



GRAIN LEGUMES:

Leveraging legumes to combat poverty, hunger, malnutrition and environmental degradation

In collaboration with

Generation Challenge Program (GCP)

Brazilian Agricultural Research Corporation (EMBRAPA)

Ethiopian Institute of Agricultural Research (EIAR)

Indian Council of Agricultural Research (ICAR)

Turkish General Directorate of Agricultural Research (GDAR)

Dry Grain Pulses Collaborative Research Support Program (Pulse CRSP)

National agricultural research and extension systems in Africa, Asia and Latin America and the Caribbean

National and international public and private sector research and development partners



Issues arising

What's New?

Partnerships

Non-traditional partnerships
National and regional organisations – public, private
other CRPs

Value

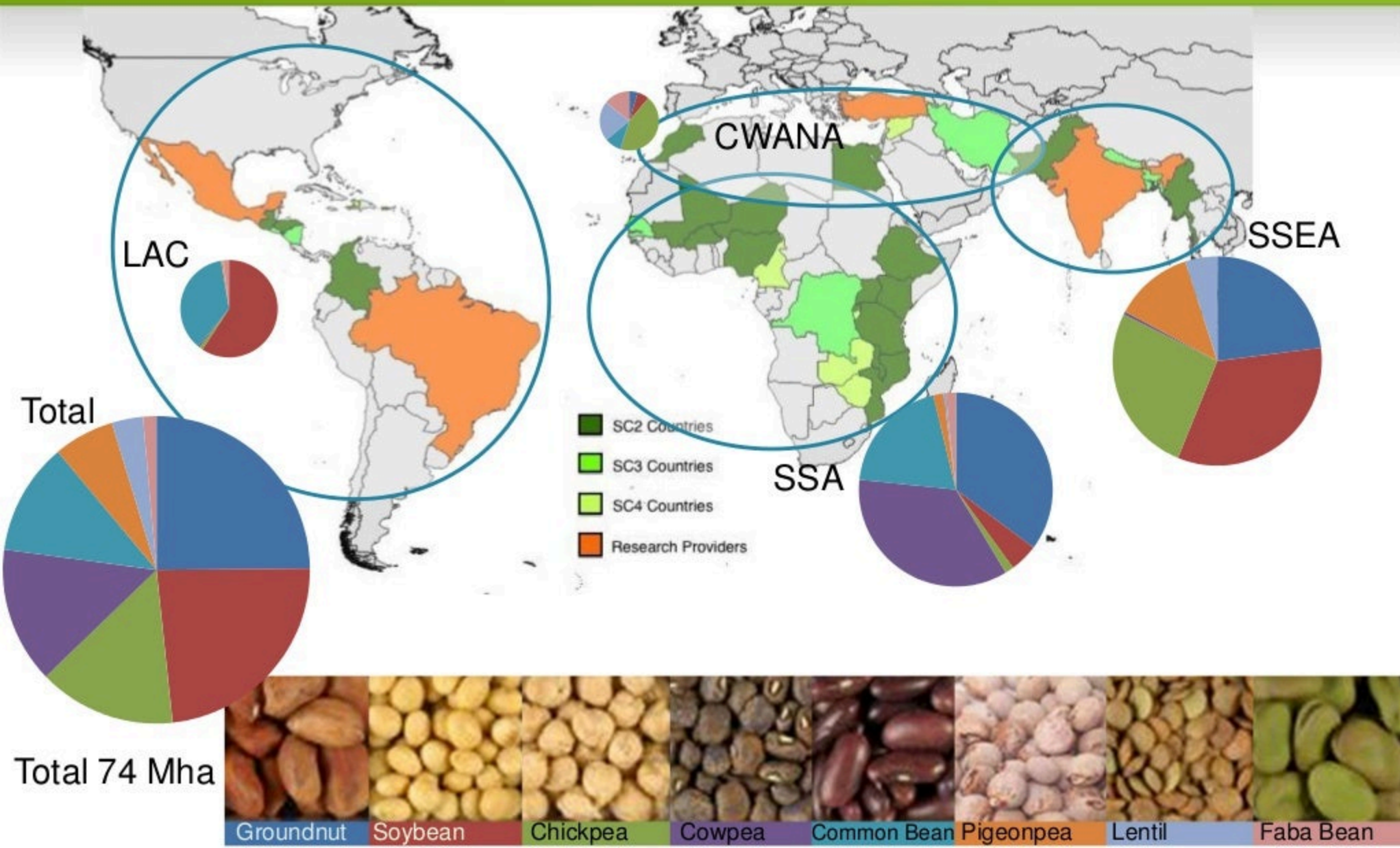
value chains
production vs value
equitability

Targets & Impact pathway

Specifics

BNF & Inoculants

A new coordinated approach



A new coordinated approach

Managing key biotic stresses

PL5 – Insect-smart chickpea, cowpea, and pigeonpea production systems

IPM strategies are being coordinated across regions and crops:

Common sites

Common protocols

Common approaches



Partnerships

integration with CRP structure

- CRP Governance & management
 - Steering Committee
 - Flagship Project Coordinators
 - Regional Coordinators
- Research
 - NARES, ARIs, Private sector ...
- Delivery and communications
 - NARES, SROs, NGOs, CBOs ...

