Moroccan Desert Truffle Fund (MDTF): Sustainable Investment in Cultivation, Processing, and Global Trade

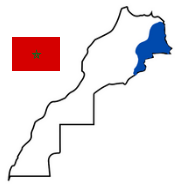
The Crisis in Morocco's Desert Truffle Industry

Northeast Morocco, one of the MENA's richest desert truffle regions, is **losing millions in potential revenue** due to an unstructured, undervalued, exploitative, and unsustainable market.

- **Collectors**, who collectively harvest up to **40-50 tons daily** (in productive seasons; important rainfall), earn as little as **$3.33/kg** for red truffles, while **intermediaries and wholesalers** resell them for **$6.67/kg**, with no added value, achieving a **100% markup**. Conserved red truffles are exported at **$38.10/kg**, resulting in a **1043% markup**. For white truffles, collectors receive **$19.05/kg**, whereas wholesalers sell them, with no added value, for **$33.33/kg**, securing a **75% markup**, despite collectors doing the most labor-intensive work. The value chain is fragmented with three levels of middlemen (intermediaries, semi-wholesalers, and wholesalers), each gaining a markup with no value-added.
- **80-90% of truffles are exported raw**, with no processing, branding, or traceability, missing out on **a 3-5x price increase.**
- Harvesting immature truffles and overexploitation are **destroying natural regeneration**, threatening future production.
- **Droughts** are making wild supply unpredictable (close to 4T in drought years), yet no farming exists to stabilize the industry.

❗ Without intervention, Morocco's truffle economy will **collapse**, leaving thousands of families without income and losing $ millions export opportunity.

Focus Region: Northeast Morocco *(a marginalized region)*, More than **5 million hectares** of suitable conditions for desert truffles.



Focus Desert Truffles:

- **White Truffles** (*Tirmania pinoyi, Tirmania nivea*): High Market Value, Export Demand, Rapid Spoilage (Needs urgent structuring for efficient collection & export).
- **Red Truffles** (*Terfezia claveryi*): Widely Available, Suitable for processing, Increasing demand.

Current Total Annual Production: > 4,000 tons in productive seasons ($80M). Very low in drought years. Global truffle market is valued at over $6B, with annual growth of ~8%.

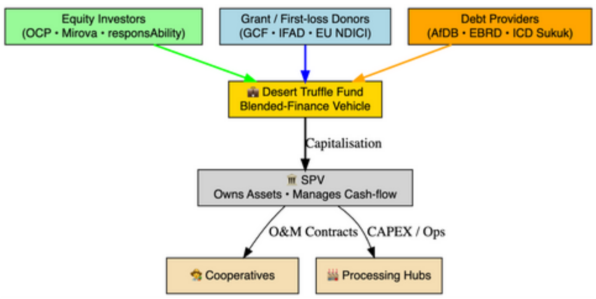
Demand far exceeds supply, from Gulf and European markets.

Solution & Investment Thesis

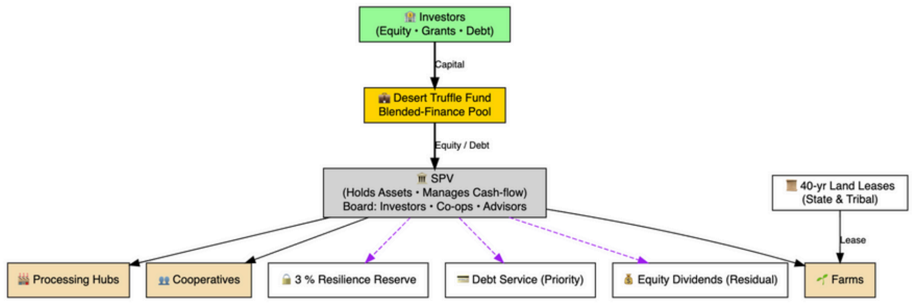
The Moroccan Desert Truffle Fund (MDTF) is a blended capital fund that builds a vertically integrated, climate-resilient value chain for desert truffles in Northeast Morocco. Through a dedicated SPV, the Fund finances three pillars: formalized wild collection via cooperatives, 2,500 ha of irrigated truffle farms under long-term leases, and solar-powered processing hubs for value-added exports.

