

Solar + Rosemary Agrivoltaics

Dual-use mountain land for clean power,
resilient herbs and rural income in
Uttarakhand.

Investor Pitch | Uttarakhand

A solar plant can become a productive, climate-smart herb farm without compromising generation.



The hill advantage comes with hidden scale costs.

Uttarakhand slopes can generate strong solar output, but the same terrain makes conventional solar O&M and high-value cultivation difficult to scale.

Solar O&M constraints

- 1 Uneven land limits mechanisation**
Tractors and standard equipment cannot move safely across steep terraces, keeping O&M labour-led.
- 2 Cleaning + weed control are recurring costs**
Current 400 kW site requires ₹5–10k/month cleaning, while weeds return through the season.
- 3 Erosion raises technical risk**
Runoff and loose hill soil can disturb access paths, exposed foundations and maintenance interventions.

IDLE GROUND

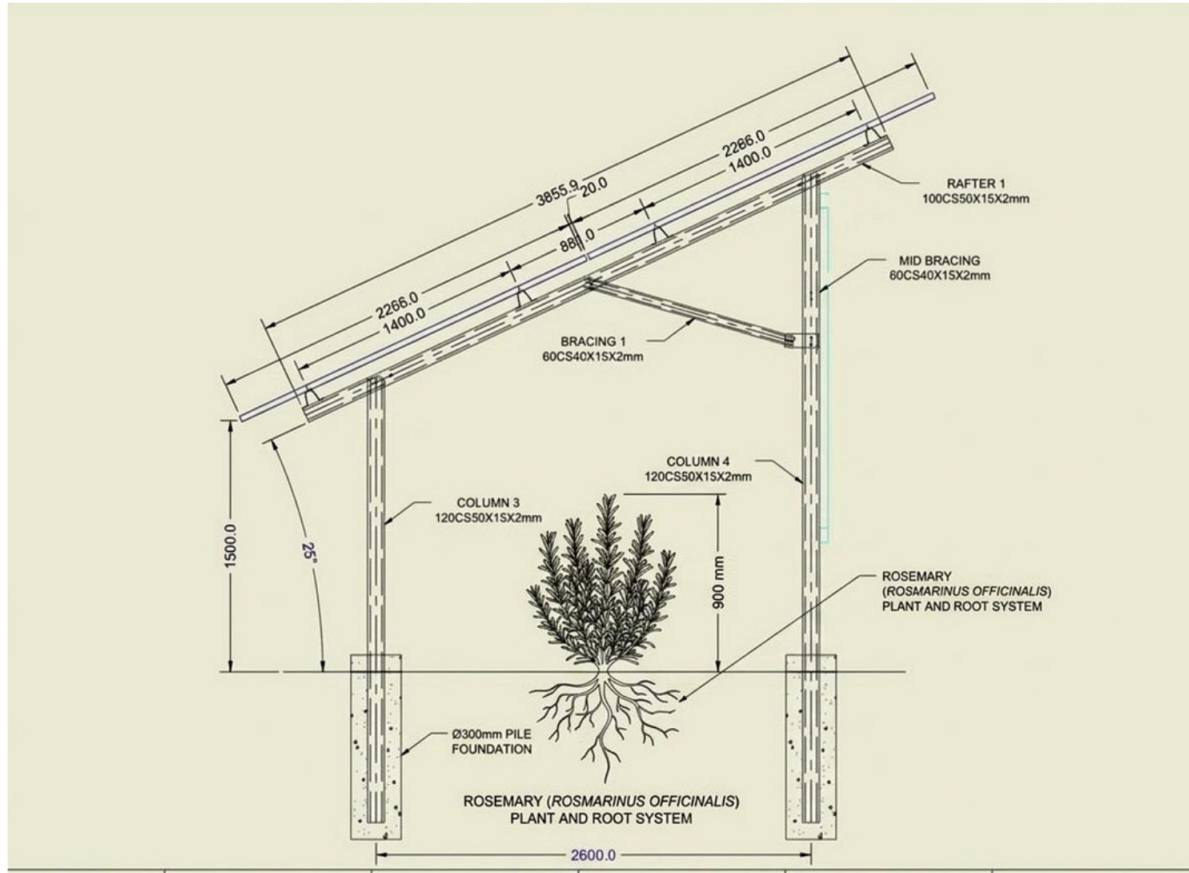
Mountain farming constraints

- 1 Returns are front-loaded**
Plants, irrigation, labour and crop establishment require capital before meaningful harvests begin.
- 2 Adoption of non-staple crops remains low**
Growers hesitate without demonstrated yields, buyer assurance and predictable economics.
- 3 High-value herbs need assured offtake**
Fresh and dried herbs require reliable buyers, storage, processing and price visibility.

