GLDC | CGIAR Research Program

Grain Legumes and Dryland Cereals Agri-Food Systems

Demand-Driven Innovation for the Drylands

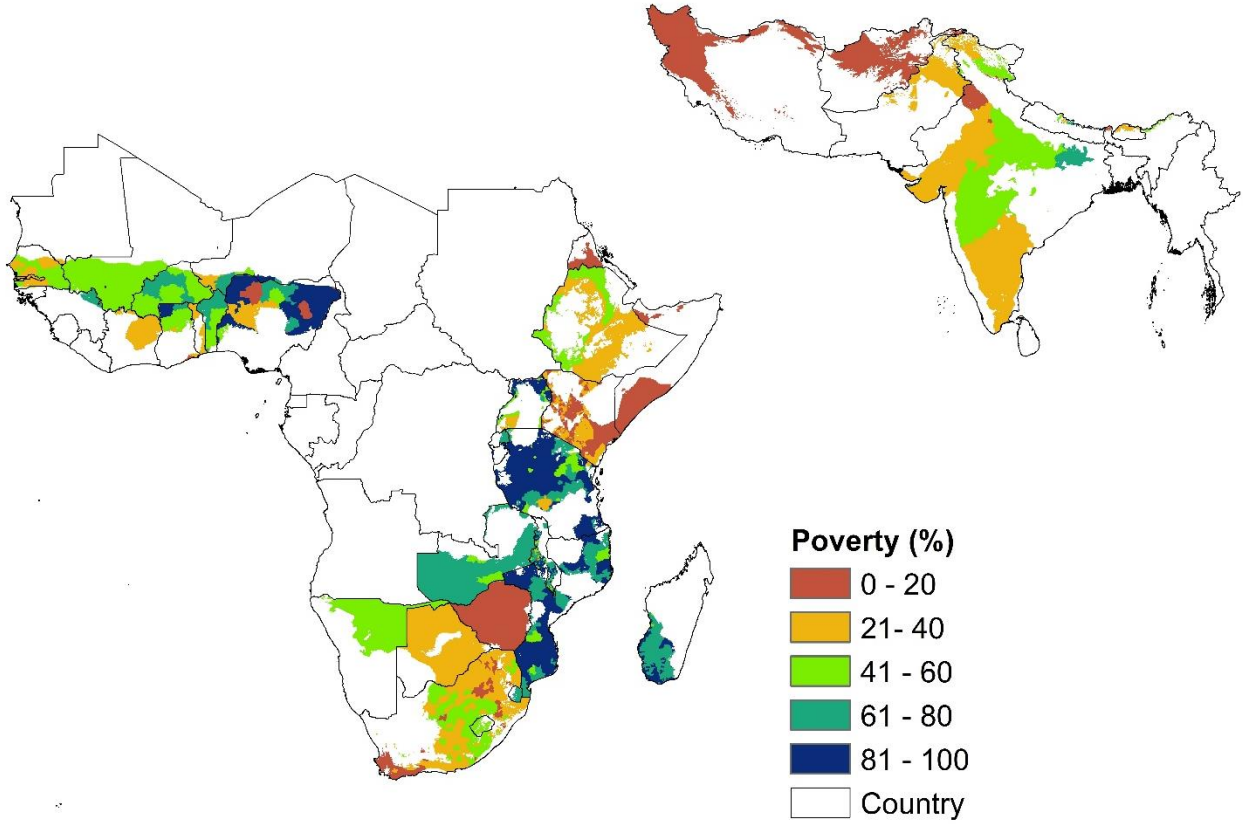
- **Discover** ways to transform underperforming Agri-Food Systems in the target ecologies into well-functioning systems
- **Deliver** greater crop technologies, productivity and economic gains from market linkages and value chain development

WHY

TO ADDRESS THE GRAND CHALLENGES

1. **>300 million poor and malnourished** live in the target ecologies
2. **Highest risk of hunger** (2030-50 projections)
3. **199 million stunted children** (as of 2016)
4. **Food prices could double** due to climate change
5. **Other major issues**:
   - Land degradation
   - Competition for land
   - Aging and changing workforce

