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Agriculture and Food Security: Where research can make a difference

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International Development Research Centre (IDRC)

A key part of Canada's aid program, IDRC supports research around the world to promote growth and development.

Strategic objectives 2015-2020:

- Invest in knowledge and innovation for **large-scale positive change**
- **Build the leaders** for today and tomorrow
- Be the **partner of choice** for greater impact

Canada

Responding to priorities by…

fostering science and innovation...

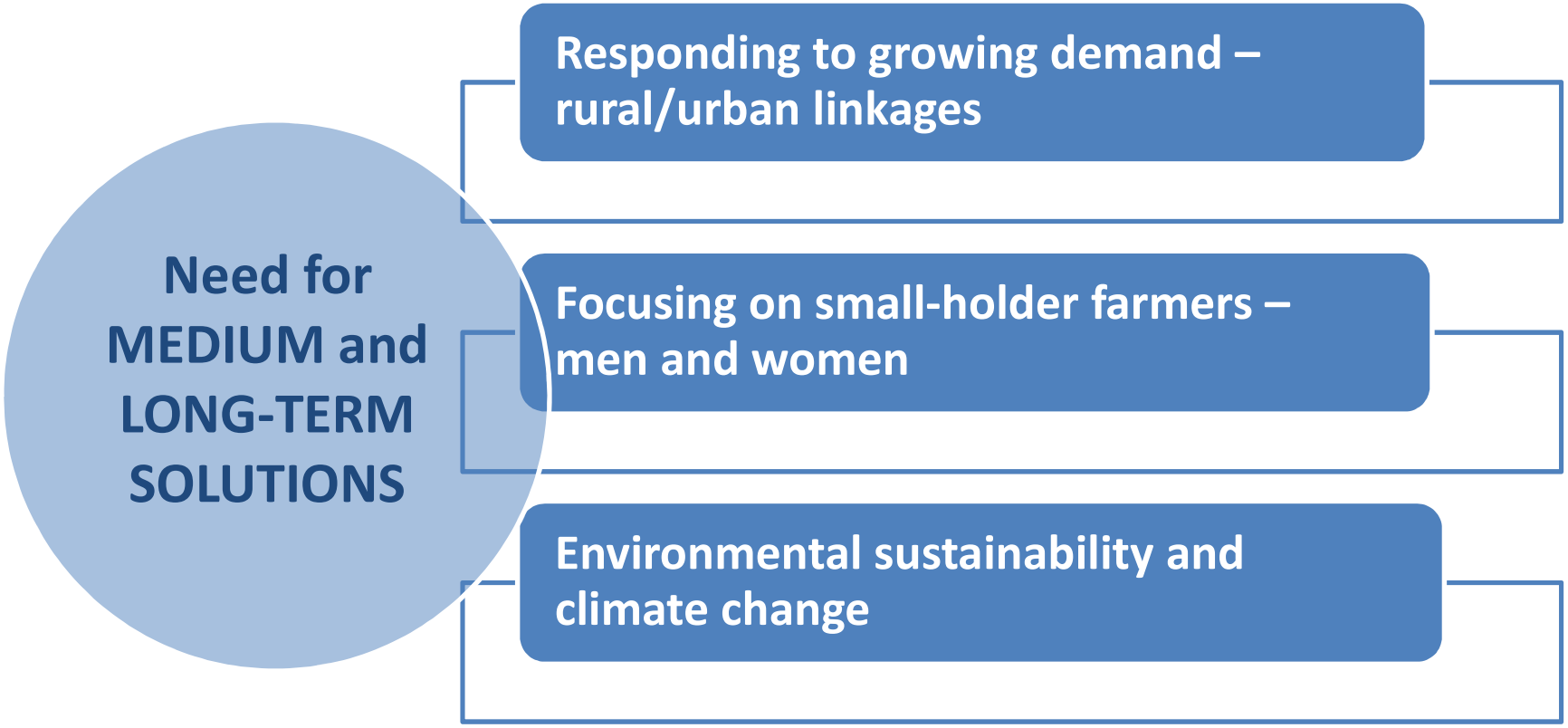
boosting agriculture prod'n & nutrition...

strengthening health systems...

promoting equitable growth.

Agriculture and Food Security

Feeding an estimated 9 billion people with safe and nutritious food by the year 2050 remains a challenge for agricultural research, development and policies.



