Reducing Smallholder Farmers vulnerability to climate change impacts including water scarcity in Mongolia through ecosystem-based adaptation (EbA) and digitalized risk mitigation insurance solutions

NDE Forum and Capacity Building for System Transformation in LAC

UN environment programme

CTCN UN Climate Technology Centre & Network

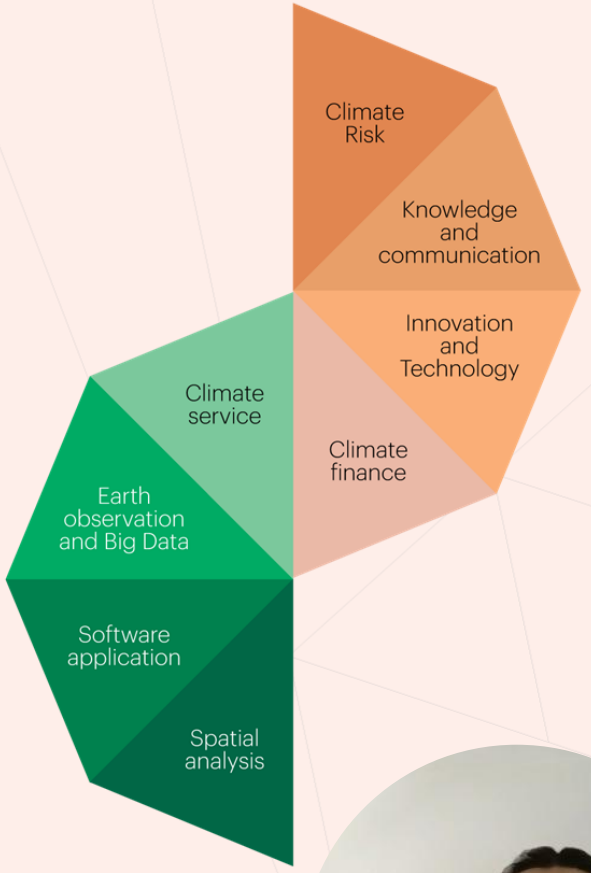
OIKO sustainable development on our finite planet

OIKO Introduction

sustainable development
on our finite planet

OIKO LOGICA S.L. is a Spanish, globally active consulting firm specializing in sustainable development. The firm excels in providing rapid, reliable responses to client requests, grounded in a deep respect for ecological cycles and a commitment to flexible, tailored solutions. OIKO adapts to the socio-economic contexts of beneficiaries while employing rigorous methodologies and accommodating cultural and regional differences.

Their core focus is on the intersection of climate variability and the livelihoods of vulnerable households, particularly those dependent on sustainable natural resources. OIKO's areas of expertise include climate change adaptation, monitoring and managing climate risks, mitigating climate change causes, promoting ecosystem sustainability, improving livelihoods, addressing vulnerabilities, and enhancing access to scarce resources and sustainable resource management.

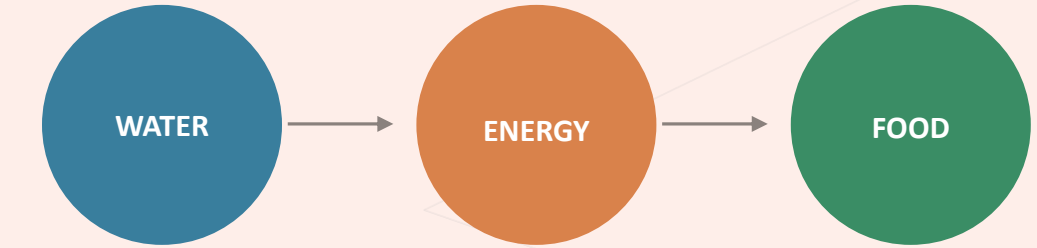


Why this TA belongs in a WEF systems trans session

The Mongolia assignment is not a single technology transfer; it is a coordinated package across water, energy, food, finance, policy and capacity.

Forum frame

CTCN's 2026 capacity building focuses on moving from sectoral technologies to integrated, system-level transformation pathways.



