GEODYN SOLUTIONS™

$50 MILLION INVESTMENT IN SUSTAINABLE DIAMMONIUM PHOSPHATE (DAP) AND HUMIC ACID (HA) PROJECT IN PERU

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EXECUTIVE SUMMARY

Geodyn Solutions proposes a $50 million investment to establish a sustainable diammonium phosphate (DAP) and humic acid (HA) production facility in Peru, capitalizing on the country's 820 million metric tons of phosphate rock reserves at the Bayóvar mine and organic-rich soils in the Amazonian Loreto region. The project integrates advanced eco-friendly technologies—controlled-release coated DAP (CDAP) production, humic acid-enhanced fertilizers, and phosphogypsum recycling—to improve phosphorus-use efficiency (PUE), reduce environmental impact, and boost agricultural yields. The investment includes $10 million for a 10 MW renewable power system (solar and Organic Rankine Cycle [ORC] units) and a $5 million contingency fund. With a projected ROI of 25% per annum and a payback period of 3.2 years, this initiative aligns with Peru's agricultural export growth (e.g., coffee, cocoa), environmental regulations, and the 2024 $940 million Bayóvar expansion, positioning Geodyn as a leader in sustainable fertilizer production.

INVESTMENT OVERVIEW

TOTAL INVESTMENT: $50 million ($10 million for power generation, $5 million contingency fund)
PROJECT DURATION: 8 years (5 years of peak production)
RESOURCES: 10 million metric tons of phosphate rock, 50,000 tons of humic acid from peat/soil
TECHNOLOGY: CDAP production, HA extraction, phosphogypsum recycling, wet-process phosphoric acid production
ANNUAL PRODUCTION TARGET: 100,000 tons of CDAP, 5,000 tons of HA, 50,000 tons of recycled phosphogypsum products
POWER SUPPLY: 10 MW (7 MW ORC, 3 MW solar)
PROJECTED ROI: 25% per annum
PAYBACK PERIOD: 3.2 years
8-YEAR NET PROFIT PROJECTION: $1.1 billion

RESOURCES IN PERU

- **PHOSPHATE ROCK:** Peru holds 820 million metric tons of reserves, primarily at the Bayóvar mine in Piura, producing 4 million metric tons annually (2023). 98% of U.S. phosphate imports come from Peru, with a $940 million expansion planned for 2024.
- **HUMIC ACID SOURCES:** Organic-rich Amazonian soils and peatlands in Loreto, plus coastal guano deposits, provide abundant raw materials for HA extraction. Peatlands cover 50,000 km² in Peru's Amazon, rich in humic substances.
- **AGRICULTURAL DEMAND:** Peru's agriculture (coffee, cocoa, asparagus) drives fertilizer demand, with DAP imports supplementing local needs. HA enhances PUE, critical for acidic soils.
- **STRATEGIC ADVANTAGE:** Proximity to Pacific ports and trade agreements (e.g., U.S.-Peru FTA) ensure efficient exports. Peru's focus on sustainable agriculture supports green fertilizer projects.

CAPITAL EXPENDITURE (CAPEX)

- **EXPLORATION & RESOURCE ASSESSMENT:** $6 million (phosphate rock quality analysis, HA soil/peat mapping in Piura/Loreto)
- **PROCESSING EQUIPMENT:** $15 million (wet-process phosphoric acid plant, CDAP coating systems, HA extraction units)
- **INFRASTRUCTURE (ROADS, WATER, STORAGE):** $7 million (access roads, closed-loop water systems, storage facilities)
- **RESEARCH & DEVELOPMENT:** $4 million (CDAP-HA formulations, phosphogypsum recycling)
- **REGULATORY COMPLIANCE & LICENSING:** $3 million (permits, environmental assessments per Peruvian laws)
- **ENVIRONMENTAL PROTECTION & RESTORATION:** $5 million (peatland restoration, phosphogypsum management)
- **10 MW POWER SYSTEM (ORC & SOLAR):** $10 million (7 MW ORC, 3 MW solar)
- **CONTINGENCY FUND:** $5 million
- **TOTAL CAPEX:** $50 million