Partnerships

integration with CRP structure

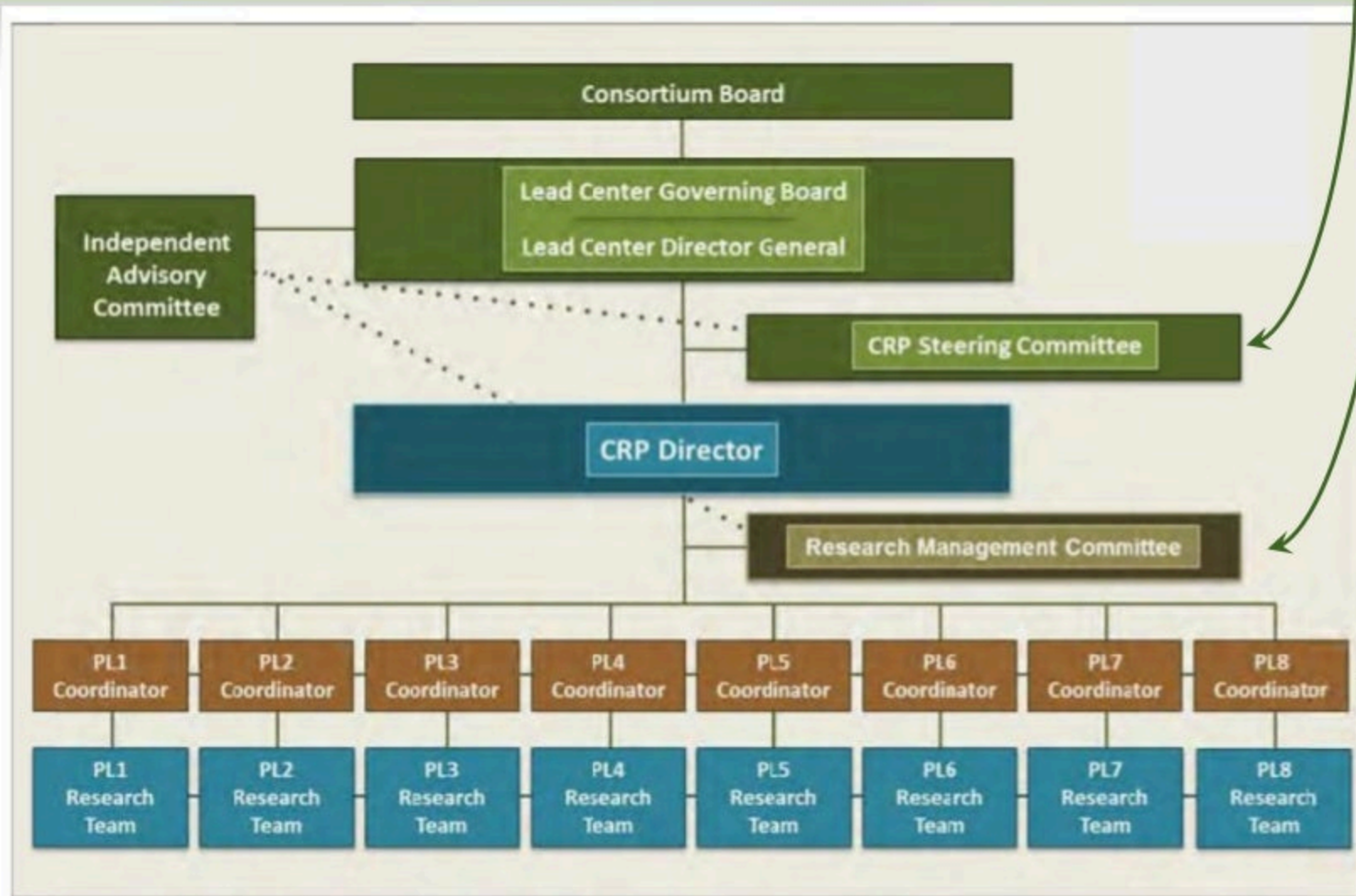


Figure 7. Grain Legumes governance and management structure.



Partnerships

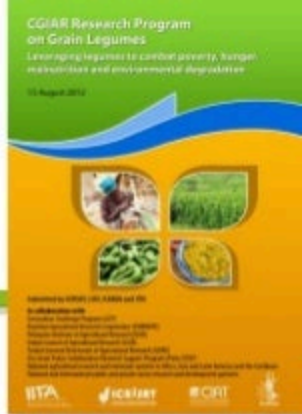
integration with CRP structure

- CRP Governance & management
 - Steering Committee
 - Flagship Project Coordinators
 - Regional Coordinators

- Research
 - NARES, ARIs, Private sector ... ➔ outputs

- Delivery and communications
 - NARES, SROs, NGOs, CBOs ... ➔ outcomes

Partnerships



Interactions with other CGIAR Research Programs

Grain Legumes will complement many other CRPs, especially Dryland Systems and CCAFS (Figure 6). The specific of the linkages with these two CRPs is outlined below. Brief descriptions of the linkage with HumidTropics; Policies, Institutions, and Markets; WHEAT; MAIZE; GRiSP; Dryland Cereals; Livestock and Fish; and A4NH are then provide.

