop Nutrition for Diverse Cropping Systems

Establishing the 4R framework as a systemic approach to optimize performance across agro-ecologies and cropping systems.

APNI prioritizes research that, in selected cropping systems:

Calibrates nutrient application to water availability, including rainfall, irrigation, and soil moisture dynamics, to optimize nutrient use efficiency, water productivity, and yield stability.

Optimizes nutrient management by explicitly accounting for spatial and temporal variability within cropping systems, including interactions in intercropping and crop rotation arrangements.

Generates location-specific ROI, yield-gap, and risk analyses that provide a clear economic rationale for sustainable nutrient management and investment decisions.

Quantifies and optimizes root–water–nutrient interactions so that economic projections reflect crop performance under stress and climate variability.

PATHWAY 3:

Accelerating Adoption through Farmer-Centric Innovation

Integrating labor, risk, gender, and economic constraints directly into 4R solution design through farmer-led research and social co-creation.

APNI prioritizes research on 4R systems agronomy that:

Integrates critical pull factors, including labor availability, gendered responsibilities, risk exposure, and cash-flow cycles, directly into the design of nutrient management strategies.

Utilizes on-farm experimentation to align the scientific potential of the 4Rs with the lived realities, constraints, and decision-making processes of farming households.

Develops analytics and digital decision-support tools that enable co-interpretation of data with farmers, translating complex on-farm data into actionable, site-specific recommendations.

Generates insights into behavioral and economic drivers of adoption, ensuring that technically sound innovations are also optimized for long-term ownership by women, youth, and marginalized groups.

Embeds research within agricultural value chains and engages strategic research, extension, development, and private-sector partners to accelerate learning, validation, and scaling.

PATHWAY 4:

Building Capacity in Research and Extension Systems

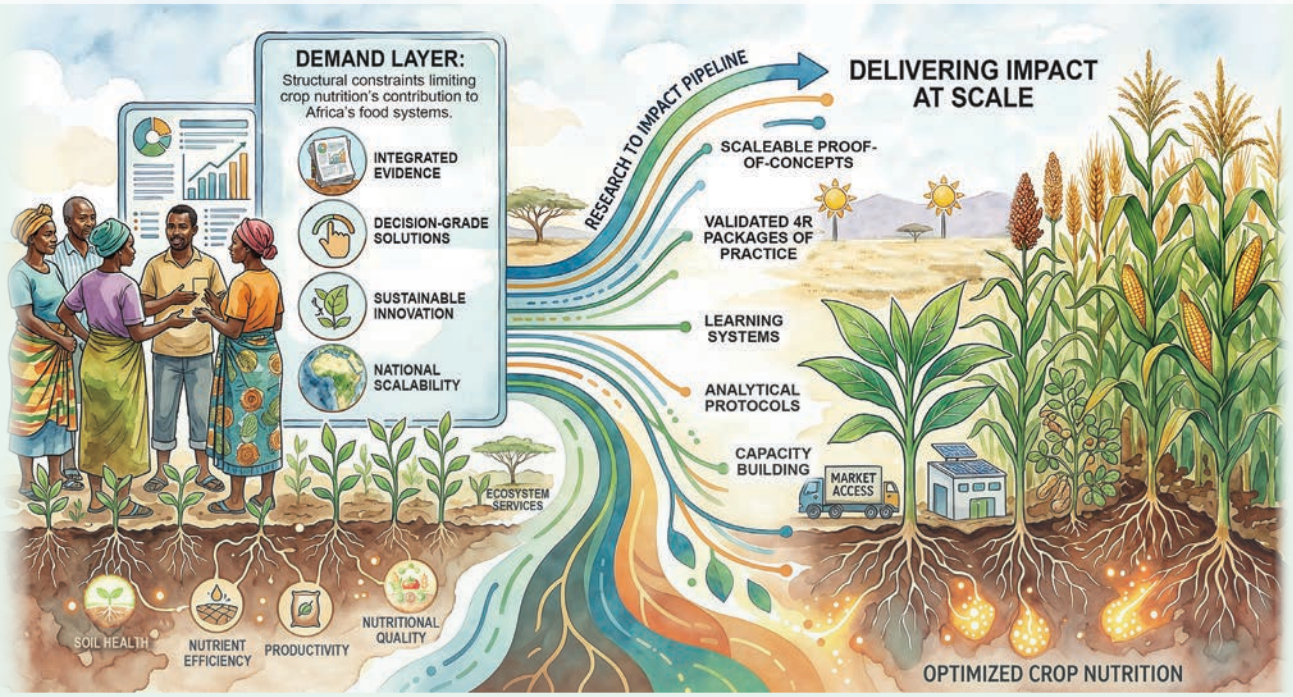
Strengthening NARES by embedding 4R science within national research programs, curricula, and extension systems, to create durable institutional competency to generate, adapt, and scale locally relevant crop nutrition knowledge independently.

APNI prioritizes capacity development efforts that:

Embeds 4R science and systems agronomy into university curricula, graduate and early-career research programs, and national extension training frameworks, building a sustained pipeline of next-generation African scientists and practitioners.

Integrates graduate students and early-career researchers directly into APNI's core research pathways 1-3, linking capacity development to the generation of decision-grade evidence.

Transfers digital toolkits, diagnostics, data management systems, and decision-support capabilities that strengthen national institutional autonomy and performance in nutrient stewardship.



From Research to Impact: APNI2030 is structured around a clear progression from why research is needed to how it delivers impact at scale. The logic begins with a defined demand layer describing the structural constraints limiting the contribution of crop nutrition to Africa's food systems.

Our solution pathways provide the strategic structure within which research is generated, synthesized, and applied.

The MVP Advantage: APNI transforms science into systemic impact by deploying Minimum Viable Products (MVPs). These are fit-for-purpose research outputs—such as ROI calculators, digital tools, or validated packages of practice—designed to provide immediate value to partners and farmers.

By releasing MVPs early, we use our science to provide the decision-grade evidence required to trigger broader investment by our partners and bridge the gap between agronomic potential and real-world adoption.

Our Partnerships

APNI works with five complementary types of partners, each playing a distinct but coordinated role in value creation:

Strategic Partners to co-create long-term value and drive system-level change.

Scaling Partners to take solutions beyond their original domain.

Resource & Investment Partners who provide core funding and collaboration.

Functional Development Partners to deliver and support on-the-ground research activities and learning processes.

Operational Partners for essential services, inputs, technologies, and infrastructure.

Learn more at apni.net/partnering

Communicating Outcomes and Impact

Communication is positioned within APNI2030 as a strategic driver of impact through its transformation of scientific results into influence, investment, and system-wide change. Its purpose is not only to share evidence, but to motivate action, shape decisions, and mobilize partnerships.

What We Believe

Science creates lasting impact only when it is **contextualized, actionable** and **value-driven.**

Our philosophy centers on **empowering farmers** through informed decision-making rather than prescriptions, while maintaining high **ethical standards** and **FAIR data policies.**

APNI seeks to foster a **healthy environment** and ensure that African agriculture remains globally competitive, sustainable, and locally fulfilling.

By valuing the **shared wisdom** of **strong and diverse partnerships**, we aim to contribute to a **food-secure** Africa where no community is overlooked.