MDTF addresses market fragmentation, price inefficiencies, and climate risks—unlocking premium export revenues while generating strong social and environmental returns, including 10,000 rural jobs, restored land, and carbon sequestration.

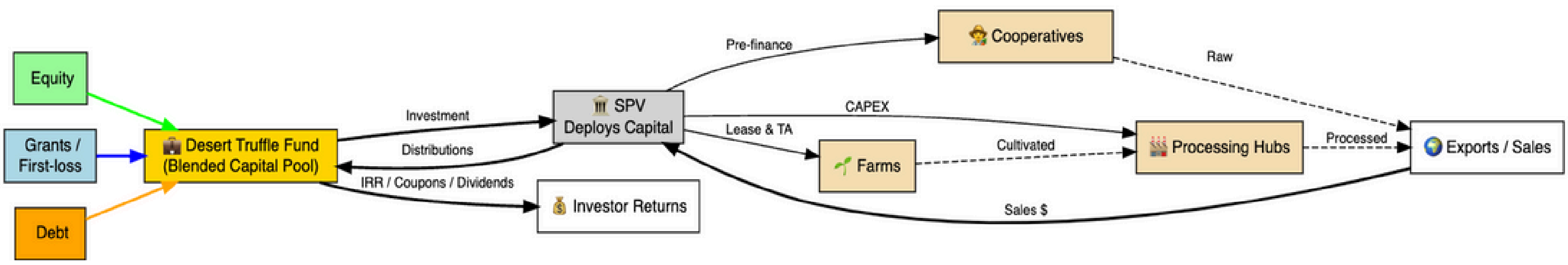
Stakeholders Map



Ownership Structure & Risk Sharing



Capital Flow



Fund Structure & Instrument

MDTF is capitalized through the Desert Truffle Fund**, a blended finance vehicle aggregating capital** from private impact investors, agri-food corporates, philanthropic institutions, and government or development finance partners. **The fund finances a Special Purpose Vehicle (SPV),** which channels investments across three integrated pillars:

- **Cooperative-Owned Truffle Farms:** The SPV finances the cultivation of 2,500 hectares of truffle orchards—both red and white varieties—on long-term leased public and tribal lands. This ensures climate-resilient supply and land restoration.
- **Wild Collection Aggregation:** Cooperatives organize and pre-finance wild truffle collectors, offering them 68% of the white truffle selling price and 73% of the red, significantly increasing incomes while eliminating middlemen. Training ensures sustainable harvesting methods.
- **Value-Added Processing & Export:** The SPV establishes local processing hubs to convert raw truffles into dried, powdered, and paste products. This shift to value-added exports boosts margins up to 4x, with branding and traceability unlocking premium market access.

The SPV serves as the financial backbone of the project, owning core infrastructure, allocating capital, and distributing profits to investors. Its role ensures financial ringfencing, governance discipline, and replicability across regions. **Five cooperatives**, each managing 500 hectares, serve as long-term operating partners embedded within the model.

Timeline of Project

- Register 5 cooperatives under Law 112-12 (ODCO).
- Sign 40-year emphyteutic leases:
  - 1,500 ha public land (state)
  - 1,000 ha tribal land (with MoU).
- File Environmental Impact Assessment (Law 12-03) & obtain ABH Moulouya water abstraction permit.
- Launch certified 5-day training on:
  - Governance, sustainable wild digging, hygiene (GHP-compliant).
- Procure long-lead items:
  - Nursery stock (host trees), solar pumps, inoculated seedlings.

US $ 1.4 M

Year 1

- Organize 2,000+ wild truffle collectors into co-ops.
- Launch pre-financing scheme:
  - Floor price = 70% of FOB, cash upfront.
- Begin raw truffle exports:
  - 80–100 tons/year to EU & Gulf (generates early revenue).

Construct and equip first solar-powered cold storage + freeze-drying hub.
  - Operational by Month 30.
- Pilot 2,500 ha farm inoculation on leased land (red & white truffles).
  - Initial irrigation & fencing installed.