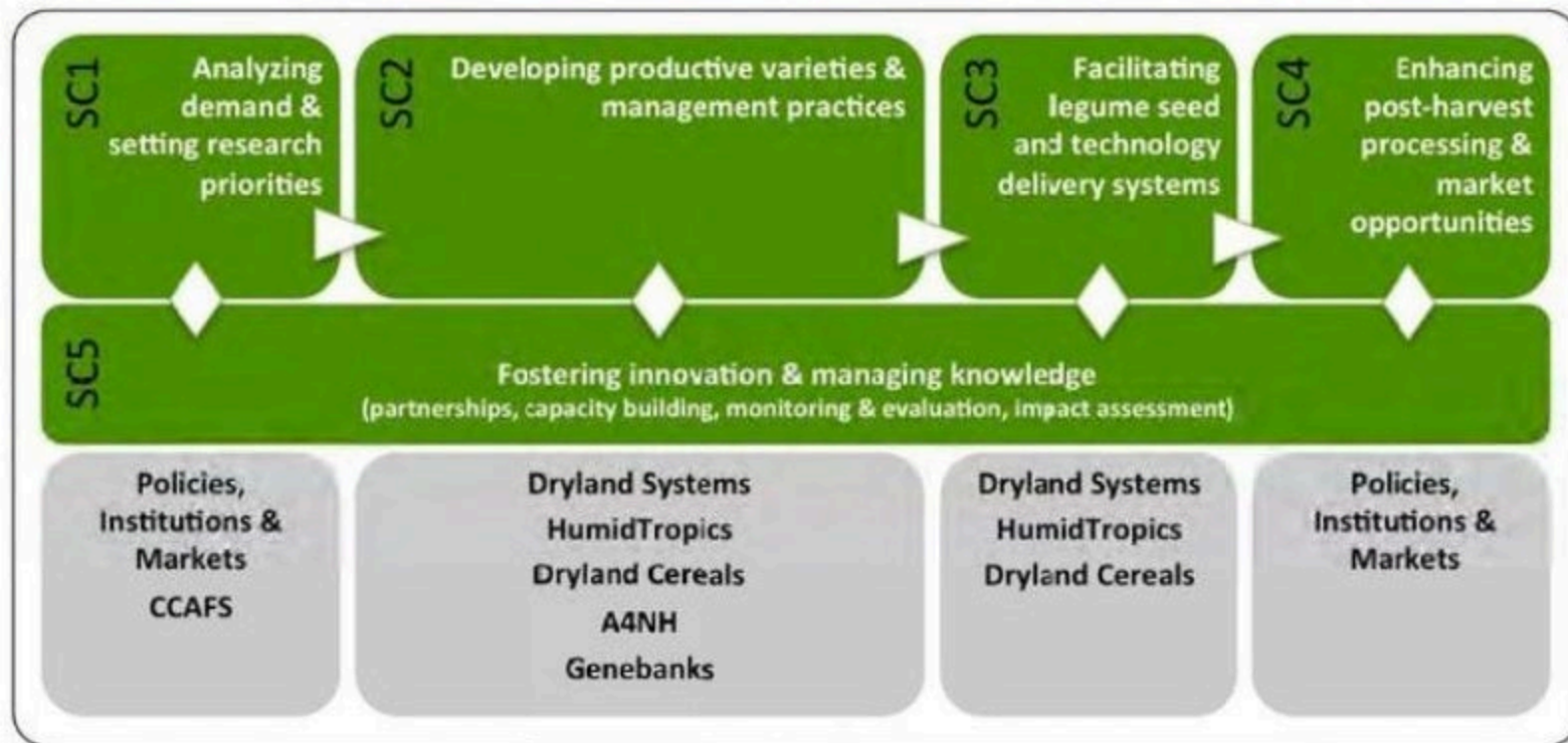
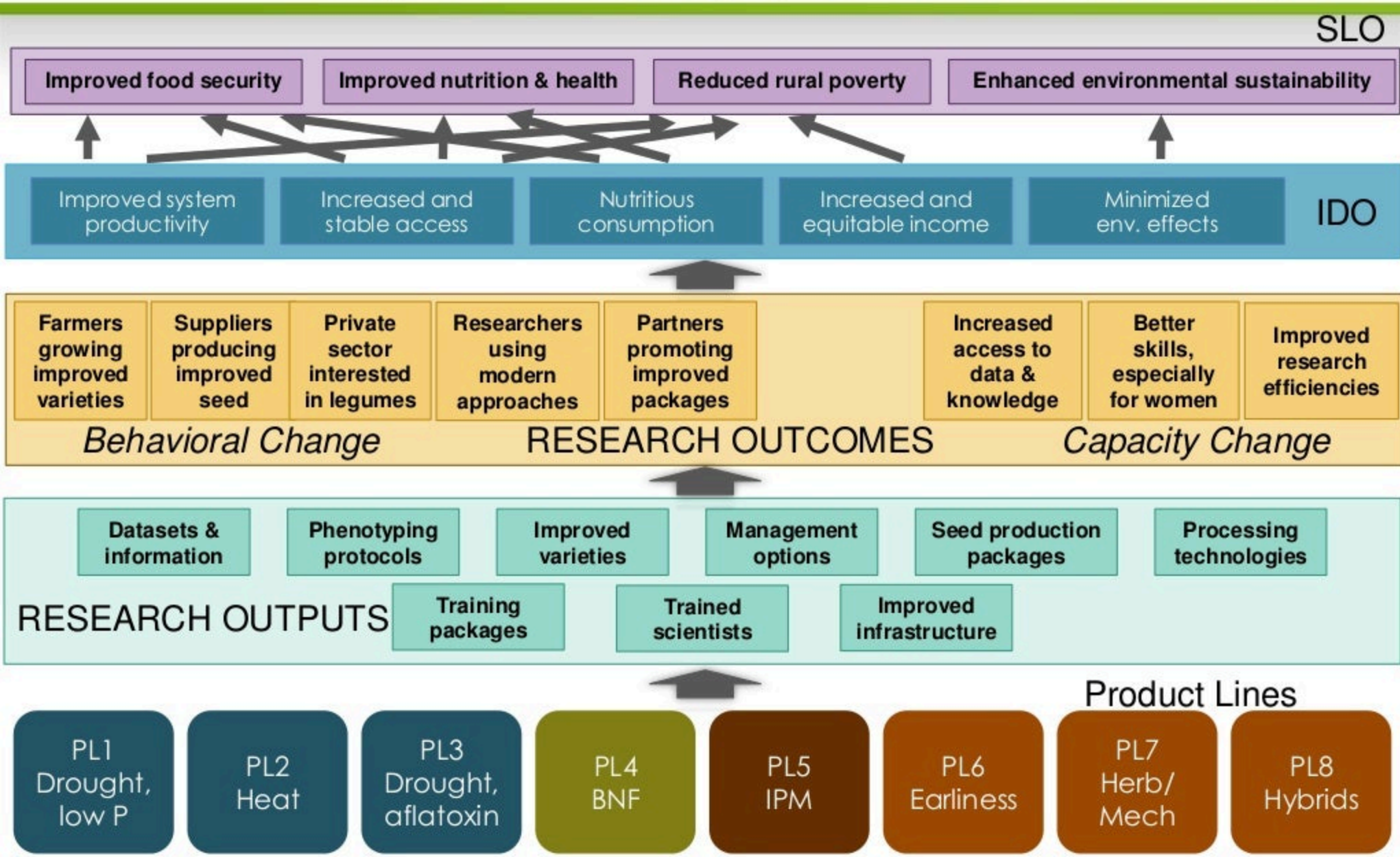