The opportunity is to turn a costly ground layer into productive crop value without compromising the solar asset above it.

Elevated PV structure over rosemary

Technical section showing the structural bay, pile foundation, panel tilt and rosemary root zone underneath.



- **PV canopy**

Panel geometry and tilt are retained for generation performance.

- **Working clearance**

Low-height perennial crop keeps service corridors accessible.

- **Root zone**

Rosemary adds productive ground cover without competing with the panel structure.

1.5 m
low edge

2.6 m
bay width

900 mm
plant height zone

The agrivoltaic structure is designed to maintain solar output while turning under-panel space into a managed rosemary crop zone.

Two growing demand curves, one land parcel

India's 2030 clean power target and rising fresh + dry herb demand create a dual-sector growth



**DUAL-SECTOR
GROWTH**

300.5 → 500 GW

India non-fossil capacity today vs 2030 target

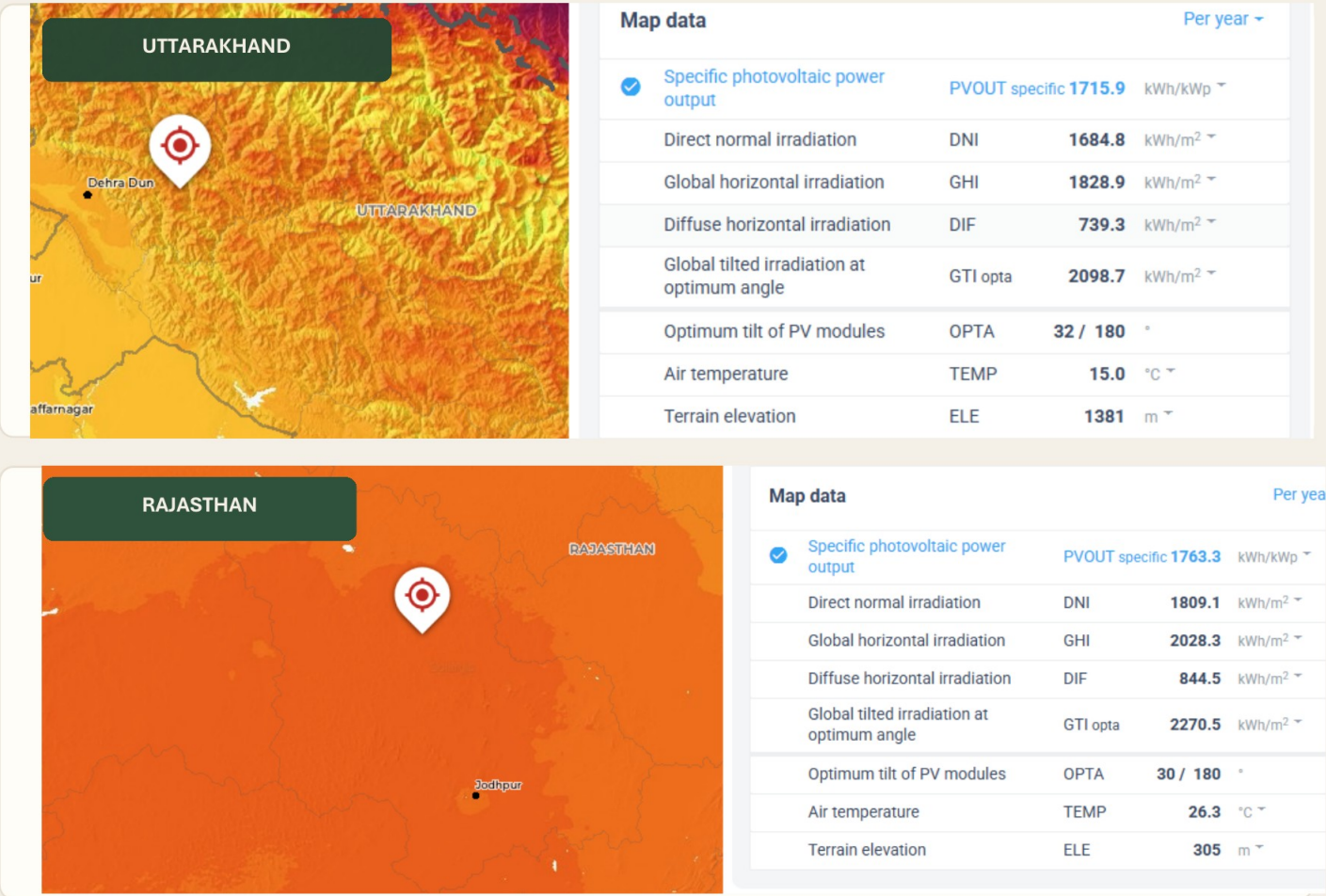
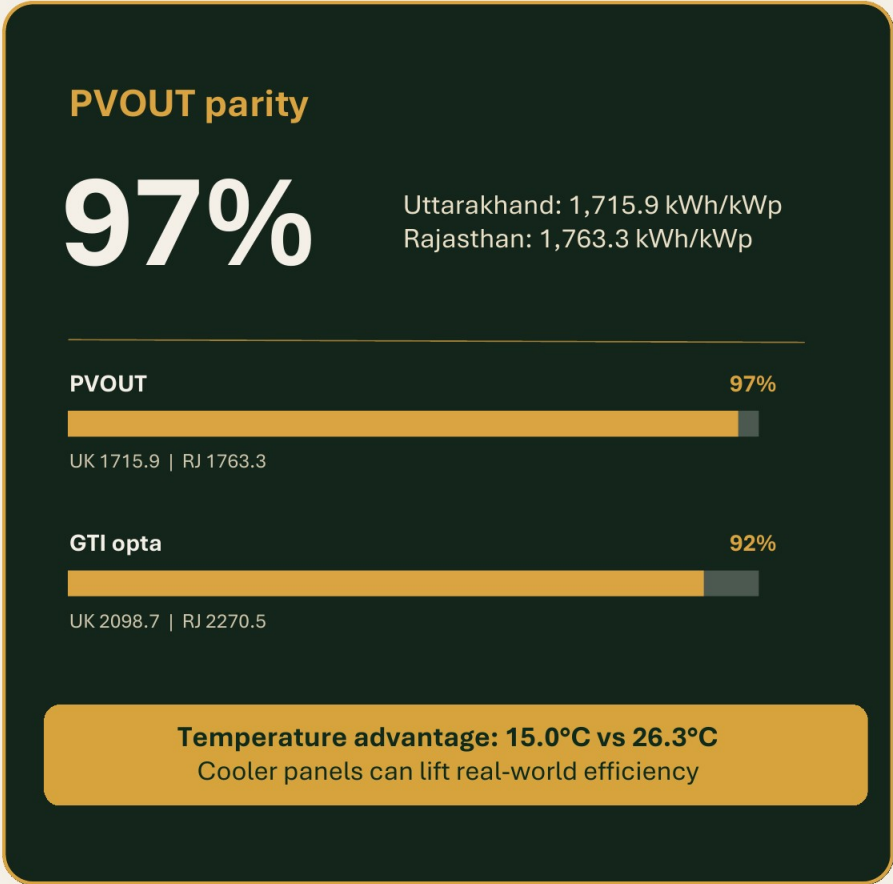
10.6% CAGR

