

Dalberg

Ethanol Cooking Fuel Master Plan

17TH SEPTEMBER 2019

Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag



SOUTH
SOUTH
NORTH

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SouthSouthNorth engaged Dalberg to develop a masterplan for an Ethanol Cooking Fuel (ECF) industry in Kenya

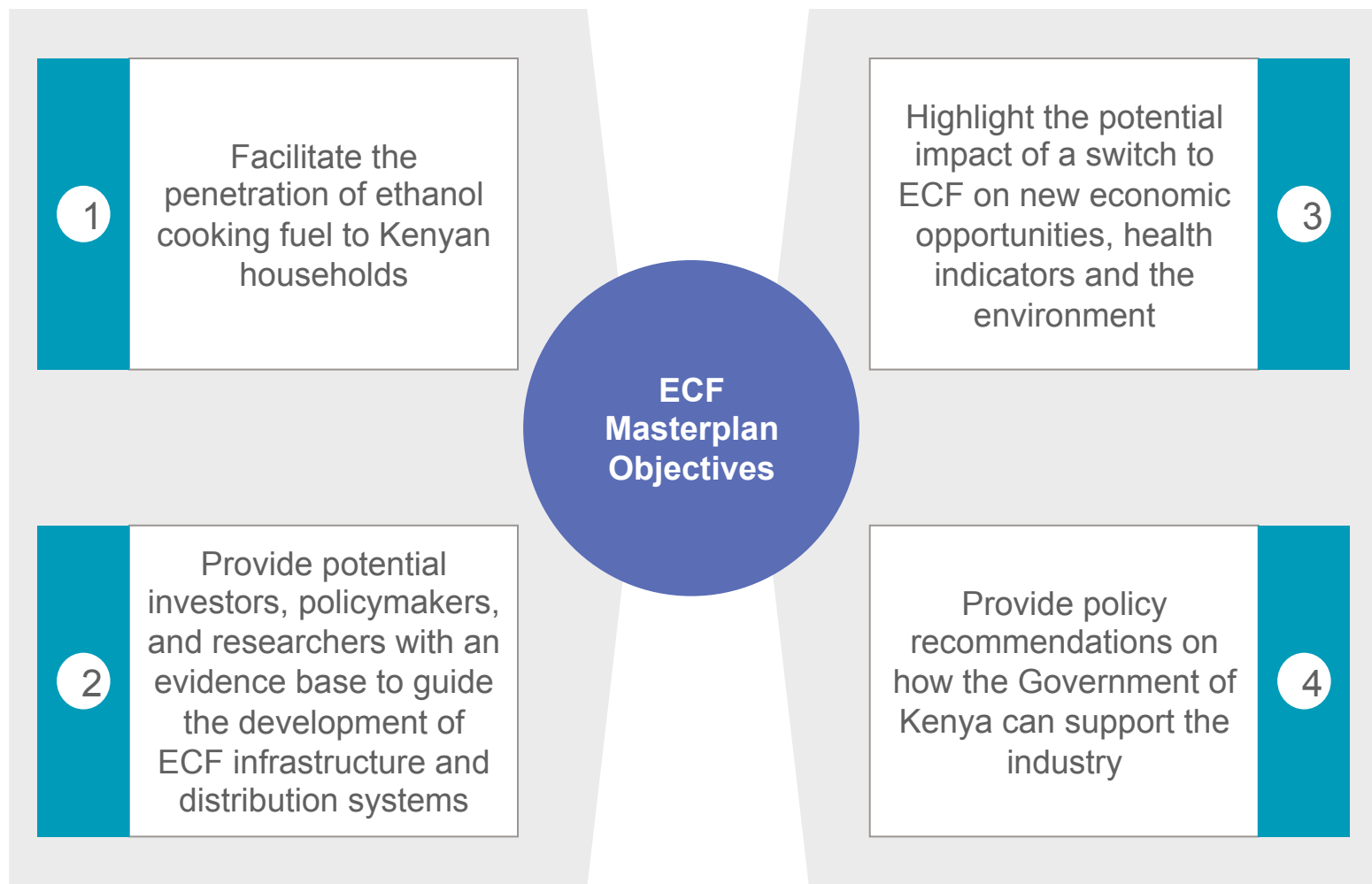


Dalberg Advisors is a strategic advisory firm with deep knowledge & networks in emerging markets. We work collaboratively with the public, private & philanthropic sectors to fuel inclusive growth & development