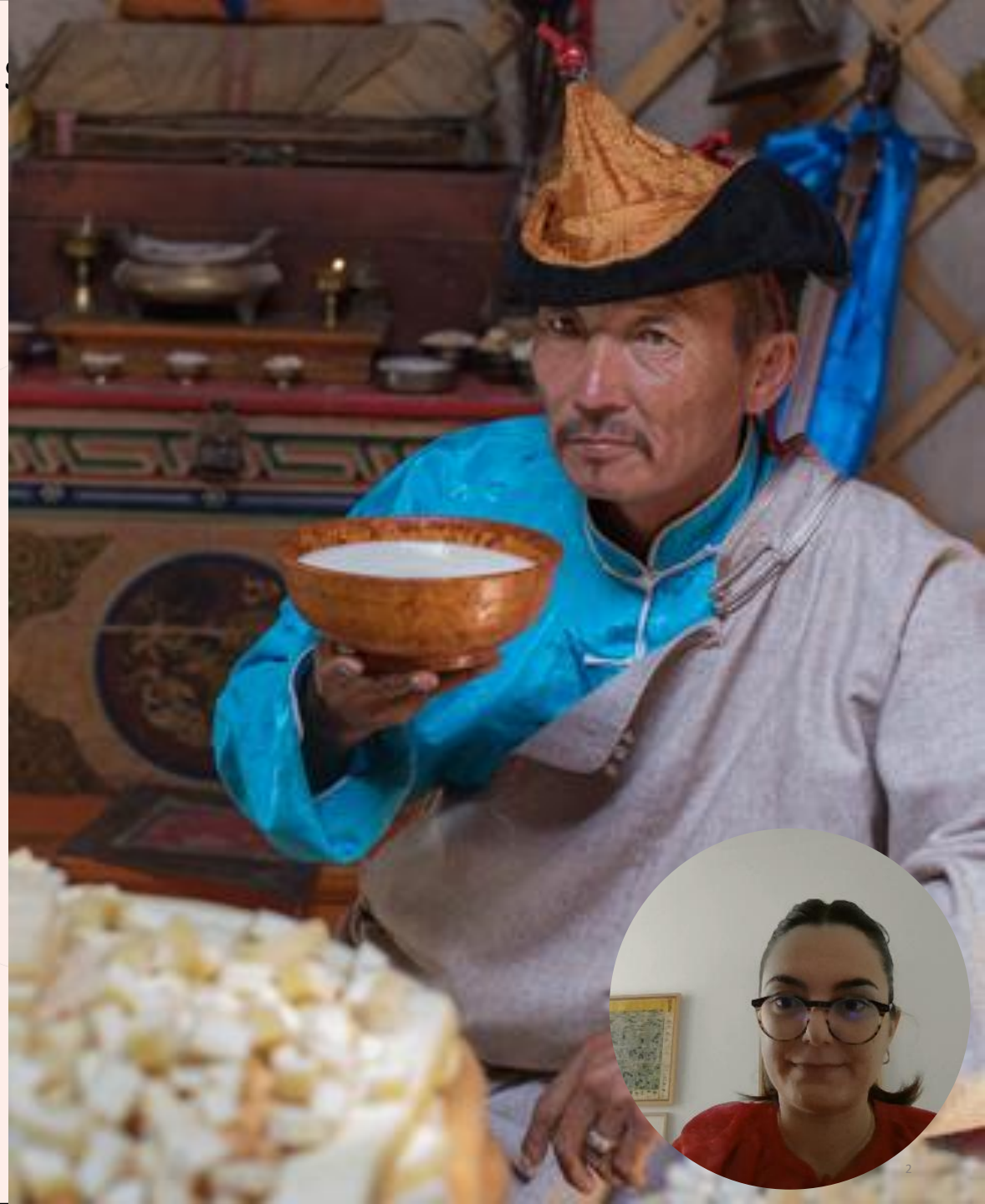
Water-efficient irrigation and safeguards against over-abstraction