Figure 6. Grain Legumes links with other CGIAR Research Programs.

IDO

Impact Pathways / Theories of Change





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Value, Targets and Partners

interventions in the value chain – (impact pathway)

Lessons from the SSA-CP (Kivu)

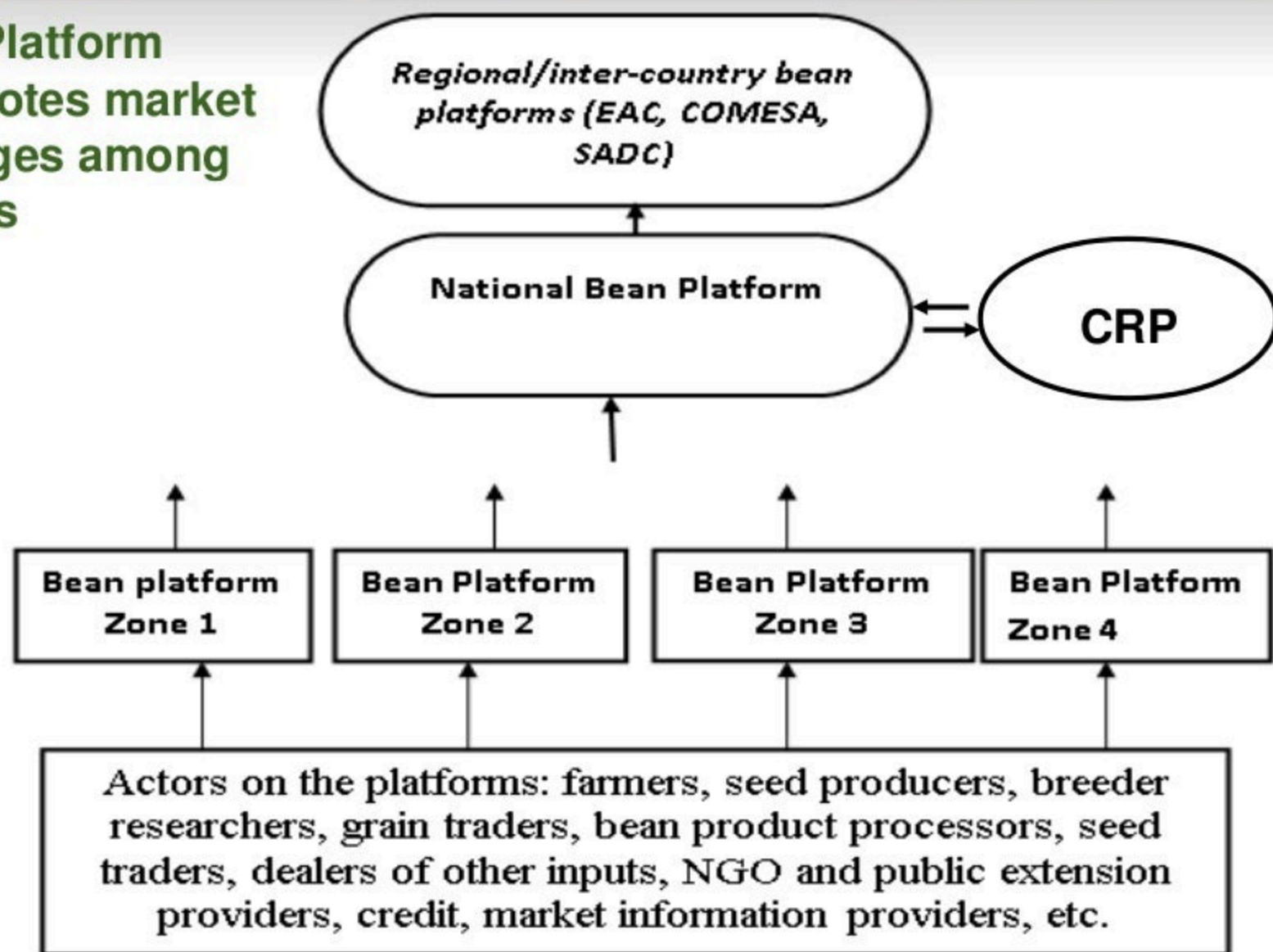
- The **Market-led Innovation Platforms** work better than research-led IPs
- Win-win scenarios attract **non-traditional partners**
- An **iterative process** enhances capacity of stakeholders
- Alternative sources of income exist in the region for **diversification**
- Linking farmers with markets creates awareness about **product quality**
- Additional interventions such as **financing** are required to sustain collective sales among farmers.
- IP method is **REPLICABLE**