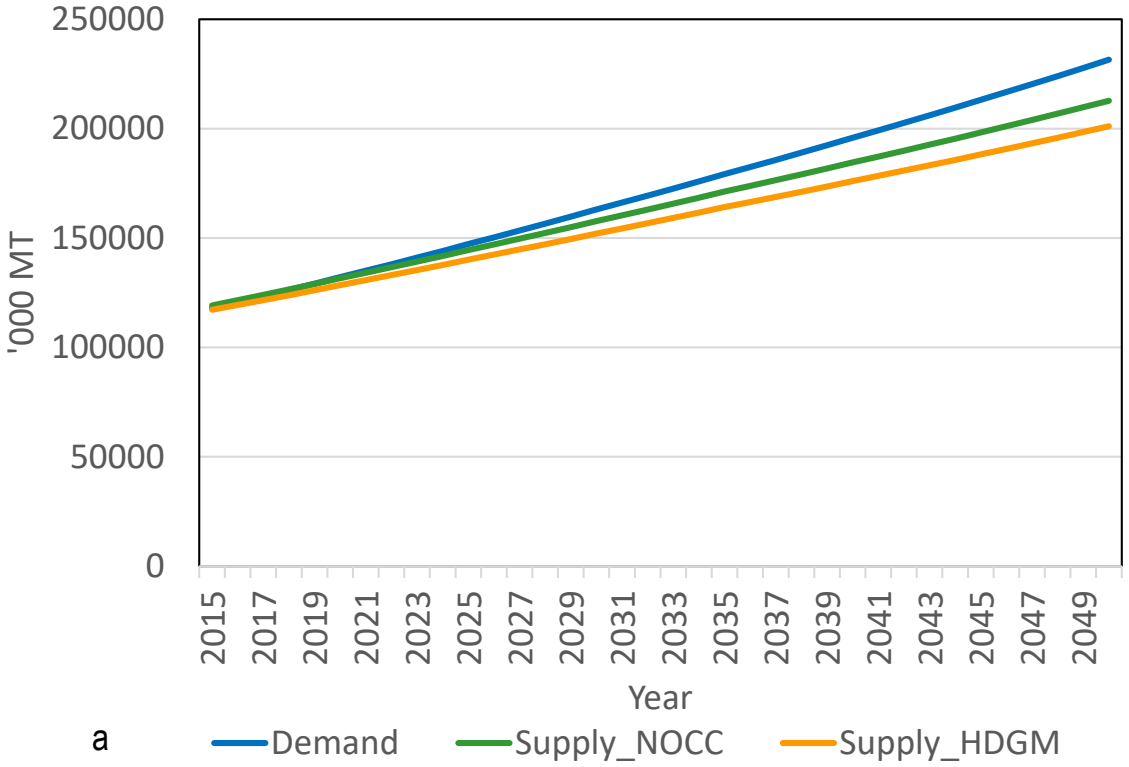
WHERE

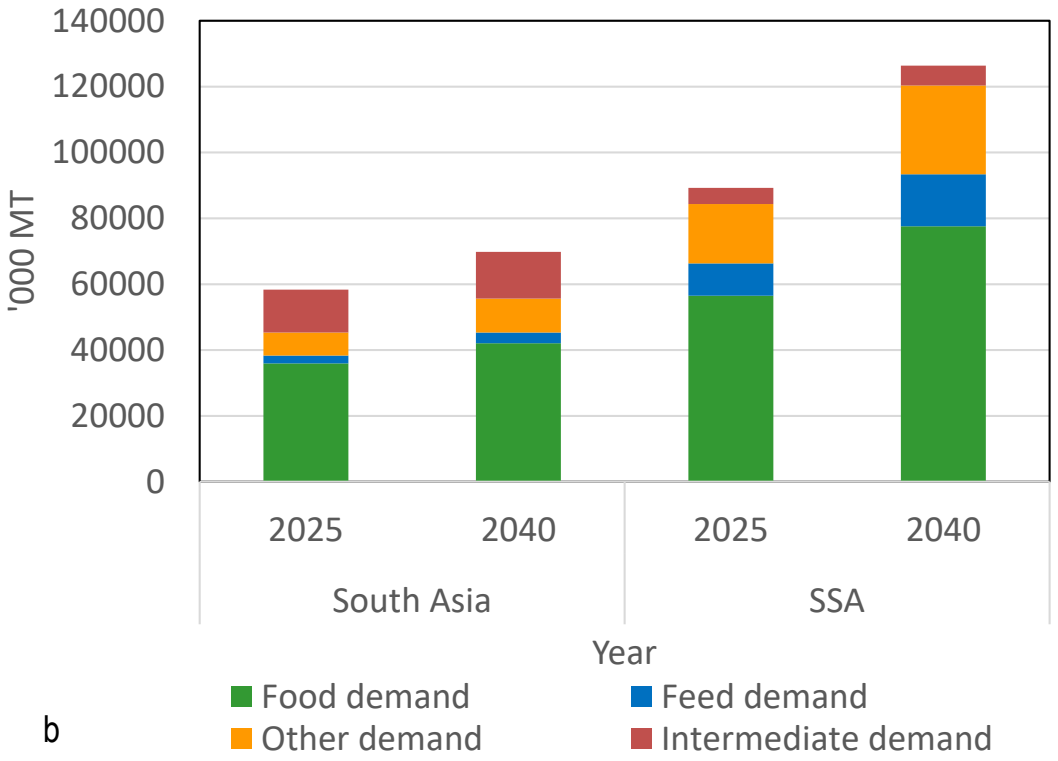


The GLDC project area covers the semi-arid and sub-humid dryland agro-ecologies of sub-Saharan Africa and South Asia which have some of the highest rates of poverty prevalence.

WHY 6

Foresight projection suggests increasing deficit between long-term aggregate supply and demand for these crops, especially for grain legumes





a: Supply and demand projection of aggregate GLDC crops in Low Income, Food Deficit Countries with and without climate change.

b: Projected disaggregated sources of demand of GLDC crops by region in 2025 and 2040 ('000 MT).

Source: IMPACT version 3.3, IFPRI, based on SSP2 with 'No Climate Change' (NoCC) and Climate Change using RCP 8.5 and the Hadley Climate Model.

HOW 1 PROMOTE KEY NUTRITIOUS CROPS

Increase productivity, profitability, resilience and marketability of GLDC crops

First order priority crops and countries

Crops	West Africa				East & Southern Africa							South Asia	
	Nigeria	Mali	Burkina Faso	Niger	Ethiopia	Sudan	Uganda	Malawi	Tanzania	Zambia	Mozambique	India	Myanmar
Sorghum	■	■	■		■	■	■					■	