India fresh herbs market, US\$542M → US\$994M by 2030

Agrivoltaics positions one hillside asset at the intersection of India's clean energy expansion and rising herb demand.

Rajasthan-class PV output in Uttarakhand

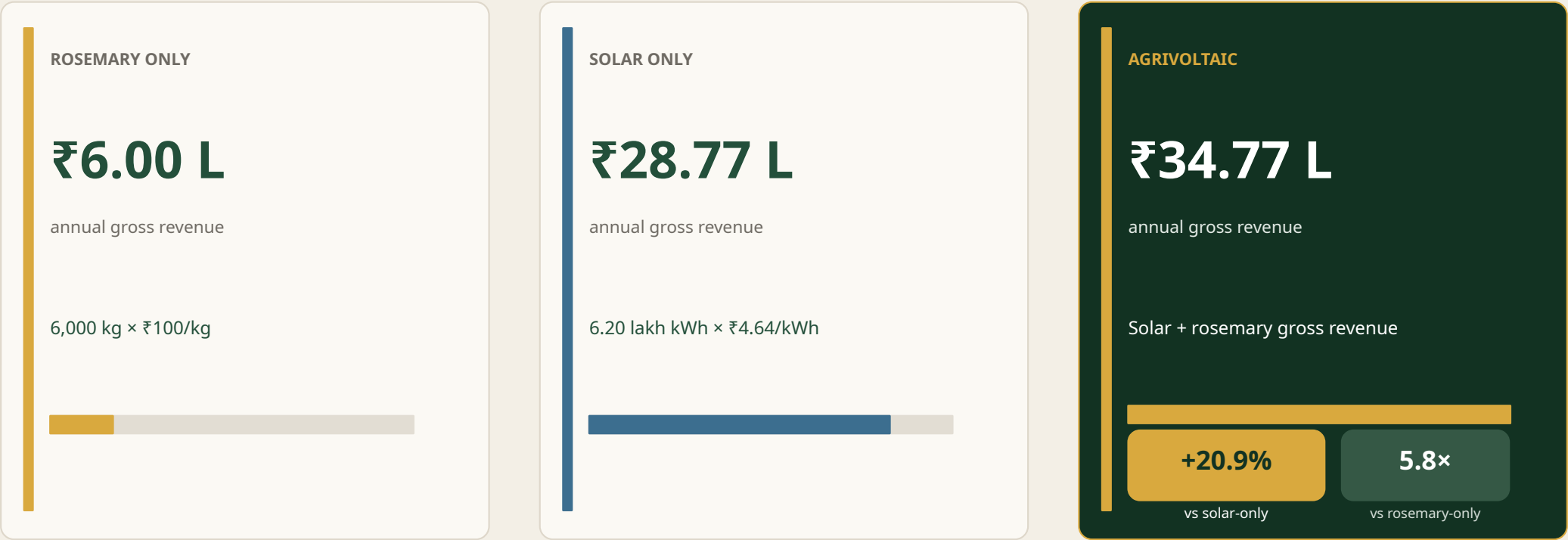
Global Solar Atlas: Uttarakhand PVOUT 1,715.9 vs Rajasthan 1,763.3 kWh/kWp, about 97% parity; ambient temperature 15.0°C vs 26.3°C.