US $ 4.2 M

Year 3

- First farm-based harvest (both red & white) in Year 4.
- Expand processing hub to 2 tons/day capacity:
  - Launch 3 value-added SKUs (dried, paste, powder).
- Breakeven reached by Year 6:
  - Wild harvest stabilized and capped at 160 tons/year for sustainability.
- Meet DSCR ≥ 1.5x (Debt Service Coverage Ratio).
  - 3% resilience reserve fully funded annually.

US $ 6.0 M

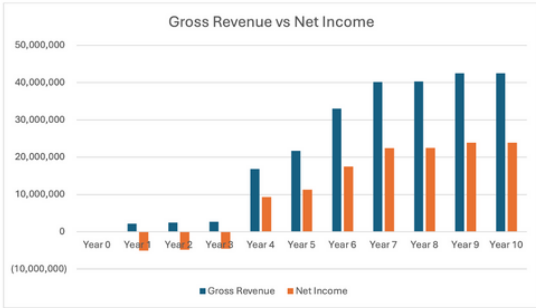
Year 7

- Farms reach peak yields of 400 kg/ha:
  - 60% of all supply becomes farm-based.
- 100% of red and 50% of white truffles are processed locally.
  - This enables 3x–4x margin uplift.
- Equity distributions start in Year 7.
  - Investors earn based on IRR outperformance.
- Exit options activated:
  - Secondary sale to agribusiness buyer
  - Or roll-over into SPV #2 (expansion fund).
- >10,000 ha replication potential unlocked in Phase 2

US $ 4.2 M

Year 10

Financial Projections (10-Year Snapshot)



SPV Structure for the MDTF Fund

1) Capital Intake & Risk-Buffering

- Aggregates **grant, equity, sukuk & senior-loan proceeds** channelled by the Desert Truffle Fund.
- Locks in risk-mitigation up-front:
- **40-year land leases** signed **before** drawdown.
- **Pre-finance to co-ops** eliminates middle-men volatility.
- 3 % of gross revenue auto-swept into a **Resilience Reserve** (drought or price shock).

2) Asset Ownership & Contracting

- SPV **owns or long-leases all core assets** – farms, processing hubs, cold-chain fleet.
- Executes **off-take & management contracts** with five registered co-operatives; KPIs: yield, traceability, gender quota.
- Board composition: 2 investor reps, 1 co-op delegate, 1 independent climate adviser → majority vote required for asset sale.

3) Revenue Collection & Profit Distribution

- Target equity return: un-levered IRR ≈ 20 %; hurdle 8 % coupon for sukuk & senior loans.

4) Asset Transfer & Exit Strategy

- **Option A – Trade sale:** sell hubs & brand to regional agrifood group; farms leased back to co-ops.
- **Option B – Refinance / roll-over**: dividend recap plus capitalise **SPV #2** (next 10 000 ha) with same governance.
- **Option C – Gradual coop buy-out:** convert land leases into equity on a book-value schedule (co-ops earn up to 40 % ownership by Year 15).

Role of Philanthropic Capital & Pathway to Market-Rate Returns

- 12 % first-loss layer : government grants, GCF, EU NDICI guarantee & carbon pre-payments ring-fence early risk.
- IFAD/ASAP concessional loans cover co-op formation, TA and index-insurance premia.
- Outcome → Leases signed, hub #1 built, raw-export revenue starts.

Phase 1 (Years 1-3): Risk Absorption by Grants & Concessionary Capital

- Cultivated farms + processing hub hit positive EBITDA; DSCR ≥ 1.5×.
- SPV can refinance senior debt with commercial green credit / sukuk, releasing grant capital for scale.
- Profit-share agreements with co-operatives lock in long-term supply & social licence..

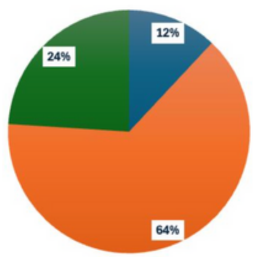
Phase 2 (Years 4-7): Transition to Market-Based Financing

- Project delivers ≥ 20 % un-levered IRR; equity dividends begin Year 7.
- Draws in institutional ag-food & infrastructure funds for 10 000 ha replication (SPV #2).
- Exit choices: trade sale of hubs, secondary share sale, or reinvestment in scale-out vehicle.