Groundnut	■	■						■	■			■	■
Soybean	■									■			
Cowpea	■	■	■								■		
Pearl millet	■	■	■	■								■	
Pigeonpea								■				■	
Chickpea					■							■	■
Finger millet					■							■	
Lentil												■	

ROI ranges: 4-28 BCR; 4 million–1.6 billion NPV

HOW

2

BUILD ON CGIAR INITIATIVES

Build on three CRPs (2012-2016)
Grain Legumes, Dryland Cereals and Dryland Systems

An analysis for 10 ICRISAT interventions gave an average
- **42%** Internal Rate of Return
- **US$43** return per dollar invested

3

SUPPORT NATIONAL POLICIES

Use **country strategies** to address issues pertinent to the region and accelerate interventions

4

TRANSFORM AGRI-FOOD SYSTEMS IN THE TARGET ECOLOGIES

- Take up a more holistic approach to unlock the potential of **cereal-legume-tree-livestock synergies**
- Create an enabling environment for demand-driven innovation

A Phase I outcome: *Farmers harvest bumper yields of pigeonpea in Tanzania. Market-preferred and disease-resistant varieties were developed in partnership with the Ministry of Agriculture and Food Security, Tanzania.*

THE OUTCOMES

Intermediate Development Outcomes (IDOs)