A platform approach to linking farmers to market – support through...

- Research and new technologies such as new varieties
- Group action to achieve bulking and collective marketing
- Linkage to market services including credit
(SC4 with CRP PIM)
- Strengthening farmer organizations for collective action.

A platform approach to linking farmers to market – support through...

**The Platform
promotes market
linkages among
actors**





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BNF & Inoculants

Value

not quite the same as cash



Dehulling adds value



A Bangladeshi mother is feeding rice and lentil dal to her children

Complementary amino acid profiles adds nutritional value to both rice and lentil



BNF adds yield to partner or following crops

Value - subdivision

**Home consumption vs market types:
dry seed, fresh (leaves, pods, seed)
fodder**

**Regional markets & unsatisfied demand
e.g. Niger -> Nigeria**

Value & proposed IDOs



Improved and stable access to grain legumes by **urban** and **rural** poor



Increased and more **equitable** income from grain legumes by low income value chain actors, especially women



Increased consumption of **healthy** grain legumes and products by the poor for a more balanced and nutritious diet, especially among nutritionally vulnerable women and children



Improved productivity of **farming systems**, especially among smallholder farmers



Minimized adverse **environmental** effects of increased production and intensification of grain legumes



Potential for Effective Development of Women's Participation in the Kano Cowpea Subsector

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²*Purdue University, West Lafayette, IN 47907-2053*

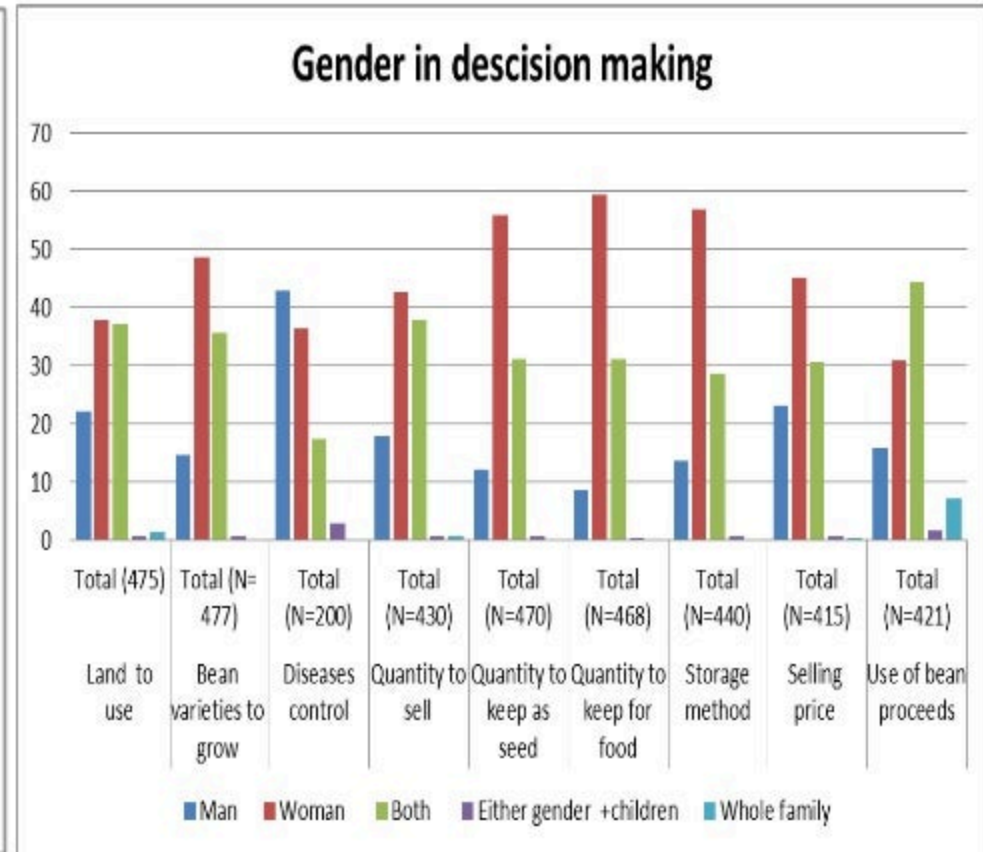
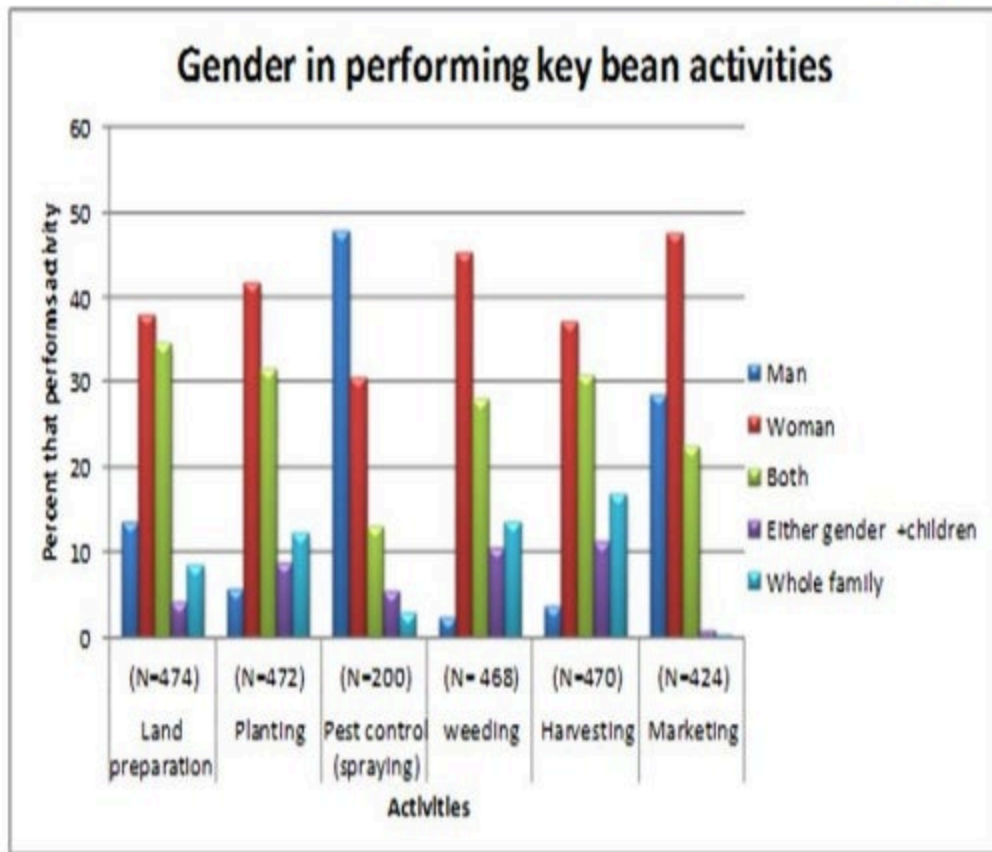
³*Bayero University of Kano State, Nigeria*