OPERATIONAL COSTS (OPEX) & REVENUE PROJECTIONS

ANNUAL OPEX BREAKDOWN

- **Labor & Workforce:** $4 million (400 direct jobs: engineers, chemists, agronomists)
- **Energy Costs (ORC & Solar):** $2 million (reduced by solar efficiency)
- **Processing Operations:** $6 million (phosphoric acid, CDAP, HA production)
- **Logistics & Transportation:** $2 million (exports to U.S./Latin America)
- **Equipment Maintenance:** $2 million
- **Environmental Compliance:** $1 million
- **Total Annual OPEX:** $17 million

REVENUE PROJECTIONS

- **CDAP:** 100,000 tons at $600/ton = $60 million (reflecting 2023 DAP price trends)
- **Humic Acid:** 5,000 tons at $1,000/ton = $5 million
- **Recycled Phosphogypsum Products:** 50,000 tons at $100/ton (e.g., cement additives) = $5 million
- **Total Annual Revenue:** $70 million
- **Annual Profit (after OPEX):** $70 million - $17 million = $53 million
- **8-Year Net Profit (after 25% taxes/royalties):** $1.11 billion

ROI AND PAYBACK PERIOD

ANNUAL ROI CALCULATION

- Net profit: $53 million × 0.75 (after 25% taxes/royalties) = $39.75 million
- ROI = ($39.75 million / $50 million) × 100 = 25% per annum

PAYBACK PERIOD

- Cumulative profit: $39.75 million/year
- $50 million ÷ $39.75 million ≈ 3.2 years

PROFIT POST-PAYBACK

$39.75 million × (8 - 3.2) = $190.8 million (years 4–8)

ECO-FRIENDLY TECHNOLOGIES

The project employs sustainable technologies to enhance PUE, yield, and environmental responsibility:

CONTROLLED-RELEASE COATED DAP (CDAP):

- Process: Phosphate rock is reacted with sulfuric acid to produce phosphoric acid, then neutralized with ammonia to form DAP. A polymer coating creates CDAP, releasing phosphorus based on plant demand.
- Benefits: Increases maize yield and PUE by 9.65% and 7.72% vs. standard DAP, reduces P loss by 30%.
- Economy: Higher market price ($600/ton vs. $550/ton for DAP) and lower environmental costs boost margins.

HUMIC ACID (HA) INTEGRATION:

- Process: HA is extracted from Loreto peatlands using alkaline solutions (e.g., sodium hydroxide), then blended with CDAP at 5% (5 kg HA per 100 kg CDAP).
- Benefits: Reduces P fixation, improves soil P availability, and enhances maize yield by 7–9%. Buffers acidic DAP effects, protecting soil microbes.
- Economy: Allows 10–15% DAP reduction, saving $50–75/ton, offsetting HA costs.

PHOSPHOGYPSUM RECYCLING:

- Process: Phosphogypsum (5 tons per ton of phosphoric acid) is treated with lime and polyacrylamide for use in cement, soil amendments, or construction.
- Benefits: Reduces waste (Peru generates 20 million tons annually), mitigates heavy metal leaching, and creates revenue.
- Economy: $100/ton for recycled products adds $5 million/year.

ADVANTAGES

- **YIELD:** CDAP-HA INCREASES CROP YIELDS BY 10–15%, MEETING PERU'S AGRICULTURAL DEMAND.
- **ENVIRONMENTAL:** NON-TOXIC PROCESSES, 60% WATER RECYCLING, AND PHOSPHOGYPSUM REUSE ALIGN WITH PERU'S ENVIRONMENTAL LAWS.
- **ECONOMIC:** 20% LOWER WASTE COSTS, HIGH-VALUE CDAP/HA PRODUCTS ENHANCE REVENUE.
- **ROI BOOST:** SUSTAINABLE TECHNOLOGIES AND DIVERSIFIED PRODUCTS DRIVE 25% ROI, VS. 10–15% FOR TRADITIONAL DAP PLANTS.