Funding challenges

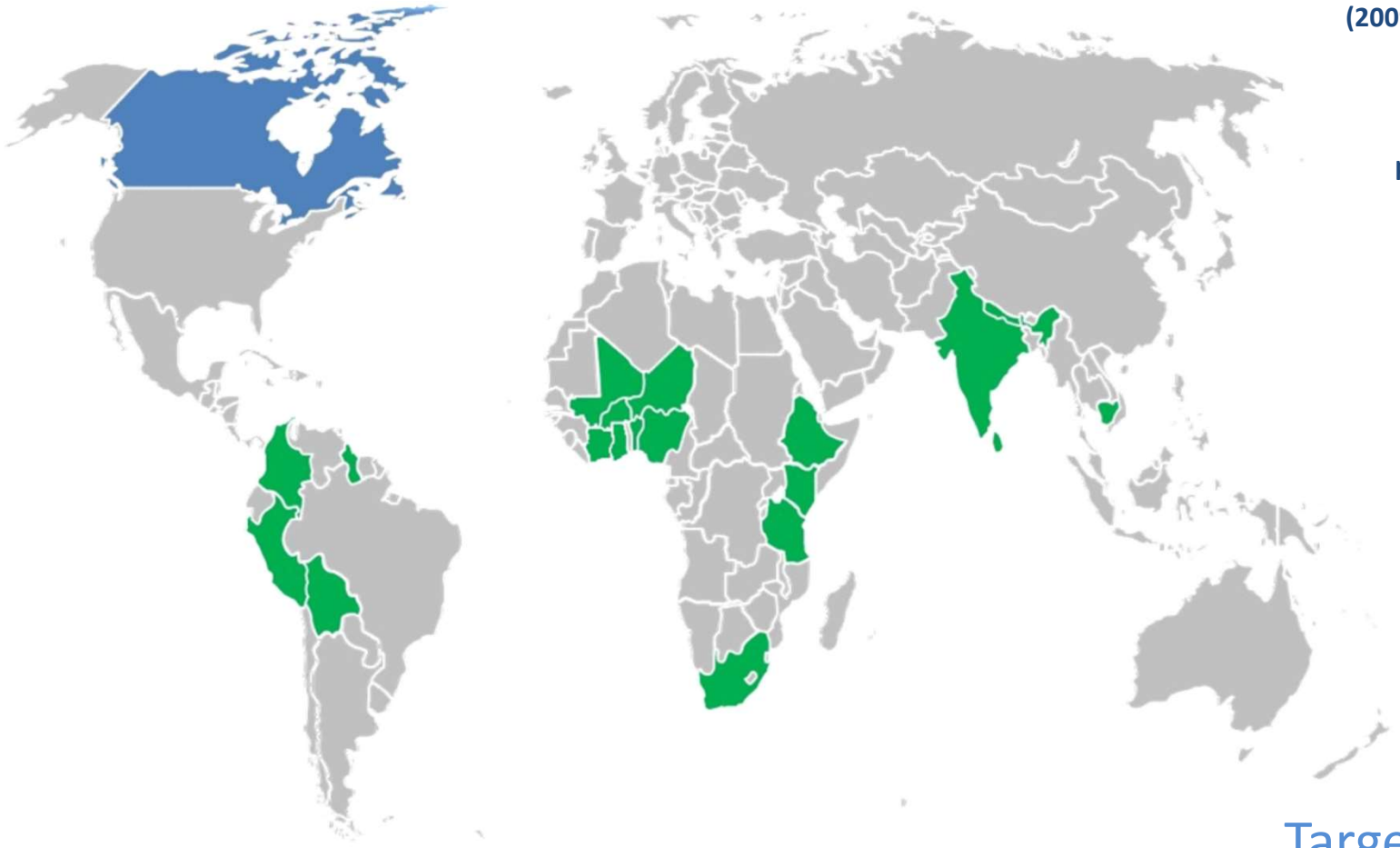
- Skepticism
- Lasting impacts within shorter timeframe
- Can research benefit large numbers of poor people?
- “Islands of success”

FROM THE LAB → TO THE FIELD

Ensuring that **RESEARCH** can make a difference in people’s lives:
This is IDRC’s mission

Canadian International Food Security Research Fund

Partnerships, R4D at Scale, Policy



$124

million CAD committed for the program's two phases (2009-2014 and 2013-2018)

39

projects in 22 countries around the world
(to date)

>110,000

farmers testing improved agriculture technologies
(after Phase 1)

>340,000

farmers using improved agriculture technologies
(after Phase 1)

