

GLOBAL  
GEOTHERMAL  
ALLIANCE



Food and Agriculture  
Organization of the  
United Nations



## POWERING AGRI-FOOD VALUE CHAINS WITH GEOTHERMAL HEAT

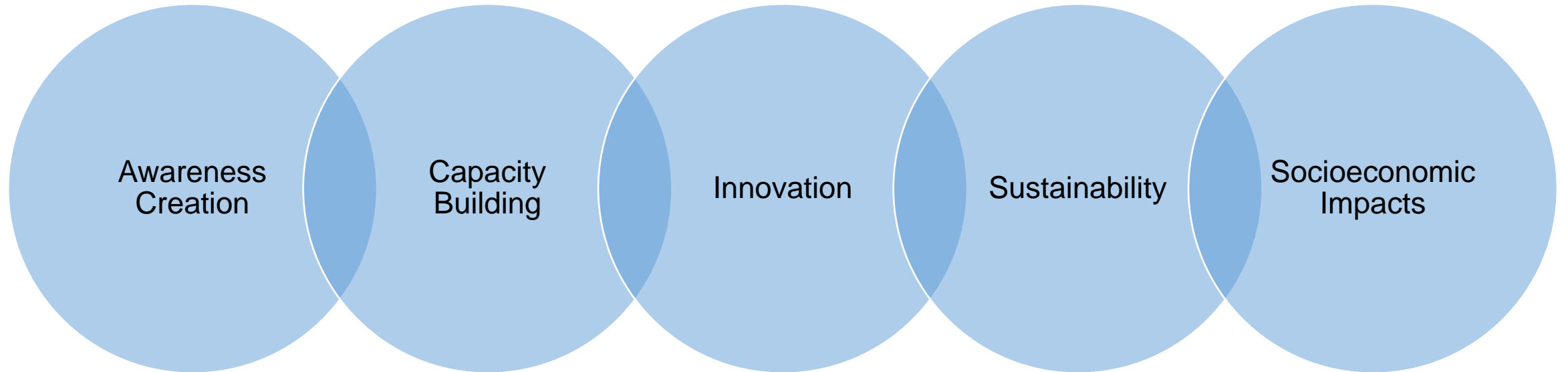
### ADDRESSING KNOWLEDGE GAPS ALONG THE GEOTHERMAL DIRECT USE VALUE CHAIN

CAPACITY BUILDING EVENT – GLOBAL WEBINAR

JUNE 23, 2022



# Knowledge Gaps along the Geothermal Direct Use Value Chain



# Awareness Creation and Capacity Building

- ✓ Awareness creation to demonstrate the benefits and opportunities of agri-food applications for policymakers, entrepreneurs and communities; raise awareness at the local level given that geothermal heat, unlike electricity, is used locally
- ✓ Build capacity through academia and/or technical capacity building programmes for:
  - Geoscientists
  - Drilling Engineers
  - Project Managers
  - Environmental and Social Experts
  - Policymakers
  - Financiers
- ✓ Pilot projects help demonstrate the technical viability and can provide indications for the commercial viability of direct-use heating technologies

- ✓ Partnerships with international, regional and local institutions are important to provide training and certification programmes for technical experts, service providers and the downstream workforce to operate and maintain projects



Oserian flower farm at Olkaria, Kenya

# Technical Capacity Building

## International, regional and national training centres or programmes



### Africa Geothermal Centre of Excellence, Kenya

Training courses



### Andean Geothermal Centre of Excellence, Chile

Academic research



### CeMIE-Geo, Mexico

Academy-industry alliance



### East Africa Geothermal Energy Resource Facility: Ethiopia, Kenya, Rwanda, Tanzania and Uganda

Technical assistance and capacity building



Fraunhofer Research Institution for Energy Infrastructures and Geothermal Systems

### Fraunhofer Institute for Energy Infrastructures and Geothermal Energy, Germany

Think-tank



### Geothermal Institute: University of Auckland, New Zealand

Research, consultancy and training



### University of El Salvador, El Salvador

Educational Programme



### iiDEA Group, UNAM, Mexico

Research group



### Sino-Icelandic Geothermal Training Program, China

Training Program

## Technical Assistance Programme in Central America



1<sup>st</sup> phase

### Promotion of Geothermal Energy in Central America (FoGeo-1) 2016 - 2020

Capacity building and development of an enabling environment for investment to facilitate the implementation of agricultural and industrial heating applications.