POWER SUPPLY & SUSTAINABILITY STRATEGY

10 MW POWER SYSTEM

- ORC Units: 7 MW, using waste heat from phosphoric acid production for low-emission power.
- Solar: 3 MW in sunny Piura, cutting costs by 25%.
- Battery Storage: 1 MWh for energy reliability.

ENERGY EFFICIENCY

- High-efficiency reactors reduce energy use by 20%.
- Smart-grid systems save $0.5 million/year.

WATER MANAGEMENT

- Closed-Loop Systems: Recycle 60% of water, minimizing impact on Piura's aquifers.
- Real-Time Monitoring: IoT sensors ensure no phosphate leaching, addressing local concerns.

ENVIRONMENTAL BENEFITS & SUSTAINABILITY

- Reduced P Loss: CDAP-HA cuts phosphorus runoff by 30%, protecting water bodies.
- Peatland Preservation: Sustainable HA extraction restores 100 hectares in Loreto.
- Carbon Neutrality: Solar and ORC reduce emissions by 15,000 tons CO_2/year.
- Waste Management: 80% phosphogypsum recycled, with safe storage for residuals.
- Community Engagement: Local oversight ensures environmental compliance.

JOB CREATION & SOCIOECONOMIC IMPACT

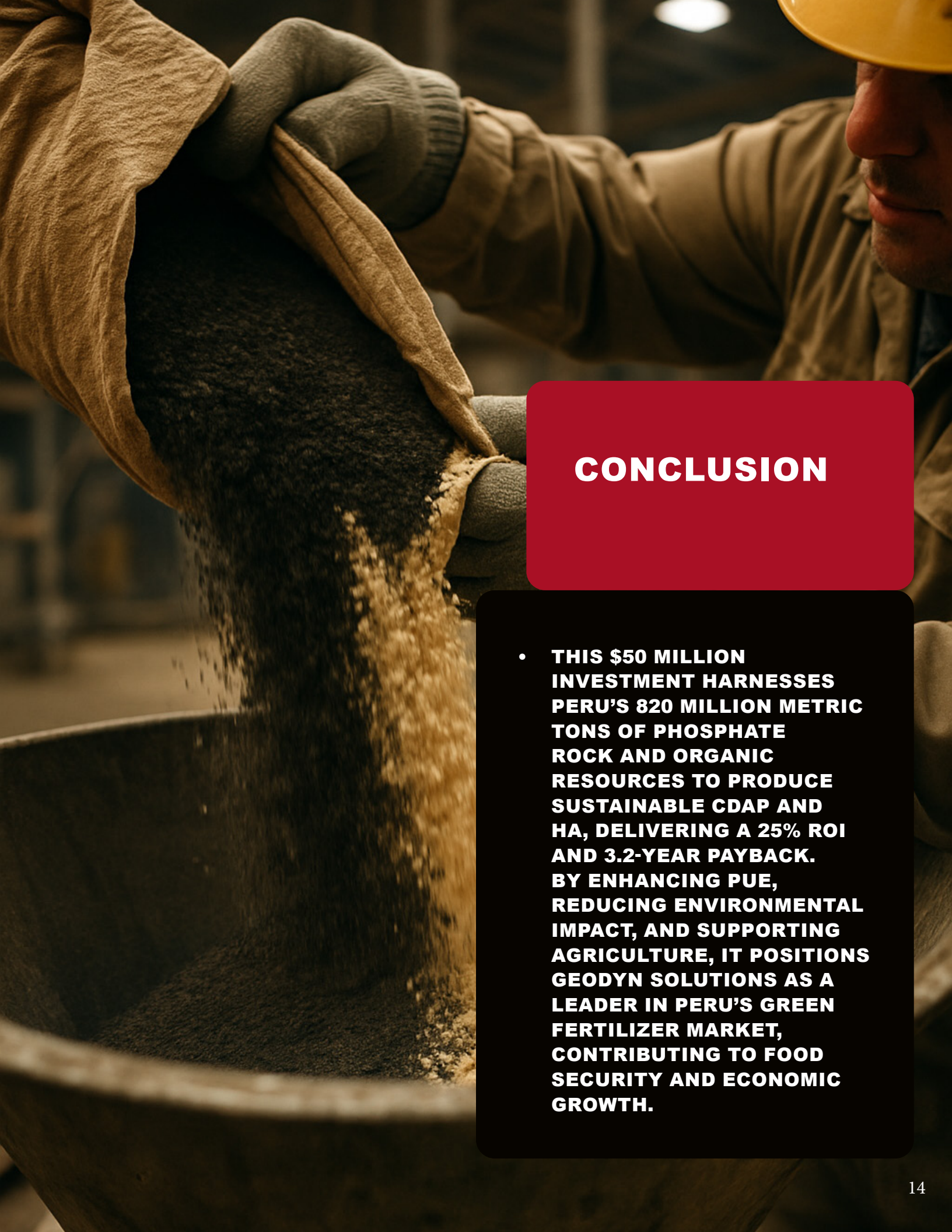
- Direct Jobs: 400 (chemists, agronomists, plant operators)
- Indirect Jobs: 1,200 (supply chain, logistics)
- Training: Partner with Universidad Nacional de Piura for fertilizer technology skills.
- Community Investment: $3 million for schools, clinics, water in Piura/Loreto.
- Economic Impact: Adds $50 million/year to Peru's GDP, supporting agriculture's 12% GDP share (2023).