Target 1,000,000

farmers by end of Phase 2

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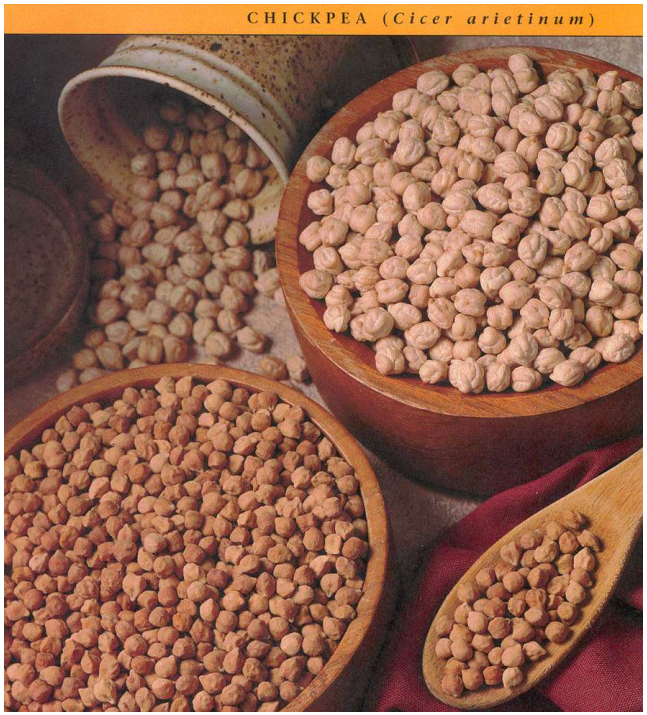
Portfolio in Asia

Reducing malnutrition in India's agri-biodiversity hotspots (Phase 1)	India
Increasing millet production in South Asia (Phase 1 and 2)	India, Sri Lanka, Nepal
Nutrition from aquaculture and home gardens in Cambodia (Phase 1 and 2)	Cambodia
Reducing fruit losses using nanotechnology (Phase 1 and 2)	India, Sri Lanka, Tanzania, Kenya, Guyana, Canada
Traditional grains boost nutrition in rural India (Phase 1)	India
Promoting aquaculture in rural Sri Lanka (Phase 1+)	Sri Lanka
Sustainable Agriculture Kits (Phase 2)	Nepal
Scaling up Double Fortified Salt in India (Phase 2)	India
Scaling up small-scale food processing for complementary foods for children (Phase 2)	Vietnam

Why target orphan crops/pulses?

- Of critical importance to small-holder farmers
- Can be grown as main or “shoulder” crop
- Agronomic benefits
- Nutrition – high in protein, lysine, micronutrients (Fe, Zn, folic acid)
- Nutritionally complementary to cereals



Pulse research – East Africa and South Asia

Using

basic and applied research

to:

Increase agricultural productivity

Raise farmers' incomes

Improve nutrition

Innovations targeted at small- and medium scale agriculture

Developing low-cost sustainable agriculture kits for Nepalese terrace farmers

- Test 20-30 best-practices and products for inclusion in the SAKs (e.g. on-farm trials with test farmers);
- Test knowledge extension models (e.g. SAK picture book, group level orientation, cell phones, etc.);
- Test the SAK scaling up model for last-mile delivery (e.g. snackfood dealers, input dealers, agrovets, etc).

A New Tool to Measure Symbiotic Nitrogen Fixation in Legumes: *GlnLux* Biosensor Technology

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Post-Doctoral Fellow, Raizada Laboratory