1. Increased climate change resilience
2. Improved diets
3. Sustainable agro-ecosystems
4. Increased incomes and employment
5. Increased productivity

System level outcomes (SLOs)

1. Reduced poverty
2. Improved food and nutrition security for health
3. Improved natural resources and ecosystem services

Projected outcomes (2022-2030)

8.9-21.7 million farm households adopt improved varieties

12.7-24.8 million meet their daily nutritional needs

4.4-11.8 million exit poverty

50% women benefit

A Phase I outcome: *Impact analysis on pearl millet hybrids*

- ***>50%*** *of the pearl millet area in India during 2013-14 was covered by hybrids with ICRISAT-origin material*
- ***>USD150 million*** *estimated annual social benefits*
- *This was possible through public-private partnerships*

THE PROCESS

Five Flagship Programs deliver into two impact pathways

FP1: Priority setting, impact acceleration

FP2: Transforming Agri-Food Systems

FP3: Farm, household management

FP4: Variety/ hybrid development

FP5: Pre-breeding & Trait Discovery

Integrated technological, institutional and policy solutions

- M&E with key indicators
- Prioritize women and youth

WHO

CGIAR research partners to build on the synergies in **cereal-legume-tree-livestock systems**

Tier I

ICRISAT: Sorghum, pearl millet, finger millet, chickpea, pigeonpea and groundnut

IITA: Cowpea and soybean

ICARDA: Lentil and chickpea

ICRAF : Agroforestry and Natural Resource Management

Tier II

ILRI: Crop-livestock integration

IWMI: Water management

Bioversity International: Promote biodiversity on farms

CRP partners

WLE: Interface farms and landscapes, increase water-use efficiency

A4NH: Biofortification and food safety

CCAFS: Climate-risk management tools and information

LIVESTOCK: Dual-purpose varieties and hybrids

PIM: Foresight modelling tools to assess impacts

RICE, WHEAT, MAIZE, ROOTS, TUBERS AND BANANAS: Intercropping with dominant crops of the CRPs

PARTNERS

Apex and SROs Sub-Saharan Africa	Private Sector companies & consortia	USAID Feed the Future Innovation Labs
FARA	DuPont Pioneer	Sorghum and Millet
CORAF/WECARD	Advanta Seeds	Peanut & Mycotoxin
CCARDESA	Syngenta Foundation	Legume
ASARECA	Seed Co, Zimbabwe	Climate-Resilient Sorghum
RUFORUM	Mars Chocolate	Climate Resilient Chickpea
WACCI	Microsoft	Climate-Resilient Cowpea
AWARD	MANOBI-AFRICA, Senegal	
	Hybrid Parent Research Consortium	
	African Seed Trade Association	
	India Pulses & Grains Association	
	Farmer Producer Organizations, India	
South Asia	NGO & Large Programs	ARIs
SAARC Agriculture Centre	Alliance for a Green Revolution in Africa	CSIRO, Australia
APAARI	Catholic Relief Services (CRS)	CIRAD, France
ICAR, India	CARE	IRD, France
National Institute of Nutrition, India	Global Alliance for Improved Nutrition	FAO Research and Extension World
	Farm Africa	Vegetable Center
	African Agricultural Technology Foundation	SLU, Sweden
	Self Employed Women's Association, India	UWA, Australia
	Young Professionals for Agricultural (YPARD)	
	N2Africa	
	HarvestPlus	

GLDC: A prospectus for transforming Agri-Food Systems in the drylands of sub-Saharan Africa and South Asia

An R4D investment of
$413 million over five years (2018-2022)

A **global initiative of partners** for the grain legume and cereal crops of the drylands of sub-Saharan Africa and South Asia

Tackling extreme poverty and malnutrition in the most fragile ecologies

A Mali Agri-business Incubation Hub member exhibits processed products.

For more information please contact

Dr Peter S Carberry
Deputy Director General – Research, ICRISAT
Tel (O) +91 40 3071 3221
Mobile +91 70321 22284
E-mail p.carberry@cgiar.org
Skype peter.stanley.carberry