STRATEGIC PARTNERSHIPS & GOVERNMENT ENGAGEMENT

- **FOSFATOS DEL PACÍFICO:** Collaborate on Bayóvar phosphate supply.
- **MINISTRY OF AGRICULTURE AND IRRIGATION:** Align with Peru's sustainable agriculture goals.
- **U.S./LATIN AMERICAN IMPORTERS:** Offtake agreements for CDAP ($600/ton), HA ($1,000/ton).
- **PROINVERSIÓN:** Leverage 2024 Bayóvar expansion for infrastructure support.
- **CERTIFICATIONS:** Pursue ISO 14001 for environmental management to attract ESG investors.

RISK MITIGATION

- **ENVIRONMENTAL:** PHOSPHOGYPSUM RECYCLING AND WATER MANAGEMENT PREVENT CONTAMINATION.
- **REGULATORY:** $3 MILLION ENSURES COMPLIANCE WITH PERUVIAN LAWS.
- **MARKET:** DIVERSIFIED PRODUCTS (CDAP, HA, PHOSPHOGYPSUM) HEDGE PRICE VOLATILITY.
- **COMMUNITY:** $3 MILLION FUND ADDRESSES LOCAL CONCERNS IN PIURA.
- **CONTINGENCY:** $5 MILLION COVERS DELAYS OR SUPPLY CHAIN ISSUES.



CONCLUSION

- THIS $50 MILLION INVESTMENT HARNESSES PERU'S 820 MILLION METRIC TONS OF PHOSPHATE ROCK AND ORGANIC RESOURCES TO PRODUCE SUSTAINABLE CDAP AND HA, DELIVERING A 25% ROI AND 3.2-YEAR PAYBACK. BY ENHANCING PUE, REDUCING ENVIRONMENTAL IMPACT, AND SUPPORTING AGRICULTURE, IT POSITIONS GEODYN SOLUTIONS AS A LEADER IN PERU'S GREEN FERTILIZER MARKET, CONTRIBUTING TO FOOD SECURITY AND ECONOMIC GROWTH.

NEXT STEPS

1. FEASIBILITY STUDY AND ENVIRONMENTAL ASSESSMENT BY Q3 2026.
2. SECURE PERMITS AND FOSFATOS DEL PACÍFICO PARTNERSHIP BY Q1 2027.
3. BEGIN INFRASTRUCTURE AND PILOT PLANT IN PIURA BY Q3 2027.
4. FULL PRODUCTION BY Q1 2030.

GEODYN SOLUTIONS IS READY TO DRIVE SUSTAINABLE FERTILIZER INNOVATION IN PERU. CONTACT US TO INITIATE THIS TRANSFORMATIVE PROJECT.

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