Solar PV for pumping and enabling systems where grid access is weak

Stable vegetable production, protected cultivation and reduced climate shocks

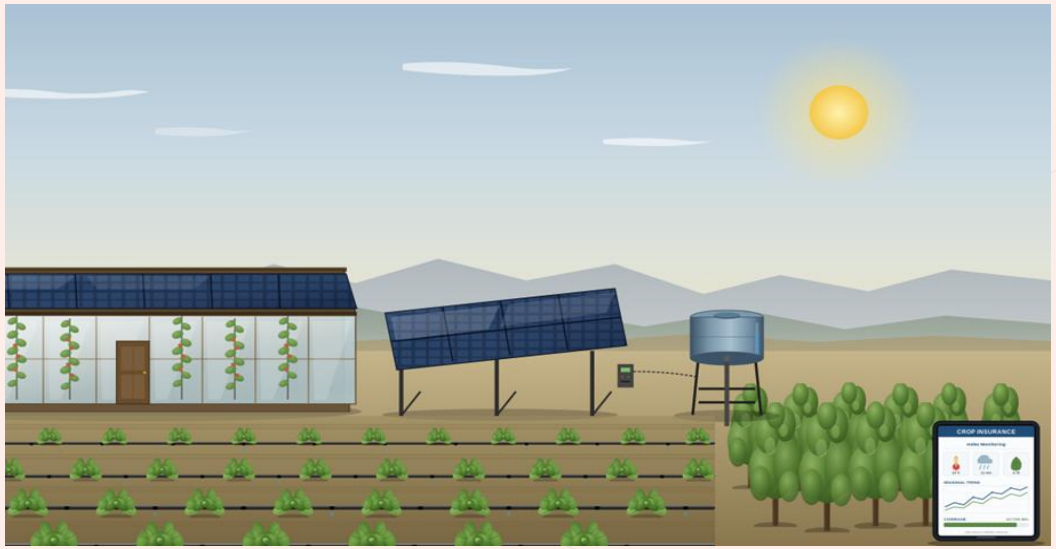
Takeaway

The project's value is the enabling system: technology + standards + risk transfer + local capacity + scale-up finance.



Assignment at a glance

A CTCN Technical Assistance project implemented for the Government of Mongolia.



Duration
18 months (2026–2027)

Budget
USD 200,700

Target provinces
Dundgovi and Uvurkhangai

Beneficiaries
Smallholder vegetable farmers

Mechanism
UNFCCC Technology Mechanism – CTCN

Implementing Partner
OIKO LOGICA, S.L.

Main objective

Support vegetable smallholders to adapt to climate change through a bankable proof of concept for sola
powered irrigation and agroforestry, supported by digital crop insurance and sustainable financing.

The challenge: climate risk and investment risk reinforce each other

Smallholders in Dundgovi and Uvurkhangai face a compound problem: high exposure, weak infrastructure and limited financial protection.

Climate stress

Water scarcity, drought, late frost, hail, strong winds, dust storms and short growing seasons.

Technology gap

Fragile structures, low irrigation efficiency and limited climate-resilient agroforestry.

Finance gap

Smallholders have limited access to credit for technology investment.

Risk-transfer gap

No dedicated vegetable crop insurance product is currently available.

Two province envelopes

- Uvurkhangai: stronger production potential, shallower wells, better basis for scaling
- Dundgovi: deeper groundwater, more arid conditions, stronger wind/dust exposure.

The transformation pathway: from vulnerable farms to a finance-ready system

The TA is structured as a sequence of outputs that progressively remove barriers to technology adoption.

1

Technology options

Feasibility, CBA and farmer-oriented technology menu

2

Standards

Guidelines and certification for suppliers, performance and safeguards

3

Finance + insurance

Blended finance facility and digital risk-transfer prototype

4

Capacity

Training, ToT and provincial centres of excellence

5

Scale-up

Roadmap and two concept notes for follow-on investment

System transformation = technology + rules + risk sharing + local capacity + investment pathway

Implementation timeline and where we are now

Eighteen months from inception to scale-up concepts and final knowledge products.

NOW

M1 — **Project setup**
Workplan, M&E, gender action plan

M3 — **Technology options**
Feasibility, CBA, technology menu

M7 — **Policy standards**
Guidelines and certification

M12 — **Finance + insurance**
Facility proposal and insurance concept

M16 — **Capacity building**
Training, ToT, provincial hubs

M18 — **Scale-up**
Roadmap, concept notes, final report

Current stage

Inception mission + Output 1 feasibility/technology assessment.

Next

Stakeholder validation and CBA assumptions.

Decision point

Which packages are bankable, insurable and scalable?

Preliminary technology shortlist under consideration

The feasibility report screens options through technical, climate, operational and preliminary economic lenses.

Greenhouses

Earth-sheltered passive solar in Uvurkhangai; wind-resistant polycarbonate semi-permanent in Dundgovi.