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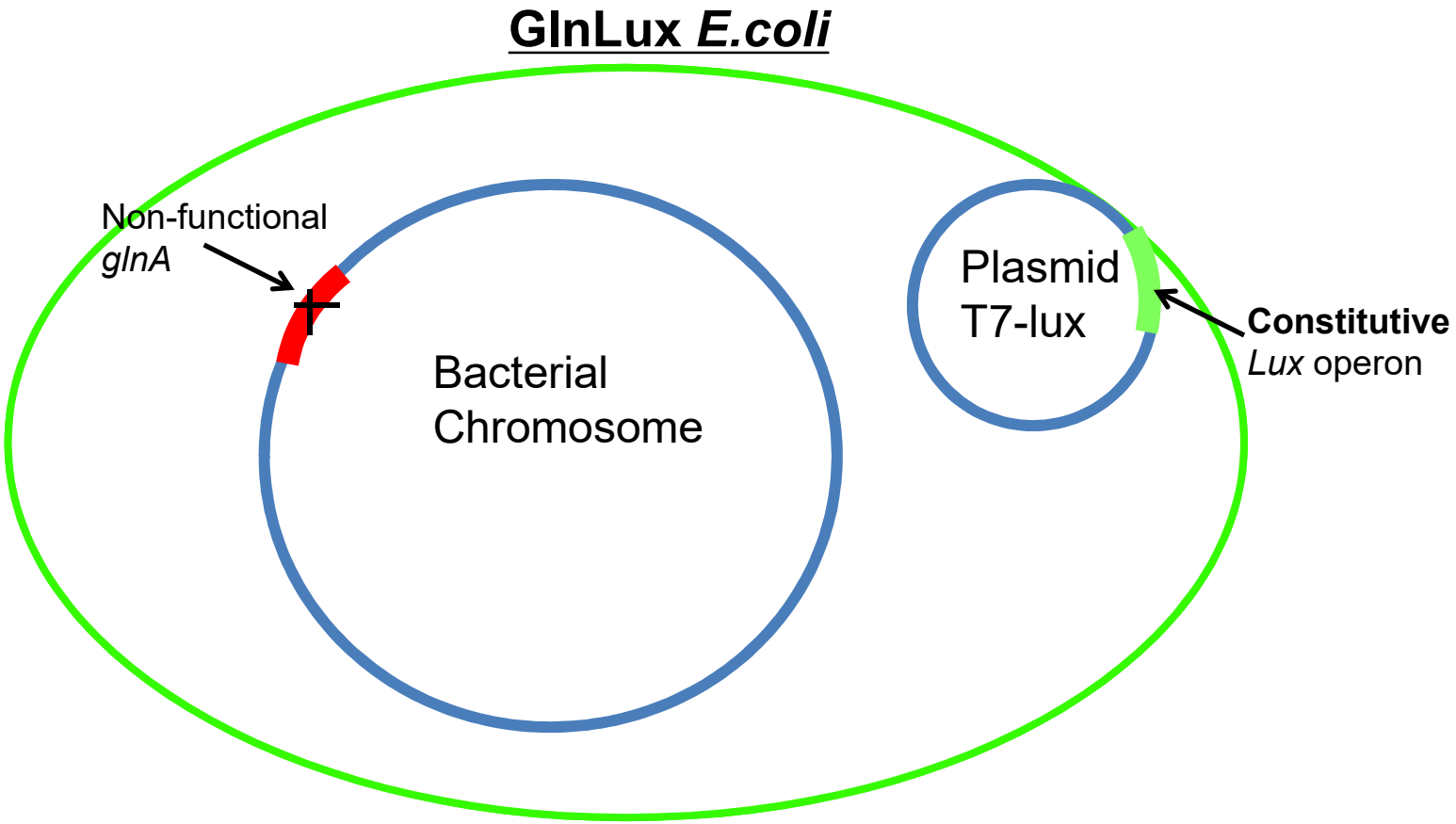
CHANGING LIVES IMPROVING LIFE
UNIVERSITY of GUELPH

Engineered a rapid and cheap diagnostic test for BNF (costing $1USD) → a non-Rhizobium bacteria to sense glutamine (gln) and then emit light (lux) - GlnLux



GlnLux cells are auxotrophic for Gln

(Tessaro, Raizada, 2012)

1. Can detect symbiotic nitrogen fixation (SNF) under controlled indoor conditions.
2. Surprisingly, the GlnLux technology can detect SNF in a diversity of legumes, including both primarily ureide and amide-exporting legumes.
3. Can distinguish predicted crop cultivar effects on the efficiency of SNF (may be a useful tool for breeders).
4. The GlnLux technology can distinguish inoculation between diverse Rhizobium strains (can be used as an initial screen to discover optimal Rhizobium strains).
5. The technology can be used as a primary indoor screen before larger scale field testing to narrow down lists of Rhizobium inoculants and crop cultivars -- a potential breakthrough.

Model development

System thinking - building on experience the Pulse Industry

Combating micronutrient deficiencies and malnutrition through plant breeding and bio-fortification of pulses and soil management

- **Production** – Increased **yields** and **income** from improved chickpea cultivars and better agronomy
- **Processing and utilization – more nutritious crops and products**: healthy foods, increased zinc & iron content of pulses; combatting stunting and anemia
- **Outreach** – Establish national **platform of public and private actors** to scale-up results to > 70,000 households

Challenges and questions

Despite clear benefit, pulse production remains stagnant, and often declining, in the very countries that consume them the most and where population is growing the fastest.

- What are the key Research-for-Development issues that we need to tackle in the next 5 to 10 years if we are to increase pulse production in India and South Asia?

- What is blocking farmers, especially small-holders growing crops on 1 to 2 ha of land, from expanding production?

- What will it take to see voluntary uptake of these crops?

- How can the private sector become more involved?

Engaging with the private sector and targeting SMEs

Ensuring that new innovations reach small scale producers and that increased production of food leads to increased availability for consumers

Foster public-private research partnerships to transform promising proof-of-concept research into development outcomes at scale.

- improve food and nutritional security for small-holder farmers;
- help to develop the rural economy, an economy that can support an expanding agriculture sector;
- Create farm and non-farm jobs for men, women and youth.

Thank you

For more information
www.idrc.ca

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