SouthSouthNorth (SSN) is a climate organization that supports national and regional responses to climate change through policy and knowledge interventions, partnerships and deep collaboration

The ECF masterplan aims to support the establishment of an ECF industry in Kenya, with four key objectives



Over the last 3 months Dalberg has engaged in extensive stakeholder consultation to develop the masterplan

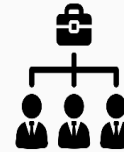
DALBERG EXAMINED:



Demand
for Ethanol
cooking
fuel



CAPEX
required to set
up a local
industry



Impact on
employment,
earnings, health &
the environment



Policy
recommendations
to support the
industry

KEY STAKEHOLDERS CONSULTED:



Ministries of Environment,
Health, Agriculture, Energy,
and Industry



Kenya Sugar
Directorate



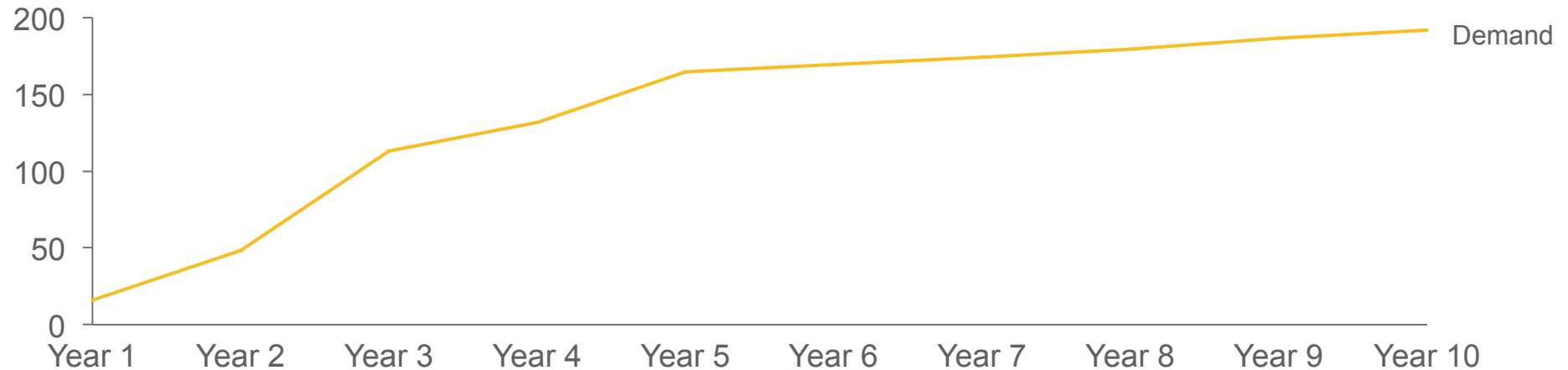
Ethanol and
sugar producers



Ethanol
distributors

Demand: In terms of liters consumed, total demand for ECF is expected to rise to 192M in 10 years