Irrigation

Solar-powered drip as main option; gravity-fed drip as low-cost fallback where elevation allows.

Agroforestry

Windbreaks and shelterbelts as the foundational EbA layer; oasis-based horticulture where water allows.

Energy

Solar PV as primary energy source; battery storage is mandatory where deep boreholes require it.

Insurance

Weather-index entry point using open data, with roadmap toward satellite/remote sensing and mobile delivery.

Important caveat: the shortlist is preliminary and will be tested through CBA, water-resource assessment and stakeholder validation

Province-tailored packages: same logic, different design parameters

The same system logic applies, but technical assumptions differ by water depth, wind exposure and production potential.

Uvurkhangai

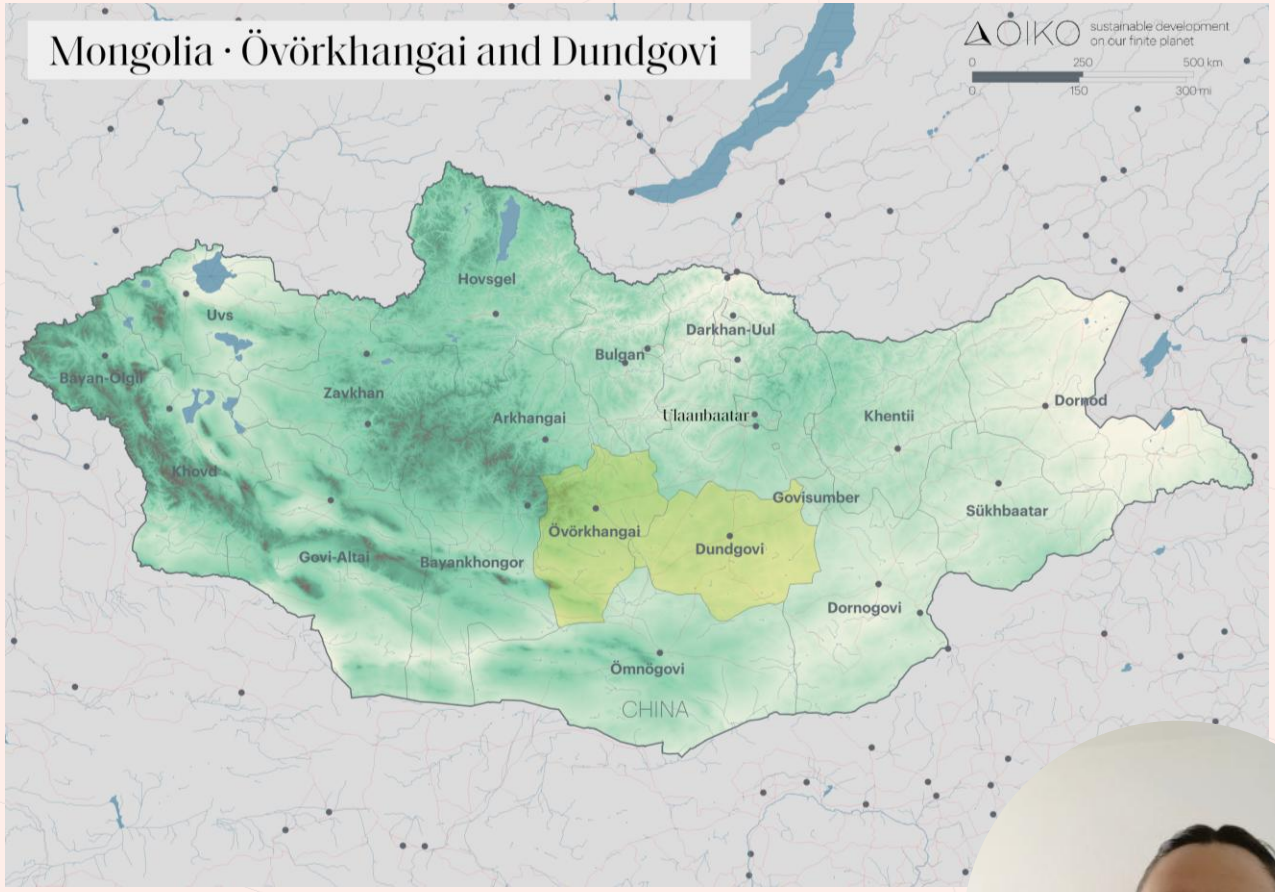
Production and scaling zone

- Shallow wells: 5–25 m
- Direct solar drip, usually no battery
- Earth-sheltered passive solar greenhouse
- Earth-sheltered passive solar greenhouse