COWPEA USE IN KANO STATE

Category	% of Cowpea Consumed
Street Foods	3.3
Home consumption	80.9
Prisons	0.1
Schools	0.2
Hospitals	0.2
Seed	5.5
Other, including storage loss	10.0

Value

Gender roles in bean production and marketing, Uganda



Women dominated most bean production activities and also made most decision in bean production.



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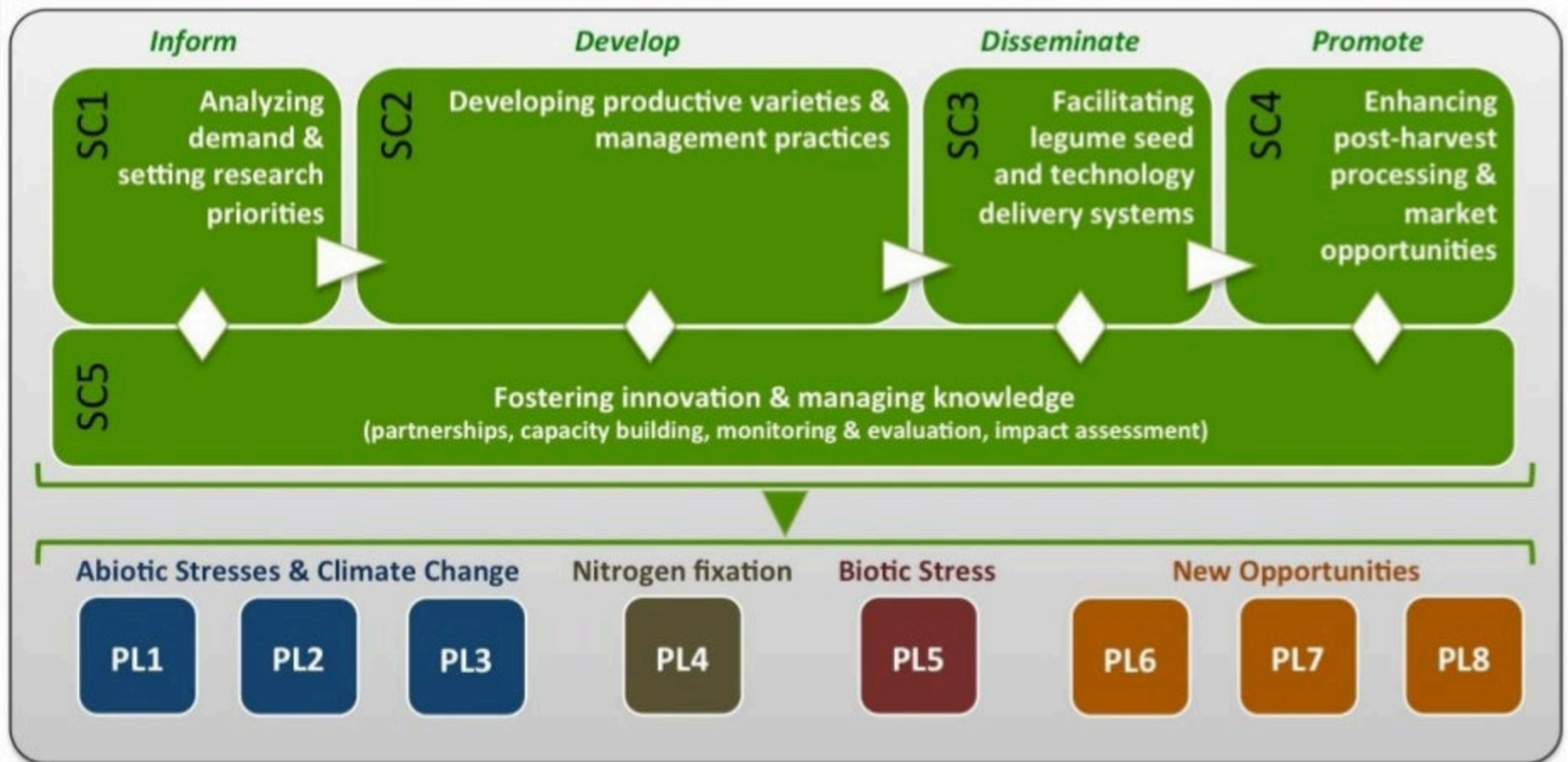
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Strategic Components and IDOs