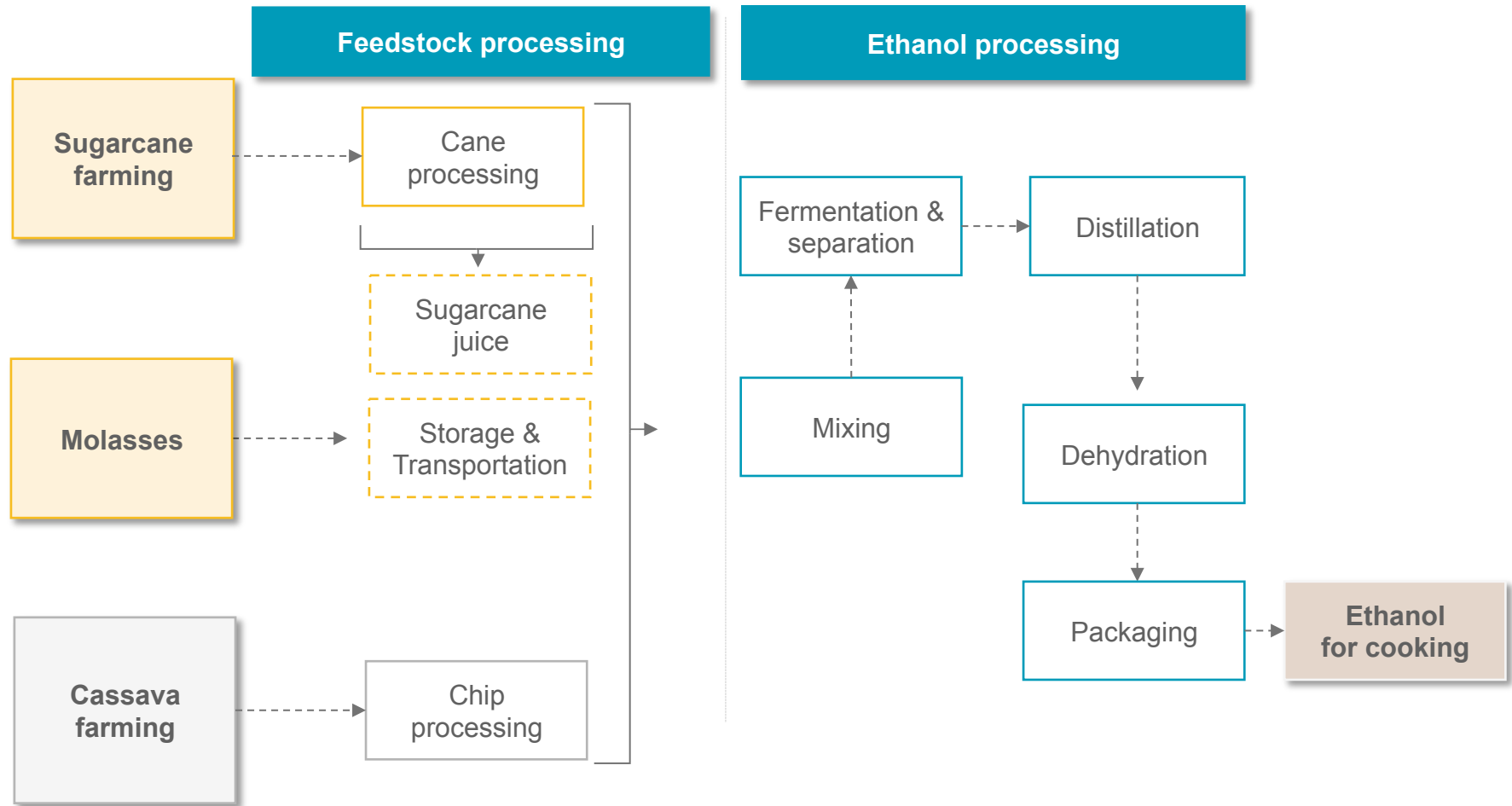
Total demand (millions of liters)



DEMAND FOR ECF WILL BE DRIVEN BY THE FOLLOWING

- 1. Affordability** of ethanol fuel and cookstoves
- 2. Awareness** of ethanol as an alternative fuel and its benefits
- 3. Access** to ethanol

CAPEX required: We chose to examine 3 types of feedstock: molasses, sugarcane juice, and cassava