South-facing Uttarakhand slopes can approach Rajasthan-class PV output, while cooler ambient temperatures can further support panel efficiency.

One hectare. Two revenue streams.

At ₹100/kg fresh rosemary and a 6-tonne annual harvest target, cultivation adds revenue on the same footprint without displacing solar generation.



SHARED-LABOUR ADVANTAGE

₹1.56 lakh / year

avoided duplicated labour + panel-cleaning cost

ROSEMARY

₹58/kg

effective operating cost

+

SOLAR

–13.8 paise

LCOE reduction / kWh

=

STRONGER LAND ECONOMICS

Pilot establishes a realistic scale and labour model

The 400 kW site already integrates an operating PV asset with mature rosemary, while the revised expansion plan targets 10,000-12,000 plants rather than 20,000.



ACTUAL PILOT SITE

SOLAR CAPACITY

400 kW
Operating PV asset

PROJECT AREA

10,000 sqm
Approx. 1 hectare

CURRENT ROSEMARY

~3,500 plants
~75% are mature, ~4 ft high

FULL-SITE PLANT CAPACITY

10k-12k
Revised site-wide estimate

MATURE YIELD BENCHMARK

>500 g / plant
300 g remains the young-plant planning figure

ANNUAL FRESH-HERB TARGET

6 tonnes
Same harvest potential, different plant mix

2 farm workers • 5 days/week • 4 harvest days • 25 kg/day = 100 kg/week • Day 5: solar panel cleaning

The next validation step is harvest-recorded yield per mature plant; the 6-tonne site target no longer depends on a 20,000-plant assumption.

Verified energy output + agricultural upside

Impact is quantified across power generation, emissions avoidance, herb production and rural livelihoods.

CO₂

431 tonnes

CO₂ emissions avoided

KWH

544,625

kWh generated

HERB

1.5 tonnes

current rosemary harvest potential

FARM

5

farmers supported

INCOME

+20.9%

gross site revenue uplift vs solar-only
₹100/kg rosemary base case



One land parcel → clean power + rosemary + rural income

The model is built for unit-level impact reporting from the first scaled block, with income uplift to be updated after harvest validation.

Next: 2 MW agrivoltaic block

A defined expansion block makes the partner ask specific, measurable and fundable.



The next milestone scales the same logic: 5x solar capacity, 4x land footprint and 5x rosemary production potential.

What's stopping us from expanding?

Physical integration has been demonstrated; replication now depends on capital, policy, offtake and mountain execution.

1

Capital intensity

MW-scale agrivoltaics requires upfront investment in solar infrastructure, elevated structures, irrigation and crop establishment before returns begin.

2

Policy gap at MW scale

Uttarakhand does not yet have a clear enabling framework or targeted support mechanism for large-scale agrivoltaic solar projects.

3

Limited PPA availability

Scaling depends on bankable long-term offtake, but willing corporate buyers and DISCOM-backed PPAs remain difficult to secure.

4

Mountain execution

Steep terrain raises installation, logistics, labour productivity and maintenance complexity compared with conventional flat-land solar sites.

Physical integration is demonstrated. The next challenge is creating the conditions for MW-scale replication.

What we need to scale

Pilot demonstrates physical integration; scale now needs four specific partner inputs.

Capital partners

Growth equity, structured debt or project finance for MW-scale replication.

Policy partners

Agrivoltaics recognition, clearer approvals and hill-region incentives.

Power offtakers

Corporate buyers, utilities or DISCOM-backed bankable long-term PPAs.

Execution partners

EPC, logistics and agricultural partners with mountain-terrain experience.

We have demonstrated the model at 400 kW. The next step is building the ecosystem required to scale it to megawatts.

Partner with us to build Uttarakhand's scalable mountain agrivoltaics platform.