Strategic Components

SC 1 – Analyzing demand and setting research priorities

*Identify **priority research and development needs** ranging from farmers, seed sellers, processors, and marketers to consumers and policymakers.*

SC 2 – Developing productive varieties and management practices

*Accelerate the development of **more productive and nutritious legumes varieties and crop and pest management practices** for resilient cropping systems of smallholder farmers.*

SC 3 – Facilitating legume seed and technology delivery systems

*Develop and facilitate efficient legume **seed production and technology delivery systems** for smallholder farmers.*

SC 4 – Enhancing post-harvest processing and market opportunities

*Enhance grain legumes **value additions**, and **social and environmental benefits captured** by the poor worldwide, especially women.*

SC 5 – Fostering innovation and managing knowledge

***Partnerships, capacities, and knowledge sharing** to enhance grain legume R4D impacts*

Product Lines

Addressing abiotic stresses and climate change effects

PL1 – Drought and low-phosphorous tolerant common bean, cowpea and soybean

PL2 – Heat-tolerant chickpea, common bean faba bean and lentil

PL3 – Short duration, drought tolerant and aflatoxin-free groundnut

Capturing legume ability to fix nitrogen

PL4 – High nitrogen fixing chickpea, common bean, faba bean and soybean

Managing key biotic stresses

PL5 – Insect-smart chickpea, cowpea, and pigeonpea production systems

Generating new opportunities to intensify cropping systems

PL6 – Extra-early chickpea and lentil varieties

PL7 – Herbicide-tolerant, machine-harvestable chickpea, faba bean and lentil varieties

PL8 – Pigeonpea hybrid management practices


Proposed Intermediate Development Outcomes



Improved and stable access to grain legumes by **urban** and **rural** poor



Increased and more **equitable** income from grain legumes by low income value chain actors, especially women



Increased consumption of **healthy** grain legumes and products by the poor for a more balanced and nutritious diet, especially among nutritionally vulnerable women and children



Improved productivity of **farming systems**, especially among smallholder farmers



Minimized adverse **environmental** effects of increased production and intensification of grain legumes

Organization, monitoring and accountability (all by all matrix)



Product line

PL1 – Drought and low-phosphorous tolerant common bean, cowpea and soybean

Strategic Component

A set of tasks with milestones and deliverables
experiments, actions ...

SC 2 – Developing productive varieties and management practices

Accelerate the development of more productive and nutritious legumes varieties and crop and pest management practices for resilient cropping systems of smallholder farmers.



A set of tasks with milestones and deliverables levels 6 -9

Level	Title	Description
1	Strategy and Results Framework (SRF)	Results-oriented research agenda in line with the CGIAR's vision and strategic objectives (System Level Outcomes)
2	CGIAR Research Program (CRP)	15 CRP's established as part of the SRF. Genebanks is a quasi-CRP. (System level Intermediate Development Outcomes [IDOs])
3	Theme (Strategic component)	Thematic components of a CRP, leading to long-term widespread improvement in society (CRP level IDOs)
4	Outcome/Objective	The specific objectives/ outcomes that the CRP aims to achieve
5	Output	A specific result - the production of a concrete product or service.
6	Milestone	A "research" milestone is a recognizable (measurable) and significant progress towards an output.
7	Activity	This comprises a group of tasks, and is a body of research work that develops scientific knowledge, and contributes to a milestone.
8	Task	A task is a specific piece of work that contributes to an activity.
9	Sub-tasks	A Sub-task is a specific piece of work that contributes to a Task.