Phase 3 (Years 8-10+): Full Market Maturity & Institutional Investment

Funding Type Mix

Stream	Timing	Waterfall tier
Wild-truffle exports	Years 1-3	feeds operating cash & debt coupons
Farm yield sales	Years 4-10	T fills Resilience Reserve → Debt Service (DSCR ≥ 1.5x)
Value-added SKUs (dried, paste, powder)	Years 4-10	1 Equity dividends once reserve & debt serviced



- **12 % Grants / First-loss** : covers technical assistance, index-insurance, and early resilience.
- **64 % Equity** : impact & strategic investors capture the 20 %+ IRR upside and hold board seats.
- **24 % Debt / Sukuk / Green loans** : senior instruments fund asset-heavy hubs and solar irrigation; DSCR > 1.5× from Year 6.

Blended-finance logic: first-loss de-risks, equity governs and scales, modest leverage boosts ROE without straining cash-flow. This cap-table is already matched to missions of listed institutions, ensuring realistic closings within the pilot timeline.

Scalability

The Moroccan Desert Truffle Fund (MDTF) is designed as a scalable and replicable model that can expand beyond the Northeast region. **Other key truffle-producing regions in Morocco,** such as Maâmora Forest, Doukkala-Abda Sahel, and the Moroccan Sahara, offer significant potential for replication. **Scale-up strategy:** Public-private partnerships to lease additional 10,000+ ha for truffle farming.

Other **MENA countries** (Egypt, Algeria) also have similar environmental and economic conditions, offering scale potential. Partnerships with regional agribusiness firms to replicate the processing model.

We can also expand into **medicinal & nutraceutical markets** using truffle-based extracts. This structure can also be applied to **other undervalued, and unstructured crop industrie**s including Saffron, Argan nuts, etc.

Risk - mitigation & sensitivity analysis

-50% of revenues	-0.8%
-40% of revenues	5.00%
-30% of revenues	9.70%
-20% of revenues	13.90%
-10% of revenues	18.20%
Base scenario	20.70%

The project maintains a positive IRR down to -40% revenue, with IRR still at 5.0%, and only turns negative (–0.8%) at a –50% revenue shock. The base case projects a strong IRR of 20.7%, confirming resilience under most plausible climate or market disruptions.

Due Diligence Process

- **Land & Environmental Viability:** Assess soil, water, and climate resilience; mitigate desertification risks.
- **Cooperative & Market Screening:** Partner with harvesters, enforce fair labor, and vet buyers/exporters.
- **Risk & Governance:** Secure land leases, stress-test financials, and monitor impact via KPIs & technology.

Legal and government alignment

- **Land security:** 40-yr emphyteutic leases (Dahir 1-05-152) + tribal accords.
- **Wild harvesting** formalised via Water & Forest Ministry licences.
- **EIA** approved under Law 12-03; water permit ABH-Moulouya.
- **Génération Green 2020-2030**: project coded as flagship agroforestry export.
- **No export barriers** : ONSSA phytosanitary & TRACES EU compliant.

IRR % Matrix given Scenarios

Yield + / Price v	-20 % price	Base price
300 kg/ha	11.4 %	15.2 %
375 kg/ha (base)	18.2 %	**20.7 %**
450 kg/ha	22.5 %	25.5 %

Impact assessment

Dimension	Measurable Result by 2034	SDG Links
Social	1 200+ direct rural jobs (30% women); harvester income ↑ 5×	1 No Poverty; 8 Decent Work and Economic Growth; 10 Reduced Inequalities
Environmental	2 500 ha restored; +0.3% soil-C; 230 000 t CO_2e sequestered (first 10 y)	13 Climate Action; 15 Life on Land
Economic	75% of output processed locally; $42.5 M revenue/year at steady state	2 Zero Hunger; 9 Industry, Innovation and Infrastructure; 17 Partnerships for the Goals

Major downside scenarios & controls

- **Export ban :** MoU with ministries + 25 % domestic channel.
- **Systemic drought** : 2 500 ha irrigated farms + index insurance.
- **Middlemen sabotage :** integrate as coop board members w/ profit-share.
- **Cold-chain failure :** solar backup, maint. OPEX reserve.