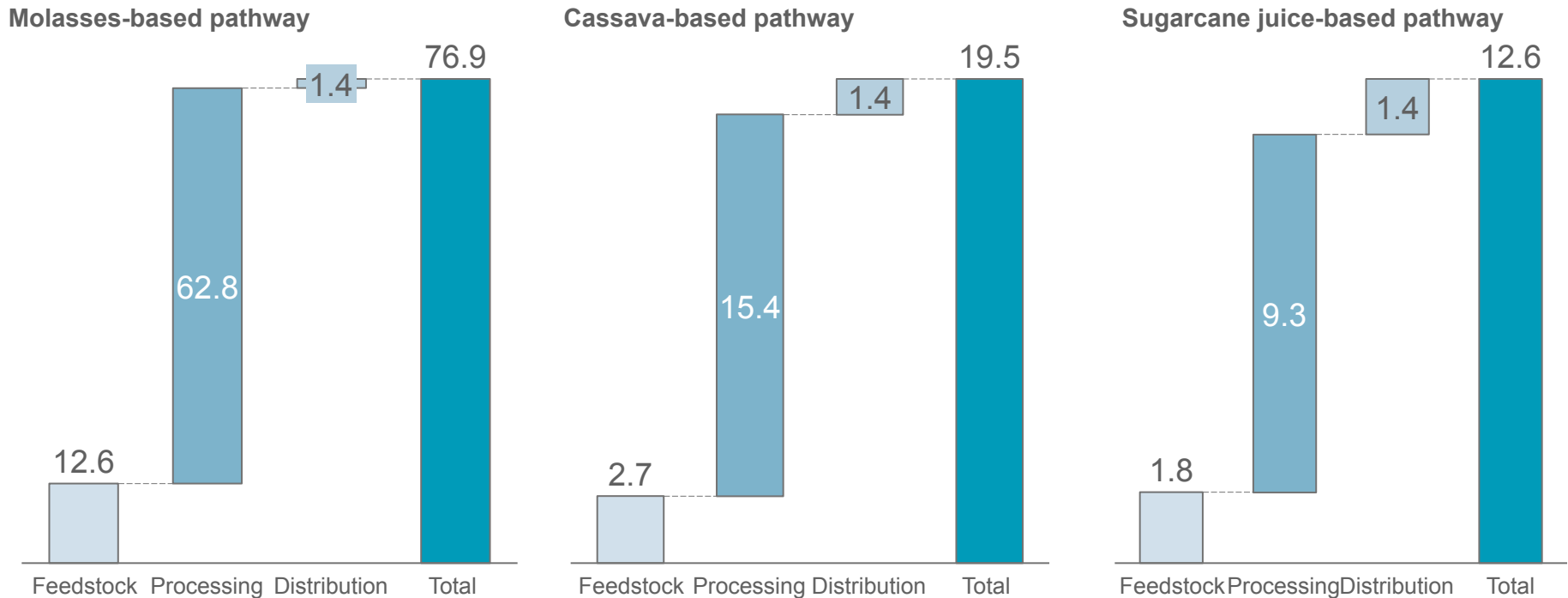


CAPEX required: To calculate the CAPEX required to establish a bio-ethanol industry, 3 sections of the value chain were examined

	1 Feedstock production	2 Ethanol Processing	3 Ethanol distribution
Description	- Assesses required feedstock - Calculate CAPEX for feedstock farming	- Estimates quantity of local production - Calculates CAPEX needed to set up ethanol plants	- Estimates required no of vehicles/devices - Projects the CAPEX for vehicles/devices
Current players (not exhaustive)			

CAPEX required: Given the supply gap, CAPEX will be required for each stage of the value chain across the 3 feedstocks

Projected CAPEX (KES in billion)



Assumptions:

- (1) 50% of domestic ethanol production
- (2) Base case demand

Note: Ethanol processing makes up the majority of CAPEX required to expand the local ECF industry in Kenya (on average 75%), followed by feedstock production (on average 19%) and ethanol distribution (on average 6%)

Impact: Switching to ECF will have significant impact along employment, income, health, and environmental dimensions

1 Jobs and Income



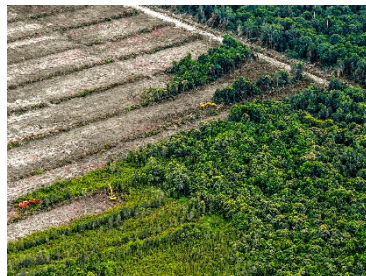
- *Jobs/opportunity created for farmers and factory workers*
- *New income generated across the value chain*

2 Health



- *Household air pollution based deaths averted*
- *DALYs averted*
 - “DALY” refers to a Disability Adjusted Life Year, a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death

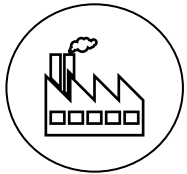
3 Environment



- *Deforestation averted and trees saved*
- *Greenhouse Gas emissions reduced*

Impact: This aligns with Kenya's Vision 2030 and Big Four Agenda...

HOW DOES THE MASTERPLAN CONTRIBUTE TO VISION 2030 AND THE BIG 4 AGENDA?