Targets: the details

INTERMEDIATE DEVELOPMENT OUTCOMES

Ultimately, GrainLegumes will contribute to all four of the System Level Outcomes as described in the approved proposal. More immediate, the CRP will focus on producing the following five Intermediate Development Outcomes:

- **Improved productivity of resource-poor farming systems, especially among smallholder farmers**

Quantification of targets:

- Yields of common bean increase at least 40% among adopters in Latin America and Africa
- Drought tolerant cowpea varieties with 15-20% increase in yield adopted by 10-15% of farmers in target countries and planted in 1.0 million hectares; low-P tolerant cowpea varieties cover at least 500,000 ha in low soil fertility areas of Burkina Faso, Mali, Mozambique, Niger, Nigeria, Senegal and Tanzania.
- Heat tolerant varieties of chickpea, faba bean, lentil and bean cultivated in 1.5 million hectares with 20-25% increase in yield in target regions



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Specifics

BNF & Inoculants

Challenges and Opportunities

Environmental
Stress (heat)



Pests and disease
(*Helicoverpa*)



Genetic
diversity

Biological
nitrogen
fixation



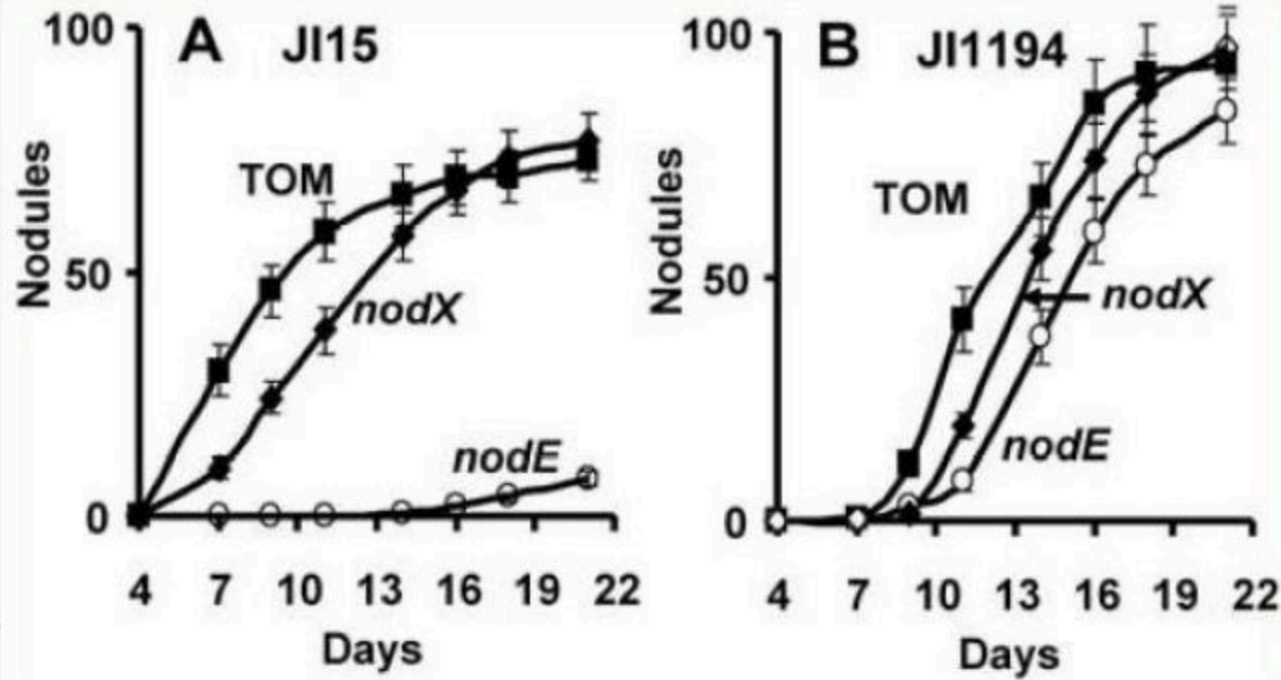
Seed systems



Hybrid performance
(pigeonpea)

Impact pathway, innovative partnerships: Seed systems – e.g. small seed packs and uptake (TLII)





Natural Variation in Host-Specific Nodulation of Pea Is Associated with a Haplotype of the SYM37 LysM-Type Receptor-Like Kinase

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¹College of Life Sciences, Shaanxi Key Laboratory of Molecular Biology for Agriculture, Northwest A & F University, Yangling Shaanxi 712100, China; ²John Innes Centre, Norwich Research Park, Colney, Norwich NR4 7UH, U.K.

Submitted 7 January 2011. Accepted 24 May 2011.

Addresses all four System Level Outcomes (SLOs) on poverty, hunger, malnutrition and environmental degradation

■ Protein rich, complement cereals, nutritious

- 10-60% of dietary protein
- 100g of chickpea = 100% MDR of iron and zinc

Improved food security

Improved nutrition & health



Chickpea paste for famine prevention – World Food Programme, Pakistan

■ High value for farm families

- US \$24 billion farm gate value: equal to maize, wheat
- Food, feed, fodder, fertility (soil)
- Export markets: engine of development

Reduced rural poverty



Pigeonpea grown for export in Tanzania

■ Vital for sustainable intensification

- Double cropping
- Diversify risk
- Make their own N fertilizer

Enhanced environmental sustainability



Chickpea intensification in Ethiopia



Thank you !

www.GrainLegumes.cgiar.org

What are Innovation Platforms?

- Innovation Platforms are loosely structured **social networks**, based on set of **goals** (e.g. profit).
- Innovation Platforms offer the participants the necessary **foundation and structure** (also security) for their work and activities.
- Innovation Platforms provide a framework for convergence of **successful interventions**.