Dundgovi

Adaptation and resilience zone

- Deep boreholes: 50–150 m
- Solar drip + $LiFePO_4$ battery storage
- Wind-resistant polycarbonate greenhouse
- Simplified drought-resilient windbreaks



CBA scenario logic

Baseline → irrigation → greenhouse → agroforestry → full integrated model + insurance.

Implementation timeline and where we are now

The Mongolia TA suggests practical design rules for cross-sectoral system transformation.

1	**Design packages, not projects**	Combine technology, enabling rules, finance, risk transfer and capacity.
2	**Start with water safeguards**	Solar irrigation can be transformative, but needs thresholds and monitoring.
3	**Make risk protection bankable**	Insurance can support lending, not only compensate losses.
4	**Local ownership is infrastructure**	National institutions, insurers, extension services and cooperatives are part of the technology system.
5	**Build for replication from day one**	Technology menus, standards, training hubs and concept notes make scaling easier after the TA

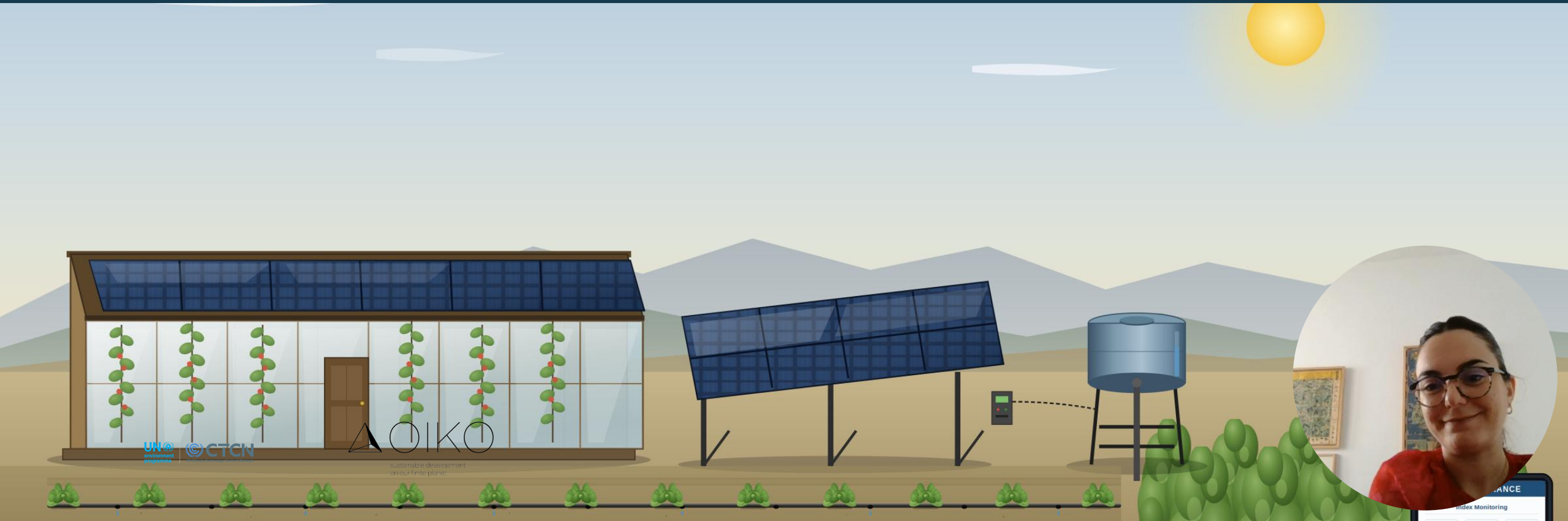
For NDEs: the coordination role is central — connecting ministries, data systems, financiers, technology providers and end-

Key takeaway

The most important technology is the system that allows farmers to adopt, finance, maintain and insure climate-resilient production.

Mongolia offers a live proof-of-concept: from technology screening to policy standards, finance, insurance, capacity and scale-up.

Thank you



Thanks for your attention.

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