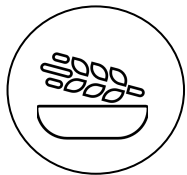
Big Four Agenda Boost the manufacturing industry

- **Goal:** Increase the manufacturing sector's share of GDP from about 9% in 2017 to 15% in 2022
- **ECF industry impact:** Investment in the Ethanol industry will provide a significant boost to manufacturing, creating a new industry



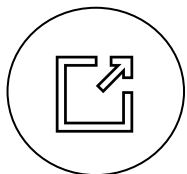
Big Four Agenda Create jobs for young people within manufacturing

- **Goal:** Create 1.3 million manufacturing jobs by 2022
- **ECF industry impact:** Up to 3480 jobs can be created through ethanol manufacturing



Big Four Agenda + Vision 2030 Food security

- **Goal:** Achieve 100% food security; reach 1 million farmers and unlock 150,000 acres of uncultivated land
- **ECF industry impact:** Investment in cassava and sugar cane will boost yields, providing feedstock for Ethanol as well as food for consumption



Vision 2030 Promote export driven manufacturing

- **Goal:** Boost the capacity and local content of domestically manufactured goods
- **ECF industry impact:** The ethanol industry will provide a significant boost to manufacturing, with the potential to export into new markets

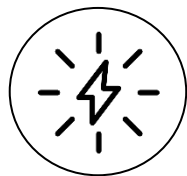
Impact: ..and also aligns with the global sustainable development goals (SDGs)

HOW DOES THE MASTERPLAN CONTRIBUTE TO THE GLOBAL SDGs?



SDG
Good health & well-being

- **Goal:** Ensure healthy lives and promote well-being for all at all ages
- **ECF industry impact:** ~3,700 deaths and 507,000 DALYs could be averted by households switching to ECF from other cooking fuels



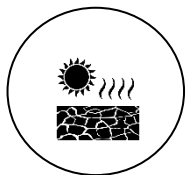
SDG
Affordable and clean energy

- **Goal:** Ensure access to affordable, reliable, sustainable and modern energy for all
- **ECF industry impact:** With the removal of VAT on ECF lower costs from domestic production, ECF will be the cheapest cooking option



SDG
Decent work and economic growth

- **Goal:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- **ECF industry impact:** Up to 370,000 jobs can be created by a domestic ECF market with KES 51 billion in new income



SDG
Climate action

- **Goal:** Take urgent action to combat climate change and its impacts
- **ECF industry impact:** Up to 54 million trees and 2.6 billion kg of Co2eq could be saved over a 10-year period from households switching to ECF

Key challenges: The ECF industry in Kenya still faces the following challenges

CHALLENGES TO THE ECF INDUSTRY

DEMAND

1. Due to import tariffs and lack of local production **ethanol fuel and cookstoves remain expensive**
2. **Awareness of ethanol as an alternative fuel is still low** especially in rural areas
3. **Access to ethanol remains low** although rising rapidly in urban areas

SUPPLY

1. **Underproducing sugar sector and nascent cassava value chain**
2. **Only two ethanol factories are currently operating**, mainly focussed on high-grade ethanol
3. There are **several operating challenges** for new business entering the market

Policy recommendations: Boosting demand & attracting investment to the ecosystem will be supported by the following

RECOMMENDATIONS TO BOOST DEMAND

1. Short term **removal of 25% import duty** for ethanol as a cooking fuel
2. **Expand current awareness and communication campaigns** to promote ECF
3. Work with the private sector and donor community to **design stove financing options**
4. **Expand existing regulations on kerosene and charcoal** to other counties

RECOMMENDATIONS TO BOOST LOCAL PRODUCTION

1. **Stimulate the market with low interest loans** for local ethanol producers
2. **Reduce barriers to entry for investors** (tax reduction on machinery, one-stop shop, land allocation, feasibility studies)
3. **Remove import duties on machinery for ethanol processing** and specialized supply chain equipment
4. **Unlock climate financing** to develop the ECF ecosystem
5. Incentivize **production of locally manufactured cookstoves**
6. **Allocate more land to cane and cassava** farming in high yield areas
7. **Build international partnerships** to create opportunities for knowledge transfer