Technical, commercial and social feasibility of select pilot projects were assessed for cascading and stand-alone opportunities in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.



2<sup>nd</sup> phase

### Geothermal Heat Utilisation for Industrial Processes in SICA Member Countries (GEO II) 2020 – 2023

Implementing pilot projects through policy dialogue, adaption of regulatory frameworks, knowledge dissemination, capacity building, stakeholder collaboration and project development.

Social and economic impacts for job creation and sustainable local community development.

## Eco-Industrial Parks

- ✓ Model for utilising geothermal resources through innovative practices to generate revenue streams and reduce waste
- ✓ Incubation centres for innovation in the energy-food nexus
- ✓ Driving sustainability and new innovative technology

## Circular Food Production

- ✓ Advantages of circular food production: optimisation of energy and nutrient use, water treatment, and waste recovery processes when geothermal heat applications are implemented in agribusiness



**Kalundborg Industrial Park**  
*Sweden*

Designed around a 1,500 MW coal-fired plant  
Provided a blueprint of an industrial symbiosis network for neighbouring companies



**Svartsengi Resource Park**  
*Reykjanes peninsula, Iceland*

Combined geothermal heat and power plant opened operations including Blue Lagoon spa and a dermatology clinic



**GEOFOOD Project**  
*Netherlands*

Partnership between Iceland, the Netherlands and Slovenia  
Integrates horticulture and aquaculture into a net zero waste production system heated using geothermal energy

# Measuring Socio-economic Impacts

## Socio-economic impact analysis

- ✓ Determine net impact of monetised and non-monetised socio-economic indicators of benefits and costs of implementing geothermal direct use projects in the agri-food sector
- ✓ Useful tool for businesses to measure non-financial metrics such as social and environmental indicators (e.g., job creation)
- ✓ Provides decision-makers with an approach to incorporate socio-economic factors into business cases and assess non-financial benefits in the geothermal agri-food value chain
- ✓ Analysis of the impacts on:
  - Enterprises
  - Energy suppliers
  - Environment
  - Society



Direct Use Geothermal Pilot Project at Menengai, Kenya (source: Kenya GDC)

# Recommendations

Challenge/gap	Description	Recommendations/lessons learnt
Building local capacity, education and awareness	<p>There is a shortage of local skilled geothermal workforce in the public and private sectors.</p> <p>Awareness is limited about the potential and benefits of direct-use applications to improve the socio-economics of local communities.</p>	<ul style="list-style-type: none"> <li>• Partner with international, regional or local institutions to provide training and certification programmes for the downstream workforce to develop, operate and maintain direct-use projects.</li> <li>• Raise awareness on the benefits and feasibility of direct-use projects among policy makers, communities and private sector agri-food industries.</li> <li>• Identify best practices and promote exchange of experiences and knowledge among countries and training centres at a regional level.</li> <li>• Build the capacity of public institutions to identify direct-use opportunities and assess their financial as well as socio-economic viability.</li> </ul>
Leveraging technology, innovation and sustainability	<p>There is a need to use resources sustainably and minimise wastage.</p> <p>Innovation should be nurtured to enable the creation of new products and processes.</p>	<ul style="list-style-type: none"> <li>• Encourage sustainability practices in the energy (geothermal) and industrial sector that aim to maximise energy use and minimise wastage of material through cascading and a circular economy.</li> <li>• Integrate incubation centres in geothermal utilisation, including by collaborating with research institutions, to promote the development of new products and processes through innovation.</li> </ul>



## THANK YOU!

